REVIEW OF EXISTING CONDITIONS REPORT

GM TRUCK GROUP
PONTIAC EAST ASSEMBLY/FORMER PONTIAC CENTRAL MANUFACTURING AND ASSEMBLY PLANTS

MID 005356902

A "Brownfield" Redevelopment Project

Pontiac, Michigan

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OCTOBER 1995
REF. NO. 7097 (1)

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A "Brownfield" Redevelopment Project

Pontiac, Michigan

VOLUME I OF IV - SUMMARY REPORT
- APPENDICES A TO B

OCTOBER 1995
REF. NO. 7097 (1)
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CONESTOGA-ROVERS & ASSOCIATES

Worldwide Facilities Group
Environmental & Regulatory Support
Remediation Team

October 6, 1995

Mr. Michael Valentino
United States Environmental Protection Agency
Region V
77 West Jackson Boulevard
Chicago, ILL 60604-3590

Re: General Motors Corporation Truck Group, Pontiac, Michigan
MID 005 356 902

Dear Mr. Valentino:

At our meeting on August 17, 1995, at the General Motors Truck Group Brownfield Redevelopment Project, GM committed to supply the U.S. EPA with updated information related to the SWMU's and AOI's identified in the A. T. Kearney/K. W. Brown Preliminary Review/Visual Site Inspection (1987) and GM environmental activities at the above captioned site. GM plans to provide this information in two separate submittals. The first submittal enclosed here consists of four volumes, entitled, Review of Existing Conditions Report, GM Truck Group, A Brownfield Redevelopment Project. This report follows our site descriptions and internal parcel designations A, B, and C used at our August 17, 1995, meeting. Parcels' A and B are presented in detail. The Parcel C information provided is preliminary. The second submittal will consist of detailed information of Parcel C and will be forwarded December 1, 1995.

As we discussed in our meeting, the site Brownfield Redevelopment has drastically changed the site appearance. Parcels have been sold, and future activities will cause further changes at the site. If U.S. EPA desires further discussion of the attached report on other issues related to the pending action, please telephone me at (313) 556-0821.

Sincerely,

G. Keith West

c: Kevin Pierard - USEPA Region V (w/attachments)
Mike Anastasio - USEPA Region V (w/attachments)

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#109

Pontiac East RCRA Review WMU

- Janet Noechel - Site inspection
- Benedict Okwumabua

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Prepared at the Request of General Motors' Counsel

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MEMO

TO: Jeff Braun

REFERENCE NO: 7097

FROM: Mike Kwiecien/mc/8

DATE: December 7, 1995

c.c.: Keith West, Ken Gembel, Jean Caufield, Randy Alderson, Glenn Turchan

RE: Schedule for the Development of the Supplemental Review of Existing Conditions Report (Supplemental Report), GM Truck Group, Pontiac East Assembly/Former Pontiac Central Manufacturing and Assembly Plants

---

The following presents the schedule of activities that have been completed during the preparation of the Supplemental Report. These activities are outlined as follows:

Date	Activity	Description
Tues. Oct. 24/95 **COMPLETE**	A meeting with Keith West, Ken Gembel, Randy Alderson, Jim Olson, Jess Tandoc, Steve Jensen and CRA at 1:30p.m., at the GM Truck Engineering Center.	Discussion of the renovation activities of Buildings 33, 34, and 35 at the GM Truck Engineering Center, and locating/copying appropriate supporting documentation. In addition, a review of the activities at the Power Plant will be completed.
Wed. Oct. 25/95 **ONGOING**	CRA, together with Randy Alderson, and Jim Olson, will locate/copy all available appropriate supporting documentation for the GM Engineering Center.	Acquisition of all information regarding the areas of interest (AOIs), identified at the GM Truck Engineering Center.

Thur. Oct. 26/95 Fri. Oct. 27/95 **COMPLETE**	CRA to meet with Ken Gembel to locate/ copy all appropriate supporting documentation for Pontiac East.	Acquisition of all available information regarding the AOIs identified at Pontiac East.
Mon. Nov. 6/95 **COMPLETE**	CRA to fax applicable draft sections of the Report to Jeff Braun, Jean Caufield, Ken Gembel, Randy Alderson, Jim Olson, and Keith West.	Review and comment on AOIs. Summarize all comments and return to CRA.
Mon. Nov. 13/95 **COMPLETE**	CRA to fax applicable draft sections of the Report to Jeff Braun, Jean Caufield, Ken Gembel, Randy Alderson, Jim Olson, and Keith West.	Review and comment on AOIs. Summarize all comments and return to CRA.
Mon. Nov. 20/95 **COMPLETE**	CRA to Federal Express a revised draft of the Supplemental Report to Jeff Braun, Jean Caufield, Ken Gembel, Randy Alderson, and Keith West.	Review and comment on AOIs. Summarize all comments and return to CRA.
Fri. Dec. 1/95 **COMPLETE**	CRA to complete and finalize the Supplemental Report.	CRA to Federal Express the Supplemental Report to the U.S. EPA.

On Monday, December 4, 1995 the Supplemental Report was Federal Expressed to the following individuals:

- Michael Valentino (U.S. EPA Region 5 Office of RCRA)
- Mike Anastasion (U.S. EPA Office of Regional Counsel)
- Jerry Philips (U.S. EPA Region 5 Office of RCRA) (replaced Kevin Pierard)
- Robert Lawson (GM) (also received October 10, 1995 report submittal)
- Keith West (GM Remediation Team)
- Jean Caufield (GM Remediation Team)
- Ken Gembel (GM Pontiac East)
- Jeff Braun (GM Legal Staff)
- Randy Alderson (GM Engineering)

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Act 307	Michigan Act 307
Act 451	Michigan Act 451
Act 478	Michigan Act 478
AMSL	Above Mean Sea Level
AOIs	Areas of Interest
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CAP	Corrective Action Plan
CRA	Conestoga-Rovers & Associates
GM	General Motors Corporation
HASP	Health and Safety Plan
IPSR	Industrial Pollutant Status Report
LUST	Leaking Underground Storage Tank
MDNR	Michigan Department of Natural Resources
NAO	GM North American Operations
NERA	Northeast Research Institute Inc.
PNAs	Polynuclear Aromatic compounds
Pontiac Central	Pontiac Central Manufacturing and Assembly Plant
Pontiac East	Pontiac East Assembly Plant
PR/VSI	Preliminary Review/Visual Site Inspection
QAPP	Quality Assurance Project Plan
RCRA	Resource Conservation and Recovery Act
Report	Review of Existing Conditions Report
SIP	Site Investigation Plan
SOW	Scope of Work
SWMU	Solid Waste Management Unit
TSDF	Treatment, Storage, or Disposal Facility
U.S. EPA	United States Environmental Protection Agency
WWES	WW Engineering Science
WWTP	Waste Water Treatment Plant

PREFACE

This Report has been developed as a follow up to General Motor's (GM) meeting with the United States Environmental Protection Agency (U.S. EPA) at the Site on August 17, 1995. At the August 17, 1995 meeting, GM outlined the significant "brownfield" redevelopment activities which have been, and are currently being implemented at the Site. The August 17, 1995 meeting, coupled with this follow up Report, (and additional information to be submitted on Parcel C in December 1995) present the Site as it existed during the 1987 U.S. EPA Preliminary Review/Visual Site Inspection (PR/VSI) and how it exists today after significant brownfield redevelopment. As such, the August 17, 1995 meeting, and this Report, serve as a voluntary presentation of the current status of environmental conditions at the Site.

1.0 INTRODUCTION

1.1 GENERAL

Conestoga-Rovers & Associates (CRA) was retained by the General Motors Corporation (GM) to prepare this document entitled "Review of Existing Conditions Report, GM Truck Group, Pontiac East Assembly/Former Pontiac Central Manufacturing and Assembly Plants, A 'Brownfield' Redevelopment Project" (Report). This Report has been prepared for the GM Truck Group's Pontiac East Truck Assembly Plant, and former Pontiac Central Manufacturing and Assembly Plants facility (Facility or Site).

The Facility is situated on approximately 350 acres of land on which over 60 buildings were located prior to 1987. The Facility includes the existing Truck Engineering Center which is located at the west end of the Site. The Facility is generally bounded by South Boulevard, Opdyke Road, and the Grand Trunk Western Railroad in Pontiac, Michigan. The Site location is presented on Figure 1.1. The 1987 Site plan is presented on Figure 1.2. A current Site plan [showing the current (1995) Site redevelopment plans] is presented on Figure 1.3. An aerial photograph of the Site from 1985 is presented on Figure 1.4. A current aerial photograph (1995) of the GM Truck Product Center (formerly Pontiac Central) is presented on Figure 1.5.

1.2 OVERVIEW

Plan 1 presents the Facility as it existed in 1987. In 1991, the core of the Pontiac Central plant was closed and decommissioned. Since 1991, the Site has been extensively redeveloped from a "brownfield" site to present conditions. As indicated on Plan 1, the GM property areas north of South Boulevard identified as Parking Lots A, N, and J are also included. Several of the support features for the Facility that are readily identifiable on Plan 1 include: the North Storm Water Retention Pond; South Storm Water Retention Pond; Waste Water Treatment Plant; Murphy Drain; and the Power Plant.

The Site has been subject to significant redevelopment activities during the last four years. The core of the former Pontiac Central Manufacturing and Assembly Plants (Pontiac Central) has been demolished and rebuilt, or is being redeveloped, and is currently referred to as the Centerpoint Business Campus. The Pontiac East Truck Assembly (Pontiac East) has been substantially upgraded and continues to produce trucks. Additional development at Pontiac East is expected within the next few years.

To facilitate the review of current environmental conditions, the Site has been divided into three major parcels (A, B, and C), as presented on Figure 1.6 (Plan 2). The division of the Site was based upon the status of development in August 1995 in terms of whether GM has retained both ownership/occupancy of the property, whether the property was placed under a long-term lease arrangement with others, or whether the property has been sold (see Plan 2). As presented on Plan 2, Parcel A consists of one parcel, and Parcels B and C have been further subdivided into subparcels B1, B2, B3, and C1, C2, C3, and C4, respectively. Plan 2 also presents the current plan for redevelopment of a major portion of the Facility as the Centerpoint Business Campus. In addition to the restructuring and redevelopment of GM owned facilities, approximately 40 locations will be available for industrial, commercial, and recreational facilities.

Parcel A, which formerly contained the main manufacturing area of Pontiac Central, is now a portion of the Centerpoint Business Campus which includes the new GM Truck Product Center. This parcel has been sold to

a third party and leased back by GM. This was the first area to be significantly redeveloped on Site.

Parcels B1, B2, and B3, formerly parts of Pontiac Central and Pontiac East, are currently owned by GM and on a long-term lease with a developer. The GM Truck Product Development Center is currently under construction in Parcel B3. Various other portions of Parcels B1, B2, and B3 are under active negotiation between the developer and potential investors for construction, lease, and/or sale.

Parcels C1, C2, C3, and C4 are currently owned and operated by GM. Parcel C1 contains both the Power House and GM Truck Engineering Center. The Power House is scheduled for decommissioning within the 1996 to 1998 timeframe. The GM Truck Engineering Center buildings have undergone substantial renovation in the past few years. Additional renovations are planned. The GM Truck Engineering Center will continue to be the GM worldwide engineering center for truck design, testing, and prototype development. Parcel C2 contains the Pontiac East Waste Water Treatment Plant (WWTP). Parcel C3 contains the GM Pontiac East Truck Assembly Plant. The Pontiac East Truck Assembly Plant had substantial renovations in recent years and continues production as one of GM's major assembly facilities. Additional renovations to the Pontiac East Truck Assembly Plant are expected within the next few years. Finally, Parcel C4 contains the area known as Parking Lot J.

1.3 CENTERPOINT BUSINESS CAMPUS DEVELOPMENT

Parcels A and B of the Site are currently being redeveloped to become the Centerpoint Business Campus. GM currently employs approximately 4,500 people at its existing Truck Engineering Center and Pontiac East Truck Assembly Plant. The developer is currently (fall 1995) completing construction of the GM Truck Product Center. Over 3 million square feet of the former Pontiac Central area was decommissioned and/or demolished to create this new state-of-the-art engineering facility. More than 4,000 additional GM personnel will occupy the new GM Truck Product Center. Construction has also been initiated on a new GM Truck Product Development Center, which will

house approximately 1,500 additional GM employees utilizing office, design, and engineering areas.

Future Centerpoint Business Campus peripheral and northwest developments are planned to employ approximately 6,500 additional people. Adjacent developments which are contemplated (or under development) include:

- commercial areas (e.g., gas stations, convenience stores, etc.)
- shopping areas;
- restaurant areas;
- office areas;
- hotels; and
- fitness and entertainment areas.

An overview of the Centerpoint Business Campus is presented in various development promotional materials which are presented in Appendix A. Appendix A also contains relevant information pertinent to the GM Truck Groups Pontiac operations.

1.4 AREAS OF INTEREST

The purpose of this section is to present an overview of the Areas of Interest (AOIs) which are evaluated in this Report. The AOIs discussed within this Report were identified in the following manner:

- 38 Solid Waste Management Units/Areas of Concern identified by U.S. EPA in the 1987 PR/VSI; and
- 43 other areas of environmental concern identified by GM during Site redevelopment activities.

The 38 U.S. EPA Solid Waste Management Units/Areas of Concern and the 43 additional areas of concern identified by GM were sequentially renumbered from 1 to 81 and are collectively reviewed in this

Report. The following discussion further defines the AOIs as presented in this Report.

In March 1987, A.T. Kearney, Inc., and K.W. Brown and Associates, Inc., prepared a report entitled "Preliminary Review/Visual Site Inspection (PR/VSI) Report of the General Motors Truck and Bus Group Pontiac Michigan Plant". The PR/VSI was developed under contract to U.S. EPA Region V. The PR/VSI identified a total of 38 units, of which 32 were identified as Solid Waste Management Units (SWMUs, #1-#31, #17 is repeated twice), and six were identified as additional potential areas of concern (#32-#37). Plan 3 presents the areas identified by U.S. EPA in the March 1987 PR/VSI report. A summary of the areas identified by U.S. EPA in the 1987 PR/VSI is presented in Table 1.1. A current photographic log of the U.S. EPA PR/VSI areas is presented in Appendix B.1.

In Parcel A, there are six areas. Of the six areas in Parcel A, three were pits, two were tank farms, and one was a container transfer station. Parcel B1 contained an underground waste oil tank. Parcel B2 contains the former south retention pond. With the redevelopment of Parcel B2, a new south retention pond is currently being constructed in Parcel C3 and the existing pond is being removed. Parcel B3 contains the north retention pond. The north retention pond collects stormwater runoff from the parking lot north of Pontiac East. The north retention pond will continue to collect stormwater from Pontiac East and from the parking lot of the new Truck Product Center. The remaining PR/VSI areas were located in Parcel C. A summary of the remedial and investigative activities which have been completed to support redevelopment within these areas is presented in Section 5.0 and 6.0, respectively. The status of the 38 areas identified by U.S. EPA in the 1987 PR/VSI is presented in Sections 7.0, 8.0, and 9.0.

As identified above, the second group of areas of environmental concern were identified by GM to support redevelopment of portions of the Facility. Plan 4 identifies the 43 additional areas identified by GM that are located within Parcels A and B. Environmental activities, including investigation and remediation, have been completed by GM in these areas to support decommissioning and demolition of certain areas of the Facility as well

as to support redevelopment as the Centerpoint Business Campus. A summary of the additional GM areas of concern is presented in Table 1.2. The status of the 43 additional areas is presented in Sections 7.0, 8.0, and 9.0. A summary of the remedial and investigative activities which have been completed to support redevelopment within these areas is presented in Section 5.0 and 6.0, respectively

The entire 81 AOIs that have been identified on Site have been consolidated and are presented on Plan 5. These include the 38 areas identified by U.S. EPA in the PR/VSI and the 43 additional areas identified by GM. A summary of all AOIs at the Site are presented in Table 1.3.

It should be noted that the review of the AOIs contained in Parcel C is only of a preliminary nature. As discussed during the August 17, 1995 meeting with U.S. EPA, additional information regarding the AOIs within Parcel C will be submitted in December 1995.

1.5 SCOPE

The scope of this Report includes the following:

- a review of available information concerning the historical use of the Facility for the treatment, storage, or disposal of solid and hazardous waste;
- a review of available information regarding Site physiography, geology/hydrogeology, and other Site location features;
- a summary of remedial measures implemented at the Site to support general Site redevelopment;
- a summary of additional previous environmental investigations; and
- conclusions from existing data and a review of the requirements to collect additional data and/or complete additional remediation.

In addition, this Report contains a variety of appendices which present details regarding the various work plans, results, and remedial activities completed within the AOIs. The appendices include copies of the Site-wide Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP) which were utilized to support environmental activities.

1.6 REPORT ORGANIZATION

This Report is organized into the following four Volumes:

1. Volume I - Summary Report

Section 1.0	introduction to and organization of the Report;
Section 2.0	background information including Site description, Site history, and RCRA permitting history;
Section 3.0	environmental setting at the Site;
Section 4.0	Site geology and hydrogeology;
Section 5.0	summary of previous remedial actions;
Section 6.0	summary of additional environmental investigations;
Section 7.0	review of the current status of the Areas of Interest in Parcel A;
Section 8.0	review of the current status of the Areas of Interest in Parcel B;
Section 9.0	review of the current status of the Areas of Interest in Parcel C; and
Section 10.0	summary.

Volume I also includes the following appendices:

Appendix A	Development Plan Promotional Materials	
Appendix B	RCRA Permit Materials	
	Appendix B.1	U.S. EPA Areas of Concern-Photographic Log
	Appendix B.2	Excerpts From The Part B Permit Application
	Appendix B.3	Work Plan For The Removal Of Two Aboveground Storage Tanks and A Concrete Containment Pad From The Hazardous Waste

		Storage Area Of The Pontiac East Assembly Facility In Pontiac, Michigan
	Appendix B.4	Closure Reports
	Appendix B.5	MDNR Closure Letters

2. Volume II - Appendices C to F

Volume II includes the following appendices:

Appendix C	Site Wide Work Plans	
	Appendix C.1	Site Wide Quality Assurance Project Plan
	Appendix C.2	Site Wide Health And Safety Plan
Appendix D	Regional Geologic Information	
	Appendix D.1	Regional Well Logs
	Appendix D.2	Mathematical Simulation Of Groundwater Flow Conditions Under GM's Truck And Coach Division, Pontiac Michigan (CDM 1981)
Appendix E	Buildings 29 Study Area	
	Appendix E.1	Final Report On Low Temperature Thermal Destruction, Building 29 And DUCO Stores
	Appendix E.2	Building 29 Underground Storage Tank Study Area Report
	Appendix E.3	MDNR Closure Letter
Appendix F	Building 43 Study Area	

	Appendix F.1	Final Report, Building 43 Study Area
	Appendix F.2	Project Specifications, Excavation Of Contaminated Material At Building 43

3. Volume III - Appendices G to K

Volume III includes the following appendices:

Appendix G	Building 53 Study Area	
	Appendix G.1	Site Characterization Report And Work Plan For Building 53 Waste Oil Tank
	Appendix G.2	Building 53 Underground Storage Tank Study Area Report
Appendix H	DUCO Stores Study Area	
	Appendix H.1	Final Report On The Findings Of The Soil Gas Survey At DUCO Stores
	Appendix H.2	Site Characterization Report And Work Plan For DUCO Stores
	Appendix H.3	DUCO Stores Study Area Report
Appendix I	"Burn Pile" Study Area	
	Appendix I.1	Summary Report, Burn Pile
Appendix J	DUCO Stores Fuel Line Study Area	

Appendix K Building 33 Study Area

Appendix K.1 Draft Subsurface Investigation/Remedial Alternatives Evaluation, Building 33 Free Product Gasoline Plume

Appendix K.2 Investigation Of Gasoline In Soils Beneath Building 33

Appendix K.3 Building 33 Free Product Report

4. Volume IV - Appendices L to M

Volume IV includes the following appendices:

Appendix L Building 33 Fuel Island Report

Appendix M J-Lot Study Area

Appendix M.1 J-Lot Work Plan

Appendix M.2 J-Lot EOC

Appendix M.3 J-Lot EECA

2.0 FACILITY DESCRIPTION

2.1 FACILITY LOCATION

The Site is located in the City of Pontiac, Oakland County, Michigan on approximately 350 acres of land, as shown on Figure 1.1. The Site is generally bordered by South Boulevard on the north, Opdyke Road on the east, and the Grand Trunk Western Railroad on the southwest. A Site plan is presented on Figure 1.2 (Plan 1). The division of the Site into parcels A, B, and C is schematically presented on Figure 1.3 (Plan 2).

2.2 FACILITY HISTORY

The Facility began producing medium and heavy duty trucks and buses in 1927 at the Pontiac Central manufacturing areas. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminating, heat treating, painting, and sealing. Manufacturing operations at the Pontiac Central portions of the Site ceased in August 1990 and portions of the Site were closed in the summer of 1991. The Site plan, as it existed in 1987, is presented on Figure 1.2 (see Plan 1). As previously identified, the Site has been divided into 3 parcels to support the evaluation of current Site conditions (see Figure 1.3/Plan 2).

Parcel A includes the core of the former Pontiac Central complex which was closed in 1991. Parcel A was decommissioned during the period from 1991 to 1995 and has been significantly redeveloped. Parcel A houses the new GM Truck Product Center. Currently, Parcel A is owned by a third party and is leased back by GM.

Parcel B includes portions of the former Pontiac Central and present Pontiac East operations. Parcel B is currently owned by GM and is leased to a developer which is redeveloping portions of the parcel to support a variety of commercial and business activities. These commercial and business

activities will support the GM Truck Product and Development Centers, as well as other general development in the area.

Parcel C is currently owned and operated by GM and includes the remaining portions of Pontiac East. These portions include the Pontiac East Truck Assembly Plant, Power Plant, WWTP, and Truck Engineering Center. These facilities have undergone significant upgrading since 1987 to support manufacturing. Certain areas within Parcel C are also scheduled for significant redevelopment and/or upgrading activities within the next five years.

Appendix A contains promotional information related to the Centerpoint Business Campus Development and GM Truck Group's Pontiac operations.

2.3 RCRA REGULATORY HISTORY

In 1981, GM submitted a RCRA Part A permit application to the U.S. EPA Region V, for treatment of hazardous wastes on Site, storage of hazardous wastes on Site over 90 days, and receipt of hazardous wastes from off Site. The Part A application was acknowledged by the U.S. EPA on August 3, 1981. A RCRA Part B permit application was submitted by GM in March 1985. At the time of the Part B permit application, the Facility was operating under RCRA interim status for ownership and operation of a facility which treated and stored hazardous wastes. GM requested withdrawal of the Part B application in July 1987. Two hazardous waste storage units identified in the March 1985 Part B Permit Application were successfully clean closed by GM under the RCRA regulatory authority of the Michigan Department of Natural Resources (MDNR). Closure certification for these two areas was received from MDNR on October 30, 1990 and July 27, 1991, respectively (see Appendix B.5). These two storage units are identified as U.S. EPA areas of concern #1 and #2 in Table 1.1 and their locations are shown on Plan 5.

A summary of the current status of the hazardous waste management units identified in the 1987 PR/VSI is presented below:

SWMU #1 - Container Storage Area (AOI #69)
- Active

SWMU #2 - Former East Tank Farm Area (AOI #75)
- Closed

SWMU #4 - Tank Storage Area (AOI #70)
- Inactive

SWMU #5 - Drum Draining Area (AOI #48)
- Active

SWMU #6 - Former Underground Tank Area (AOI #42)
- Under Closure consideration

SWMU #8 - Waste Purge Solvent Tank Area (AOI #72)
- Active

SWMU #13 - Former Waste Solvent Collection Area (AOI #2)
- Closed

SWMU #24 - Waste Pickle Acid Tank (AOI #61)
- Active

SWMU #26 - Pickle Acid Treatment Tank (AOI #63)
- Active

The following information related to the RCRA permitting history of the Site is presented in Appendix B:

Appendix B	RCRA Permit Materials	
	Appendix B.1	U.S. EPA Areas of Concern - Photographic Log
	Appendix B.2	Excerpts From The Part B Permit Application
	Appendix B.3	Work Plan For The Removal Of Two Aboveground Storage Tanks and A Concrete Containment Pad From The Hazardous Waste Storage Area Of The

Pontiac East Assembly Facility In Pontiac, Michigan

Appendix B.4 Closure Reports

Appendix B.5 MDNR Closure Letters

2.4 DESCRIPTION OF WASTE ACTIVITIES

The Part B Permit application indicated that the Facility generated the following listed wastes:

- F001
- F002
- F003
- F005
- F006
- F019
- D001
- D002

Hazardous waste processes at the Facility included temporary storage and limited treatment. Temporary storage processes consisted of container storage within secondary containment areas and storage in above-ground tanks located within diked containment areas. Relevant information regarding the waste activities is presented in Appendix B.2.

2.5 SITE WIDE ENVIRONMENTAL ACTIVITIES

The majority of the environmental investigative work, and all of the remedial work, has been conducted under the strict adherence to a Site wide Quality Assurance Project Plan (QAPP) and Health and Safety Plan (HASP). Copies of these plans are presented in Appendix C.1 and C.2, respectively. These documents were utilized to support environmental activities associated with Site redevelopment.

3.0 REGIONAL SETTING

3.1 LAND USE

The surrounding land uses to the north and west of the Site are presented on Figure 3.1. Land uses to the south and east of the Site are presented on Figure 3.2. Land uses in the vicinity of the Site are summarized as follows:

Location	*Jurisdiction*	*Land Use*
North	City of Pontiac	Industrial
East	Bloomfield Township	Residential
South	Bloomfield Township	Residential
West	City of Pontiac/Bloomfield Township	Various

All areas adjacent to the Site are serviced by municipal water supplies.

3.2 DEMOGRAPHICS

The populations within a three-mile, five-mile, and ten-mile radius of the Site, in 1990 and 1994, are summarized below:

	Population		
Location	*1990*	*1994*	*% Change (1990-1994)*
Three-mile	53,130	54,519	+2.6
Five-mile	171,040	174,349	+1.9
Ten-mile	708,384	729,197	+2.9

3.3 CLIMATE

The prevailing winds are from the northwest in the winter, and the southwest in the summer months. A wind rose diagram is presented on

Figure 3.3 which identifies the prevailing wind direction and speed. Precipitation data for the period 1931 through 1960, inclusive, indicate the mean annual precipitation to be 30.68 inches with 56 percent of the total precipitation falling during the period from May through October. This area is of a temperate climatic regime having average daily temperatures of 25° F and 72° F for January and July, respectively.

3.4 REGIONAL GEOLOGY

The information on the regional geology of the Site is based on published regional information, as well as other subsurface investigations performed on or in the vicinity of the Site.

3.4.1 Overburden

Topography and overburden in the vicinity of the Site are the result of glacial and post-glacial deposition and erosional processes. Continental glaciers advanced into this area of Michigan at least twice, once in each of the last two glacial stages of the Illinoian and Wisconsinan glaciers of the Pleistocene Epoch. During the Wisconsinan stage, ice sheets of the Huron-Erie glacial lobe advanced from the southeast across the area of the Site. During the advance and retreat of this ice sheet, a series of end moraines (Fort Wayne, Defiance, and Birmingham) and a thick sequence of ground moraine (glacial till) comprised of clay, silt, and rock fragments were deposited in this area. As the ice sheet retreated to the southeast, large volumes of meltwater formed glacial Lake Maumee between the Fort Wayne Moraine and the retreating glacier. The ice again advanced, forming the Defiance Moraine, and subsequently retreated, forming glacial Lake Arkona. As the ice advanced yet again from the east, the Birmingham Moraine was formed.

The surficial geology of the region is presented on Figure 3.4. As indicated on Figure 3.4, the Site is located in an area of terminal, or end moraine. In the area surrounding the Site, the end moraine material may vary

from slightly less than 100 feet to as much as 350 feet. The end moraine material is generally medium textured till with a dominant clay and silt matrix.

The regional well logs available for well locations shown on Figure 3.5 were used to construct an approximate east-west geologic cross-section which is presented on Figure 3.6. The well logs utilized to develop this section are provided for reference in Appendix D.1.

3.4.2 Bedrock

The Coldwater Shale, of Early Mississippian age, is the first bedrock formation encountered below the Site at an elevation of approximately 625 to 650 feet above mean sea level (AMSL) (to an approximate depth of 250 to 350 feet). This shale is dark brown to black, bituminous, fissile, and finely laminated. The Coldwater Shale may be as much as 1,300 feet thick in the vicinity of the Site. Located below the Coldwater Shale are sedimentary formations of the Berea Sandstone-Bedford Shale unit. Figure 3.7 presents the regional bedrock geology.

3.5 REGIONAL HYDROGEOLOGY

Groundwater resources in the Clinton and Rouge River watersheds exist in both the glacial drift and the bedrock of the area. In the region surrounding the Site, groundwater is encountered in four general water bearing units as discussed in the following subsections:

- unconfined water table zone;
- glacial till aquifer(s);
- lower sand and gravel aquifer; and
- bedrock aquifer(s).

3.5.1 Unconfined Water Table Zone

The upper glacial till of the area contains an unconfined water table which is influenced by seasonal precipitation, local drainage patterns, and topography. The water table is located at a depth of approximately 10 to 30 feet below the ground surface (bgs) and the saturated thickness is approximately 5 to 10 feet. The unconfined water table zone is not utilized for water supply purposes. The use of this zone as a potable supply would be generally prohibited by Michigan Department of Public Health regulations (i.e., it is at a depth of less than 25 feet) [Part 127 of Act 368 (Groundwater Quality Control), 1978]. This shallow water table, if present, would not be defined under Michigan Act 451 (Act 451), Part 201, as an "aquifer" for regulatory purposes. It should also be noted that the water table zone is locally absent in certain areas.

3.5.2 Glacial Till Aquifer(s)

The regional glacial till is quite extensive (both areally and vertically). The glacial till is approximately 250 to 350 feet in thickness in the vicinity of the Site. The glacial till moraines consist of poorly stratified clays, sand, and gravel that are not always continuous with depth. This material does not transmit large quantities of water and as a result, water bearing zones within this unit are not considered significant aquifers. However, in some areas, glacial outwash underlies the moraine material. In the vicinity of the Site, the outwash appears in a more complex, bedded sequence with the moraine. It is within these interbedded layers of outwash that larger quantities of water are yielded over longer periods of time. Figure 3.8 identifies the Site location within the regional aquifer characterization. Figure 3.8 identifies that the more usable aquifers are found at greater depths. As identified on Figure 3.9, impervious materials (e.g., aquitards) protect the lower aquifers from surface contamination in the general vicinity of the Site.

3.5.3 Lower Sand and Gravel Aquifer

The regional lower sand and gravel aquifer is glacial outwash that generally consists of beds of well-sorted sand and gravel. This aquifer unit underlies the glacial till and interbedded aquifers described above and shown on Figure 3.8. Although the lower sand and gravel aquifer is not widespread throughout southeastern Michigan, it is prevalent throughout the region of the Site where the outwash is in distinct channels. This unit is considered the most important aquifer in the region as it provides storage for large quantities of water that can be used for both residential and industrial supplies. The lower sand and gravel aquifer is considered to be protected from surface contamination by the more impervious overlying glacial till aquitards (Figure 3.9).

3.5.4 Bedrock Aquifer(s)

On a regional basis, the Coldwater Shale and the Bedford Shale are commonly considered nonproductive aquifers, typically yielding only small amounts of water. However, on a local basis, within parts of the region, the Coldwater Shale contains beds of sandstone. This occasional sandstone, and the Berea Sandstone where present, yield enough water for residential use. A more abundant water supply is found at impractical greater depths and with significant increases in mineral content. The bedrock water resources, like the more usable lower sand and gravel aquifer above them, are considered to be protected from surficial contamination (Figure 3.9).

3.6 REGIONAL HYDROLOGY

The area of the Site is within both the Clinton River and Rouge River basins. The Clinton River basin drains an area of approximately 760 square miles covering almost half of Oakland County and the majority of Macomb County. The Rouge River basin drains an area of approximately 467 square miles and covers portions of Oakland, Wayne, and Washtenaw Counties. The Clinton River discharges into Lake St. Clair to the east, while the

Rouge River discharges into the Detroit River, below Lake St. Clair. The Detroit River flows into Lake Erie. The boundaries of the river basins, with the location of the Site, are indicated on Figure 3.10.

Both river basins contain similar topographic features. Generally, the northwest is made up of undulating morainal hills with narrow sand and gravel plains in-between. The southeast is typically identified by relatively flat level lake plain. The two different areas are separated by relic beaches extending in a northeast direction.

4.0 SITE SETTING

The local setting of the Site, which is based on several subsurface investigations conducted on and in the vicinity of the Site, is presented in the following subsections:

Section 4.1 Site Geology;
Section 4.2 Site Hydrogeology; and
Section 4.3 Site Hydrology.

4.1 SITE GEOLOGY

The description of the geologic units discussed in this section is based upon numerous geotechnical and environmental investigations which have been completed at the Site. Typical cross sections, which are generally representative of the Site conditions, were developed during earlier investigations of Pontiac Central (Parcel A) and Building 33 (Parcel C1). The cross section locations, and associated cross sections, are presented on Figures 4.1 through 4.6. Additional details regarding Site investigations which have been completed are provided in Sections 5.0 and 6.0.

4.1.1 Surficial Fill Unit

The surficial materials encountered consistently throughout the Site are comprised of an interlayering mix of sand, gravel, clay, asphalt, concrete, and other fill. The fill unit ranges in depth from approximately 5 to 15 feet bgs (Figure 3.6). The fill zones encountered at the Site are a result of the various phases of construction which have been completed across the Site since the mid-1920s. Significant volumes of soil materials have been cut and filled during the general "leveling" of the Site which has occurred over the last 70 years. Underlying the surficial fill are the extensive glacial clay/till and interbedded sand and gravel units.

4.1.2 Clay/Till and Interbedded Sands Unit

A glacial clay/till deposit occurs immediately below the surficial fill materials at the Site. Based on Water Well Record logs of wells on or near the Site (see Appendix D.1), the clay/till is continuous across the area. The clay/till is comprised of clay, silt, sand, and gravel, and generally displays low to very low permeability. Numerous sand lenses and outwash channels of limited extent are also encountered within the clay/till.

The two predominant interbedded sand and gravel layers within the clay/till vary in thickness and depth. The first sand layer is about seven feet thick and was encountered in the vicinity of Parcel B1 at a depth of approximately 120 feet bgs. The second sand layer was medium to fine grained and was encountered more extensively within and to the south of the Site at approximately 150 feet bgs. The second sand layer ranged from 10 to 75 feet thick.

The clay/till and interbedded sands and gravels are shown on Figure 3.6, a subsurface cross-section of the Site, based on selected Water Well Records. The glacial till unit generally extends to a depth of about 230 feet bgs where a lower sand and gravel unit is encountered.

4.1.3 Lower Sand and Gravel Unit

Consistent with the regional glacial deposition, the lower sand and gravel unit is encountered at the Site underlying the clay/till and interbedded sand layers. The lower sand and gravel is identified in both Site well logs and nearby residential well logs. The unit is at an elevation of approximately 740 feet AMSL and a depth of about 200 to 220 feet bgs, and may be as thick as 20 to 80 feet. Figure 3.6 shows this lower sand and gravel unit on the regional cross-section.

4.1.4 Coldwater Shale

The Coldwater Shale is the first bedrock formation encountered below the Site. The shale is dark brown to black, bituminous, fissile, and finely laminated. Water well records of test wells drilled along the Grand Trunk Western Railroad, south of the Site, show the shale with associated sandstone and over consolidated clays encountered at about 290 feet bgs.

4.2 SITE HYDROGEOLOGY

The individual hydrogeologic units identified at the Site are discussed in the following sections.

4.2.1 Unconfined Water Table Zone

Shallow unconfined groundwater has been encountered in several areas of the Site, generally at depths of 10 to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the interbedded confined sand aquifer, the perched groundwater is not considered to be hydraulically connected with the lower water bearing zones. It should also be noted that the water table zone is not considered to be an "aquifer" and is locally absent at a variety of locations on Site.

4.2.2 Clay/Till Aquitard and Interbedded Sand Aquifer

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Site. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981). A copy of this report is presented in Appendix D.2.

The CDM report identifies three primary sand and sand/gravel aquifers beneath the Site. These aquifers occur at depths of 120, 150, and 210 feet bgs, and are approximately 7, 25, and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is no longer utilized by the Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [#3 (Building 29) and #6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (well #7). All portions of the Facility are currently serviced by municipal water.

4.2.3 Lower Sand and Gravel Aquifer

The lower sand and gravel aquifer has been encountered underlying the clay/till aquitard at approximately 210 to 220 feet bgs. Consistent with the regional description of local outwash channels, this aquifer has been used to support industrial wells on Site and residential wells south of the Site.

The lower sand and gravel aquifer is confined by the clay/till aquitard sequence above. This aquifer may also be confined by the Coldwater Shale below.

4.2.4 Coldwater Shale

The Coldwater Shale is not considered a usable aquifer beneath the Site. Because it is overlain by the productive Lower Sand and Gravel Aquifer, the Coldwater Shale may be considered an aquitard with its relatively low permeable material. Available water well records for wells drilled along the

Grand Trunk Western Railroad south of the Site show the shale encountered near 290 feet bgs (no elevation control was available).

4.3 SITE HYDROLOGY

The Site is located at the divide between the Clinton and Rouge River drainage basins. Construction activities at the Site have influenced the divide, and the Site now drains to the Clinton River, through the Murphy Drain. Surface water drainage ultimately discharges to Lake St. Clair, about 20 miles east and southeast from the Site. The Site location, as related to the Clinton River Basin, is presented on Figure 3.10.

5.0 SUMMARY OF PREVIOUS REMEDIAL ACTIONS

The following sections present a summary of three additional AOIs identified by GM, which represent previous major remedial actions that were performed at the Site after 1991.

5.1 PARCEL A

5.1.1 Former Building 29 Tank Farm (AOI #16)

Nine 12,000-gallon steel USTs were installed near the south wall of the exterior of Building 29 in 1946. The tank farm was taken out of service during the summer of 1991 and the tanks were excavated and removed in October 1991. BTEX and PNA constituents were identified in the soils surrounding the former tank farm in confirmatory samples taken at the time of the UST removal. The tanks appeared undamaged during excavation. The soil contamination was, therefore, assumed to be due to routine filling operations. The location of the former Building 29 tank farm remediation area is presented on Plan 5.

The construction and contents of the tanks in the Building 29 tank farm are summarized below.

Building 29 Tank Contents/Construction

Tank No.	*Material*	*Tank Const.*	*Tank Size (gallons)*	*Year Inst.*	*Pipe Const.*	*Pipe Buried*
1	Eng Oil	Steel	12,000	1946	Steel	No
2	15w 40 Eng Oil	Steel	12,000	1946	Steel	No
3	10w 30 Eng Oil	Steel	12,000	1946	Steel	No
4	A90 Trans Oil	Steel	12,000	1946	Steel	No
5	P/S Fluid	Steel	12,000	1946	Steel	No
6	Axle Fluid	Steel	12,000	1946	Steel	No
7	Auto Tr Fluid	Steel	12,000	1946	Steel	No
8	Axle Fluid	Steel	12,000	1946	Steel	No
9	Eng Oil	Steel	12,000	1946	Steel	No

GM notified the Michigan State Police-Fire Marshal Division (MSP-FMD) office on October 16, 1991, that a confirmed release (i.e. residual soil contamination) had occurred at the former Building 29 tank farm. Notification of the release was made based on the analytical results of soil samples taken to satisfy the Fire Marshal's site assessment requirements.

Notification of the release was followed by 20-Day and 45-Day reports submitted to the MDNR Environmental Response Division (ERD) in accordance with LUST requirements. A Corrective Action Plan (CAP) was submitted to the MDNR-ERD on March 16, 1992. Revised pages for the CAP were submitted to the MDNR-ERD on April 30, 1992. The CAP was approved by the MDNR, with changes to the Sampling and Analysis Plan as proposed in GM's June 10, 1992 letter, on June 26, 1992.

Approximately 3,000 cubic yards of soil were removed from the Building 29 tank farm excavation and stored west of the Study Area on the asphalt paved parking lot. The dimensions of the excavation were approximately 130 feet from north to south, 40 feet from east to west, and 17 feet deep. The perimeter of the base of the excavation was 340 feet and the surface area was 5,200 square feet. Excavation on the east side wall was restricted due to bank stability concerns (due to the presence of a steep slope).

A 45-Day report (Maecorp, November 1991), and the Corrective Action Plan (CAP) (June 1992), both state that following receipt of initial verification sampling results, additional soil (approximately 10 cubic yards) was removed from the base of the excavation, and six additional verification samples were collected and analyzed for PNAs. The analytical data for these six samples (non-detect for all PNAs) was presented as Appendix I to the CAP. These samples were taken from the locations of the original verification samples.

Five cubic yards of soil were removed from the excavations in the sidewall area to address elevated benzene levels found. A second confirmatory sample was obtained and analyzed for benzene. Benzene was not detected in the second confirmatory sample.

During the corrective action (undertaken for GM by M. L. Chartier of Detroit, Michigan) in June 1992, contaminated soils were removed and thermally treated. Verification samples were collected in general accordance with the requirements for soil cleanup verification. Four water samples were collected from the base of the excavation in lieu of soil samples due to the presence of water in the excavation. The source of this water was from a water leak in the fire deluge tank (located to the northeast of the excavation). The collection of water samples was deemed unacceptable by MDNR in determining soil cleanup verification.

The soils excavated from the tank area were thermally treated on site. All thermally treated soils were verified non-detect for BTEX and PNAs. The soil was then used as backfill for the tank excavation, or stockpiled along the side of the access road to Building 29, which ran south from the building. A copy of the thermal treatment report for Building 29 is presented in Appendix E.1.

Verification samples could not be collected from the east and south sidewalls of the excavation due to bank stability concerns. Therefore, confirmatory sampling was performed through the installation of seven boreholes following backfilling of the excavation. Areas of PNA contamination above the then current Type B criteria were identified on the east side of the excavation in several boreholes installed by WW Engineering & Science (WWES) in December, 1992.

A final subsurface investigation of this site was conducted by CRA on behalf of GM in January 1994, in order to address remaining comments provided by the MDNR (letter dated November 19, 1993) regarding past UST closure efforts and the previous investigation conducted by WWES.

CRA's investigation included the installation of six additional boreholes to collect soil samples from the former base of the UST excavation, and on the east wall of the former excavation. Other areas of the excavation were previously sampled and confirmed to be closed (Maecorp, November 1991).

The results of the investigation were presented in CRA's February 10, 1995 report (see Appendix E.2). The report concluded that the remediation effort conducted during the UST closure had been successful and that no additional remedial effort was required. This report was accepted by the MDNR by letter dated March 17, 1995 and thus the Building 29 USTs are considered "closed". The MDNR letter stated that this area was removed from the Michigan list of contaminated sites under the former Michigan Environmental Response Act, 1982 PA 307 (see Appendix E.3).

Building 29 was subsequently demolished as part of the redevelopment work and its former location is now a portion of the parking lot for the new Truck Product Center.

5.2 PARCEL B

5.2.1 Building 43 Remediation (AOI #44)

In June 1993, WWES and GM conducted a test excavation of this area to obtain a visual assessment of the extent of potentially affected material in the vicinity of Building 43. The location of the Building 43 remediation area is presented on Plan 5. In August 1994, CRA conducted an additional subsurface soil investigation to substantiate the visual data using soil analytical data. The fill material located adjacent to Building 43 was identified to be comprised of ash and miscellaneous debris. Chemicals of concern for closure activities included volatiles, PNAs, and metals. Based on the visual and analytical data, CRA prepared a report (see Appendix F.1).

CRA subsequently prepared Project Specifications for the Excavation of Contaminated Material at Building 43 for GM in April 1995. The specifications were finalized, a contractor procured, and excavation initiated on July 31, 1995. The excavation was completed in early September 1995. A total of approximately 11,000 cubic yards of material was disposed of off Site. Verification of the removal of impacted material was accomplished through the collection of approximately 40 soil samples from the floor and sidewalls of the

excavation. Closure of the excavation was obtained using Act 451 [Natural Resources and Environmental Protection Act (NREPA)], Part 201, soil cleanup standards.

The Project Specifications utilized to complete the Building 43 remediation are presented in Appendix F.2. A construction report for the Building 43 remediation is currently under development.

After remediation of the contaminated fill adjacent to the building, the demolition contractor initiated activities. Building 43 was demolished during September 1995 to support further Site redevelopment.

5.2.2 Former Building 53 Tank Area (AOI #42)

In August 1991, a 1,000-gallon waste oil steel underground storage tank (UST) was removed from the Building 53 area. The location of the former Building 53 tank area is presented on Plan 5. The tank was originally installed in 1972, for the temporary storage of waste oil, and was found to be in excellent condition upon removal. In November 1991 excavation of the Building 53 UST Study Area was completed. Following characterization, the excavated soils were approved for, and disposed of, at a landfill.

Following the excavation and removal of the tank, soil samples were collected from the excavation, in accordance with MDNR guidelines for verification of soil remediation, to confirm clean closure of the Study Area. Four sidewall and two excavation floor samples were collected and analyzed for lead, cadmium, chromium, BTEX, and PNAs. The analytical data identified BTEX and PNA constituents at levels exceeding the then current Type B criteria in all samples except one which was taken from the east wall of the excavation. Based on the analytical results from the sampling, waste oil related soil contamination was identified and reported on October 22, 1991.

In accordance with the Michigan LUST Act (Act 478), 20-Day and 45-Day reports were prepared and submitted. The 20-Day report was prepared and submitted by GM on October 30, 1991. The 45-Day report was

prepared by Maecorp Incorporated (Maecorp), on GM's behalf, and submitted on December 2, 1991. In the 45-Day report, it was concluded that the waste oil related contamination was due to routine tank operations (e.g., filling and removal activities).

Additional excavation of the Building 53 UST Study Area was completed during November 1991. The limits of the excavation were defined by additional sampling of the excavation sidewalls and floor at previously sampled locations. At the floor locations, samples were taken at the ground surface, and at 1-foot, 2-foot, and 3-foot depths below ground surface. Based on the BTEX and PNA analytical results for these additional samples, the horizontal excavation limits were increased approximately 3 feet to the north and south, and the vertical excavation depth increased from 10 feet to 15 feet bgs. The excavated soils were stockpiled on plastic sheeting, covered, and the excavation backfilled. Composite samples of stockpiled soil were collected and analyzed to determine disposal requirements. Following characterization, the excavated soils were approved for, and disposed of, at a landfill.

The final dimensions of the excavation were reported to be approximately 27 feet from north to south, 13 feet from east to west, and 15 feet deep. The total volume of soil excavated was approximately 190 cubic yards (based on the dimensions of the excavation and volume of the tank).

As groundwater was not encountered during either UST removal or additional excavation activities, and the extent of BTEX and PNA residual soil contamination had been defined, clean closure of the Building 53 UST Study Area was requested by GM on January 22, 1992. The original verification samples (August 1991) did, however, identify levels of lead (24 to 38 mg/kg) and chromium (21 to 35 mg/kg) in the soil, which exceeded Michigan Type A soil standards (e.g., background default inorganic levels).

A supplemental subsurface investigation of the UST area near Building 53 was conducted by CRA on behalf of GM in January 1994, in order to address comments provided by the MDNR (letter dated November 19, 1993) regarding past UST closure efforts. Further information is provided in Appendix G.1.

CRA's investigation included a literature search to further define local background concentrations for lead and chromium and the installation of four boreholes in the area to further define the geology, hydrogeology, and nature of lead and chromium concentrations in area-wide soils, including background conditions. The investigation report dated February 11, 1994, concluded that lead and chromium concentrations previously reported were typical of background levels and that additional remediation was not required. This report was submitted to the MDNR (see Appendix G.2). Responses to MDNR comments on the report were subsequently submitted on March 28, 1994.

After the completion of the remediation activities, and associated decommissioning activities, Building 53 was demolished. This area is currently available for redevelopment. Closure certification of the former Building 53 tank area is currently under consideration by the MDNR.

5.3 PARCEL C

5.3.1 DUCO Stores Remediation (AOI #50)

The DUCO Stores UST area consisted of eight steel tanks, installed in 1927, when the facility was originally constructed. The tanks were numbered one to eight, from south to north. The location of the DUCO Stores Remediation area is presented on Plan 5.

Available information regarding tank construction and contents is provided as follows:

DUCO Stores UST Data

Tank No.	*Material*	*Tank Mat'l*	*Tank Size (gallons)*	*Year Installed*	*Pipe Mat'l*	*Pipe Buried*
1	Gasoline	Steel	12,000	1927	Steel	No
2	Gasoline	Steel	12,000	1927	Steel	No
3	RR End Lube	Steel	12,000	1927	Steel	No
4	Glycol	Steel	12,000	1927	Steel	No
5	Axle Oil 80w90	Steel	12,000	1927	Steel	No
6	#1 Diesel	Steel	12,000	1927	Steel	No
7	#1 Diesel	Steel	12,000	1927	Steel	No
8	#1 Diesel	Steel	12,000	1927	Steel	No

On February 2, 1990 gasoline odors were detected in the Pontiac Central Power House (located to the south of DUCO stores). The source was found to be gasoline which was infiltrating a 12 inch diameter sanitary sewer line which drains northerly from the power house through Building 34. This sanitary sewer runs immediately to the west of the former DUCO Stores UST area.

A pneumatic plug was inserted in the sewer line south of Building 34, and the sewer contents removed, as necessary, by vacuum tanker truck.

In May 1990, a second gasoline release was discovered near the DUCO Stores tank farm. The gasoline was discovered infiltrating into a storm sewer which was located near the Study Area. The sewer was plugged and sewer contents collected through the use of a vacuum tanker truck.

In order to further define the extent of the gasoline plume, GM retained Northeast Research Institute, Inc. (NERI) to perform a soil gas survey of the area in June 1990. The survey consisted of a grid of 53 sample points, installed to a depth of approximately 18 inches bgs, which covered the DUCO Stores UST area, the hazardous material handling storage pad, and loading area. The findings of the soil gas survey were presented to GM by NERI in a September 19, 1990 report entitled "Final Report on the Findings of the

Petrex Soil Gas Survey Conducted for the General Motors Truck and Bus Group at the DUCO Stores Tank Farm Site in Pontiac Michigan" (NERI, 1990) (see Appendix H.1).

The following conclusions were made regarding soil vapors in the DUCO Stores Study Area:

- compounds typically found in gasoline were identified in soil vapors. Concentrations indicted that the likely source was the gasoline tanks in the DUCO Stores, near Building 21; and

- a plume of oil constituents (likely from medium grade oil) was identified. Its source was identified as being in the DUCO Stores UST area, based on concentration data.

Between August 20, 1991 and August 29, 1991, the eight tanks were excavated and removed from the area. During the UST removals, visible evidence of a release was not observed. Therefore, the excavation was sampled to satisfy the site assessment requirements of the MSP-FMD UST rules on permanent UST closures. The results of the site assessment are discussed below.

On September 5, 1991, prior to receipt of the analytical data from the site assessment, diesel fuel was observed to be seeping into the excavation at the north end. The MSP-FMD was notified and corrective actions to recover the diesel fuel were implemented immediately. Approximately 100 gallons of diesel fuel was recovered before seepage ceased.

On September 20, 1991, a 20-Day report was submitted to the MDNR detailing the abatement measures taken subsequent to the diesel release. These measures included the immediate implementation of a plan to recover the diesel fuel from the excavation floor. A 45-Day report was prepared and submitted to the MDNR by Maecorp Incorporated (Maecorp) on August 14, 1991.

Confirmatory sampling was conducted on soils at the base and on the side walls of the open excavation. The results of the confirmatory analytical data were compared with the then current Act 307 Type B direct contact criteria. Due to the significant depth to the first aquifer (approximately 120 feet), and the impermeable nature of the clay soils, the 20x drinking water criteria were considered to be inappropriate. Only five of the thirty six confirmatory samples reported concentrations of benzene or PNAs which were above the then current Type B direct contract criteria. The exceeded parameters included benzene, benzo(a)anthracene, and chrysene. With respect to the then current Type C criteria (MDNR Industrial Cleanup criteria), only benzo(a)anthracene was exceeded in one sample.

Further excavation of the east and west walls was not possible due to the location of existing structures including: buildings, concrete sewers, and a concrete storage pad. However, additional excavation of the base was conducted.

Following the receipt of analytical results from composite samples collected from the soil pile, M.L. Chartier was contracted by GM to perform thermal treatment of the excavated soils. The soils were characterized following treatment and certified by M.L. Chartier as being clean (see Appendix E.1). Approximately 3,000 cubic yards of soil from DUCO Stores were treated by M.L. Chartier. This material was stockpiled on Site.

After excavation of the soil, verification soil samples were collected and submitted for BTEX and PNA analyses. Low residual concentrations, exceeding their respective then current Type B soil cleanup criteria were identified. These soils were found to be limited in extent near the excavation. Further excavation of the east and west walls was not possible (due to existing structures, sewers, etc.), however further excavation of the base was conducted. Sampling results of the excavation floor collected during sampling events in September 1991 and April 1994 indicated no residual BTEX or PNAs at concentrations exceeding the then current Type B direct contact soil values. No additional investigation of the excavation base was required and the excavation was backfilled with clean fill.

Due to the discovery of diesel fuel in the open excavation, CRA was retained to further define the nature and extent of the residual soil contamination in the area. CRA conducted a subsurface investigation including a total of six boreholes installed in January 1994. Soil samples were collected from the boreholes and submitted for BTEX and PNA analyses. A report was prepared and submitted to GM in May 1994. The report indicated that minor residual concentrations of BTEX and PNAs remained in soils at inaccessible locations. The report concluded that no additional work was required to obtain closure for the Site (see Appendices H.1, H.2, and H.3).

5.3.2 Burn Pile Remediation (AOI #71)

The evaluation of the "Burn Pile" had been ongoing since November 1993. The location of the Burn Pile Study Area is presented on Plan 5. The initial investigation was begun by GM personnel and continued by Cook & Associates, Inc., an environmental consulting firm, retained by GM. CRA became involved in the evaluation initially to coordinate the field activities associated with the project. CRA was retained on an as required basis, to continue the investigation.

An overview of activities completed at the Burn Pile is presented in the following sub-sections:

- Phase I Investigation/Excavation;
- Phase II Investigation/Excavation; and
- Off-Site disposal.

5.3.2.1 Phase I Investigation/Excavation

The Phase I investigation at the Burn Pile Study Area began in November 1993. An extensive sub-surface soil investigation was subsequently conducted at the Study Area in March, 1994 by Cook & Associates, Inc. (Cook). In April, 1994 CRA was retained by GM to coordinate field activities at the Burn Pile Study Area and to provide services on an as requested basis. Seventy-six

(76) boreholes were advanced into the native clay/till underlying the Study Area. The boreholes were located on a 50-foot grid initially, and later on a 25-foot grid to better delineate the materials within the Burn Pile Study Area.

In July, 1994 a portion of the Burn Pile was excavated and segregated into "potentially clean" and "potentially affected" soil stockpiles by Barton Malow for GM (to support redevelopment).

Information obtained in the Phase I investigation was used to delineate "potentially clean" and "potentially affected" soil within the Burn Pile Study Area. GM personnel reported that the soil was segregated using this delineation information and by visual observations.

It was reported by GM that approximately 35,500 cubic yards of material was excavated, segregated and stockpiled within the Burn Pile Study Area during the Phase I excavation. Approximately 32,000 cubic yards were stockpiled as "potentially clean" soil, and 3,500 cubic yards were stockpiled as "potentially affected".

5.3.2.2 Phase II Investigation/Excavation

A Phase II field investigation was conducted by CRA from August 10, 1994 to August 26, 1994, after odors were reported by a GM contractor during earth moving operations at the Site (associated with Site redevelopment activities). The investigation was conducted to characterize the nature and extent of affected or potentially affected material remaining at the Burn Pile Study Area after the Phase I excavation. The investigation consisted of the installation of twelve boreholes and four temporary monitoring wells. Soil and groundwater samples were collected and submitted for chemical analysis.

The Phase I and Phase II investigations provided GM with estimated quantities of soils requiring off-Site disposal.

5.3.2.3 Off-Site Disposal

In the Phase II excavation, during the period from October 13, 1994 to October 18, 1994, approximately 6,500 cubic yards of soil, including the Phase I potentially affected soils as well as additional in situ soils, were excavated, loaded, and transported to Waste Management's Eagle Valley Recycling and Disposal Facility in Orion, Michigan.

Verification Sampling

Approximately six inches of soil was removed from underneath the stockpiled soil to ensure that all affected soil was removed and disposed of properly. The limits of the excavation were determined in the field based on the results of the Phase II investigation and field screening of head-space samples with a PID, with the exception of the western edge of the excavation.

The western edge of the excavation was approximately five feet west of the right of way clearance for the Centerpoint Parkway. The west wall of the excavation appeared to contain affected soil and no verification samples were collected.

Once head-space readings from the PID meter indicated no further contamination was detectable (i.e., <1 meter unit), verification samples were collected in accordance with MDNR guidance on verification sampling, with the exception of the west side wall.

Following receipt of the analytical results, one sample was identified to contain constituents above the then current Michigan Type B 20x Drinking Water Cleanup Criteria for soil. An additional excavation of approximately 20 cubic yards of soil was undertaken on December 20, 1994. An additional verification sample was collected. The analytical results of this additional sample indicated that all compounds were below the then current Michigan Type B 20x Drinking Water Cleanup Criteria.

The Phase II excavation was backfilled with clean aggregate by Barton Malow under the direction of GM.

The environmental activity in the Burn Pile Study Area that was associated with the Centerpoint Parkway has been completed. The remaining portion of the Burn Pile is located in Pontiac East. An overview of the Burn Pile activities is presented in the final Summary Report (Appendix I).

6.0 SUMMARY OF PREVIOUS ENVIRONMENTAL INVESTIGATIONS

The following sections present a summary of four additional AOIs identified by GM, which represent previous major environmental investigations that were performed at the Site after 1991.

6.1 PARCEL C

6.1.1 DUCO Stores Fuel Line Study Area (AOI #50)

The investigation of the DUCO Stores Fuel Line evaluated the current status, and results of additional investigations conducted to resolve the outstanding environmental issues. These issues were identified in the Phase II Study area investigation performed by WWES in 1992. The requirements of the LUST Act (P.A. 478, 1988 as amended by Act 645 of 1993) were followed, since the environmental issues within the Study Area were the result of the operation of an UST fuel delivery system. The general location of the Study Area is presented on Plan 5.

WWES installed 12 soil borings and three monitoring wells in Building 11, in the north end of Building 12, and within Building 27. Samples were collected and analyzed for BTEX and lead (water samples only).

The results of the analytical work by WWES identified BTEX constituents at levels exceeding the then current Type B soil cleanup levels for soil in five soil borings. These elevated concentrations were found in both a clay layer and underlying sand lens. The clay layer and sand lens occur approximately between 5 and 15 feet bgs. Analysis of perched water samples collected from three monitoring wells identified concentrations of BTEX constituents and lead above the then current Type B Drinking Water criteria. It should be noted that the perched water zone is not an aquifer and is of limited extent.

In order to further define the extent of the sand lens in which evidence of a gasoline vapor was detected, seven boreholes were installed by CRA in the vicinity of the fuel line in January 1994.

One borehole was installed north of Building 11 in the parking lot area (BHFL7-94), and three boreholes were installed surrounding the previous WWES boreholes in Building 11.

Three additional boreholes were installed by CRA along the alignment of the fuel line further to the south in order to assess the extent of possible, residual gasoline along the length of the fuel line. Samples were collected from each borehole for chemical analysis for BTEX and lead. The results of the analysis did not identify any further areas of residual BTEX constituents in soil at levels of concern.

As part of the redevelopment of the property, a storm sewer was installed through the study area, at a depth of approximately 20 feet, in March 1994. Based on WWES findings, the excavation should have intersected perched water. However, the excavation remained dry indicating that the perched water is minor in extent and/or seasonally dependent. In order to further confirm that perched water did not extend significantly, CRA installed three test excavations in the area. These excavations also remained dry.

CRA's June 1994 final report to GM concluded that no additional investigation or remediation is required or warranted within this area (see Appendix J).

6.1.2 Building 33 Free Product Investigation (AOI #53)

Studies were performed by Gilbert/Commonwealth, Inc. of Michigan and E.C. Jordan Co. [now ABB-Environmental Services, Inc. (ABB-ES)] to determine the nature and extent of the free product discovered during an investigation for new building foundations. The results of these studies indicated that gasoline is trapped in a sand lens under Building 33. The gasoline

was estimated to have an approximate volume of 2,000 gallons. The location of the free product investigation is presented on Plan 5.

To further define the extent of the soils affected by the gasoline, CRA conducted a subsurface investigation of the area which included the installation of 19 boreholes. Four boreholes were installed within the building to redefine the edge of the free product. An additional fifteen boreholes were installed around the perimeter of the study area to investigate if gasoline constituents had migrated significantly. Soil samples were screened using a photoionizing detector and submitted for chemical analysis of BTEX and lead. Appendix K presents the results of investigation of gasoline in soils beneath Building 33.

A monitoring well was installed within one of the interior boreholes to permit sampling of free product and measurement of gasoline thickness.

A free product pumping test was conducted by CRA to assess the feasibility of collecting the gasoline utilizing extraction well methods.

A draft report was prepared and submitted to GM on April 17, 1995 (see Appendix K). The report presented several remedial alternatives which could be utilized for the possible removal of the gasoline.

6.1.3 Building 33 Fuel Island Investigation (AOI #51)

Once manufacturing operations at the Facility ceased in August 1990, and the Facility was closed in the summer of 1991, the USTs which were no longer in service were removed. The investigation of the fuel island study area was to evaluate the current status with respect to outstanding environmental issues identified by the MDNR in their letter dated November 19, 1993. The Building 33 fuel island is located south of Building 33, in an asphalt parking area. The location of the fuel island is presented on Plan 5.

During the investigation, waste oil product was identified in the vicinity of the UST and the Building 33 - Fuel Island. Since the environmental issues within the fuel island investigation study area are the result of the operation of an UST system, the requirements of the LUST Act (P.A. 478, 1988 as amended by Act 645 of 1933) must be addressed.

There is a concrete pad surrounding the fuel island and covering two 12,000-gallon fuel tanks. In the past, a 10,000-gallon tank which contained diesel fuel was removed from the present location of the fuel island, and the fuel island was reconstructed (including installation of the two tanks now present). A release was documented in 1991 and MDNR records indicate that contaminated materials (from a diesel release) may still exist within the Study Area. MDNR records also indicated that 20-Day and 45-Day reports were submitted by GM.

CRA submitted a draft report to GM on this study area in January 1994 recommending further investigative activities (see Appendix L).

6.1.4 Former J-Lot Fill Area (AOI #79)

An initial subsurface investigation of the J-Lot fill area was conducted by ERM in May 1994. The ERM investigation identified the extent of "Potential Petroleum Contamination" at the Site by means of a series of boreholes. However, the report indicated that additional investigation was required to more suitably identify the extent of contamination. The PR/VSI identified this AOI to the north of South Boulevard. The location of the former J-Lot fill area is presented on Plan 5.

In an effort to more suitably identify the extent of contamination, an additional investigation was conducted by CRA to further define the extent of affected soils. The investigation was conducted in August 1994, and consisted of the excavation of 24 test trenches. In general, the excavations identified mixed rubble fill and soil to depths of 1 to 13 feet below grade. Materials deposited in the fill were suspected to be potential sources for contamination.

Based on the findings of the investigation it was determined that an additional broader investigation was warranted to identify any possible migration pathways for constituents encountered. As a result, an Extent of Contamination/Engineering Evaluation and Cost Analysis (EOC/EECA) Work Plan was prepared. The Work Plan was implemented in August and November 1994. The EOC/EECA Work Plan is presented in Appendix M.1.

The characterization of the nature and extent of affected or potentially affected materials at the Site was achieved by conducting a variety of Site investigative activities. The field investigation at the Site included the following activities:

- Site survey and base plan preparation;
- installation of 17 boreholes;
- installation of six monitoring wells;
- collection of soil samples for laboratory, chemical, and geotechnical analysis;
- collection of groundwater samples for laboratory chemical analysis; and
- water level measurements in all monitoring wells.

In order to characterize the subsurface conditions within, around, and below the fill materials, 17 boreholes were completed. The boreholes were advanced to depths of 16 to 44 feet bgs. Eleven of the boreholes were advanced to a depth of approximately 5 to 10 feet into the native clay soils which underlie the surficial fill material. Six of the boreholes were advanced approximately 30 feet into the clay to investigate the hydraulic properties of the clay aquitard. Six groundwater monitoring wells were installed.

In order to provide a vertical profile of potential contamination, two to four fill/soil samples were collected from each borehole and submitted for chemical analysis.

A glacial clay/till deposit exists immediately below and around the fill material in the area. The clay/till unit is continuous across the Site. Borehole stratigraphic logs indicate this clay layer extends to a depth of at least 44 feet bgs at the Site. The thickness of this clay/till unit was not

determined by on Site borings but is reported to be approximately 100 to 250 feet thick (based upon regional information).

The Site hydrogeology was characterized through the installation of 17 boreholes, six monitoring wells, static water level measurements, and laboratory geotechnical tests. In general, no distinct hydrostratigraphic units were identified at the Site. Only perched, discontinuous water zones were identified to exist within the glacial clay/till during the Site investigation. The lack of a continuous water bearing zone, and the low hydraulic conductivity of the glacial clay/till, combine to effectively limit the flow of groundwater on or off Site.

The location of chemical sources and residual compounds were further defined by the EOC investigation. Soils were found to exceed the then current Michigan Type B residential criteria, and in some cases, the Michigan Type C industrial criteria. However, the extent of exceedances was limited to within the J-Lot area boundary. No potential pathways for off-Site migration were identified. The EOC Report is presented in Appendix M.2.

In addition, an EECA report was prepared for the Site by CRA and provided to GM. The report presents potential remedial alternatives for the Site. The EECA Report is presented in Appendix M.3.

7.0 PARCEL A AREAS OF INTEREST

As presented on Figure 1.6, the Site has been divided into three distinct areas comprised of Parcels A, B, and C. The Parcel A AOIs include those areas of concern previously identified by U.S. EPA in the PR/VSI in addition to other areas of environmental concern identified by GM. The AOIs identified in Parcel A include six areas of concern identified in the PR/VSI and 35 additional areas which were identified by GM. The PR/VSI and GM areas are summarized in Table 7.1 and their locations are presented on Figure 7.1.

An evaluation of the status of the 41 AOIs contained in Parcel A is provided in the following subsections. The summary includes a brief history of the AOIs, their current status, and whether they have been closed or decommissioned.

7.1 FORMER DELUGE TANK AREA (AOI #1) (SWMU #12)

The PR/VSI identified the former deluge tanks as an AOI with 8 to 10 separate underground concrete vaults (subunits). The exact location of all of the subunits was not identified during the PR/VSI due to the size of the Facility. These units were designed to collect runoff from fire fighting activities, located in close proximity to numerous fire mains and areas where flammable materials were managed.

During the PR/VSI, the visual inspection of the deluge tanks was limited to a single representative subunit. The former subunit had been previously identified during the PR/VSI as SWMU #12, and not subject to a RCRA permit requirement. The location of the former tank area is presented on Figure 7.1.

The PR/VSI suggested further actions which included structural integrity testing of the unit and subunits, and identification of wastes managed at the units.

During the decommissioning activities, there were ten vaults identified as former deluge tanks. These vaults were used to collect emergency discharges of waste paint sludge from overhead painting operations. There were six vaults found at the Pontiac Central, and four at Pontiac East and the Truck Engineering Center areas.

The six vaults at Pontiac Central, were cleaned, inspected and decommissioned by Cook and Associates. During inspection of the vaults, there were no visible signs of cracks, and pictures were taken where possible to verify the vaults structural integrity. Following decommissioning activities, the vaults were redeveloped. Redevelopment activities generally included demolition or removal/disposal of the subunits. In certain instances the subunits were collapsed into the subbase of proposed buildings and backfilled with clean fill.

A new concrete floor slab was cast-in-place over the area of the former deluge tanks for the construction of the GM Truck Product Center.

7.2 FORMER WASTE SOLVENT COLLECTION AREA (AOI #2) (SWMU #13)

This former waste solvent collection area consisted of three vertical 3,500-gallon aboveground steel tote tanks and a storage area for 55-gallon drums. This area was located in Building 9 on a concrete floor approximately 50 feet long and 15 feet wide. Historically, waste solvent was transferred from this unit to the outdoor waste purge solvent collection tanks located in Parcel C3 (Pontiac East). The location of the former waste solvent collection area is presented on Figure 7.1.

The former waste solvent collection area had been previously identified during the PR/VSI as SWMU #13, and subject to RCRA permit requirements. During the PR/VSI, no releases were identified and the potential for a release was considered low.

The PR/VSI suggested further action was; structural integrity testing should be conducted and performance standards of the RCRA solvent collection area be verified.

During the redevelopment phase of the Facility, the former waste solvent collection area was considered closed. Closure activities generally included cleaning, demolition, and removal/disposal.

The former waste solvent collection area had a new concrete floor slab cast-in-place over the former waste solvent collection area for the construction of the GM Truck Product Center.

7.3 FORMER WASTE PURGE SOLVENT COLLECTION PIT (AOI #3) (SWMU #14)

This area was incorrectly identified in the PR/VSI as a waste purge solvent collection area. During the decommissioning activities, this area was identified as an overflow collection pit, which was used to collect brake fluid and axle oil. The former overflow collection pit was located in Building 9, Bay 71F, and had a capacity of approximately 675 gallons. The location of the former collection pit is presented on Figure 7.1

This pit was previously identified during the PR/VSI as SWMU #14, and not subject to a RCRA permit requirement. The PR/VSI suggested further action was; no further action was required.

Decommissioning activities generally included sweeping, shoveling, chiseling, or pumping of the pits to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the pits. The pits were then fan dried for structural integrity inspection. Following cleaning activities, the pit was found to have no visible cracks or evidence of leaking, and pictures were taken to authenticate the pit as being structurally sound.

Following these decommissioning activities, the pit was redeveloped. Redevelopment activities generally included demolition and backfilling with clean fill.

A new concrete floor slab was cast-in-place over the area of the pit for the construction of the GM Truck Product Center.

7.4 FORMER FLUID COLLECTION PITS (AOI #4) (SWMU #15)

The PR/VSI identified that there were 10 to 13 former fluid collection pits located throughout Pontiac Central. These pits were primarily constructed of concrete with some constructed of concrete encased steel tanks. These former fluid collection pits were designed to collect fluids such as gasoline, diesel, and oil associated with the production of automotive vehicles on the production assembly line.

During the PR/VSI, the visual inspection of the former fluid collection pits was limited to a single representative pit. The pit had been previously identified during the PR/VSI as SWMU #15, and not subject to a RCRA permit requirement. The PR/VSI suggested further action was; structural integrity testing of the pits be completed, otherwise, no further action was required. All the former fluid collection pits, including the pit evaluated during the PR/VSI as SWMU #15, were decommissioned. The location of the representative pit is presented on Figure 7.1.

Decommissioning activities generally included sweeping, shoveling, chiseling, or pumping the fluid collection pits to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the fluid collection pits. The fluid collection pits were then fan dried for structural integrity inspection. The former fluid collection pits were found to have no visible cracks or evidence of leaking, and pictures of the pits were taken when possible, to verify the pits were structurally sound. Following these decommissioning activities, the pits were redeveloped. Redevelopment activities generally included demolition, or removal/disposal and backfilling with clean fill.

A new concrete floor slab was cast-in-place over the areas of these former pits for the construction of the GM Truck Product Center.

7.5 FORMER SLUDGE DOCK AREA (AOI #5) (SWMU #16)

The former sludge dock was a shipping area located on the first floor of Building 44, Bay 65BE2. Waste sludges from the electrophoretic paint dip operation (ELPO), on the second floor, were discharged through a chute into shipping containers. The waste sludge would then be transported to the container storage area. The location of the former sludge dock area is presented on Figure 7.1.

The former sludge dock was identified in the PR/VSI as SWMU #16, and not subject to a RCRA permit requirement. The PR/VSI suggested further action was; air emission monitoring should be considered during sludge dock operations.

In an effort to determine if the sludge dock operation had impacted the soils, a soil investigation near the former sludge dock loading area was performed. Since the indicator chemicals associated with the former sludge dock area operations (lead and PNAs) were not detected at concentrations exceeding their respective then current Act 307 soil cleanup criteria. Therefore, no additional investigation of this area was required. Following these investigation activities, the sludge dock area was redeveloped. Redevelopment activities generally included, dismantling, demolition and removal/disposal of the sludge dock.

The former sludge dock area was developed as part of the new parking lot facility in support of the GM Truck Product Center.

7.6 FORMER WASTE LIFT STATIONS (AOI #6) (SWMU #17)

The former waste lift stations consisted of a network of pump systems designed to transport wastewater to the wastewater treatment plant. The wastewaters pumped to the WWTP consisted of acid wastes, general wastes and cleaner wastes. During the PR/VSI, two holding tanks identified as Green Lee Coolant Storage and 1803 ELPO Storage, were stored at the station location. The former waste lift station was located within a bermed area at the southwest corner of Building 29. The location of the former wastewater lift station is presented on Figure 7.1.

The former wastewater lift stations had been previously identified by the PR/VSI as SWMU #17, and not subject to a RCRA permit requirement. The PR/VSI suggested further actions were; air emission monitoring should be considered during the wastewater lift stations operation, and structural integrity testing of the wastewater lift stations should be completed.

During the decommissioning activities, a structural integrity inspection of all the wastewater lift stations, revealed a crack in the concrete wall of the former "cleaner waste" wet well. In an effort to determine if the operation of the wastewater lift stations impacted the soils, a soil investigation in the vicinity of the crack was completed. Since the indicator chemicals typical of "cleaner waste"(lead, chromium, zinc, naphthalene, and phenanthrene) were not detected at concentrations exceeding their respective then current Act 307 soil criteria, no additional investigation of the wastewater lift stations was required. Following these decommissioning activities, the area of the wastewater lift station was redeveloped. Redevelopment activities generally included, dismantling, demolition and removal/disposal.

The area of the former wastewater lift stations were redeveloped as part of the new parking lot facility in support of the GM Truck Product Center.

7.7 FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PITS (AOI #7, 8, 9)

During the decommissioning activities, these three former heavy duty hydraulic lift pits were identified by GM as additional areas of environmental concern due to historical manufacturing operations. The three former heavy duty body shop hydraulic lift pits were located in Building 4, Bays 41BA, 42BD, and 48BD1, respectively. The locations of the three former heavy duty hydraulic lift pits are presented on Figure 7.1.

Decommissioning activities of the former heavy duty body shop hydraulic lift pits generally included sweeping, shoveling, chiseling, or pumping to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the lift pits. The hydraulic lift pits were then dried for structural integrity inspection.

At the time of inspection by Cook and Associates, these pits were found to contain some water and small amounts of oil. Integrity inspections of these pits found that the water and oil appeared to originate from hairline crack(s) within the pit walls. Following cleaning and reinspection, the pits were redeveloped. Redevelopment activities generally included, demolition, removal/disposal, and backfilling the pits with clean fill.

The three former heavy duty body shop hydraulic lift pits were developed as part of the new parking lot facility in support of the GM Truck Product Center.

7.8 FORMER CREOSOTE TANK (AOI #10)

During decommissioning activities, the former creosote tank was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The location of the former creosote tank is presented on Figure 7.1.

Evidence of a possible former creosote tank existing at the Facility was only found on an insurance company drawing dated 1932. The drawing indicated that the tank was aboveground with secondary containment. Since no other evidence of the creosote tank existed at the time of the decommissioning activities, further investigation of the former creosote tank was not required.

A new concrete floor slab was cast-in-place over the former creosote tank area for the construction of the GM Truck Product Center.

7.9 FORMER PRESS PITS (AOI #11, 12, 13)

During decommissioning activities, these three former press pits were identified by GM as additional areas of environmental concern due to historical manufacturing operations.

Decommissioning activities of the press pits generally included, sweeping, shoveling, chiseling, or pumping to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the press pits. The press pits were then fan dried for structural integrity inspection, at which time water was found leaking through hairline crack(s). No exfiltration of the water is believed to have occurred at these locations because the press pit floors were found to be watertight.

The three former press pits that were inspected during decommissioning activities were identified as follows:

Building	*Bay*	*Process*	*Closure Date*
12	30J	#32791 Press	April 13, 1992
12	31J	#21310 Press	January 14, 1992
12	57K-W	#29470 Press	April 29, 1992

Following these decommissioning activities, the former press pits were redeveloped. Redevelopment activities generally included, excavation, removal/disposal and backfilling the pits with clean fill.

A new concrete floor slab was cast-in-place over these former pit areas for the construction of the GM Truck Product Center.

7.10 FORMER SPRAY PRIMER MIX ROOM PIT (AOI #14)

During decommissioning activities, the former spray primer mix room pit was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The former spray primer mix room pit was located in Building 12, Bay 90L, and had a capacity of approximately 500 gallons. The location of the former spray primer mix room pit is presented on Figure 7.1.

Decommissioning activities of the former spray primer mix room pit generally included was sweeping, shoveling, chiseling, or pumping to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the spray primer mix room pit.

Following cleaning, the structural integrity of the pit was inspected, and found that water was leaking into the pit. The water appeared to originate from hairline crack(s) near the top of the pit. The inspection of the pit also identified that a very mild petroleum odor was present.

In an effort to determine petroleum constituents had impacted the pit, a sample of the water within the pit was collected and analyzed for BTEX and acetone. BTEX and acetone concentrations were significantly below drinking water standards, and therefore, no further investigation of the former spray primer mix room pit was required. Following the investigation activities, the mix room was redeveloped. Redevelopment activities generally included, excavation, removal/disposal and backfilling the pit with clean fill.

As part of the Centerpoint Business Campus Site redevelopment plans, the former spray primer mix room pit was redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.11 FORMER CYANIDE DESTRUCTION OPERATION (AOI #15)

During decommissioning activities the former cyanide destruction operation was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The location of the former cyanide destruction operation was determined to be on the first floor of Building 29. The location of the former cyanide destruction operation is presented on Figure 7.1.

Inspection of the area revealed no evidence of former pits for the former cyanide operation. The tanks used during the operation were removed in 1976. Since there was no evidence of the former cyanide operation to support decommissioning activities, no further investigation of the operation was required.

The former cyanide destruction operation area was redeveloped as part of the new parking lot facility in support of the GM Truck Product Center.

7.12 FORMER BUILDING 29 TANK FARM (AOI #16)

During decommissioning activities, the former Building 29 tank farm was identified by GM as an additional area of environmental concern. The location of the former Building 29 tank farm is presented on Figure 7.1.

Nine 12,000-gallon steel USTs were installed near the south wall of Building 29 in 1946. The tank farm was utilized for the storage of engine oil, transmission fluids, axle fluids, and power steering fluids. The USTs were removed from service in October 1991 in support of the Centerpoint Business Campus Site redevelopment plans. The Building 29 UST area report is presented in Appendix E.2.

In an effort to determine if the former UST operation had impacted the soils, confirmatory soil samples were taken in support of the UST

removal actions. The analytical results of the soil samples revealed that the soils had been impacted by BTEX and PNA constituents. Since the USTs appeared undamaged during excavation, the source of the soil contamination was assumed to be from routine filling operations. Excavation of approximately 3,000 cubic yards of soil was conducted and thermally treated on Site. The final report on low temperature thermal destruction is presented in Appendix E.1.

In response to a MDNR letter dated November 19, 1993 requesting verification of soil remediation, six additional boreholes were drilled and samples collected. The verification samples confirmed successful closure of the former Building 29 tank farm. Appendix E.2 contains the Building 29 UST Study Area Report (as also discussed in Section 5.3.1).

Acknowledgment of closure was received from the MDNR on March 10, 1995. A copy of the MDNR closure letter is presented in Appendix E.3.

The former Building 29 tank farm was redeveloped as a part of the new parking lot facility for the GM Truck Product Center.

7.13 FORMER PAINT MIX ROOM FIRE DUMP TANK (AOI #17)

During decommissioning activities, the former paint mix room fire "dump" tank was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The location of former paint mix room fire dump tank is presented on Figure 7.1.

The only evidence of the former paint mix room fire "dump" tank, was the drain line to the tank, and the plant engineering design drawings. Since no physical evidence of the former paint mix room fire dump tank was found during decommissioning activities, no further investigation or evaluation was required.

The former paint mix room fire dump tank area has been redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.14 FORMER PROCESS TRASH COMPACTOR SUMP (AOI #18)

During decommissioning activities, the former process trash compactor sump was identified by GM as an additional area of environmental concern. The former process trash compact sump was located in Building 36, Bay 85N. The location of the former process trash compactor sump is presented on Figure 7.1.

Designed to collect fluids, the sump was set within the pit floor to provide a low point to collect water. At a predetermined float level, the sump would commence automatic pumping of any water present.

Decommissioning of the former process trash compactor sump generally included sweeping, shoveling, chiseling, or pumping to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the sump. The sump was then fan dried for structural integrity inspection.

During the structural integrity inspection of the sump, water was found to be leaking in at the bottom. If any oil would collect in the sump, it would float above the leak point due to the presence of water, and therefore be contained. Since there was no evidence of water exfiltration, no further investigation was required. Following these decommissioning activities, the former process trash compactor sump and area was redeveloped. Redevelopment activities generally included removal/disposal, and backfilling the sump area with clean fill.

The former process trash compactor sump has been redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.15 FORMER BLACK DIP TANK (AOI #19)

During decommissioning activities, the former black dip tank was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The former black dip tank was located in Building 2, Bay 22BD1, and had a capacity of approximately 10,000 gallons. The location of the former back dip tank is presented on Figure 7.1.

The former black dip tank operation consisted of a dip tank at floor level and a subsurface tank for storing the dip solution during periods of dip tank maintenance. The dip solution used in this operation consisted of xylene, paint thinner, and metals such as chromium and lead. The equipment associated with the black dip tank operation had been removed in 1973, and the tank was removed in 1982.

In an effort to determine if the former black dip tank operation had impacted the soils, a soil investigation in the vicinity of the former black dip tank area was performed. Since the indicator chemicals associated with the black dip tank operation (chromium, lead, and xylene) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former black dip tank operation was required.

Following the investigation activities, the area of the former black dip tank was redeveloped. Redevelopment activities generally included demolition and removal/disposal.

The former black dip tank has been redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.16 FORMER PHOSPHATING LOCATIONS (AOI #20, 21, 22)

During decommissioning activities, the former phosphating locations were identified by GM as additional areas of environmental concern

due to historical manufacturing operations. At the time of the investigation, no drawings were found to outline former phosphating equipment layout. Only conveyor pits, tunnels, and overhead conveyor lines were present.

The approximate locations of three former phosphating areas were as follows: AOI #20 was located along the exterior wall near columns 26BE and 27BE in Building 2; AOI #21 was located at the south end near columns 32BD in Building 3; and AOI #22 was located near column 32A in Building 3. The locations of the former phosphating operations are presented on Figure 7.1.

In an effort to determine if the former phosphating operations had impacted the soils, a soil investigation in the vicinity of each former phosphating location was performed. Since the indicator chemicals associated with phosphating operations (butyl-cellosolve, nickel, and zinc) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former phosphating operations was required. Following the investigation activities, the former phosphating areas were redeveloped. Redevelopment activities generally included demolition and removal/disposal.

The three former phosphating locations have been redeveloped as part of the new landscaped areas surrounding the GM Truck Product Center.

7.17 FORMER TOP COAT PIT (AOI #23)

During decommissioning activities, the former top coat pit was identified by GM as an additional area of environmental concern. The former top coat pit was a two-level room below the plant floor located in Building 3, Bay 24BA1. The location of the former top coat pit is presented on Figure 7.1.

Historically, the upper level served as a pump room and the lower level served as a wet well for the booth water recirculation system, which was used by the top coat paint spray booth.

During decommissioning activities, the former top coat pit was swept, shoveled, chiseled, or pumped to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the top coat pit. The top coat pit was then dried for structural integrity inspection. Following cleaning activities, a crack in the concrete wall was discovered in the lower level of the pit.

In an effort to determine if the former top coat pit operation had impacted the soils, a soil investigation in the vicinity of the crack was performed. Since the indicator chemicals associated with the former top coat pit operations (acetone, ethyl-acetate, lead, methanol, ethyl glycol, chromium, istobutanol, ethylbenzene, and methyl isobutyl ketone) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former top coat pit operation was required. Following the investigation activities, the former top coat pit was redeveloped. Redevelopment activities generally included excavation, removal/disposal and backfilling the pit with clean fill.

The former top coat pit has been redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.18 FORMER ELEVATOR TIRE SHAFT (AOI #24)

During decommissioning activities, the former elevator tire shaft was identified by GM as an additional area of environmental concern. The former elevator tire shaft was located in Building 5, Bay 62BD. The location of the former elevator tire shaft is presented on Figure 7.1.

The former elevator tire shaft was constructed to house the elevator piston assembly. The shaft was cylindrical (approximately 6 feet in diameter), constructed of bricks, and was 35 feet below the floor of the elevator

pit. Historically, the elevator piston assembly was known to contain water and periodically leaked hydraulic oil into the tire shaft pit.

Decommissioning activities of the former elevator tire shaft generally included sweeping shoveling, chiseling, or pumping to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the elevator tire shaft. The shaft was then dried for structural integrity inspection. The shaft was found to have water leaking in at the bottom at an approximate rate of 1.5 gallons per week.

In an effort to determine if the former elevator tire shaft operation had impacted the soils, a soil investigation in the vicinity of the former elevator tire shaft was performed. Since the indicator chemicals associated with the former tire shaft operation (PNAs and zinc), were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former elevator tire shaft operation was required.

The two units of the former elevator tire shaft operation that were inspected during decommissioning activities were identified as follows:

Building	*Bay*	*Size (inches L/W/D)*	*Closure Date*
5	62BD	177 x 250 x 72 (Pit)	October 3, 1991
5	62BD	72 x 72 x 420 (Shaft)	October 3, 1991

Following the decommissioning and investigation activities, the former elevation fire shaft was redeveloped. Redevelopment activities generally included, dismantling, demolition, removal/disposal, and backfilling the shaft with clean fill.

The former elevator tire shaft was developed as part of the new parking lot facility for the GM Truck Product Center.

7.19 FORMER PLATING DEPARTMENT (AOI #25)

During decommissioning activities, the former plating department was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The exact location of the plating equipment could not be found as there were no drawings or clues existing at the time of the investigation. The former plating department was located in Building 9, within Bays D and E, between column lines 39 and 59. The general location of the plating department is presented on Figure 7.1.

The exact types of plating processes within this department were unknown. However, typical plating operations for truck manufacturing include decorative chrome, zinc phosphating, cold zinc galvanizing, cadmium plating, and nickel plating.

In an effort to determine if the former plating department operation had impacted the soils, a soil investigation in the vicinity of the former plating department was performed. The indicator chemicals associated with former plating operations were determined to be arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc.

In general, arsenic and selenium were both found at varying concentration levels above and below their respective then current Act 307 soil cleanup criteria. Since selenium and arsenic were not used at the former Pontiac Central facility, it was determined that the arsenic and selenium were within the range of naturally-occurring levels in the Site area, and no further investigation was required. Following the investigation activities, the area of the former plating department was redeveloped. Redevelopment activities generally included demolition and removal/disposal of the plating department area.

The former plating department had a new concrete floor slab cast-in-place for the construction of the GM Truck Product Center.

7.20 FORMER BLACK DIP TANK (AOI #26)

The former black dip tank was identified during decommissioning activities by GM as an additional area of environmental concern due to historical manufacturing operations. The exact location of the former black dip tank was not found as no equipment or plant drawings existed at the time of inspection. The former black dip tank was located in Building 9, Bay 37E, and within 10 feet of a gasoline fueling station on one of the assembly lines. The general location of the former black dip tank is presented on Figure 7.1.

Another black dip tank operation is discussed previously in Section 7.15. The dip solution historically used in the former black dip tank consisted of xylene, and metals such as lead and chromium.

In an effort to determine if the former black dip tank operation had impacted the soils, a soil investigation in the vicinity of the former black dip tank was performed. Since the indicator chemicals associated with the former black dip tank operation (chromium, lead, and xylene), as well as those associated with the former gasoline facility station (benzene, toluene, and ethylbenzene), were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former black dip tank operation was required. Following investigation activities, the area of the black dip tank was redeveloped. Redevelopment activities generally included demolition and removal/disposal.

The former black dip tank area had a new concrete floor slab cast-in-place over the former black dip tank area for the construction of GM Truck Product Center.

7.21 FORMER IRON PHOSPHATING AREA (AOI #27)

During decommissioning activities, the former iron phosphating area was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The former iron

phosphating area was located in Building 9, Bay 71E. Since there was no evidence of iron phosphating equipment, and no plant drawings were found, the exact location of the former iron phosphating operation could not be identified. The general location of the phosphating area is presented on Figure 7.1.

In an effort to determine if the former iron phosphating operation had impacted the soils, a soil investigation in the vicinity of the former iron phosphating area was performed. Since the indicator chemicals associated with the former iron phosphating operation (butyl-cellosolve, nickel, and zinc) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former iron phosphating operation was required. Following the investigation into the former iron phosphating area, the area was redeveloped. Redevelopment activities generally included demolition and removal/disposal.

The former iron phosphating area had a new concrete floor slab cast-in-place over the former iron phosphating area for the construction of the GM Truck Product Center.

7.22 FORMER ENAMEL PIT (AOI #28, 30)

During decommissioning activities, the two former enamel pits were identified by GM as additional areas of environmental concern due to historical manufacturing operations. The two former enamel pits were located in Building 9, near column 68A.

At the time of the investigation, the exact location of both former enamel pit operations was not identified. There were no drawings and no pit footprints to be found. The general locations of the former enamel pits are presented on Figure 7.1.

In an effort to determine if the two former enamel pit operations had impacted the soils, a soil investigation in the vicinity of the former enamel pits was performed. Since the indicator chemicals associated with the two former enamel pit operations [xylene, toluene, methyl ethyl ketone

(MEK), zinc, and chromium] were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the two former enamel pit operations was required. Following the investigation activities, the area of the former enamel pit was redeveloped. Redevelopment activities generally included demolition and removal/disposal.

As part of the Centerpoint Business Campus Site redevelopment plans, a new concrete floor slab was cast-in-place over the former enamel pit area for the construction of the GM Truck Product Center.

7.23 FORMER SPRAY BOOTH (AOI #29, 32)

During decommissioning activities, these two former spray booths were identified by GM as additional areas of environmental concern due to historical manufacturing operations.

Since, at the time of the investigation, there was no physical evidence of the former spray booth operations, and no drawings, the exact location of the operation could not be identified. The two former spray booths were located in Building 9, near columns 71E and 53F, respectively. The former spray booth located near column 53F was also located near a degreasing station spray booth. The locations of the spray booths are presented on Figure 7.1.

In an effort to determine if the two former spray booth operations had impacted the soils, a soil investigation in the vicinity of the former spray booth areas was performed. Since the indicator chemicals associated with the two former spray booths, and degreasing operations, [1,1,1-trichloroethane (1,1,1-TCA), and methylene chloride] were not detected in the soil samples at concentrations exceeding their respective then current Act 307 cleanup criteria, no additional investigation of the two former spray booth operations was required. Following the investigation into the two former spray booths, these areas were redeveloped. Redevelopment activities generally included demolition and removal/disposal.

A new concrete floor slab was cast-in-place over the former spray booth areas for the construction of the GM Truck Product Center.

7.24 FORMER PHOSPHATING AREAS (AOI #31, 33)

During decommissioning activities, these two former phosphating areas were identified by GM as additional areas of environmental concern due to historical manufacturing operations. The two former phosphating areas were both located in Building 9, Bay 31F and 75F, respectively. The exact location of these areas was not determined since the plans for the operation were not found, and there was no physical evidence of the former phosphating operations. The general locations of the phosphating areas are presented on Figure 7.1.

In an effort to determine if these two former phosphating areas had impacted the soils, a soil investigation the vicinity of the phosphating areas was performed. During the soils investigation in the vicinity of Bay 31F, a slight petroleum odor was noted, and the PID readings were moderately elevated.

Since the indicator chemicals associated with the former phosphating operations, and petroleum odor, (butyl-cellosolve, zinc, nickel and BTEX) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the two former phosphating area operations was required. Following the investigation into these two phosphating locations, these areas were redeveloped. Redevelopment activities generally included demolition and removal/disposal.

A new concrete floor slab was cast-in-place over the former phosphating areas for the construction of the GM Truck Product Center.

7.25 FORMER LOWERATOR (AOI #34)

During decommissioning activities , the former lowerator was identified by GM as an additional area of environmental concern. The lowerator was an elevator located in Building 9, Bay 77C, with a sump located near the south pit wall. The location of the lowerator is presented on Figure 7.1.

The former lowerator was used to lower partially assembled truck frames from the second floor to the first floor. Historically, brake fluid would accumulate on the floor of the lowerator pit.

In an effort to determine if the former lowerator operation had impacted the soils, a soil investigation in the vicinity of the former lowerator sump was performed. Since the indicator chemical associated with the former lowerator operation [triethylene glycol monoethyl ether (TGME)] was not detected in the soil samples at concentrations that are a threat to public health and safety (no Act 307 cleanup criteria are available for this constituent), no additional investigation of the former lowerator operation was required. Following the investigation activities, the area of the former lowerator was redeveloped. Redevelopment activities generally included dismantling, demolition, removal/disposal, and backfilling the pit with clean fill.

The area of the former lowerator was redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.26 FORMER TRANSFORMER ACCIDENT SITE (AOI #35)

During decommissioning activities, the former transformer accident site was an additional area of environmental concern identified by GM. The former transformer accident site was located in Building 12, Bay 91H. The location of the former transformer accident site is presented on Figure 7.1.

At this location, an electrical transformer was reported to have been dropped on the floor in 1972. Fluids were identified to have leaked onto the floor during this accident.

In an effort to determine if the former transformer accident site had impacted the soils, a soil investigation in the vicinity of the spill was performed. Since the indicator chemicals associated with transformer operations (PCBs) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former transformer accident site was required. Following the investigation of the accident site, the site was redeveloped. Redevelopment activities generally included excavation, demolition and removal/disposal.

The area of the former transformer accident site was redeveloped as part of the parking lot facility for the GM Truck Product Center.

7.27 FORMER ZINC PLATERS (AOI #36)

During decommissioning activities, the former zinc plating operation was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The former zinc platers (barrel and still platers) were located at the south end of Building 13, near Bay 103G. The location of the former zinc platers is presented on Figure 7.1.

In an effort to determine if the former zinc plater operation had impacted the soils, a soil investigation in the vicinity of the former zinc platers area was performed. Since the indicator chemical associated with these plating operations (zinc) was not detected in the soil samples at concentrations exceeding the then current Act 307 soil cleanup criteria, no additional investigation of the former zinc plating operation was required.

The zinc platers were cleaned, dismantled, and decommissioned between 1984 to 1986. The area of the former zinc platers has been redeveloped as part of the GM Truck Product Center parking lot.

7.28 FORMER WASTEWATER SUMP (AOI #37)

During decommissioning activities, the former wastewater sump was identified by GM as an additional area of environmental concern. The former wastewater sump, and pumping station, were located in Building 13, column 101G, at the north end of the former steam tunnel. The location of the former wastewater sump is presented on Figure 7.1.

In an effort to determine if the former wastewater sump had impacted the soils, a soil investigation in the vicinity of the sump was performed. Since the indicator chemicals associated with the former wastewater sump operation [zinc, and (total) chromium] were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former wastewater sump area was required. Following the investigation activities, the former wastewater sump area was redeveloped. Redevelopment activities generally included excavation and removal/disposal of the sump.

The former wastewater sump was redeveloped as part of the new parking lot facility for the GM Truck Product Center.

7.29 FORMER WASTEWATER TUNNEL (AOI #38)

During decommissioning activities, the former wastewater tunnel was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The former wastewater tunnel was installed in the steam pipe trench when the southern portion of Building 13 was converted from a lumber kiln to a plating shop. The steam pipe trench was aligned north/south below the floor in the center of the building. The location of the former wastewater tunnel is presented on Figure 7.1.

In an effort to determine if the former wastewater tunnel operation had impacted the soils, a soil investigation in the vicinity of the tunnel was performed. Since the indicator chemicals associated with the former wastewater tunnel operation [amenable cyanide, and (total) chromium] were not

detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former wastewater tunnel area was required.

The former wastewater treatment tunnel was backfilled with clean fill, paved over, and decommissioned in 1982. The former wastewater tunnel was redeveloped as part of the parking lot facility for the GM Truck Product Center.

7.30 FORMER ANODIZER (AOI #39, 40)

During decommissioning activities, two former anodizers were identified by GM as additional areas of environmental concern due to historical manufacturing operations. These two former anodizers were located in the former plating shop at the south end of Building 13, Bay 103G3 and Bay 103J, respectively. The locations of the two former anodizers is presented on Figure 7.1.

In an effort to determine if the former anodizers had impacted the soils, a soil investigation in the vicinity of the two former anodizers was performed. Since the indicator chemical associated with the anodizer operations (chromium) was not detected in the soil samples at concentrations exceeding its then current Act 307 soil cleanup criteria, no additional investigation of the two former anodizer operations was required. Following these investigation activities, the area of the former anodizers were redeveloped. Redevelopment activities generally included demolition, excavation, and removal/disposal.

The area of the former anodizers has been redeveloped as part of the GM Truck Product Center parking lot.

7.31 FORMER CHIP DOCK (AOI #41)

During decommissioning activities, the former chip dock was identified by GM as an additional area of environmental concern due to historical manufacturing operations. The location of the former chip dock is presented on Figure 7.1.

The former chip dock was located in the southwest corner of Building 29, which originally contained two north-south railroad spurs in individually recessed trainwells. These railroad spurs were used to remove ferrous metal shavings and cuttings from the engine factory on the second floor of Building 29.

Gondolas were typically filled with metal shavings and cuttings and then discharged from the second floor into railroad gondola cars at ground level. The material was then sent out as scrap steel. When engine production ceased, the trainwells were backfilled to grade and the area was paved.

In an effort to determine if the former chip dock operation had impacted the soils, a soil investigation in the vicinity of the chip dock was performed. Since the indicator chemicals associated with the former chip dock operation (PNAs and metals) were not detected in the soil samples at concentrations which posed a threat to public health and safety, no additional investigation of the former chip dock operation was required.

The area of the former chip dock was redeveloped as part of the parking lot facility for the GM Truck Product Center.

8.0 PARCEL B AREAS OF INTEREST

Parcel B was segmented into Parcels B1, B2, and B3, respectively, as shown on Figure 1.6. The Parcel B AOIs include those areas previously identified by the U.S. EPA in the PR/VSI in addition to other areas of environmental concern identified by GM.

There are a total of three AOIs identified in Parcel B1, one AOI in Parcel B2, and one AOI in Parcel B3. Of these five AOIs, three AOIs were identified by both U.S. EPA and GM.

An evaluation of the status of the five AOIs identified within of Parcels B1, B2, and B3 is provided in the following subsections. The summary includes a brief history of the AOIs, their current status, and whether they have been closed or decommissioned.

8.1 PARCEL B1

The AOIs identified in Parcel B1 include one area of concern identified in the PR/VSI and two additional areas of concern which were identified by GM. The PR/VSI and GM areas within Parcel B1 are summarized in Table 8.1 and presented on Figure 8.1.

8.1.1 Former Underground Tank Area (AOI #42) (SWMU #6)

The former underground storage tank area consisted of a 1,000-gallon waste oil steel UST. The UST was located east of and adjacent to Building 53, and was originally installed in 1972 for the temporary storage of waste oil. When the PR/VSI was performed, the tank contents were defined as nonhazardous by RCRA. The location of the former UST is presented on Figure 8.1.

The PR/VSI was limited to the area surrounding the intake/discharge stand pipes of the UST. At the time of the investigation, the

PR/VSI recommended that an assessment of the structural integrity of the UST, and surface soil sampling in the area surrounding the intake/discharge stand pipes (due to visible surface staining) be completed.

During remediation activities, the former UST was removed on August 30, 1991. The UST was found to be in excellent condition upon removal. Soil samples that were collected and analyzed during the UST removal, identified waste oil-related soil contamination. These results were then reported to the MDNR on October 22, 1991. In the 45-day report submitted to the MDNR on December 2, 1991, it was concluded that the waste oil-related contamination was due to routine tank operations (such as tank filling).

Based on the soil sampling results for BTEX and PNA constituents, the excavation limits of the former UST area were determined. The volume of soil removed and disposed of at an approved landfill was approximately 190 cubic yards.

On January 22, 1992, a Type B closure of the Building 53 UST Study Area was requested by GM. On November 19, 1993, the MDNR requested additional information be provided prior to granting closure. On February 11, 1994, a final report satisfying the MDNR's request for additional information for the Building 53 UST Study Area (see Appendix G and Section 5.2.2) was submitted for closure. Comments received from the MDNR regarding this report were addressed and submitted to the MDNR on March 28, 1994. The Building 53 UST Study Area is currently undergoing closure consideration by the MDNR. As identified in Section 5.2.2, Building 53 has been demolished.

New manufacturing/distributing and office/research buildings are planned for construction in this area as part of the Centerpoint Business Campus Site redevelopment plans.

8.1.2 Former Construction Debris Site (AOI #43)

During redevelopment activities, the former construction debris site was identified by GM as an additional area of environmental concern. The location of the former construction debris site is presented on Figure 8.1.

The former construction debris site was an area in which construction debris from the renovations of Buildings 33, 34, and 52, located in the Truck Engineering Area (Parcel C1), were received. Due to the construction of new pits in these buildings, the construction debris consisted primarily of soil spoil. Since some of the debris originated from Building 33, an area of a known gasoline release, there existed a potential for the soil excavation spoil to contain BTEX constituents.

In an effort to determine if the former construction debris site operations had impacted the soils, a soil investigation in the vicinity of the debris site was performed. Since the indicator chemicals associated with the former debris (BTEX) were not detected in the soil samples at concentrations exceeding their respective then current Act 307 soil cleanup criteria, no additional investigation of the former construction debris site operation was required.

The former construction debris site is being redeveloped as a manufacturing/distributing and office/research area as part of the Centerpoint Business Campus Site redevelopment plans.

8.1.3 Building 43 Investigation/Remediation (AOI #44)

During redevelopment activities, the Building 43 Study Area, previously identified by GM as the frame rack storage area, was an additional area of environmental concern due to the historical use of the storage area. The location of the Building 43 Study Area is presented on Figure 8.1.

The Building 43 Study Area was historically a location in which some miscellaneous materials had been backfilled. This was evidenced by

buried ash which was unearthed during construction of the former frame storage racks.

In an effort to determine if the Building 43 Study Area materials had impacted the soils, a subsurface soil investigation of the area was performed. During the test pit investigation, a layer of ash was found approximately three feet thick and four feet below ground surface. Also contained in the ash were cured or burned paint sludge, wood, and steel bands. A subsurface soils investigation of the area was also performed to define the extent of potentially affected material at the Study Area. Soil samples were submitted and analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), and Target Analyte List (TAL) metals. Based on the soil sampling results, the excavation limits (for remediation) of the area were determined. The volume of soil excavated in the area during remediation was approximately 11,000 cubic yards. The materials were characterized and disposed of at a Michigan Type II Landfill. The Building 43 Study Area reporting activities are presented in Appendix F (also see Section 5.2.1).

In summary, the investigation/remediation of the Building 43 Study Area has been completed. After completion of the remediation, Building 43 was demolished. CRA is currently preparing a construction report to detail the remedial activities completed at the Building 43 Study Area.

The Building 43 area is being redeveloped as a manufacturing/distributing and office/research area as part of the Centerpoint Business Campus Site redevelopment plans.

8.2 PARCEL B2

8.2.1 Former South Retention Pond (AOI #45) (SWMU #33)

The former south retention pond was approximately 100 yards long, 5 yards deep, and 30 yards wide. Historically, the south

retention pond typically collected stormwater runoff from Pontiac East and the wastewater treatment plant. The location of the former south retention pond is presented on Figure 8.2.

This former south retention pond had been previously identified in the PR/VSI as SWMU #33, and was not subject to RCRA permit requirements. The PR/VSI suggested further action was; sediment sampling be completed in an effort to determine the potential presence of hazardous constituents that may have drained into the south retention pond.

In response, North American Operations (NAO) Facilities Engineering performed a Level One Environmental Site Assessment. The assessment concluded that releases of materials into the pond did not affect the water quality or adjacent soils. In 1985, soil samples from the unit were found to be non-contaminated. In 1991, soil samples were found to have levels of VOCs and PNAs below the detection limits, and levels of metals were found to be below regulatory levels. No additional investigation of the former south retention pond was required.

As part of the Centerpoint Business Campus Site redevelopment, the former south retention pond is being developed as a commercial and office/research area. The new Centerpoint Parkway is also currently under construction in the vicinity of the former south retention pond, which provides primary access within the Centerpoint Business Campus.

8.3 PARCEL B3

8.3.1 North Retention Pond (AOI #46) (SWMU #34)

The north retention pond is approximately 30 yards long, 3 yards deep, and 15 yards wide. Historically, the north retention pond collected stormwater runoff from the northern parking lots of Pontiac East. The location of the north retention pond is presented on Figure 8.3.

The north retention pond had been previously identified in the PR/VSI as SWMU #34, and was not subject to RCRA permit requirements. The PR/VSI suggested further action was; sediment sampling be completed in an effort to determine the potential presence of hazardous constituents.

In response, NAO Facilities Engineering performed a Level One Environmental Site Assessment of the area. The assessment determined that there have been no hazardous constituents released into the north retention pond. No additional investigation of the north retention pond was required.

As part of the Centerpoint Business Campus Site redevelopment, the area in the vicinity of the north retention pond is being developed as a commercial and office/research area. The GM Truck Product Development Center, and Campus Drive, are both under construction, and nearing completion in the vicinity of the north retention pond. The north retention pond currently receives stormwater runoff from existing parking lots and will continue to service these areas in the future.

9.0 PARCEL C AREAS OF INTEREST

This section presents an overview of the Parcel C AOIs and precludes a follow-up report to be submitted in 1995 with additional information on the 35 Parcel C AOIs and other areas identified to be of environmental concern in Parcel C. The follow-up report will contain detailed information on all identified Parcel C AOIs.

As presented on Figure 1.6, the GM Site has been segmented into three distinct areas comprised of Parcels A, B, and C. Parcel C was further separated into individual Parcels C1, C2, C3, and C4. The parcels were separated to identify and independently evaluate Pontiac East, the Waste Water Treatment Plant (WWTP), the Truck Engineering Center, and the former J-Lot fill area. For the purposes of this Report, Parcels C1 through C4 are considered contiguous GM owned and operated parcels. The AOIs in these parcels are discussed in Sections 9.1 through 9.4.

Finally, Section 9.5 presents an evaluation of two additional AOIs. These include the following:

- Murphy Drain, and
- Pits and Sump.

The Murphy Drain is a stormwater outlet located north of South Boulevard. Murphy Drain is evaluated separately because it is not located within any of the defined parcels. The pits and sumps category is considered part of Pontiac Central and Pontiac East. The pits and sumps category refers to over 200 pits and sumps identified during the decommissioning activities of Pontiac Central, in addition to other pits and sumps which will be evaluated in Pontiac East.

The Parcel C AOIs include those areas identified by the U.S. EPA in the PR/VSI, in addition to other areas of interest identified by GM. In total, 29 Parcel C AOIs were identified by U.S. EPA in the PR/VSI. It should be noted that 15 of the 29 areas identified by U.S. EPA in the PR/VSI are located at or within the Wastewater Treatment Plant (WWTP) located at Building 56. An

additional six AOIs have been identified by GM. Of the 35 AOIs identified, seven are located in Parcel C1 (Truck Engineering Center), 18 are located in Parcel C2 (WWTP), seven are located in Parcel C3 (Pontiac East Truck Assembly Plant), and one is located in Parcel C4 (former J lot area). The Murphy Drain AOI is located off Site north of South Boulevard. The pits and sumps are located in both Pontiac Central and Pontiac East.

The locations are presented on Figures 9.1 through 9.4 for Parcels C1 through C4, respectively. The Parcel C AOIs are summarized in Table 9.1. The Murphy Drain location is also presented on Figure 9.1. The pits and sumps locations are not shown on Figures 9.1 through 9.4.

9.1 PARCEL C1

9.1.1 Refuse Process Facility (AOI #47) (SWMU #7)

The refuse process facility, located at the Power Plant, is an area which processes wastes such as cardboard, paper, and wood segregated wastes (including those received from off-Site sources). The refuse process facility also shreds burnable solid wastes generated on Site and locally for supplemental boiler fuel. Heavy materials are reprocessed and metals are magnetically separated and sent off Site to a landfill. Historically, the volume of process waste received was approximately 160 tons/day.

The refuse process facility had been previously identified in the PR/VSI as having a Michigan Act 641 operating license. The refuse process facility was active at the time of the PR/VSI inspection.

The PR/VSI suggested that no further action was required at the refuse process facility.

It should be noted that the Power Plant is scheduled for closure and decommissioning within the 1996 to 1998 timeframe. All buildings on Site will be designed for natural gas heating and existing building heating systems will be converted to natural gas.

9.1.2 Drum Draining Area (AOI #48) (SWMU #5)

The drum draining area consisted of an aboveground concrete sump with metal grid covering the open top. The drum draining area includes two 750-gallon tanks with an output volume of 1,500 gallons per day. Materials managed in the area include oily and ignitable wastes which may contain volatile constituents and heavy metals.

The PR/VSI identified oil and paint stains on the upper grid portion of the unit. In addition, the PR/VSI noted odors typical of VOCs, in the immediate vicinity of the tanks.

The drum draining area had been identified by the PR/VSI as being RCRA regulated and was active at the time of inspection.

The PR/VSI suggested further action was; air monitoring during drum draining operations be conducted and structural integrity testing be completed.

9.1.3 Coal Storage Unit (AOI #49) (SWMU #32)

The coal storage unit, which is located in the Pontiac East (Power Plant) area, is used to manage coal unloaded from railroad cars. The coal storage unit and the Power Plant are scheduled to simultaneously undergo decommissioning activities in the 1996 to 1998 timeframe.

The coal storage unit was identified as a suspected source of an October 12, 1977 release of PCBs (suspected to have arrived from a shipment of contaminated coal) in stormwater runoff to a storm sewer which empties into a tributary of the Clinton River. Additional information regarding this issue will be presented in the follow-up report.

The regulatory status of the coal storage unit was identified in the PR/VSI as being nonregulated. The unit was active at the time of the coal storage unit inspection.

The PR/VSI suggested further action was; monitoring of possible air emissions should be considered during the loading and unloading of coal.

9.1.4 DUCO Stores (AOI #50)

During the Site investigation activities of Parcel C1, DUCO Stores was identified by GM as an additional area of environmental concern due to historical operations. Environmental activities have been completed in the following areas:

- DUCO Stores UST Study Area remediation; and
- DUCO Stores Fuel Line Study Area investigation.

The remediation activity for DUCO Stores is summarized in Section 5.3.1 and is presented in detail in Appendix H and J. The investigation activity for the DUCO Stores Fuel Line is discussed in further detail in Section 6.1.1 and is presented in Appendix J.

The following sections summarize the DUCO Stores activities.

DUCO Stores UST Study Area

The DUCO Stores UST Study Area is a tank farm which consisted of eight steel underground storage tanks (USTs) that were installed in 1927 when the Pontiac Central Plant was originally constructed. The USTs typically contained gasoline, RR end lube, glycol, axle oil, and diesel fuel. The DUCO Stores UST area was located outside of the northwest corner of Building 21.

On September 5, 1991, following removal of the USTs between August 20 and 29, 1991, which were identified to be in good condition, diesel fuel was observed to be seeping into the north end of the excavation. Corrective actions to recover the diesel fuel were implemented immediately and approximately 100 gallons of diesel fuel were recovered before seepage ceased.

Additional remedial activities included the excavation and thermal treatment of approximately 3,000 cy of soil. No additional investigation is required for closure. This is identified in the May 1994 report for the DUCO Stores Study Area submitted to GM (see Appendix H).

DUCO Stores Fuel Line Study Area

The DUCO Stores Fuel Line Study Area was an underground distribution network for gasoline and fuel oil which was installed in 1927 with the original plant buildings. The DUCO Stores Fuel Line has been out of service for approximately 30 years.

In an effort to determine if the former fuel line had impacted the soils and groundwater, investigations in the vicinity of Buildings 11, 12, and 27 were performed in 1992. The indicator chemicals associated with the operation of the former fuel line [BTEX], were detected in five boreholes exceeding their then current Type B soil cleanup criteria. The water samples collected from the perched water zone also exceeded their then current Type B Drinking Water criteria for BTEX and lead.

Additional investigative activities of the Fuel Line Study Area were performed in 1994 to determine the extent of the impacted soils. The soil samples which were collected were analyzed for BTEX and lead. This investigation did not identify any further areas of residual BTEX in soil at levels of concern. In the 10 to 12-foot bgs interval, BTEX concentrations were below the then current Type B direct contact soil criteria.

The final report for the DUCO Stores Fuel Line Study Area was submitted to GM in June 1994 and stated that no additional investigation or remediation was required for this area (see Appendix J).

9.1.5 Building 33 Fuel Island Study Area (AOI #51)

The fuel island is located south of Building 33 in an asphalt parking area. There is a concrete pad surrounding the fuel island which covers two 12,000-gallon fuel tanks. In the past, a 10,000-gallon tank which contained diesel fuel was removed from the present location of the fuel island and the fuel island was reconstructed (including installation of the two tanks now present).

A release was documented in 1991. The fuel island UST was removed and the area was remediated. A report regarding the Building 33 Fuel Island Study Area was submitted to GM in January 1994 (see Appendix L).

9.1.6 Building 35 Tank Farm (AOI #52)

The Building 35 Tank Farm is located directly adjacent to the west side of Building 35. On October 12, 1992, GM reported a suspected release from the AOI following structural integrity testing of the tanks. The release was confirmed on October 21, 1992 following receipt of the results of a second tank test. GM submitted both 20-day and 45-day Abatement Reports to MDNR. The work plan included in the 45-day report included the removal of six 2,000-gallon USTs which stored various fuels and mineral spirits.

Following removal of the USTs, a soil feasibility study was conducted. Final remediation of the area began on November 1, 1994 subsequent to completion of the soil feasibility analysis. Final remediation included the removal of 1,244 cubic yards of contaminated soils.

The Building 35 Tank Farm final closure report is currently being prepared and will be submitted for MDNR review and approval.

9.1.7 Building 33 Free Product Study Area (AOI #53)

The Free Product Study Area is a pure product gasoline plume located beneath Building 33. Building 33 is part of the Truck Engineering Center located immediately west of the new GM Truck Product Center. Based upon the significant investigations, evaluations, and remedial efforts which have been conducted to date, an estimated 2,000 gallons of gasoline is believed to be trapped within a sand lens in the clay till located below the building.

In 1985, a gasoline release was discovered by GM during the foundation investigation for the planned expansion of Building 33. Nineteen geotechnical soil borings were drilled. Free product (gasoline) was found in one borehole, gasoline constituents were found in soils from seven of the borings, gasoline odors were detected in seven borings, and the remaining five borings showed no evidence of gasoline. The National Response Center and the MDNR were notified of the leaking fuel line supplying an abandoned fuel island south of Building 33. The fuel supply line was found to be leaking in 1968/1969. A pressure check was performed on the line. The fuel line and fuel station were abandoned in approximately 1969 following the discovery of the leaking pipe, and the fuel lines capped.

A report was prepared and submitted to GM on April 17, 1995 detailing several remedial alternatives which could be utilized for the removal of gasoline at the Site. This report is presented in Appendix K. GM is currently evaluating the Building 33 remedial options.

It should be noted that Building 33 is scheduled to be completely renovated in 1997. It is currently expected that additional remediation will be completed during the renovation of Building 33.

9.2 PARCEL C2

9.2.1 Former Surface Impoundment (AOI #54) (SWMU #31)

The former surface impoundment was a temporary lagoon used once in 1978 due to an upset in process operations. At the time of the PR/VSI, the former surface impoundment existed as a ground depression and was identified to have contained fly ash generated on Site.

The former surface impoundment was located adjacent to the Wastewater Treatment Tank Area, although the exact location of the impoundment was unknown. The surface impoundment was used for the temporary storage of approximately 70,000 gallons of liquid waste.

The regulatory status of the former surface impoundment was identified by the PR/VSI as non-regulated. The former surface impoundment was inactive at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; soil/sediment sampling should be completed to determine the exact location of the surface impoundment and whether hazardous constituents are present. During construction activities of the Centerpoint Business Campus adjacent to the wastewater treatment tank area, no evidence of flyash or indicators of hazardous constituents were discovered.

9.2.2 General Waste Solids Separator (AOI #55) (SWMU #18)

The Waste Water Treatment Plant (WWTP) for Pontiac East and the former Pontiac Central manufacturing areas is located at and within Building 56. The PR/VSI had identified a variety of units located at the WWTP which are contained entirely within Building 56. These AOIs include:

Description	***AOI#***	***SWMU#***
General Waste Solids Separator	55	18
Acid Waste Sludge Tanks	56	19
Sludge Filter Press	57	20
Sludge Filter Press Sump	58	21

Acid Waste Separator System	59	22
Polymer Tank	60	23
Waste Pickle Acid Tank	61	24
Cleaner Waste Separator	62	25
Pickle Acid Treatment Tank Storage Area	63	26
Former Vacuum Filter Press	64	27
Oil Skimmer Storage Tank	65	28
Wastewater Treatment Tank Area	66	29
Lime Slaker	67	36
Drum Storage Area	68	37
Container Storage Area	69	1

The solids separator consists of two open topped tanks surrounded by a 4-inch concrete berm located in Building 56. The solids separator was designed for the separation of waste solids received via a conveyor belt system.

The regulatory status of the general waste solids separator was identified by the PR/VSI as nonregulated. The general waste solids separator was identified to be active during the PR/VSI inspection.

The PR/VSI suggested further actions were; air monitoring should be considered during operations and structural integrity testing should be performed.

It should also be noted that all components within the WWTP located within Building 56 have been operated and maintained in accordance with applicable operating manuals and manufacturer specifications.

9.2.3 Acid Waste Sludge Tanks (AOI #56) (SWMU #19)

The acid waste sludge tank area is located in the Pontiac East WWTP area, upstairs in Building 56, and consists of three vertical tanks of approximately 5,000 gallons each. The sludge tanks were set up in 1972 and modified in 1978. These tanks serve as temporary storage units for sludge

generated from the Acid Waste Separator System and to be received by the Sludge Filter Press. The acid waste sludge tanks receive wastes which contain heavy metals from the acid waste separator system.

The PR/VSI indicated that there was some evidence of staining and minor splashing at the top of the tank, suggesting the possibility of past releases. The regulatory status of the acid waste sludge tanks had been identified by the PR/VSI as nonregulated. The tanks were active at the time of the acid waste sludge tank PR/VSI inspection.

The PR/VSI suggested that no further action was required.

9.2.4 Sludge Filter Press (AOI #57) (SWMU #20)

The sludge filter press is located in the Pontiac East WWTP area, downstairs in Building 56, and serves to dewater all incoming sludges. During each dewatering cycle, 5.5 cubic yards of sludge are processed. The sludge filter press manages waste sludges (including F019) which may contain volatile constituents, heavy metals, and organics. The PR/VSI indicated that splashing and staining of the surrounding walls was observed at the lower portion of this unit. The PR/VSI had also identified that some minor runoff from this area (trickles) had occurred beneath the outside gate towards the concrete driveway. According to the PR/VSI, odors representative of VOCs were evident in the area.

The regulatory status of the sludge filter press was identified in the PR/VSI as nonregulated. The sludge filter press was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; air monitoring should be considered during unit operations.

9.2.5 Sludge Filter Press Sump (AOI #58) (SWMU #21)

The sludge filter press sump is located in the Pontiac East WWTP area, downstairs in Building 56 (next to gondola collection/loading area). This open top unit is constructed entirely of concrete. A piping system in the sludge filter press sump sends the water derived from the Sludge Filter Press back upstairs to the General Waste Solids Separator (Unit #18). All drainage water collected from within Building 56 and the container storage area are received by this sump.

The PR/VSI indicated that there was no evidence of any releases (other than some staining on the overlying grid). The regulatory status of the sludge filter press sump was identified by the PR/VSI as nonregulated. The sludge filter press sump was active at the time of the inspection.

The PR/VSI suggested further action was; air monitoring should be considered during sump operation, as well as structural integrity testing.

9.2.6 Acid Waste Separator System (AOI #59) (SWMU #22)

The acid waste separator system is located in the Pontiac East WWTP area, upstairs in Building 56. The acid waste separator is approximately 10 feet x 40 feet, and receives the majority of its acidic influent from the Power House. Acid wastes containing heavy metals are neutralized to a pH between 6 and 8. Solids which are generated are gravity separated and directed to the acid waste sludge tanks. Waste waters are treated at the wastewater treatment tank area.

The PR/VSI identified no visible evidence of release, although odors representative of VOCs were present. The regulatory status of the acid waste separator system was identified by the PR/VSI as nonregulated.

The PR/VSI suggested further action was; air monitoring should be considered during system operation as well as testing of the structural integrity of the separator system.

9.2.7 Polymer Tank (AOI #60) (SWMU #23)

The polymer tank is located in the Pontiac East WWTP area, upstairs in Building 56. The polymer tank is approximately 10,000 gallons in capacity and is believed to have been out of service for several years.

The regulatory status of the polymer tank was identified by the PR/VSI as nonregulated. The tank was inactive at the time of the PR/VSI inspection.

The PR/VSI suggested that no further action was required.

9.2.8 Waste Pickle Acid Tank (AOI #61) (SWMU #24)

The waste pickle acid tank is located in the Pontiac East WWTP area, upstairs in Building 56. The waste pickle acid tank is a 12,000-gallon steel tank containing ferrous chloride products used in the chemical reduction of hexavalent chromium. Ultimately, this solution receives lime which effectively raises the pH of the waste pickle acid solution. The wastes handled in the tank includes waste pickle acid, which contains lead, chromium, and nickel.

The PR/VSI indicated that some staining and minor corrosion at the tank bottom was identified and odors representative of VOCs were present. The regulatory status of the waste pickle acid tank was identified by the PR/VSI as RCRA regulated. The tank was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; routine inspections were required.

9.2.9 Cleaner Waste Separator (AOI #62) (SWMU #25)

The cleaner waste separator is open at the top and measures approximately 15 feet by 40 feet with a capacity of approximately 4,000 gallons. The system is manually operated to skim the oil contained in cleaner wastes. The cleaner waste separator is located in the Pontiac East WWTP area, upstairs in Building 56.

Cleaner wastes managed typically contain complexed organics. The skimmed oil is piped downstairs to the oil skimmer storage tanks. The wastewater obtained from this operation is sent outside to the wastewater treatment tank area.

The PR/VSI indicated that oil staining was observed along the floor inside the bermed area. The regulatory status of the cleaner waste separator was identified by the PR/VSI as nonregulated. This area was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; air monitoring should be considered during operations, as well as structural integrity testing of the separator.

9.2.10 Pickle Acid Treatment Tank Storage Area (AOI #63) (SWMU #26)

The pickle acid treatment tank storage area consists of vertical pickle acid treatment operations co-existing with two other vertical tanks. The waste treatment process units utilize 1,200 gal/day ferrous sulfate to chemically reduce hexavalent chromium to trivalent chromium. These tanks have a total capacity of 34,500 gallons. The pickle acid treatment tank storage area is located in the Pontiac East WWTP area, first floor of Building 56.

The pickle acid treatment tank manages waste pickle acid. Waste pickle acid contains lead, chromium, and nickel. The other two

non-SWMU tanks consist of an inactive sulfuric acid treatment tank, and a caustic treatment tank.

The regulatory status of the pickle acid treatment tank storage area was identified by the PR/VSI as RCRA regulated. The tanks were active at the time of the storage area inspection.

The PR/VSI suggested further action was; routine inspections should be performed.

9.2.11 Former Vacuum Filter Press (AOI #64) (SWMU #27)

The two former vacuum filter presses were approximately 16 feet by 12 feet and were used in the sludge dewatering operations. These two former vacuum filter presses were located in the Pontiac East WWTP area, downstairs in Building 56.

The regulatory status of the two former vacuum filter presses was identified by the PR/VSI as nonregulated. The presses were inactive at the time of the PR/VSI inspection.

The PR/VSI suggested that no further action was required.

The two vacuum filter presses have since been dismantled and removed from Building 56.

9.2.12 Oil Skimmer Storage Tank (AOI #65) (SWMU #28)

The oil skimmer storage tank is located in the Pontiac East WWTP area, downstairs in Building 56. The oil skimmer storage tank is a vertical tank which receives oily waste skimmed from the surface of the Waste Separator located upstairs. The oil skimmer storage tank has a capacity of 6,000 gallons. Cleaner waste oil is shipped off Site for disposal.

The regulatory status of the oil skimmer storage tank was identified in the PR/VSI as nonregulated. The tank was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; air monitoring should be considered during the oil skimmer storage tank operation.

9.2.13 Wastewater Treatment Tank Area (AOI #66) (SWMU #29)

The wastewater treatment tank area consists of approximately 20 open top vertical tanks located outside Building 56, in the Pontiac East WWTP area. The wastewater treatment tank area has a total capacity of approximately 4 million gallons. The wastewater treatment tanks are designated as follows:

- three tanks for treatment of acid wastes;
- six tanks for the treatment of general wastes;
- two clarifier tanks;
- one equalization tank;
- three sludge thickener tanks which were being converted to provide an additional cleaner waste tank; and
- a smaller (e.g., approximately 5,000 gallons) unidentified aboveground tank located beneath/adjacent to the catwalk leading to the wastewater treatment tank area from Building 56.

It should be noted that all of these tanks are above ground storage tanks (ASTs). The PR/VSI identified the following general concerns:

1. absence of individual tank berms;
2. unidentified drums piled along the sides of several tanks;
3. debris and stained soil adjacent to the tank bottoms and throughout the tank area, although the immediate area was covered with gravel;
4. sludge stains inside one of the tanks implied past levels where overflow conditions may have occurred;
5. corrosion was noted in several tank areas; and

6. visibly stained soil was observed near the drainage collection ditch.

The regulatory status of the wastewater treatment tank area was identified by the PR/VSI as nonregulated.

The PR/VSI suggested further action was; a soil investigation should be completed and proper identification of all unlabeled drums should be provided.

9.2.14 Lime Slaker (AOI #67) (SWMU #36)

The lime slaker was identified during the PR/VSI as an area of concern. The lime slaker is a unit which receives dried pebble lime from a 25-ton vertical storage hopper. The lime is then wetted and the slaked solution is sent to the adjacent wastewater treatment tank area. The lime slaker is located in Pontiac East WWTP, upstairs in Building 56.

The regulatory status of the lime slaker was identified by the PR/VSI as nonregulated. The lime slaker was active at the time of the lime slaker PR/VSI inspection.

The PR/VSI suggested further action was; air monitoring during operation of the lime slaker should be considered.

9.2.15 Drum Storage Area (AOI #68) (SWMU #37)

The drum storage area was identified during the PR/VSI as an area of concern. The drum storage area was used for the storage of product sodium hypochlorite and sodium bisulfate contained in 55-gallon drums. At the time of the PR/VSI, the drums were placed on wooden pallets and stacked. The storage area is located at the Pontiac East WWTP, downstairs in Building 56.

The regulatory status of the drum storage area was identified by the PR/VSI as nonregulated. The drum storage area was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; all drums should be properly identified.

9.2.16 Container Storage Area (AOI #69) (SWMU #1)

The container storage area consists of a 12,543-square foot, 8-inch thick epoxy-coated concrete waste management pad, that was constructed in 1980. The waste management pad is divided into two operating halves separated by a 4-foot high, 2-foot thick concrete wall. The west half is a covered drum storage waste accumulation area and the east half operates as an uncovered waste bulking area. This container storage area is located at the Pontiac East WWTP, adjacent to and north of Building 56.

The west half of the waste management pad (the drum storage waste accumulation area) is the only area in which hazardous waste was stored. The east half of the waste management pad (bulking area of the pad) was not used for the storage of hazardous waste. Wastes typically received at the waste management pad included non-hazardous paint sludges, solvents (F003 and F005), chlorinated solvents (F001) and non-hazardous oils.

The drum storage area operated as a hazardous waste storage area under interim status. In March 1985, GM submitted a Part B Permit Application which requested approval to operate the storage pad. In July 1987, GM withdrew its Part B Permit Application and proceeded to close this waste storage area.

Closure activities included decontamination, soil sampling, and excavation of approximately 35 cubic yards of soil north of the bulking pad retaining wall. These activities satisfied the requirements of the waste management pad closure as specified in 40 CFR 265.111. Closure activities are

summarized in the Closure Report dated March 1991 which is presented in Appendix B.4. The MDNR approval of the closure is presented in Appendix B.5.

9.2.17 Tank Storage Area (AOI #70) (SWMU #4)

The tank storage area consists of container storage space, a sludge solidification pit, and six horizontal ASTs, each having a 12,000-gallon capacity. The tank storage area is used for the management of waste materials presently being stored in mobile tanks in the Container Storage Area (AOI #69). A secondary containment area surrounding the tanks has a 33,614-gallon capacity. The tank storage area is located west of Building 56. The tanks (#21-#26) are identified as follows:

#21 - Waste Oil
#22 - Waste Oil/ Glycol
#23 - Waste Glycol
#24 - Low Lead Paint (Flammable)
#25 - High Lead Paint (Flammable)
#26 - Purge Solvent (Flammable)

These wastes contain heavy metals, VOCs and complexed organics. The tank storage area was under construction in 1987 at the time of the PR/VSI inspection.

The regulatory status of the tank storage area was identified by the PR/VSI as RCRA regulated.

The PR/VSI suggested that no further action was required since the tank storage area was under construction.

9.2.18 Burn Pile (AOI #71)

The "Burn Pile" Site is located south of the Pontiac East WWTP and north of the Grand Trunk Western Railroad. It is comprised of an

earth fill matrix with some wood and metal construction debris, paint chips, brick, and metal scraps. The "Burn Pile" originated from historic filling activities conducted on Site.

The Burn Pile was initially evaluated by GM in 1993. The evaluation was continued by Peter Cook and Associates, and CRA, as part of the redevelopment plans for the Centerpoint Business Campus. The "Burn Pile" was situated on property over which the Centerpoint Parkway was constructed.

The evaluation of the Burn Pile consisted of two investigations. The Phase I investigation delineated "potentially clean" and "potentially affected" soil. This investigation resulted in the removal of 32,000 cubic yards of "potentially clean" soil and the stockpiling of 3,500 cubic yards of "potential affected" soil. Phase II soil and groundwater investigations were conducted to characterize the nature and extent of affected or potentially affected materials remaining following Phase I remediation. The Phase I and Phase II investigations resulted in the removal and disposal of approximately 6,500 cubic yards of soil to a Michigan Type II landfill.

An overview of the Burn Pile activities is presented in the Final Summary Report (Appendix I). The Burn Pile remedial activities were completed to support Site redevelopment. All activities were successfully completed. No further activities have been identified to be required.

9.3 PARCEL C3

9.3.1 Waste/Purge Solvent Tanks (AOI #72) (SWMU #18)

The waste/purge solvent tank area consisted of four vertical tanks located outside and adjacent to Building 1 in Pontiac East. The four vertical tanks are situated on a concrete pad several feet high and approximately 15 feet by 30 feet in dimension. These four tanks store waste/purge solvents that have been generated from process operations in Pontiac East.

The regulatory status of the waste/purge solvent tanks was identified by the PR/VSI as RCRA regulated. The tanks were active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; structural integrity testing should be performed.

9.3.2 Paint Sludge Room (AOI #73) (SWMU #9)

The paint sludge room is located in Pontiac East and contains three concrete sumps approximately 25 feet by 40 feet with open tops located inside Building 1, Plant 6. The paint sludge is collected and transported for storage to the waste container storage area at the Pontiac East WWTP.

The three concrete sumps manage waste paint sludge with elevated levels of lead (i.e., D008), and a proprietary polymer. The waste sludges managed by these sumps include:

- one sump used for color coat paint sludge
- one sump used for clear coat paint sludge
- one sump used as an auxiliary sump for either color coat or clear coat paint sludge depending on process requirements.

The regulatory status of the paint sludge room was identified by the PR/VSI as nonregulated. The paint sludge room was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was that air emission monitoring be performed during operations as well as structural integrity testing.

9.3.3 Former Container Storage Area (AOI #74) (SWMU #3)

The former container storage area was located in Pontiac East, outside and adjacent to Building 1, Plant 6. This area was constructed with a concrete pad including a 6-inch concrete berm. The former container storage area was typically used for the temporary storage of 55-gallon drums containing solvents and sludges from ongoing construction activities at the Site. The former container storage pad was approximately 20 feet by 50 feet, with a storage capacity of approximately 37,400 gallons.

At the time of the PR/VSI, there was evidence of leaking and unlabeled drums. Several drums were completely open to the air resulting in unidentified odors. The floor of the concrete pad was covered by various sludges which were also identified to be outside the contained concrete area.

The regulatory status of the container storage area was not identified by the PR/VSI. The storage area was active at the time of the container storage inspection.

The PR/VSI suggested further action was; the regulatory status of the container storage area should be determined, air monitoring should be considered, and a soil investigation should be completed around the perimeter of the storage area. In addition, the PR/VSI suggested that the leaking drums, unlabeled drums, management of the storage area, storage practices, and the concrete pad residual sludges should be appropriately addressed.

9.3.4 Former East Tank Farm (AOI #75) (SWMU #2)

The former east tank farm area was identified as a former hazardous waste storage location of approximately 4,500 square feet housing two former vertical 10,000-gallon ignitable waste collection tanks. The former east tank farm area was constructed with a concrete slab which had a 22-inch high curbing to provide tank secondary containment. The tank farm was located south of Building 2, and west of Building 1.

The former waste storage area typically received drummed waste such as chlorinated solvents (F001), waste paints (F003, F005, and D001), and waste solvents (F003, F005, and D001). These drummed wastes had been removed prior to use of the former waste storage area as secondary containment for the two 10,000-gallon hazardous waste storage tanks. These waste storage tanks were used for the storage of waste paint and waste solvent (F003 and F005).

This area operated as a storage area under interim status. In July 1987, GM withdrew its Part B Permit Application and proceeded with closure of this area.

Closure activities were identified in the "Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area", dated September 21, 1989. The Work Plan was approved, with modification, by the MDNR Waste Management Division.

Closure activities were completed between October 4, 1989 and October 6, 1989. The storage tanks, and containment pad, were cleaned, removed and disposed. Approximately 150 cubic yards of concrete was removed from the area and disposed of as inert material at the Pallards Landfill Facility in Montrose Township, Michigan. The two aboveground storage tanks were cleaned, dismantled, and quartered prior to off-Site disposal. Excavation and disposal of 780 cubic yards of contaminated soils was performed between February 1990 and March 1990.

The Closure Report for the former east tank farm area, dated August 31, 1990, is presented in Appendix B.4. The MDNR approval of the closure, dated October 30, 1990, is presented in Appendix B.5.

9.3.5 Waste Antichip Accumulation Area (AOI #76) (SWMU #11)

The waste antichip accumulation area is located inside Building 1 and contains an open-topped concrete sump which is approximately

25 feet by 40 feet in size. The sump receives waste antichip]spray comprised of a plastic type material (e.g., polyurethane) which is sprayed on the undercarriage of automotive vehicles to prevent chipping by pebbles/debris during vehicle use. The waste antichip sludge is then transferred to the WWTP facilities.

The regulatory status of the waste antichip area was identified by the PR/VSI as nonregulated. The area was active at the time of the PR/VSI.

The PR/VSI suggested further action was; structural integrity testing and air monitoring should be performed due to the open nature of the sump.

9.3.6 Waste Oil Accumulation Tanks (AOI #77) (SWMU #10)

The waste oil accumulation tanks are enclosed steel tanks contained within concrete pits. The number of these waste oil accumulation tanks located throughout Building 1 was unknown at the time of the PR/VSI. One tank was located at column C-36 and evaluated. The waste oil accumulation tanks typically received waste oil, waste power steering fluid, glycol, and waste brake and transmission fluids at assembly line areas. Tank contents were then piped to the wastewater treatment facility.

The regulatory status of the waste oil accumulation tank was identified by the PR/VSI as nonregulated. The area was active at the time of the PR/VSI.

The PR/VSI suggested further action was that structural integrity testing of the waste oil accumulation tanks be completed.

9.3.7 Waste Lift Stations (AOI #78) (SWMU #17)

The waste lift stations consist of a network of pump systems and holding tanks designed to transport wastewater from Pontiac East to the

wastewater treatment plant. A concrete berm 4 inches to 8 inches in height surrounding the station provides secondary containment. The lift station receives wastewater consisting of acid wastes, general wastes, and cleaner wastes.

In August 1988, there was a release of industrial wastewater from the unit due to a power failure. The flow to the storm sewers was blocked upon discovery of the release, and most of the industrial wastewater was recovered on Site. An analysis of the outfall water showed no effect on water quality.

The regulatory status of the wastewater lift station was identified by the PR/VSI as non-regulated. The lift station was active at the time of the inspection.

The PR/VSI suggested further action was; air emission monitoring should be considered during wastewater lift station operation and structural integrity testing of the lift station should be considered.

9.4 PARCEL C4

9.4.1 Former J-Lot Fill Area (AOI #79) (SWMU #30)

The former J-Lot fill area, located within the J-Lot parking area, represents a one-time burial of waste materials sometime between 1950 and 1955.

The regulatory status of the former J-Lot fill area was identified by the PR/VSI as nonregulated. The J-Lot fill area was inactive at the time of the fill area inspection. The PR/VSI recommended that a soil investigation be completed to identify if hazardous constituents were present within the soil.

In response, a Phase I Environmental Site Assessment was conducted by GM North American Operations in March 1993. The report

concluded that historical activities in the vicinity of the former J-Lot fill area may have adversely impacted the soil.

An initial subsurface investigation of the area in the vicinity of the former J-Lot fill area was conducted by ERM in May 1994. The report indicated that the extent of contamination was not suitably defined.

An additional investigation was carried out by CRA to further define the extent of affected soils identified in the ERM investigation. It was determined that an additional broader investigation was warranted to identify any possible migration pathways for the constituents encountered (Appendix M.2) (which was performed during the EOC/EECA).

CRA completed an Extent of Contamination (EOC) Study and developed an Engineering Evaluation and Cost Analysis (EECA). The EECA report identified various removal action alternatives based on the effectiveness, implementability, and cost of each alternative. The J-Lot reports are presented in Appendix M (also see Section 6.1.4).

9.5 OTHER

9.5.1 Murphy Drain (AOI #80) (SWMU #35)

Murphy Drain is a large 48-inch diameter storm sewer which drains to the north of South Boulevard. The location of the drain is presented on Figure 9.1, off Site and north of Parcel C1.

The regulatory status of the Murphy Drain was identified by the PR/VSI as an off-Site NPDES outfall. Murphy Drain was active at the time of the PR/VSI inspection.

The PR/VSI suggested further action was; structural integrity testing of the storm sewer should be completed.

9.5.2 Pits and Sumps (AOI #81)

In addition to the pits and sumps previously discussed in Sections 7.0 and 8.0 of this Report, over 200 additional pits and sumps were identified as an area of interest in Pontiac Central. These areas were located within the areas identified in the Centerpoint Business Campus development plans. This area was redeveloped as the GM Truck Product Center, with supporting several thousand parking areas for the new facility, and landscaped areas.

During the decommissioning activities of Pontiac Central, each pit and sump was thoroughly cleaned to remove any remaining contents. A high pressure wash was utilized to remove any oil or grease present in the pits and sumps. Each area was then dried for structural integrity inspection.

Following the inspection and cleaning of each area, the pits and sumps were classified as to further activities and were subsequently decommissioned. Decommissioning activities generally included demolition and removal/disposal of the pit structures and associated backfill. In certain instances the pits were collapsed into the subbase of proposed buildings.

10.0 SUMMARY

This Report was developed as a preliminary review of the significant environmental activities conducted by GM to support the development of the Centerpoint Business Campus at the former Pontiac Central and Pontiac East manufacturing areas. As discussed with U.S. EPA at the August 17, 1995 meeting conducted at the Centerpoint Business Campus, GM proposed to submit all relevant information related to the significant environmental activities which had, and were, being completed. This Report primarily focused on those environmental activities completed within the former Pontiac Central areas (Parcels A and B). Available information relating to the Pontiac East areas (Parcel C) is also provided. As discussed during the August 17, 1995 meeting, a Supplement to the Review of Existing Conditions Report will be submitted in December 1995 to detail the environmental status of the AOIs within Parcel C.

Parcels A and B: Centerpoint Business Campus (Former Pontiac Central)

The former Pontiac Central manufacturing areas have been subject to major Site redevelopment activities since the PR/VSI was conducted by U.S. EPA in 1987. The former Pontiac Central manufacturing areas (Parcels A and B) were closed, decommissioned, and demolished to provide the core of the development site for the Centerpoint Business Campus. During the decommissioning activities, GM investigated, evaluated, and closed 9 areas of concern identified by U.S. EPA; an additional 37 AOIs identified by GM; and over 200 additional pits and sumps.

Environmental activities completed by GM in the Parcels A and B included:

- inspections of all units which conveyed products or waste materials containing hazardous constituents;

- investigations, including installation of boreholes, and monitoring wells, at areas of environmental concern;

- assessment of analytical data and evaluation of remedial action alternatives;

- implementation of decommissioning and remedial activities, including:
  - dismantling of equipment,
  - demolition of structures,
  - excavation of affected soils, and
  - treatment or disposal of affected soils; and

- documentation of remedial activities, including reporting to regulatory agencies, where necessary.

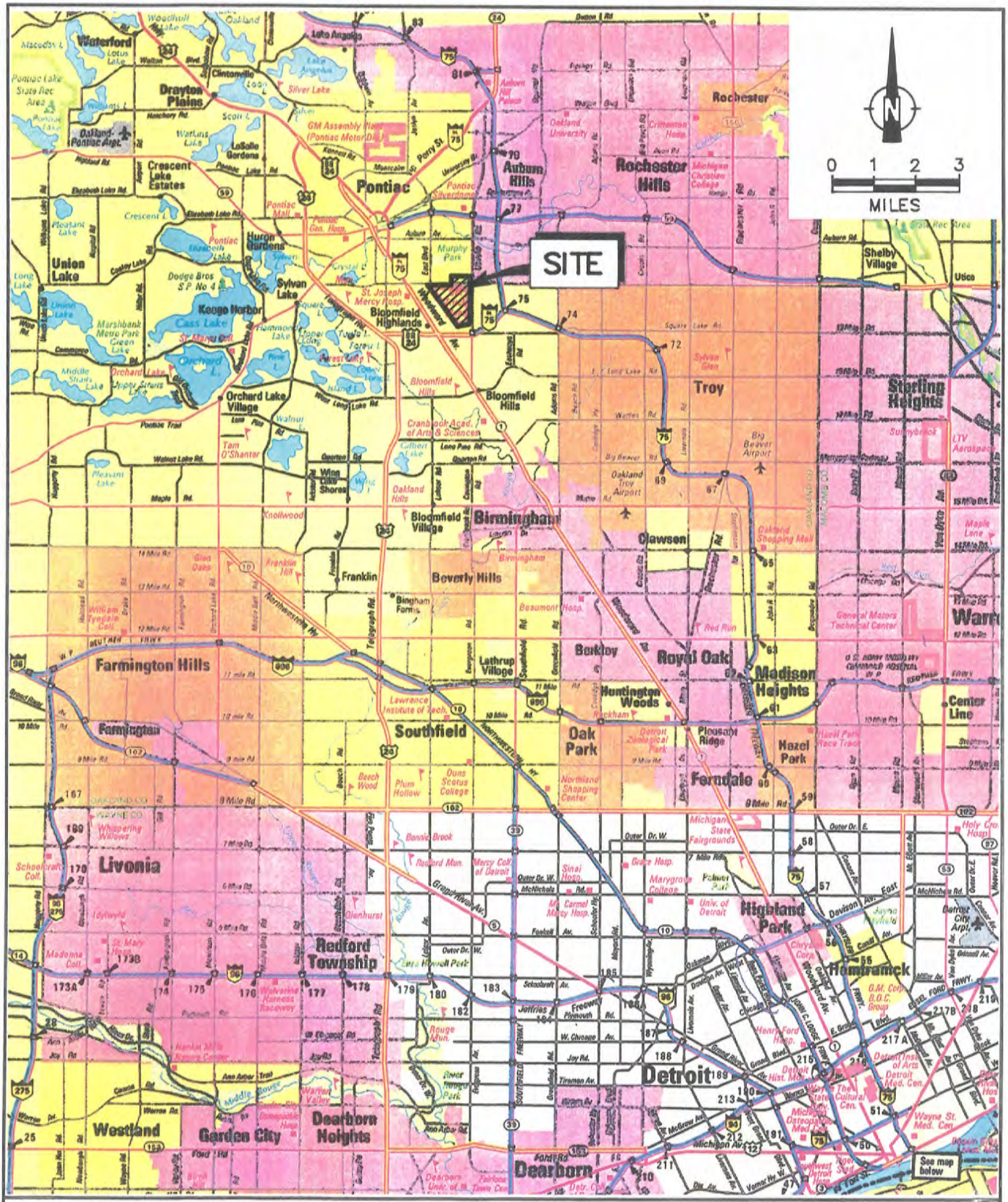
Based upon the activities completed to date, and the significant redevelopment which has occurred, the environmental restoration of Parcels A and B is nearing completion. As a result of, GM believes the environmental investigation and remedial activities necessary in Parcels A and B will be completed to U.S. EPA's satisfaction by the time a RCRA Corrective Actions order could be implemented.

Parcel C: Pontiac East

The Pontiac East areas (Parcel C) have also been significantly upgraded by GM over the period from the U.S. EPA PR/VSI in 1987 to present. These upgrades have included the completion of numerous activities to support ongoing environmental compliance. In addition, significant additional redevelopment within Parcel C is expected within the next few years.

As discussed within this Report, GM has completed environmental activities at a variety of the AOIs identified in Parcel C. This Report presented a preliminary review of the status of these activities. The review of these environmental activities is currently ongoing.

A Supplement to the Review of Existing Conditions Report, which details the current environmental status of the AOIs in Parcel C, will be submitted to U.S. EPA in December 1995.



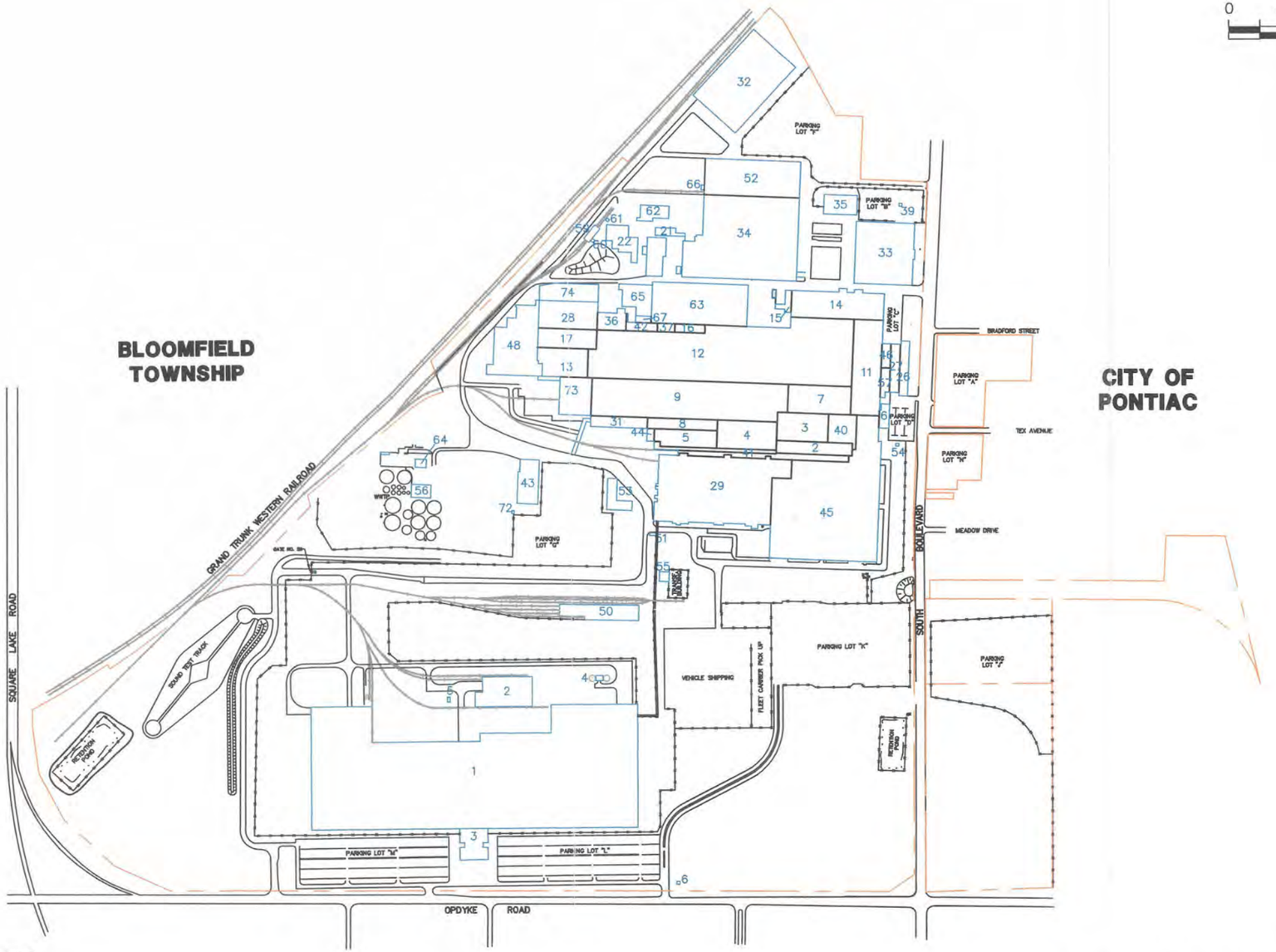
SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 06/95(W) REV.0



0 400 800ft

LEGEND

PROPERTY BOUNDARIES

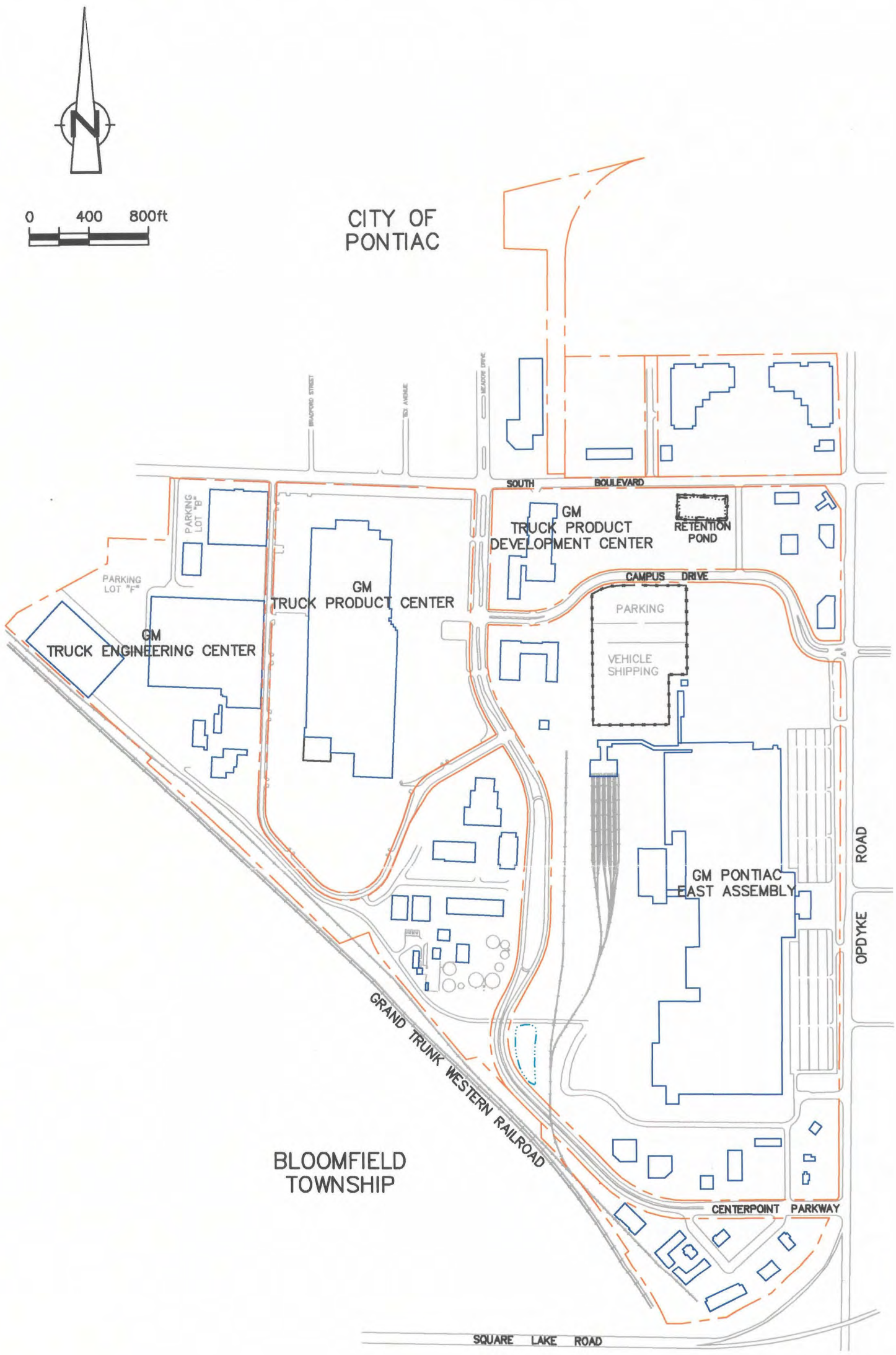
43 BUILDING NUMBER

figure 1.2

1987 SITE PLAN
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (2) MAR 26/96(W) REV.0 (P-50)



LEGEND

PROPERTY BOUNDARY

EXISTING, UNDER CONSTRUCTION AND PROPOSED BUILDINGS

figure 1.3

SITE PLAN
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 22/95(W) REV.0 (P-29)



LEGEND

- PROPERTY BOUNDARY
- (1) PONTIAC EAST ASSEMBLY PLAN
- (2) WASTE WATER TREATMENT PLANT
- (3) PONTIAC CENTRAL MANUFACTURING AND ASSEMBLY PLANT
- (4) ENGINEERING
- (5) PARKING LOT "J"
- (6) PARKING LOT "N"
- (7) PARKING LOT "A"

SOURCE:

GENERAL MOTORS PONTIAC.

figure 1.4

1985 SITE AERIAL PHOTO
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 21/95(W)REV.0

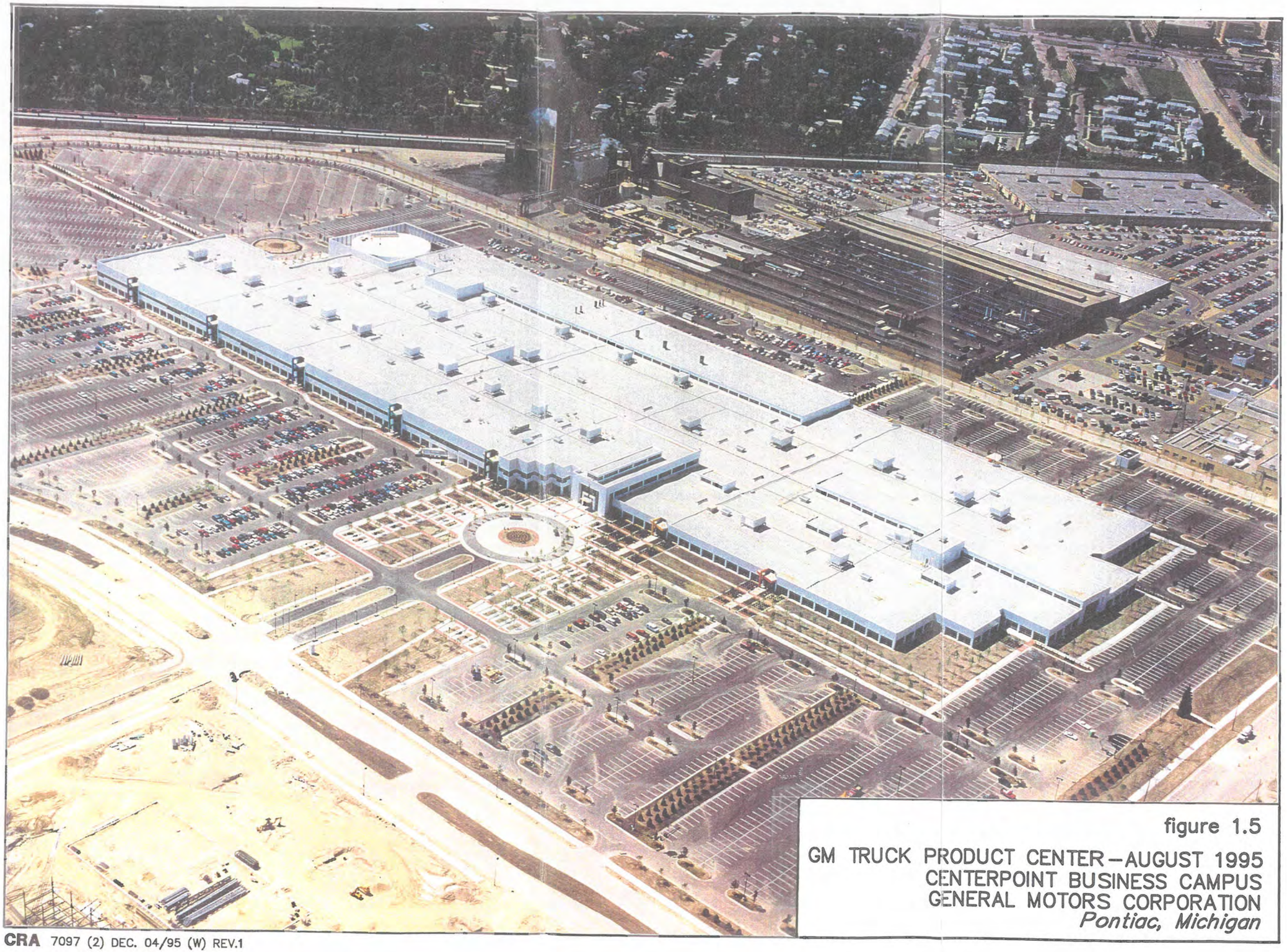
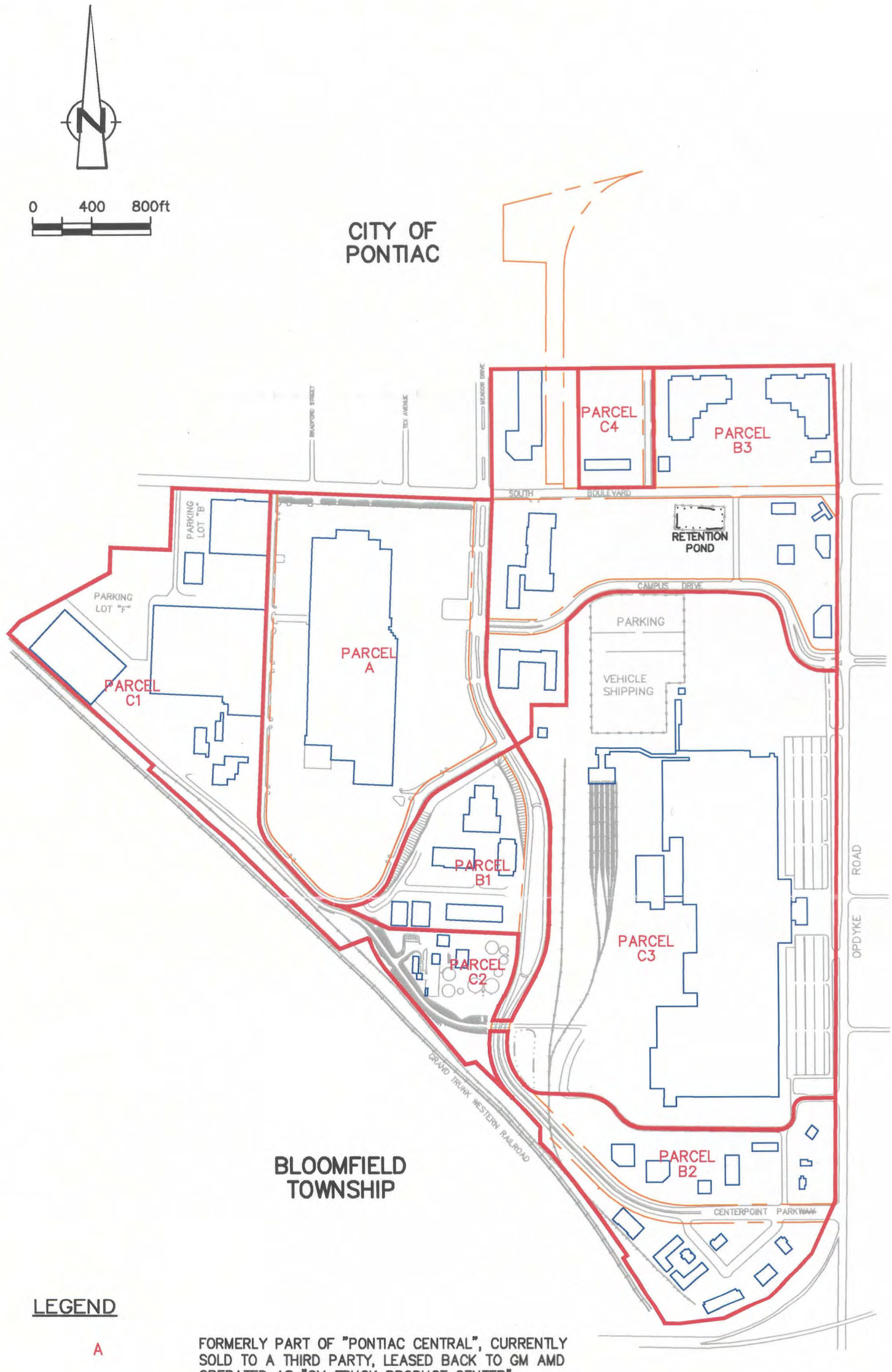


figure 1.5

GM TRUCK PRODUCT CENTER – AUGUST 1995
CENTERPOINT BUSINESS CAMPUS
GENERAL MOTORS CORPORATION
Pontiac, Michigan



LEGEND

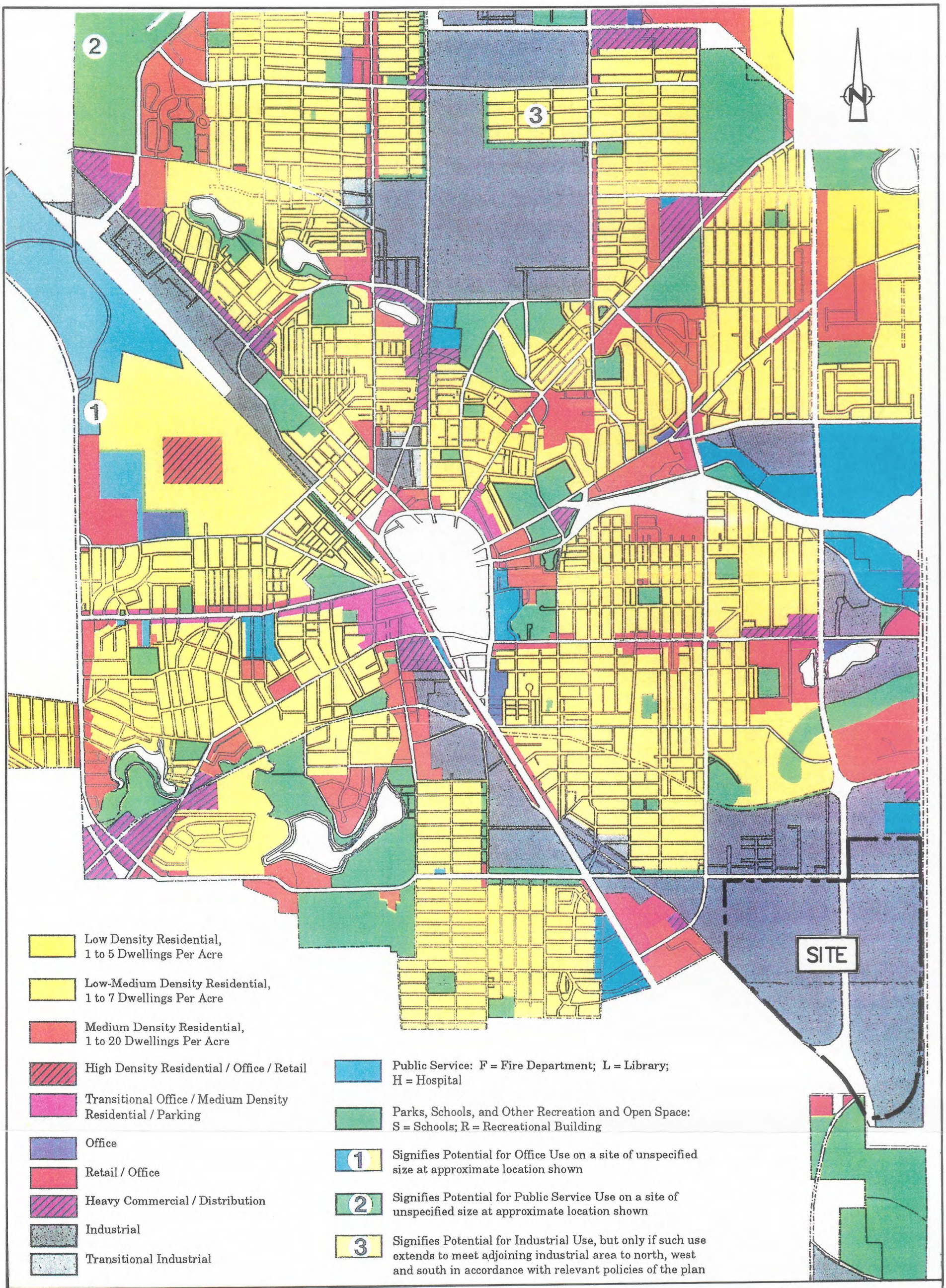
A	FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK TO GM AMD OPERATED AS "GM TRUCK PRODUCT CENTER".
B1,B2,B3	FORMERLY PART OF PONTIAC TRUCK GROUP FACILITIES, CURRENTLY OWNED BY GM AND LEASED TO DEVELOPER.
C1,C2,C3,C4	CURRENTLY OWNED AND OPERATED BY THE GM TRUCK GROUP.
——— — ———	PROPERTY BOUNDARY
———	APPROXIMATE LIMIT OF PARCEL BOUNDARY
▭	EXISTING, UNDER CONSTRUCTION AND PROPOSED BUILDINGS

figure 1.6

PARCEL SUMMARY PLAN
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 22/95(W) REV.0 (P-30)



SOURCE: CITY OF PONTIAC PLANNING COMMISSION

figure 3.1

CITY OF PONTIAC LAND USE MAP
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 21/95(W)REV.0

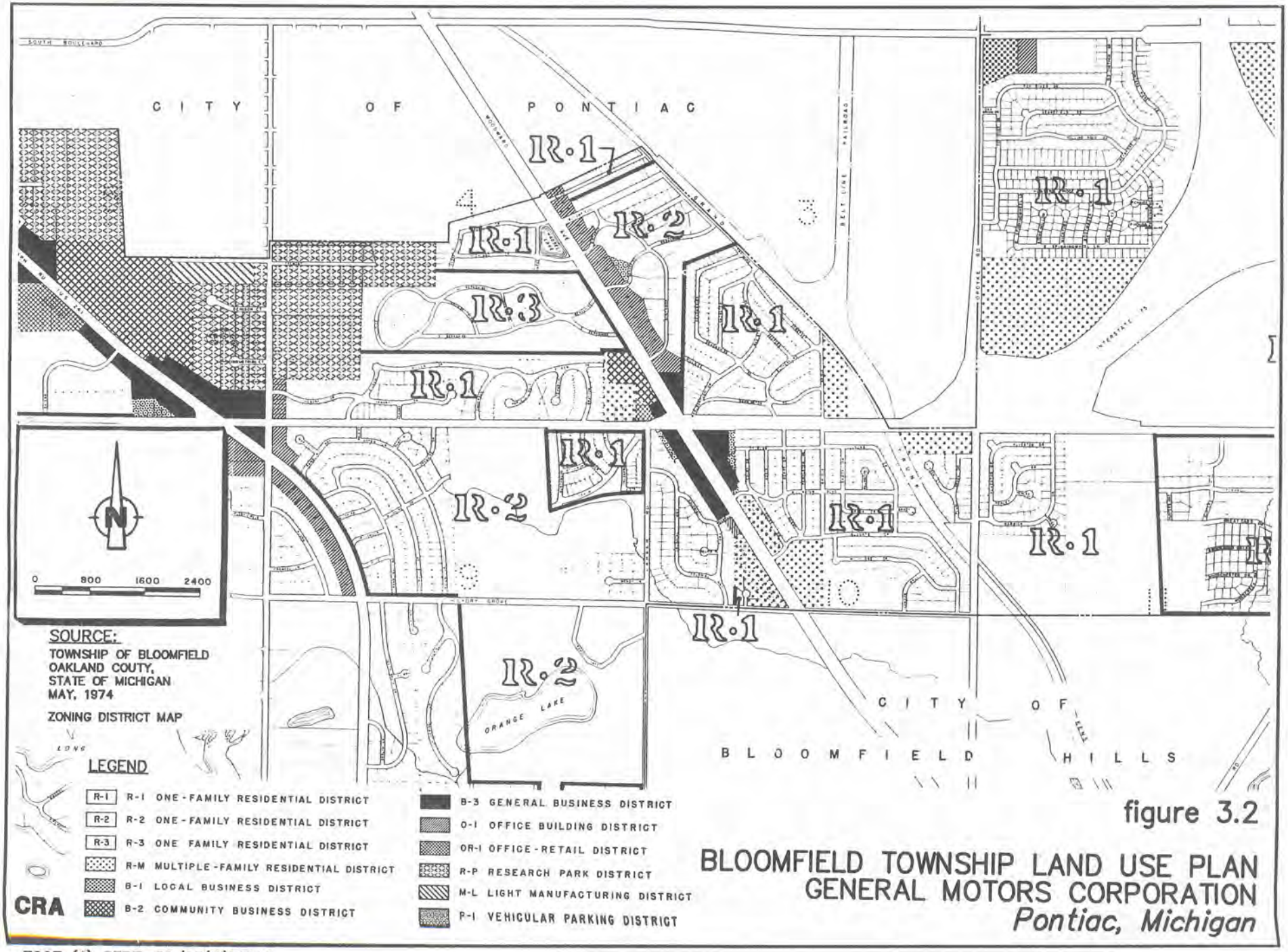
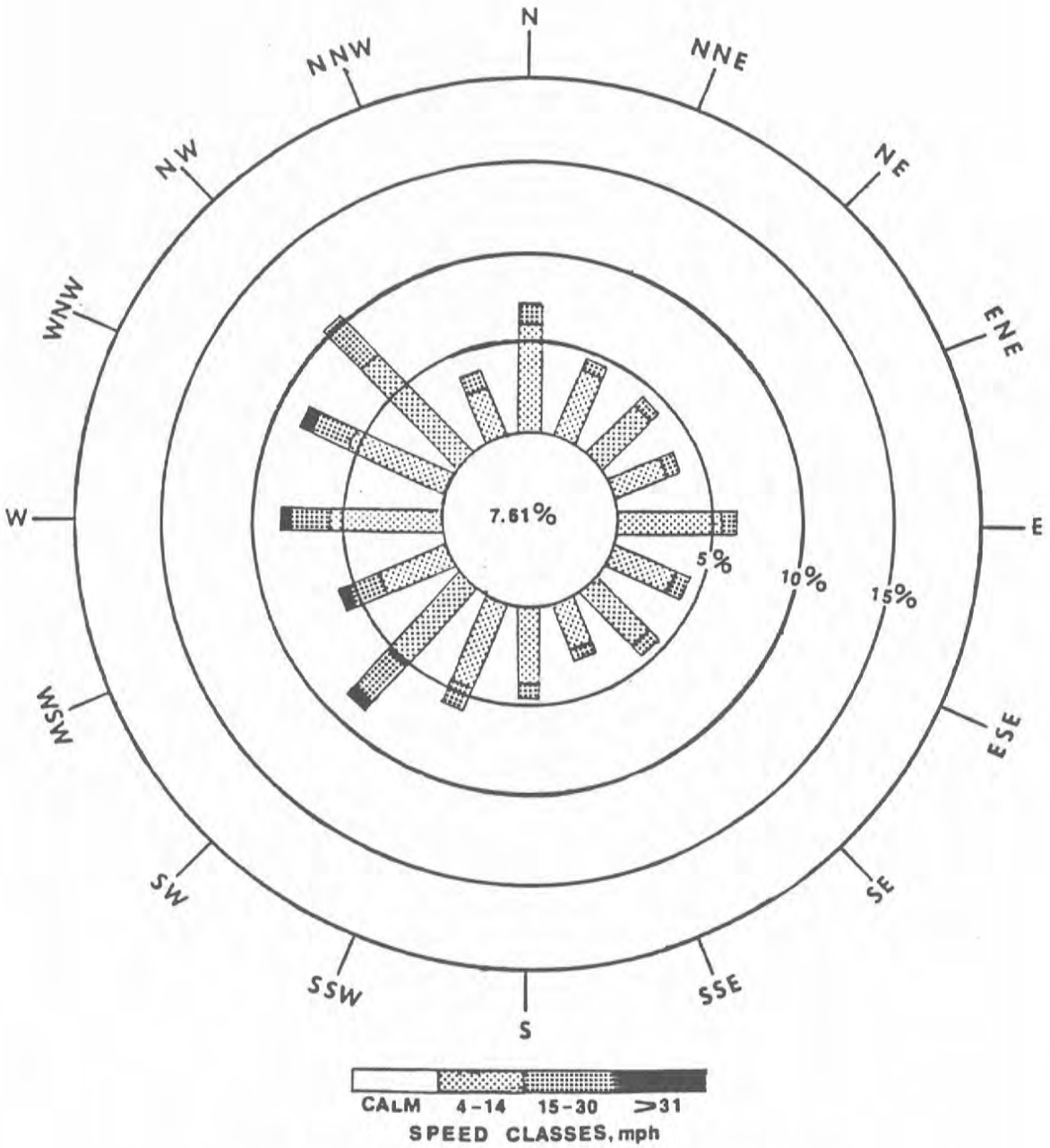


figure 3.2

BLOOMFIELD TOWNSHIP LAND USE PLAN
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 21/95(W)REV.0



WIND ROSE FOR DETROIT METRO AIRPORT(5yr)

figure 3.3

WIND ROSE DIAGRAM
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 06/95(W) REV.0

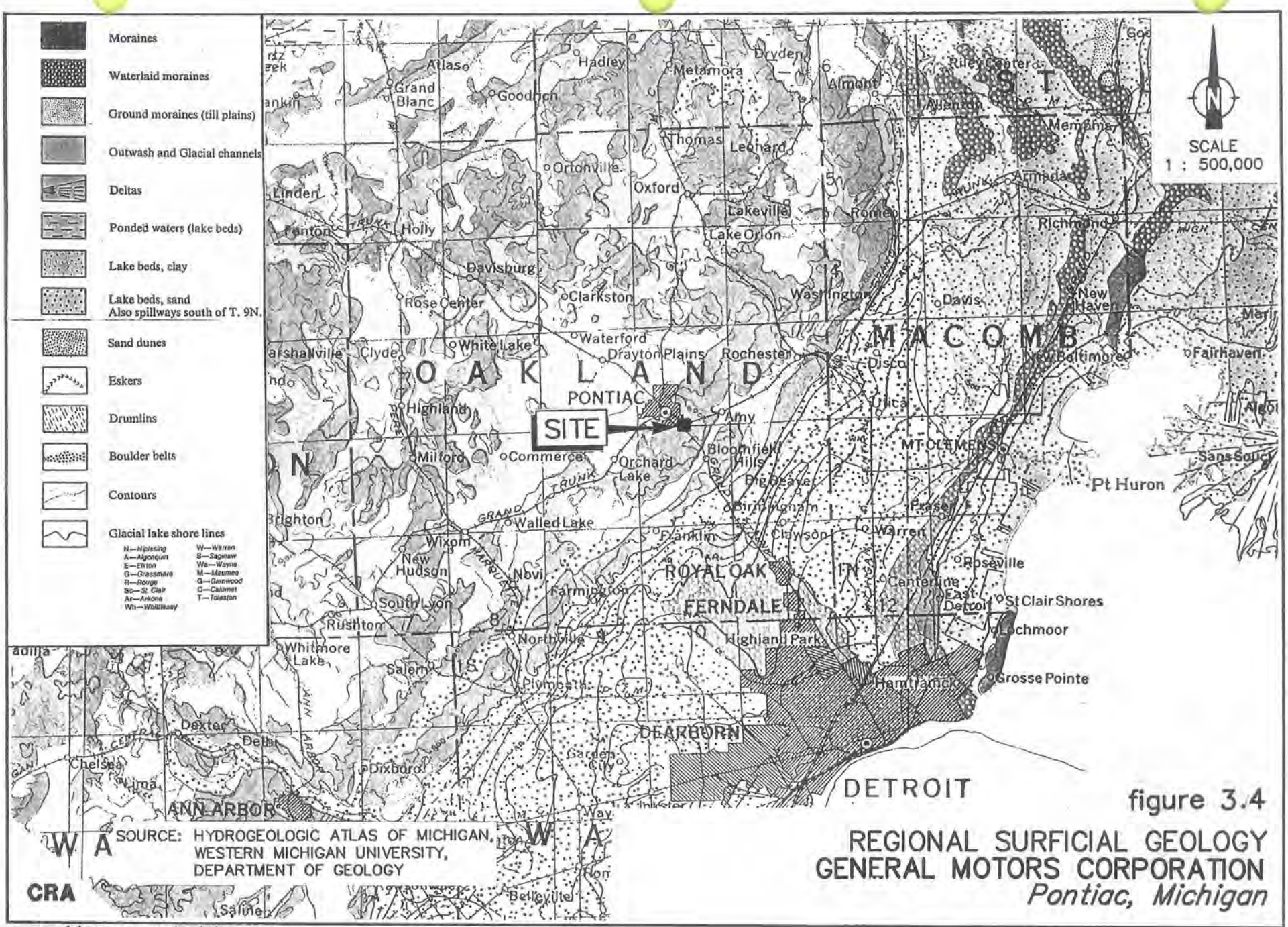
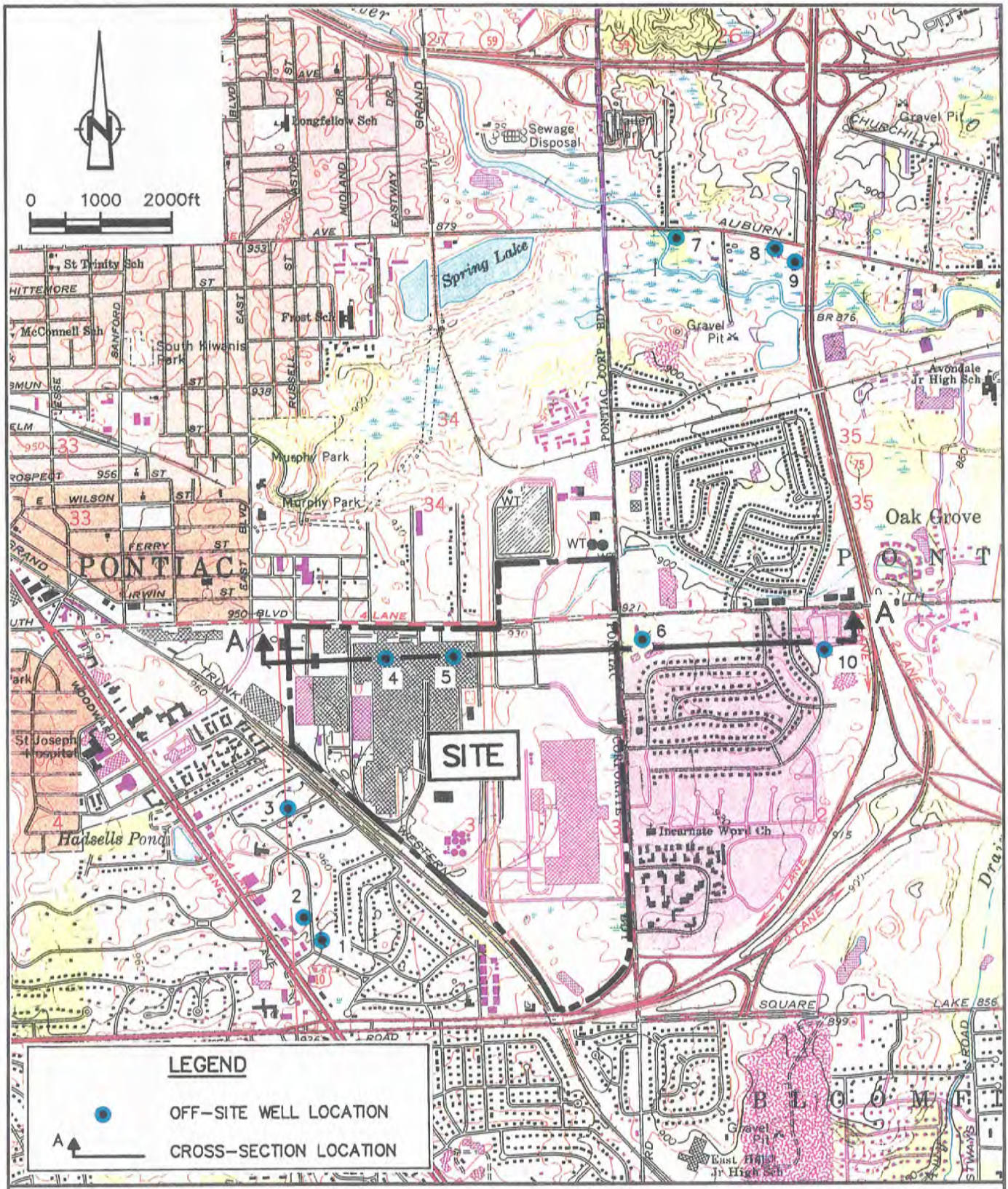


figure 3.4

REGIONAL SURFICIAL GEOLOGY
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 06/95(W) REV.0



SOURCE: USGS QUADRANGLE MAPS;
PONTIAC NORTH, PONTIAC SOUTH,
BIRMINGHAM AND ROCHESTER, MICHIGAN

figure 3.5

OFF-SITE WELL LOCATION PLAN AND REGIONAL GEOLOGIC CROSS-SECTION LOCATION GENERAL MOTORS CORPORATION

Pontiac, Michigan

CRA

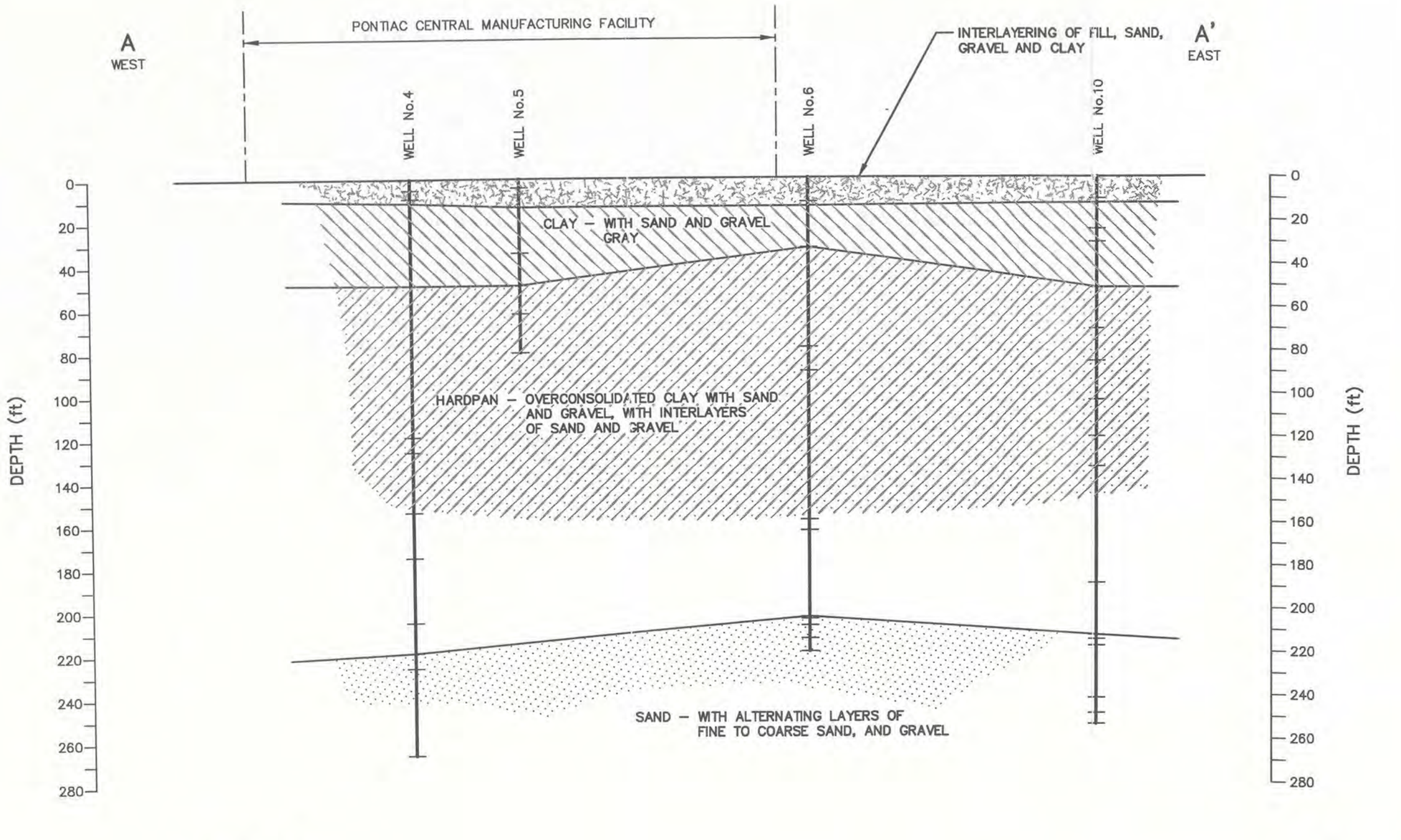


figure 3.6
REGIONAL GEOLOGIC CROSS-SECTION A-A'
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 26/95(W) REV.0 (X-03)

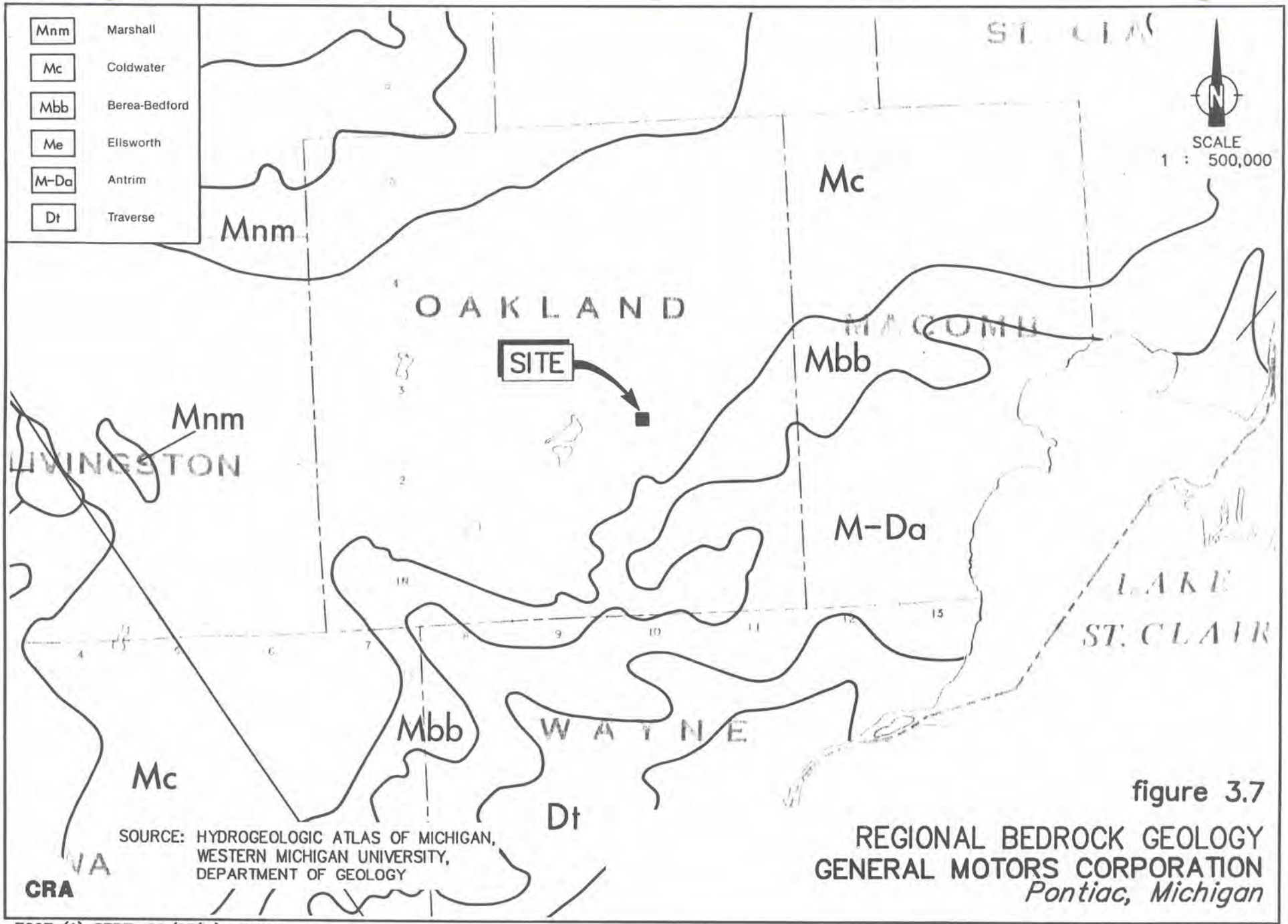


figure 3.7

REGIONAL BEDROCK GEOLOGY
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 06/95(W) REV.0

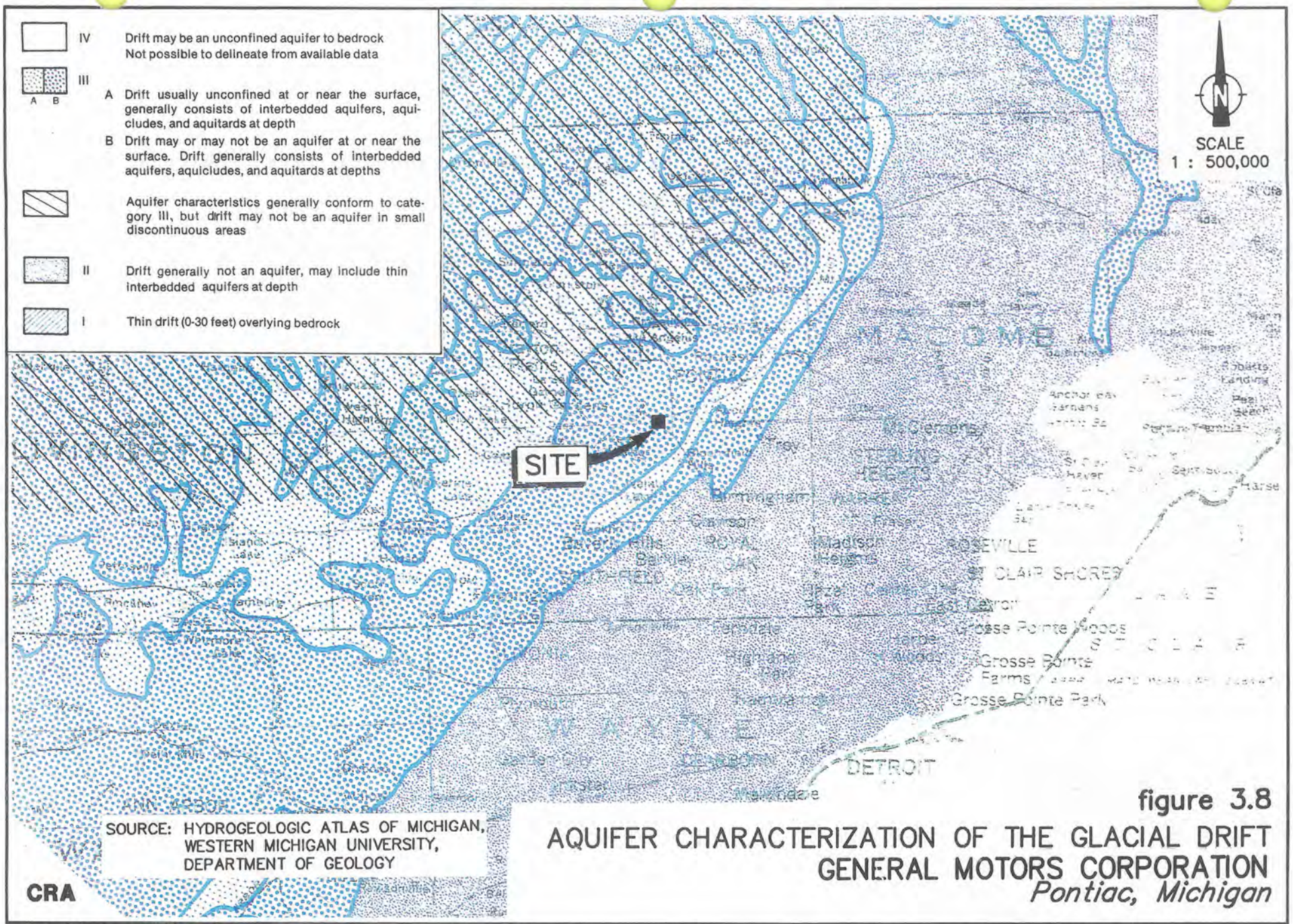


figure 3.8

AQUIFER CHARACTERIZATION OF THE GLACIAL DRIFT
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 06/95(W) REV.0

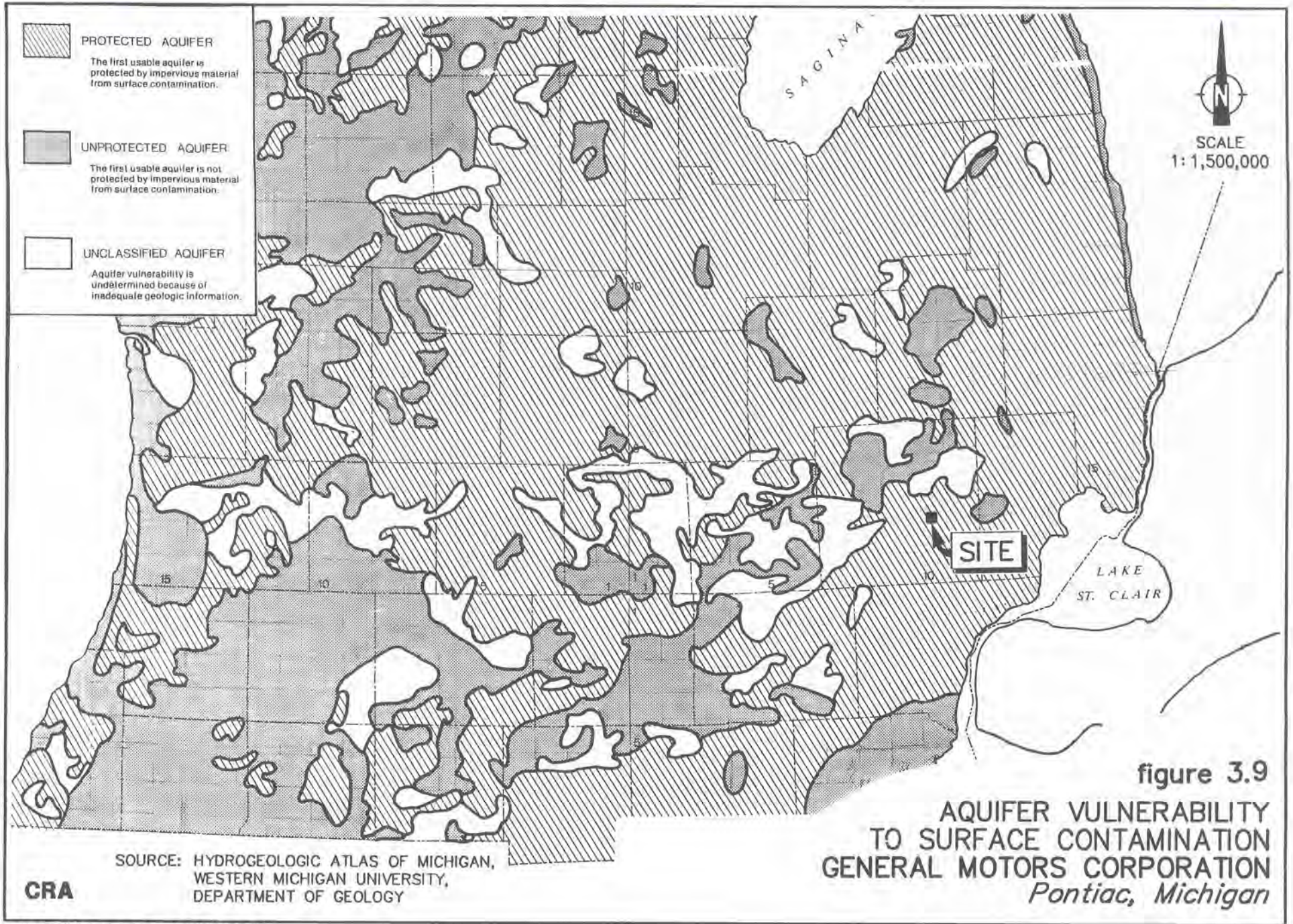
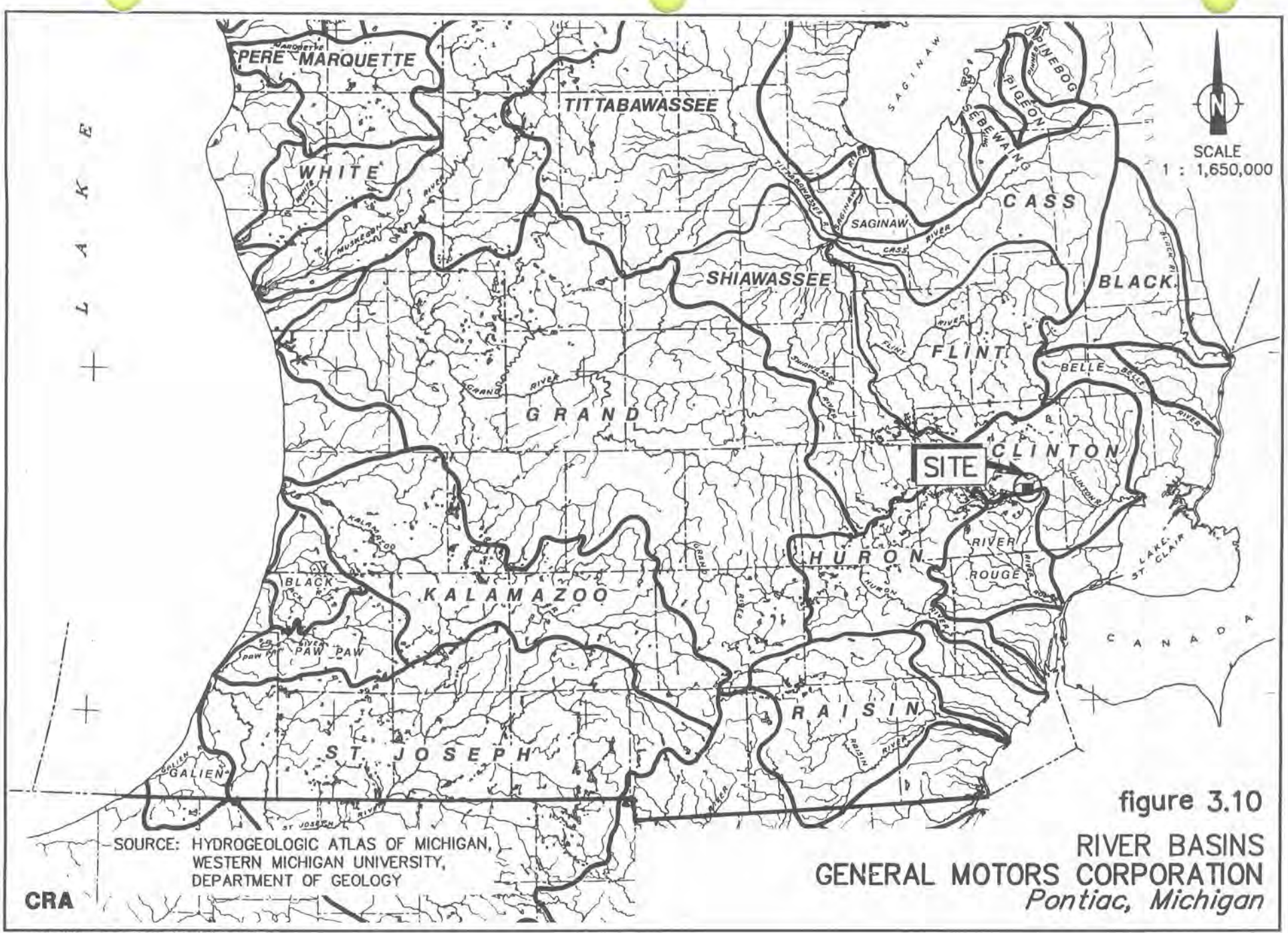


figure 3.9

AQUIFER VULNERABILITY
TO SURFACE CONTAMINATION
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) SEPT. 06/95(W) REV.0



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, WESTERN MICHIGAN UNIVERSITY, DEPARTMENT OF GEOLOGY

figure 3.10

RIVER BASINS
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 06/95(W) REV.0

PARCEL LIST:

A — FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK BY GM AND OPERATED AS "GM TRUCK PRODUCT CENTER".

GRAND TRUNK WESTERN RAILROAD

GM TRUCK ENGINEERING CENTER

62

21

22

PARKING LOT "B"

BUILDING 33

N

0 100 300ft

GM TRUCK PRODUCT CENTER

PARCEL A

MW-2203

MW-2202

MW-2201

MW-2204 (ABANDONED)

22-1

22-9

22-10

9-1

7-2

7-1

6-1

8-1

10-1

5-1

3-1

A

A'

26-1

17-1

15-1

27-1

25-1

11-1

13-1

12-2

12-1

28-1

24-1

14-1

B

20-1

16-1

23-1

1-1

1-2

4-1

2-2

2-1

30-1

21-2

21-1

31-1

19-2

19-3

19-1

18-1

B'

WWTP

43

MEADOW DRIVE

GM TRUCK PRODUCT DEVELOPMENT CENTER

LEGEND

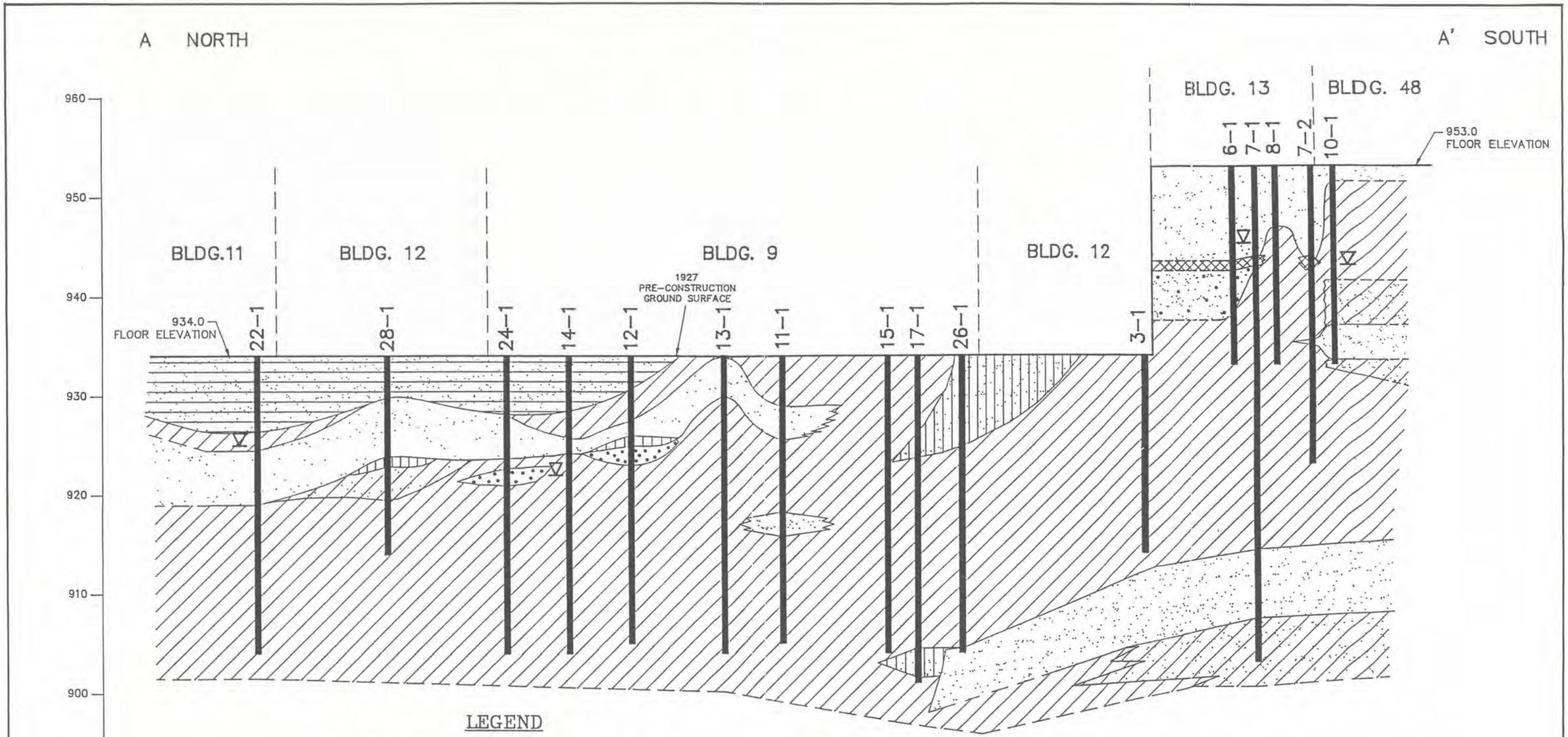
- MONITORING WELL
- SOIL BORING LOCATIONS
- PROPERTY BOUNDARIES
- APPROXIMATE LIMIT OF PARCEL BOUNDARY
- EXISTING, UNDER CONSTRUCTION OR PROPOSED BUILDINGS
- A–A' CROSS–SECTION LOCATION

CRA

7097 (1) MAR 26/96(W) REV.0 (P–47)

figure 4.1

CROSS–SECTION LOCATIONS
PARCEL A INVESTIGATION
GENERAL MOTORS CORPORATION
Pontiac, Michigan

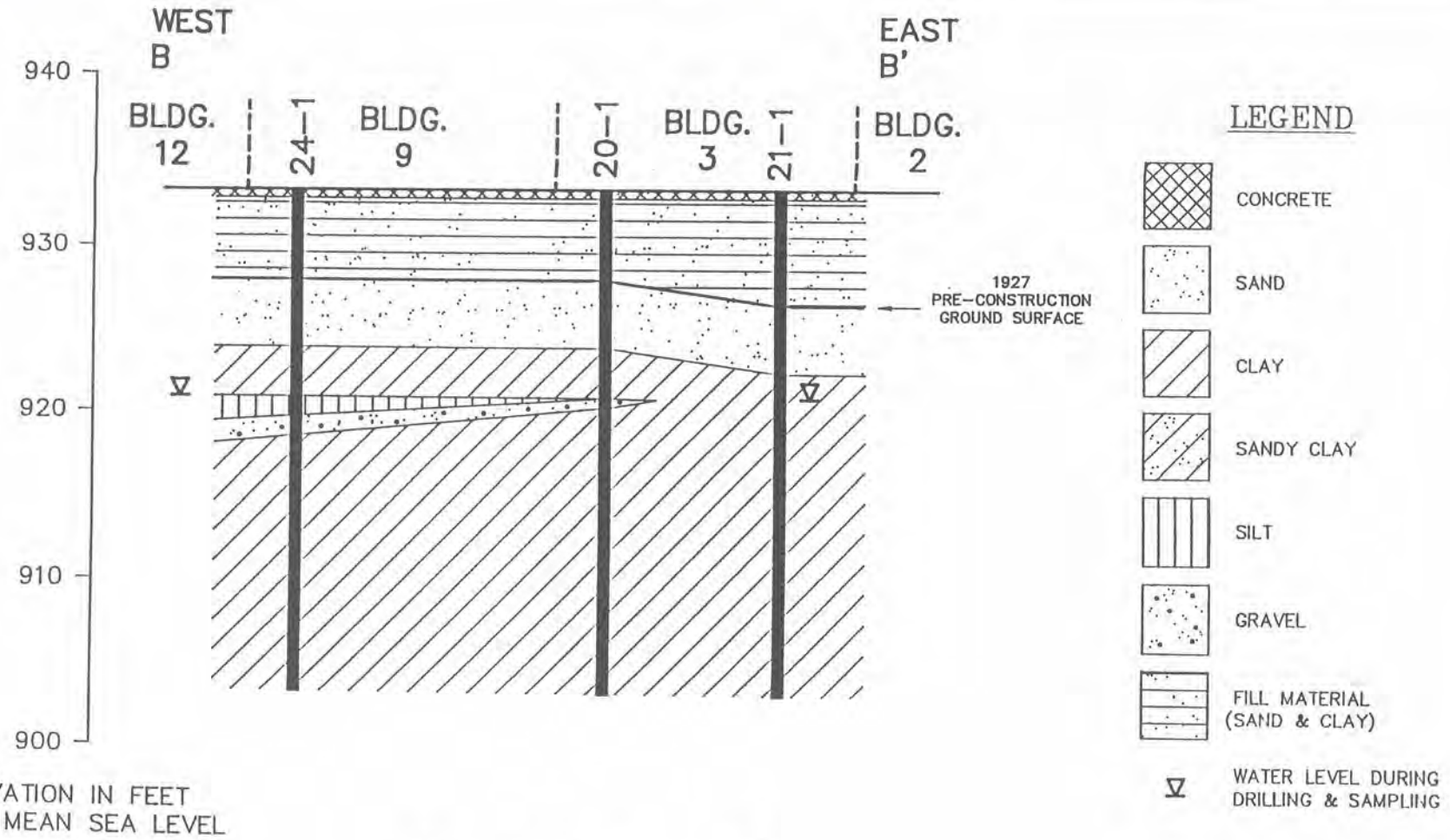


SOURCE:
WW ENGINEERING & SCIENCE

figure 4.2
GEOLOGIC CROSS-SECTION A-A'
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 06/95(W) REV.0



SOURCE:
WW ENGINEERING & SCIENCE

figure 4.3

GEOLOGIC CROSS-SECTION B-B'
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT. 06/95(W) REV.0

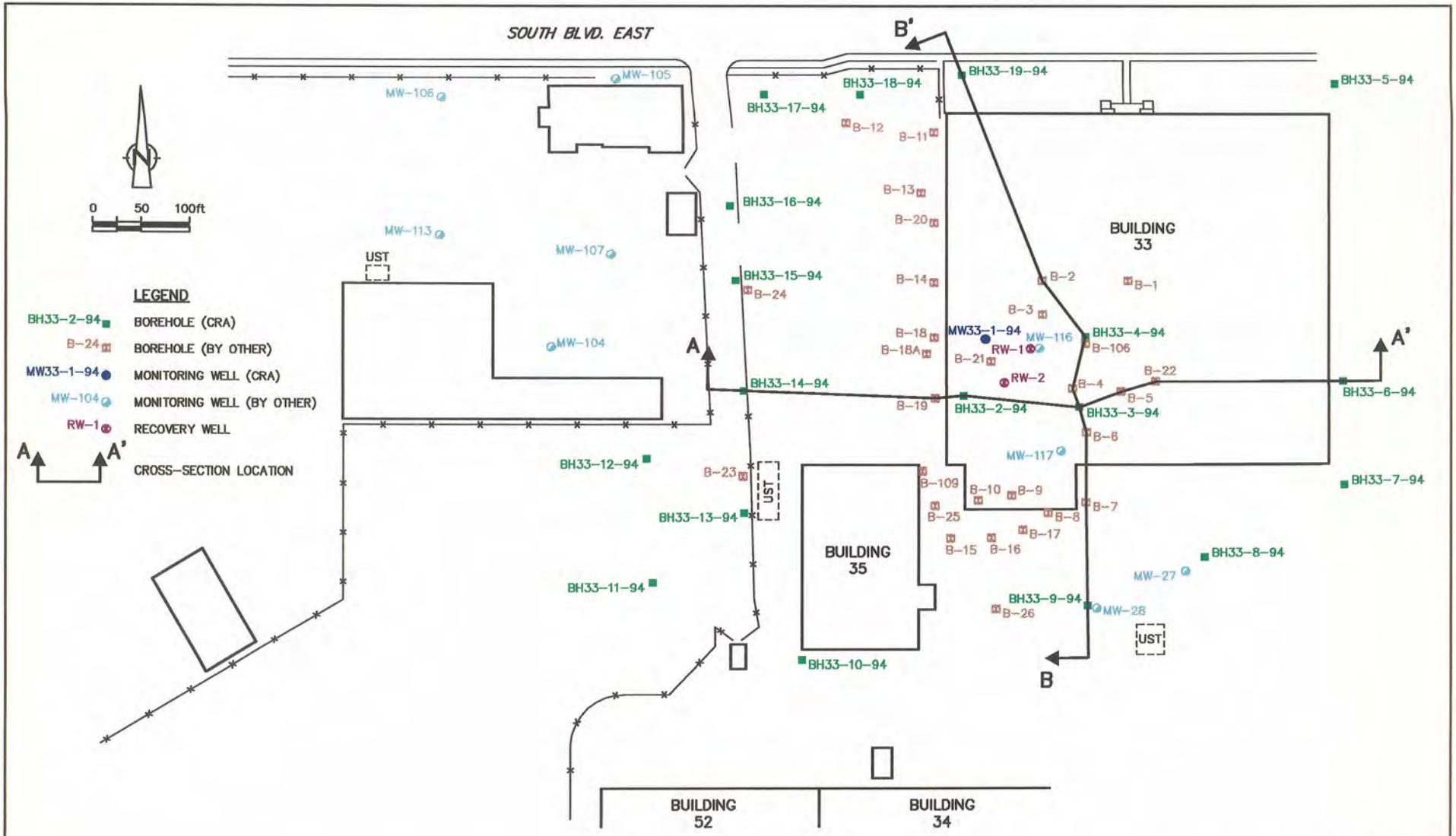
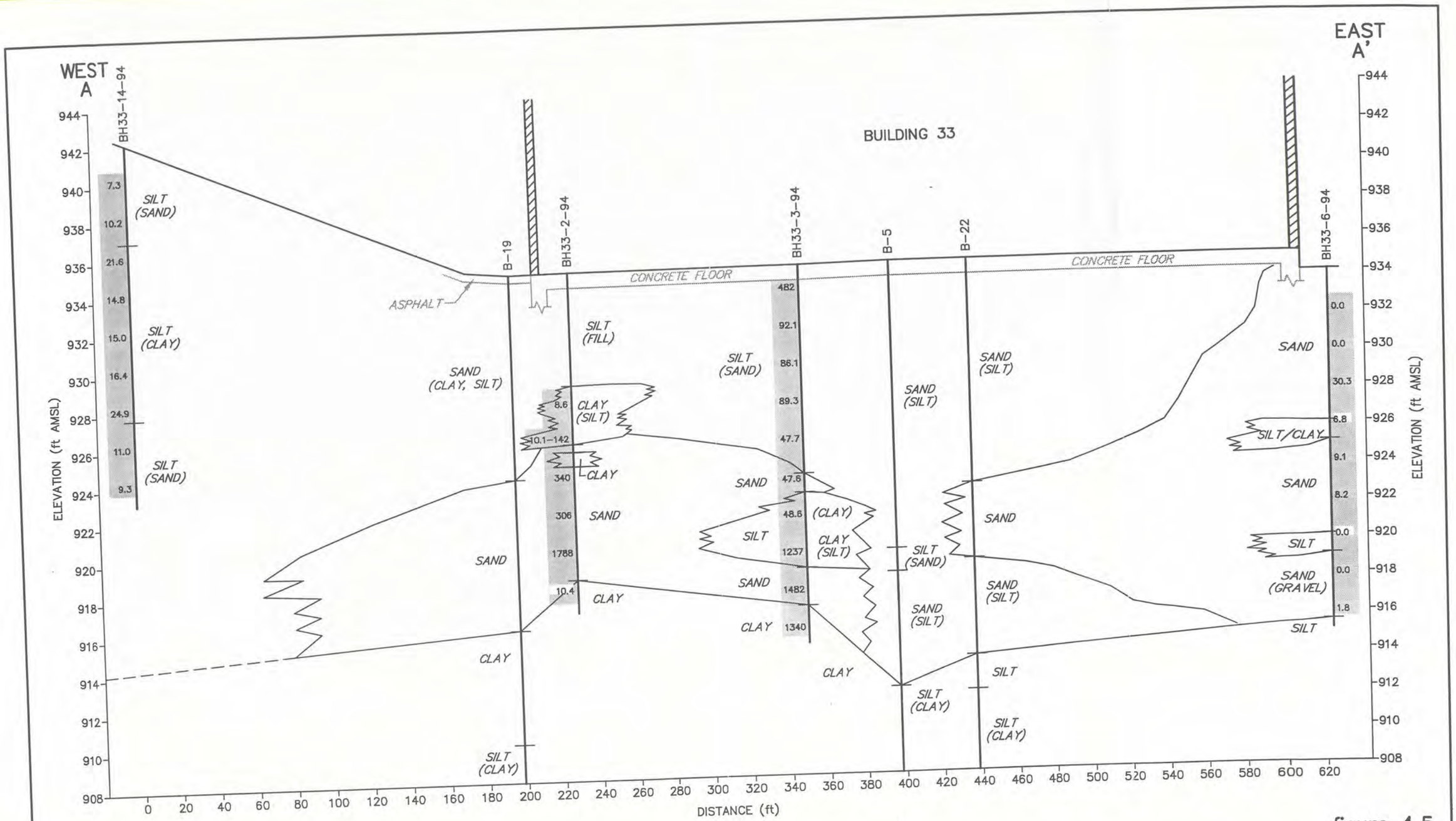


figure 4.4

CROSS-SECTION LOCATIONS BUILDING 33
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 12/95(W) REV.0 (P-40)



LEGEND

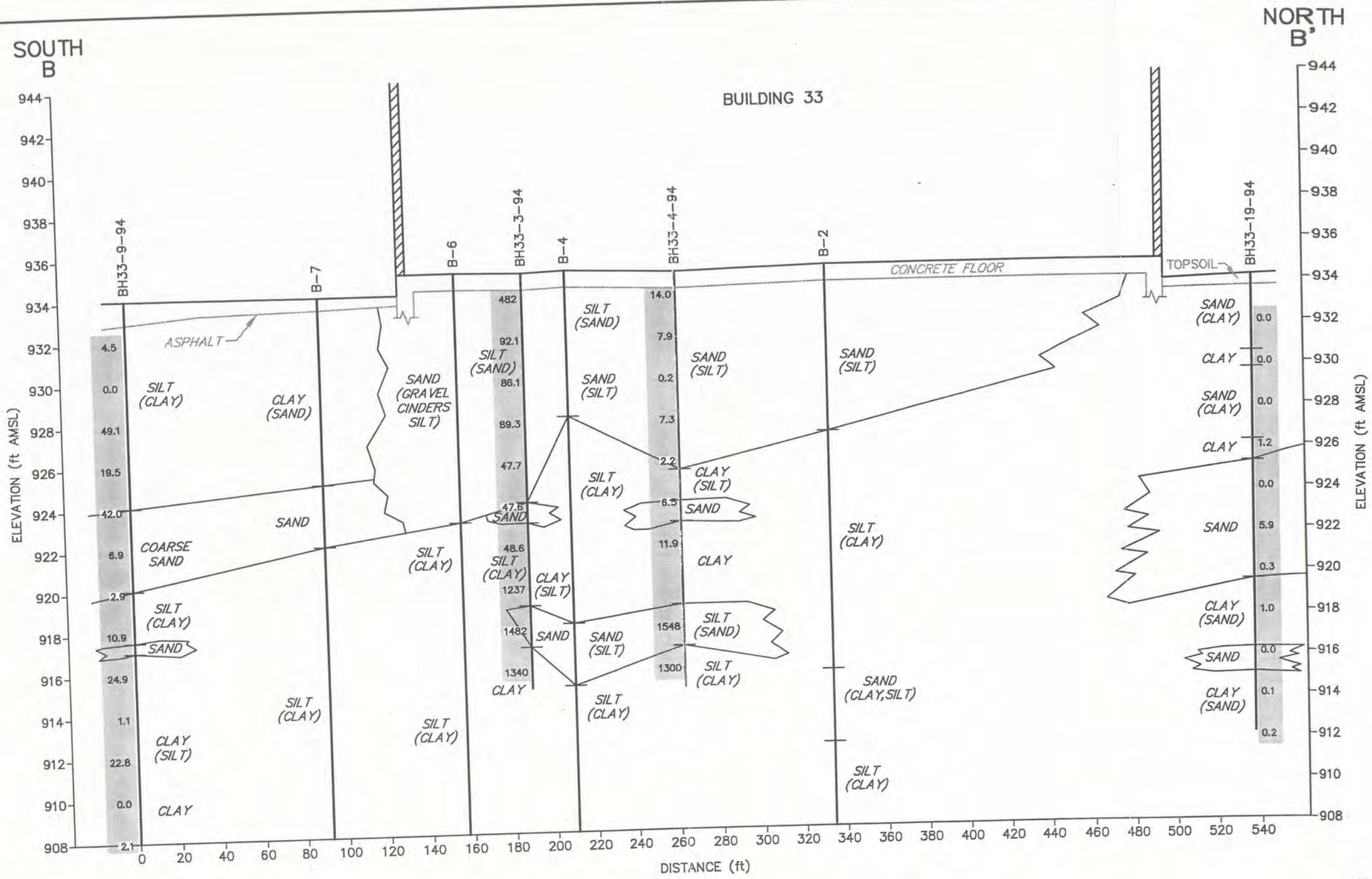
10.4 PID READING (ppm)

figure 4.5

CROSS-SECTION A-A'
BUILDING 33
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 26/95(W) REV.0 (X-01)



LEGEND

24.9 PID READING (ppm)

figure 4.6

CROSS—SECTION B—B'
BUILDING 33
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) SEPT 26/95(W) REV.0 (X-02)



figure 7.1
PARCEL A – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) OCT 03/95(W) REV.0 (P-20)

PARCEL LIST:

B1 FORMERLY PART OF PONTIAC TRUCK GROUP FACILITIES, CURRENTLY OWNED BY GM AND LEASED TO DEVELOPER.

N

0 60 150ft

AREAS OF INTEREST

42 FORMER UNDERGROUND TANK AREA

43 FORMER CONSTRUCTION DEBRIS SITE

44 BLDG. 43 INVESTIGATION/REMEDIATION

WWTP

PARCEL B1

LEGEND

PROPERTY BOUNDARIES

APPROXIMATE LIMIT OF PARCEL BOUNDARY

42 AREAS OF INTEREST

EXISTING, UNDER CONSTRUCTION OR PROPOSED BUILDINGS

CRA

figure 8.1

PARCEL B1 – AOIs

GENERAL MOTORS CORPORATION

Pontiac, Michigan

7097 (1) OCT 03/95(W) REV.0 (P-21)

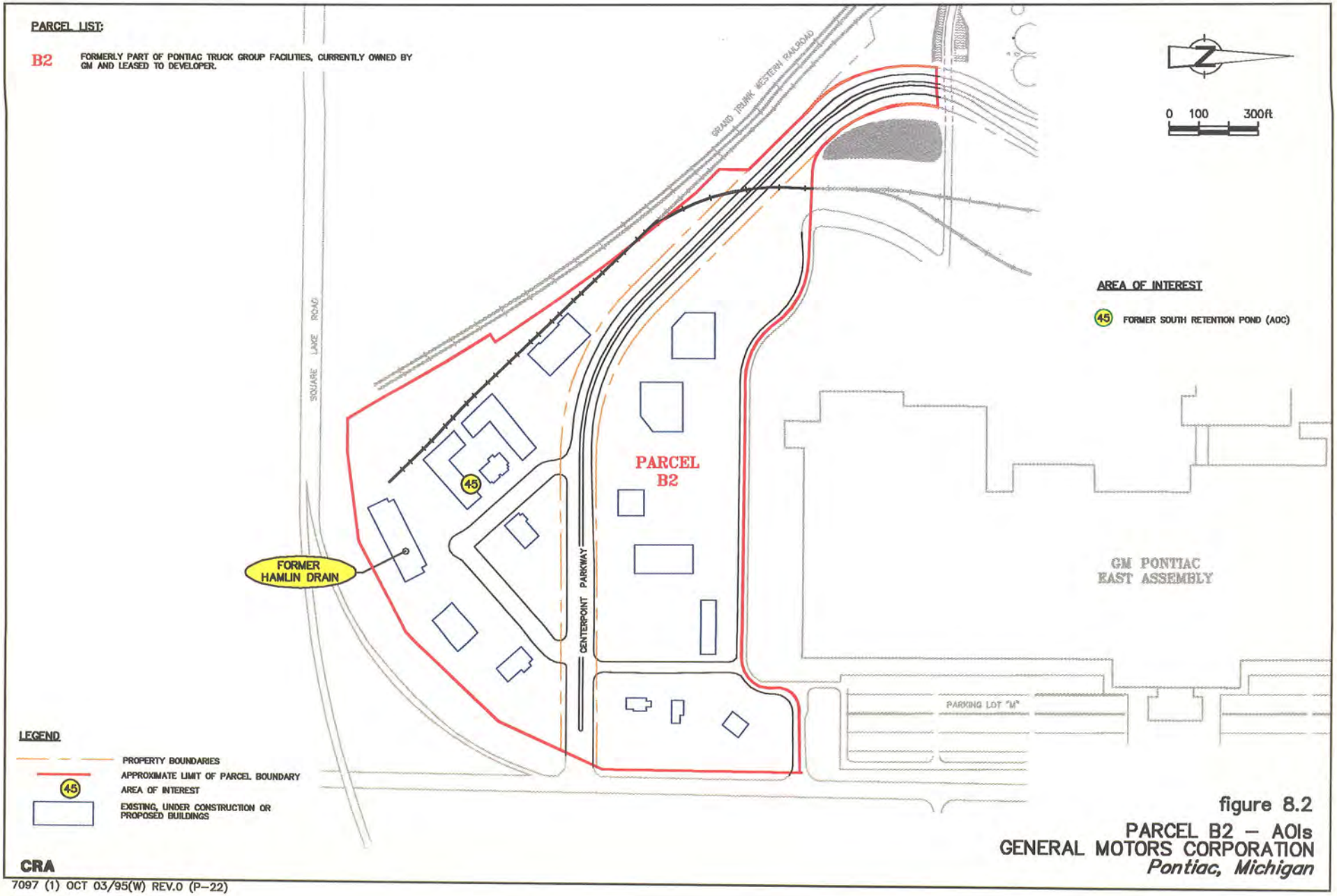


figure 8.2
PARCEL B2 – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan

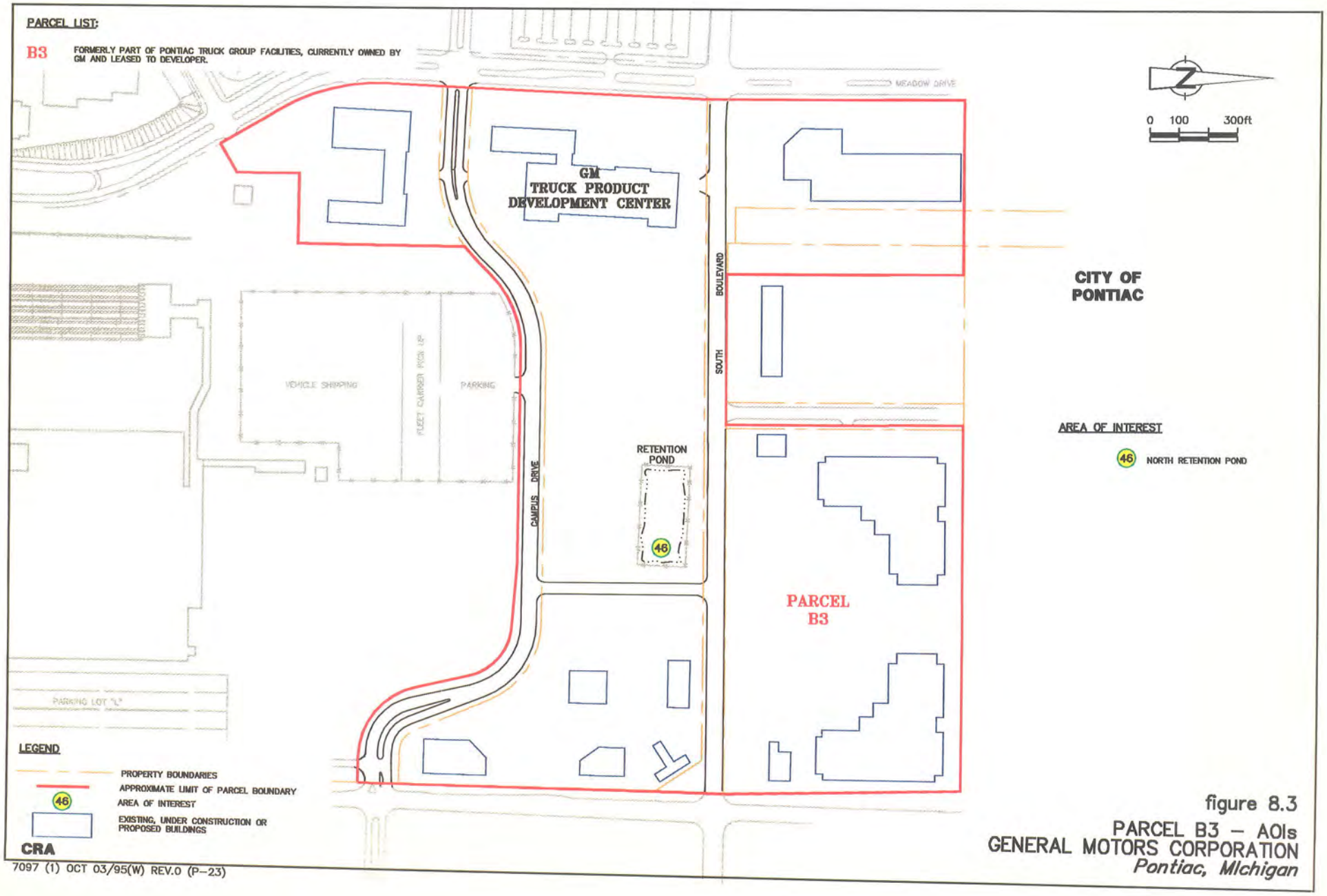


figure 8.3
PARCEL B3 – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan

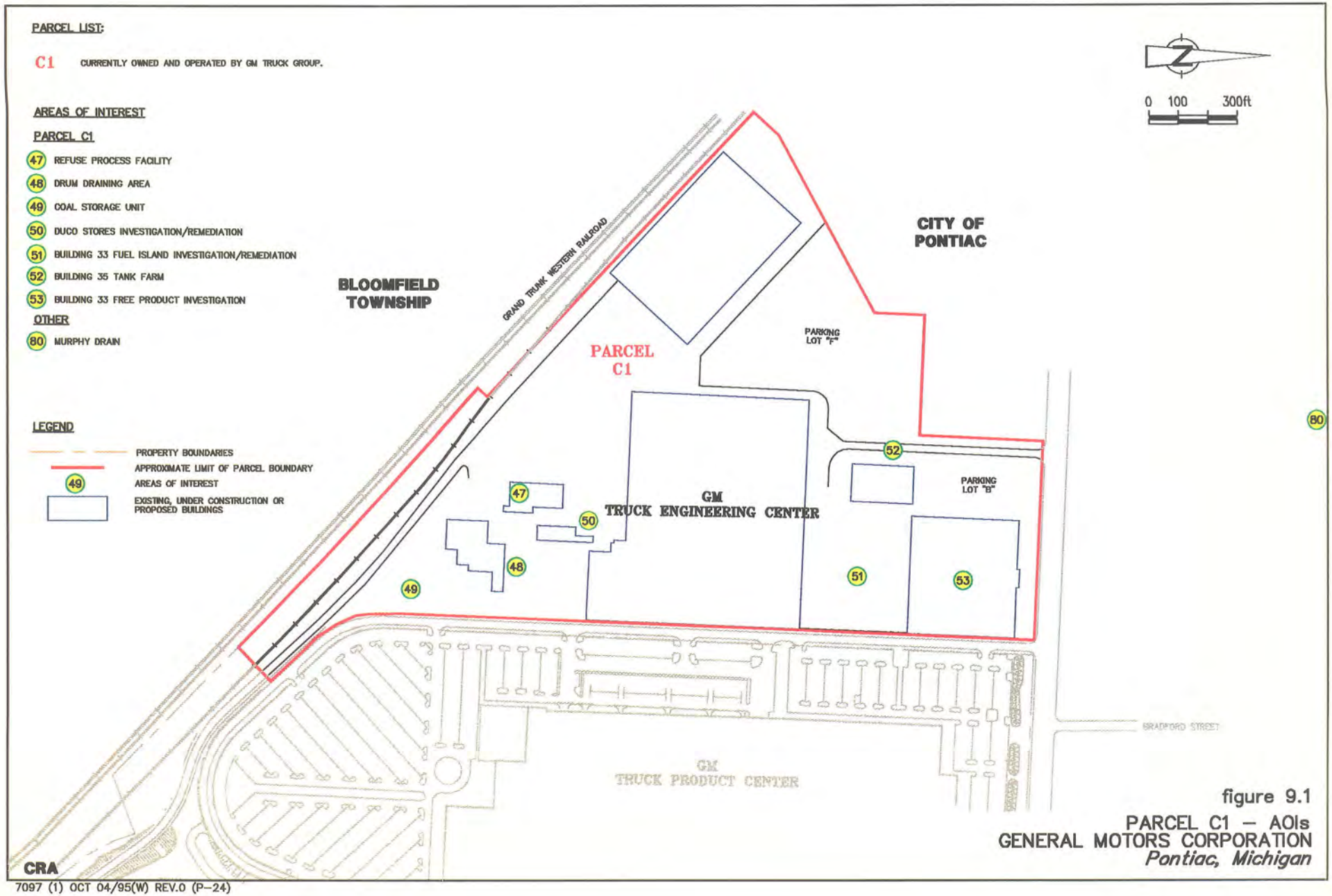


figure 9.1
PARCEL C1 – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan

7097 (1) OCT 04/95(W) REV.0 (P–24)



figure 9.2
PARCEL C2 – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan

CRA

7097 (1) OCT 04/95(W) REV.0 (P–25)

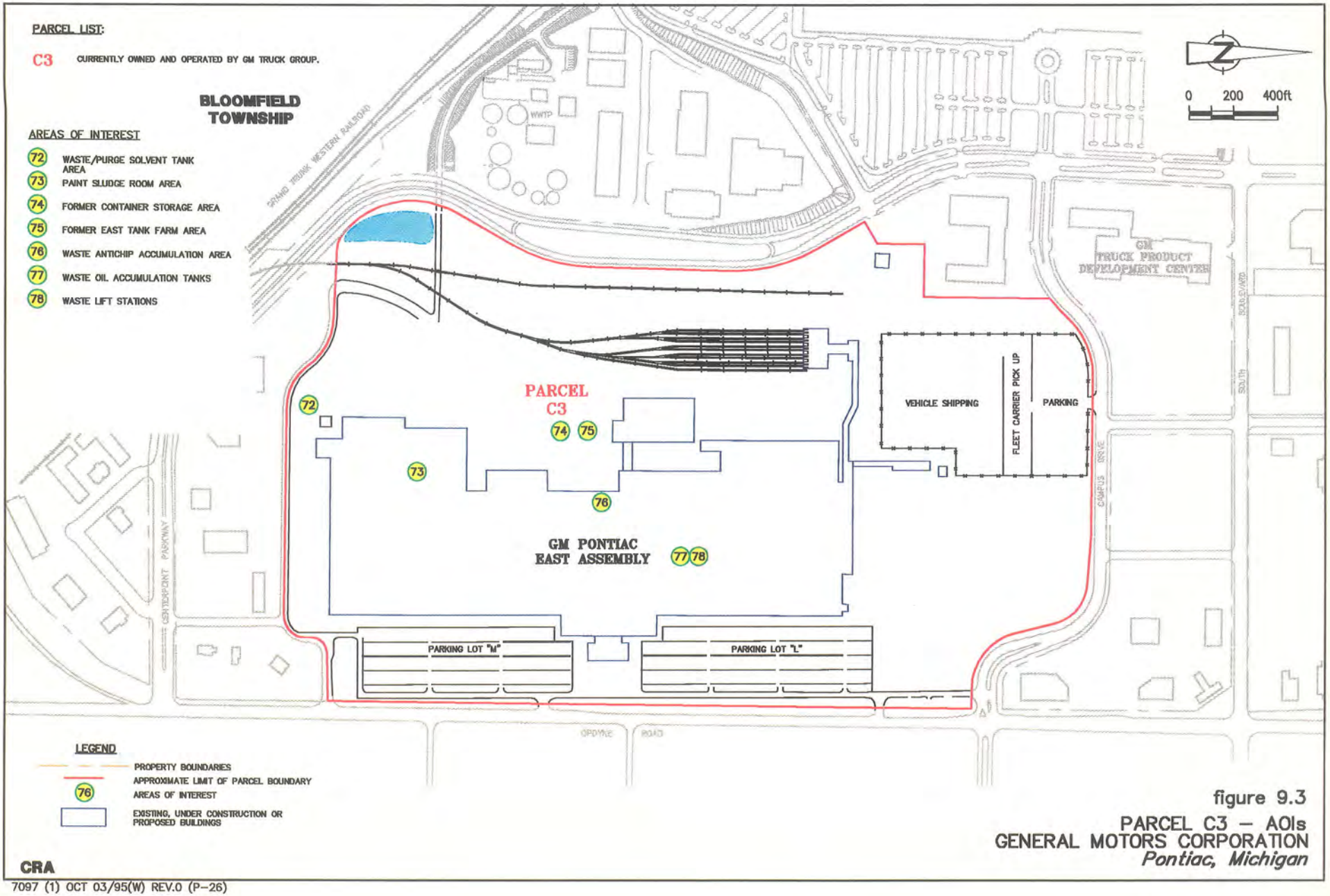
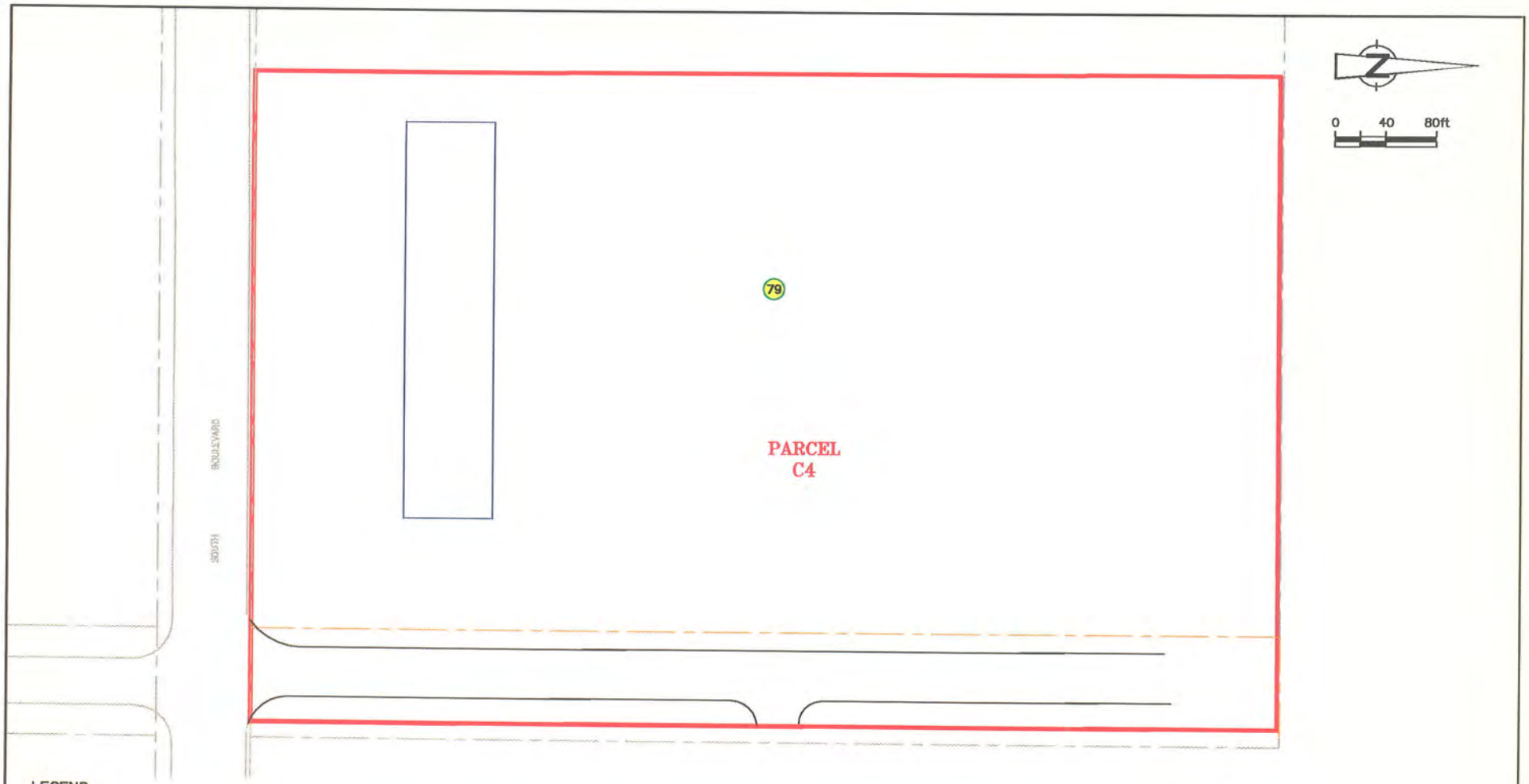


figure 9.3
PARCEL C3 – AOIs
GENERAL MOTORS CORPORATION
Pontiac, Michigan



CRA

7097 (1) OCT 03/95(W) REV.0 (P-27)

figure 9.4

PARCEL C4 – AOIs

GENERAL MOTORS CORPORATION

Pontiac, Michigan

TABLE 1.1

LIST OF U.S. EPA SWMUs AND AOCs
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Number*	*U.S. EPA PR/VSI SWMU #*	*U.S. EPA PR/VSI (1) Operation/Identification*
A	Central	1	12	Former Deluge Tank Area
		2	13	Former Waste Solvent Collection Area
		3	14	Former Waste Purge Solvent Collection Areas
		4	15	Former Fluid Collection Pits
		5	16	Former Sludge Dock
		6	17	Former Waste Lift Stations (2)
B1	Central	7	6	Former Underground Tank Area
B2	Central	8	33	Former South Retention Pond (AOC) (3)
B3	Central	9	34	North Retention Pond (AOC)
C1	East (Eng.)	10	5	Drum Draining Area
		11	7	Refuse Process Facility
		12	32	Coal Storage Unit (AOC)
C2	East (WWTP)	13	1	Container Storage Area
		14	4	Tank Storage Area
		15	18	General Waste Solids Separator
		16	19	Acid Waste Sludge Tanks
		17	20	Sludge Filter Press
		18	21	Sludge Filter Press Sump
		19	22	Acid Waste Separator System
		20	23	Polymer Tank
		21	24	Waste Pickle Acid Tank
		22	25	Cleaner Waste Separator
		23	26	Pickle Acid Treatment Tank
		24	27	Former Vacuum Filter Press
		25	28	Oil Skimmer Storage Tank
		26	29	Wastewater Treatment Tank Area
		27	31	Former Surface Impoundment
		28	36	Lime Slaker (AOC)
		29	37	Drum Storage Area (AOC)

TABLE 1.1

LIST OF U.S. EPA SWMUs AND AOCs
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Number*	*U.S. EPA PR/VSI SWMU #*	*U.S. EPA PR/VSI (1) Operation/Identification*
C3	East	30	2	Former East Tank Farm Area
		31	3	Former Container Storage Area
		32	8	Waste/Purge Solvent Tank Area
		33	9	Paint Sludge Room Area
		34	10	Waste Oil Accumulation Tanks
		35	11	Waste Antichip Accumulation Area
		36	17	Waste Lift Stations (2)
C4	East	37	30	Former "J" Lot Fill Area
Other	East	38	35	Murphy Drain (AOC)

Notes:

(1) Preliminary Review/Visual Site Inspection (PR/VSI) Report of the General Motors Truck and Bus Group Pontiac, Michigan, Plant (March 1987).
(2) U.S. EPA PR/VSI SWMU #17 was identified in the PR/VSI to be located in both the Pontiac Central and Pontiac East Areas.
(3) Area of Concern (AOC) identified by U.S. EPA.

TABLE 1.2

ADDITIONAL GM AREAS ASSESSED TO SUPPORT SITE REDEVELOPMENT (1)
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	#	*GM Operation/Identification*
A	Central	1	Former Heavy Duty Body Shop Hydraulic Lift Pit
A	Central	2	Former Heavy Duty Body Shop Hydraulic Lift Pit
A	Central	3	Former Heavy Duty Body Shop Hydraulic Lift Pit
A	Central	4	Former Creosote Tank
A	Central	5	Former #32791 Press Pit
A	Central	6	Former #21310 Press Pit
A	Central	7	Former #29470 Press Pit
A	Central	8	Former Spray Primer Mix Room Pit
A	Central	9	Former Cyanide Destruction Operation
A	Central	10	Former Building 29 Tank Farm
A	Central	11	Former Paint Mix Room Fire Dump Tank
A	Central	12	Former Process Trash Compactor Sump
A	Central	13	Former Black Dip Tank
A	Central	14	Former Phosphating Location
A	Central	15	Former Phosphating Location
A	Central	16	Former Phosphating Location
A	Central	17	Former Top Coat Pit
A	Central	18	Former Elevator Tire Shaft
A	Central	19	Former Plating Department
A	Central	20	Former Black Dip Tank
A	Central	21	Former Iron Phosphating Area
A	Central	22	Former Enamel Pit
A	Central	23	Former Spray Booth
A	Central	24	Former Enamel Pit
A	Central	25	Former Phosphating Area
A	Central	26	Former Spray Booth
A	Central	27	Former Phosphating Area
A	Central	28	Former Lowerator
A	Central	29	Former Transformer Accident Site
A	Central	30	Former Zinc Platers
A	Central	31	Former Wastewater Sump
A	Central	32	Former Wastewater Tunnel
A	Central	33	Former Anodizer
A	Central	34	Former Anodizer
A	Central	35	Former Chip Dock
B1	Central	36	Former Construction Debris Site
B1	Central	37	Building 43 - Investigation/Remediation
C1	East (Eng.)	38	DUCO Stores Investigation/Remediation
C1	East (Eng.)	39	Building 33 - Fuel Island Investigation/Remediation
C1	East (Eng.)	40	Building 35 - Tank Farm Investigation/Remediation
C1	East (Eng.)	41	Building 33 - Free Product Investigation
C2	East (WWTP)	42	Burn Pile Investigation/Remediation
Other	Central	43	Pits and Sumps

Notes:

(1) There are additional areas, beyond those identified by U.S. EPA in the PR/VSI Report (see Table 1.1), which have been addressed by GM to support Site re-development activities.

TABLE 1.3

COMBINED LISTING OF ALL AREAS OF INTEREST (1)
(U.S. EPA AND GM AREAS RENUMBERED SEQUENTIALLY)
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*AOI #*	*Operation/Identification*	*Existing Condition*
A	Central	1	Former Deluge Tank Area (SWMU #12)	GM Truck Product Center
A	Central	2	Former Waste Solvent Collection Area (SWMU #13)	GM Truck Product Center
A	Central	3	Former Waste Purge Solvent Collection Pits (SWMU #14)	GM Truck Product Center
A	Central	4	Former Fluid Collection Pits (SWMU #15)	GM Truck Product Center
A	Central	5	Former Sludge Dock (SWMU #16)	Parking Lot
A	Central	6	Former Waste Lift Stations (SWMU #17) (2)	Parking Lot
A	Central	7	Former Heavy Duty Body Shop Hydraulic Lift Pit	Parking Lot
A	Central	8	Former Heavy Duty Body Shop Hydraulic Lift Pit	Parking Lot
A	Central	9	Former Heavy Duty Body Shop Hydraulic Lift Pit	Parking Lot
A	Central	10	Former Creosote Tank	GM Truck Product Center
A	Central	11	Former #32791 Press Pit	GM Truck Product Center
A	Central	12	Former #21310 Press Pit	GM Truck Product Center
A	Central	13	Former #29470 Press Pit	GM Truck Product Center
A	Central	14	Former Spray Primer Mix Room Pit	Parking Lot
A	Central	15	Former Cyanide Destruction Operation	Parking Lot
A	Central	16	Former Building 29 Tank Farm	Parking Lot
A	Central	17	Former Paint Mix Room Fire Dump Tank	Parking Lot
A	Central	18	Former Process Trash Compactor Sump	Parking Lot
A	Central	19	Former Black Dip Tank	Parking Lot
A	Central	20	Former Phosphating Location	Landscaped Areas
A	Central	21	Former Phosphating Location	Landscaped Areas
A	Central	22	Former Phosphating Location	Landscaped Areas
A	Central	23	Former Top Coat Pit	Parking Lot
A	Central	24	Former Elevator Tire Shaft	Parking Lot
A	Central	25	Former Plating Department	GM Truck Product Center
A	Central	26	Former Black Dip Tank	GM Truck Product Center
A	Central	27	Former Iron Phosphating Area	GM Truck Product Center
A	Central	28	Former Enamel Pit	GM Truck Product Center
A	Central	29	Former Spray Booth	GM Truck Product Center
A	Central	30	Former Enamel Pit	GM Truck Product Center
A	Central	31	Former Phosphating Area	GM Truck Product Center
A	Central	32	Former Spray Booth	GM Truck Product Center
A	Central	33	Former Phosphating Area	GM Truck Product Center
A	Central	34	Former Lowerator	GM Truck Product Center
A	Central	35	Former Transformer Accident Site	Parking Lot
A	Central	36	Former Zinc Platers	Parking Lot
A	Central	37	Former Wastewater Sump	Parking Lot
A	Central	38	Former Wastewater Tunnel	Parking Lot
A	Central	39	Former Anodizer	Parking Lot
A	Central	40	Former Anodizer	Parking Lot
A	Central	41	Former Chip Dock	Parking Lot
B1	Central	42	Former Underground Tank Area (SWMU #6)	Under Closure Consideration
B1	Central	43	Former Construction Debris Site	Under Redevelopment
B1	Central	44	Building 43 - Investigation/Remediation	Under Redevelopment
B2	Central	45	Former South Retention Pond (AOC) (SWMU #33)	Under Redevelopment
B3	Central	46	North Retention Pond (AOC) (SWMU #34)	Active
C1	East (Eng.)	47	Refuse Process Facility (SWMU #7)	Active
C1	East (Eng.)	48	Drum Draining Area (SWMU #5)	Active
C1	East (Eng.)	49	Coal Storage Unit (AOC) (SWMU #32)	Active
C1	East (Eng.)	50	DUCO Stores Investigation/Remediation	Complete
C1	East (Eng.)	51	Building 33 - Fuel Island Investigation/Remediation	Complete

TABLE 1.3

COMBINED LISTING OF ALL AREAS OF INTEREST (1)
(U.S. EPA AND GM AREAS RENUMBERED SEQUENTIALLY)
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*AOI #*	*Operation/Identification*	*Existing Condition*
C1	East (Eng.)	52	Building 35 Tank Farm Investigation/Remediation	Complete
C1	East (Eng.)	53	Building 33 - Free Product Investigation	Complete
C2	East (WWTP)	54	Former Surface Impoundment (SWMU #31)	Inactive
C2	East (WWTP)	55	General Waste Solids Separator (SWMU #18)	Active
C2	East (WWTP)	56	Acid Waste Sludge Tanks (SWMU #19)	Active
C2	East (WWTP)	57	Sludge Filter Press (SWMU #20)	Active
C2	East (WWTP)	58	Sludge Filter Press Sump (SWMU #21)	Active
C2	East (WWTP)	59	Acid Waste Separator System (SWMU #22)	Active
C2	East (WWTP)	60	Polymer Tank (SWMU #23)	Active
C2	East (WWTP)	61	Waste Pickle Acid Tank (SWMU #24)	Active
C2	East (WWTP)	62	Cleaner Waste Separator (SWMU #25)	Active
C2	East (WWTP)	63	Pickle Acid Treatment Tank (SWMU #26)	Active
C2	East (WWTP)	64	Former Vacuum Filter Press (SWMU #27)	Removed
C2	East (WWTP)	65	Oil Skimmer Storage Tank (SWMU #28)	Active
C2	East (WWTP)	66	Wastewater Treatment Tank Area (SWMU #29)	Active
C2	East (WWTP)	67	Lime Slaker (AOC) (SWMU #36)	Active
C2	East (WWTP)	68	Drum Storage Area (AOC) (SWMU #37)	Active
C2	East (WWTP)	69	Container Storage Area (SWMU #1)	Active
C2	East (WWTP)	70	Tank Storage Area (SWMU #4)	Active
C2	East (WWTP)	71	Burn Pile Investigation/Remediation	Complete
C3	East	72	Waste/Purge Solvent Tank Area (SWMU #8)	Active
C3	East	73	Paint Sludge Room Area (SWMU #9)	Active
C3	East	74	Former Container Storage Area (SWMU #3)	Closed
C3	East	75	Former East Tank Farm Area (SWMU #2)	Closed
C3	East	76	Waste Antichip Accumulation Area (SWMU #11)	Active
C3	East	77	Waste Oil Accumulation Tanks (SWMU #10)	Active
C3	East	78	Waste Lift Stations (SWMU #17) (2)	Active
C4	East	79	Former "J" Lot Fill Area (SWMU #30)	Complete
Other	East	80	Murphy Drain (AOC) (SWMU #35)	Active
Other	Central	81	Pits and Sumps	Redeveloped

Notes:

(1) Includes U.S. EPA SWMUs/AOCs and additional areas assessed by GM (see Tables 1.1 and 1.2).
(2) AOI #6 and #78 both refer to U.S. EPA PR/VSI SWMU #17.
Decommissioned - The AOI has been cleaned, structural integrity tested, or inspected, and taken out of service.
Active - The AOI is currently in operation at the Site.
Inactive - The AOI is no longer in use at the Site, but remains in place.
Under Redevelopment - these AOIs are currently under commercial, office/research, and manufacturing development.
Redeveloped - these areas currently form part of either the GM Truck Product Center, parking lot, or landscaping.

TABLE 7.1

PARCEL A - AREAS OF INTEREST
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Area #*	*Operation/Identification*	*PR/VSI Identified Regulatory Status*	*U.S. EPA Suggested Further Action*	*GM Action Taken*	*Existing Condition*
A	Central	1	Former Deluge Tank Area (SWMU #12)	Nonregulated; Active	Unit integrity testing	Cleaning, structural integrity testing, demolished, and removed/disposed	GM Truck Product Center
A	Central	2	Former Waste Solvent Collection Area (SWMU #13)	RCRA regulated; Active	Verify RCRA performance standard	Cleaning, structural integrity testing, demolished, and removed/disposed	GM Truck Product Center
A	Central	3	Former Waste Purge Solvent Collection Pits (SWMU #14)	Nonregulated; Active	No further action	Cleaning, structural integrity testing, demolished, backfilled	GM Truck Product Center
A	Central	4	Former Fluid Collection Pits (SWMU #15)	Nonregulated; Active	Unit integrity testing	Cleaning, structural integrity testing, demolished, backfilled	GM Truck Product Center
A	Central	5	Former Sludge Dock (SWMU #16)	Nonregulated; Active	Air monitoring	Soil inv., demolished, removed/disposed	Parking Lot
A	Central	6	Former Waste Lift Stations (SWMU #17)	Nonregulated; Active	Air monitoring; Unit integrity testing	Cleaning, structural integrity testing, soil inv., dismantling, demolition, removal/disposal	Parking Lot
A	Central	7	Former Heavy Duty Body Shop Hydraulic Lift Pit	–	–	Cleaning, structural integrity testing, demolition, removal/disposal, backfilling	Parking Lot
A	Central	8	Former Heavy Duty Body Shop Hydraulic Lift Pit	–	–	Cleaning, structural integrity testing, demolition, removal/disposal, backfilling	Parking Lot
A	Central	9	Former Heavy Duty Body Shop Hydraulic Lift Pit	–	–	Cleaning, structural integrity testing, demolition, removal/disposal, backfilling	Parking Lot
A	Central	10	Former Creosote Tank	–	–	No action required	GM Truck Product Center
A	Central	11	Former #32791 Press Pit	–	–	Cleaning, structural integrity testing, excavation, removal/disposal, backfilling	GM Truck Product Center
A	Central	12	Former #21310 Press Pit	–	–	Cleaning, structural integrity testing, excavation, removal/disposal, backfilling	GM Truck Product Center
A	Central	13	Former #29470 Press Pit	–	–	Cleaning, structural integrity testing, excavation, removal/disposal, backfilling	GM Truck Product Center
A	Central	14	Former Spray Primer Mix Room Pit	–	–	Structural integrity testing, water sampling excavation, removal/disposal, backfilling	Parking Lot
A	Central	15	Former Cyanide Destruction Operation	–	–	No action required	Parking Lot
A	Central	16	Former Building 29 Tank Farm	–	–	UST removal, structural integrity testing, soil investigation, thermal treatment of 3000 c.y. soil	Parking Lot
A	Central	17	Former Paint Mix Room Fire Dump Tank	–	–	No action required	Parking Lot
A	Central	18	Former Process Trash Compactor Sump	–	–	Cleaning, structural integrity testing	Parking Lot
A	Central	19	Former Black Dip Tank	–	–	Soil investigation, demolished, removed/disposed	Landscaped areas
A	Central	20	Former Phosphating Location	–	–	Soil investigation, demolished, removed/disposed	Landscaped areas
A	Central	21	Former Phosphating Location	–	–	Soil investigation, demolished, removed/disposed	Landscaped areas
A	Central	22	Former Phosphating Location	–	–	Soil investigation, demolished, removed/disposed	Parking Lot
A	Central	23	Former Top Coat Pit	–	–	Cleaning, structural integrity testing, soil inv., excavation, removal/disposal and backfilling	Parking Lot
A	Central	24	Former Elevator Tire Shaft	–	–	Cleaning, structural integrity testing, soil inv., dismantling, demolition, removal/disposal, backfilling	GM Truck Product Center
A	Central	25	Former Plating Department	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	26	Former Black Dip Tank	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	27	Former Iron Phosphating Area	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	28	Former Enamel Pit	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	29	Former Spray Booth	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	30	Former Enamel Pit	–	–	Soil investigation, demolished, removed/disposed	GM Truck Product Center

TABLE 7.1

PARCEL A - AREAS OF INTEREST
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Area #*	*Operation/Identification*	*PR/VSI Identified Regulatory Status*	*U.S. EPA Suggested Further Action*	*GM Action Taken*	*Existing Condition*
A	Central	31	Former Phosphating Area	--	--	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	32	Former Spray Booth	--	--	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	33	Former Phosphating Area	--	--	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	34	Former Lowerator	--	--	Soil investigation, demolished, removed/disposed	GM Truck Product Center
A	Central	35	Former Transformer Accident Site	--	--	Soil investigation, demolished, removed/disposed	Parking Lot
A	Central	36	Former Zinc Platers	--	--	Soil investigation, cleaned, dismantled, removed, diposed	Parking Lot
A	Central	37	Former Wastewater Sump	--	--	Soil investigation, demolished, removed/disposed	Parking Lot
A	Central	38	Former Wastewater Tunnel	--	--	Soil investigation, filled, paved over	Parking Lot
A	Central	39	Former Anodizer	--	--	Soil investigation, demolished, removed/disposed	Parking Lot
A	Central	40	Former Anodizer	--	--	Soil investigation, demolished, removed/disposed	Parking Lot
A	Central	41	Former Chip Dock	--	--	Soil investigation, demolished, removed/disposed	Parking Lot

Notes:

-- Additional areas of interest identified by GM.

TABLE 8.1

PARCEL B - AREAS OF INTEREST
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Area #*	*Operation/Identification*	*PR/VSI Identified Regulatory Status*	*U.S. EPA Suggested Further Action*	*GM Action Taken*	*Current Status*
B1	Central	42	Former Underground Tank Area (SWMU #6)	UST Program	Soil surface samples; UST	UST removal, structural integrity testing, soil investigation, disposal of 190 c.y. soil	Under closure consideration
B1	Central	43	Former Construction Debris Site	--	--	Soil investigation	Under redevelopment
B1	Central	44	Building 43 - Investigation/Remediation	--	--	Test pits, subsurface soil investigation, excavation of 11,000 c.y. of soil	Under redevelopment
B2	Central	45	Former South Retention Pond (AOC) (SWMU #33)	Nonregulated; Active	Sediment sampling	Level One Environmental Site Assessment	Under redevelopment
B3	Central	46	North Retention Pond (AOC) (SWMU #34)	Nonregulated; Active	Sediment sampling	Level One Environmental Site Assessment	Active

Notes:

Under Redevelopment - these AOIs are currently under commercial, office/research and manufacturing development.
Active - the AOI is currently in operation at the Site.

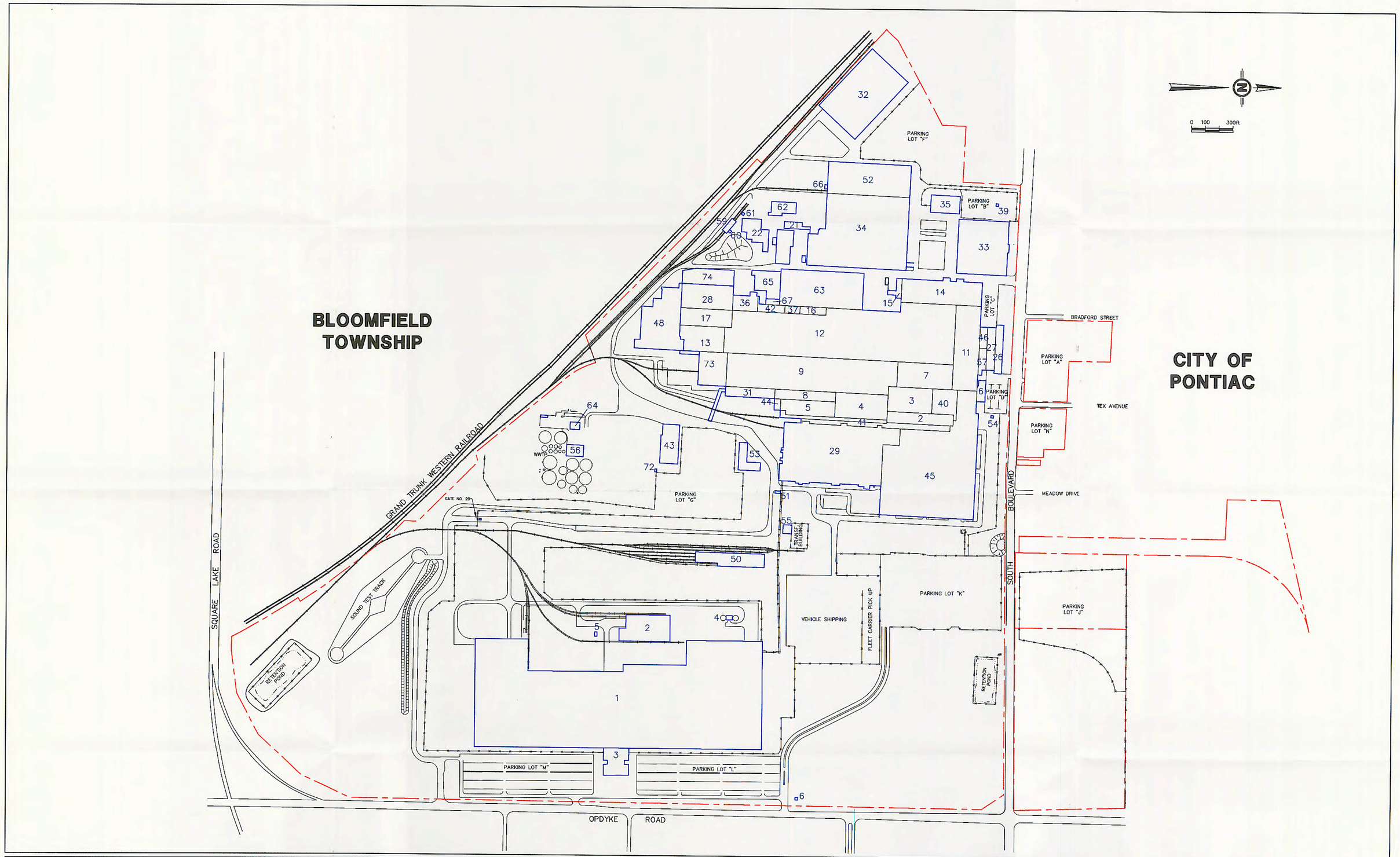
TABLE 9.1

PARCEL C - AREAS OF INTEREST
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM Area	*GM Location*	*Area #*	*Operation/Identification*	*PR/VSI Identified Regulatory Status*	*U.S. EPA Suggested Further Action*	*GM Action Taken*	*Current Status*
C1	East (Eng.)	47	Refuse Process Facility (SWMU #7)	Michigan Act 641	No further action	–	Active
C1	East (Eng.)	48	Drum Draining Area (SWMU #5)	RCRA regulated; Active	Verify RCRA performance standard	–	Active
C1	East (Eng.)	49	Coal Storage Unit (AOC) (SWMU #32)	Nonregulated; Active	Air monitoring	–	Active
C1	East (Eng.)	50	DUCO Stores Investigation/Remediation	–	–	–	Complete
C1	East (Eng.)	51	Building 33 - Fuel Island Investigation/Remediation	–	–	–	Complete
C1	East (Eng.)	52	Building 35 Investigation/Remediation	–	–	–	Complete
C1	East (Eng.)	53	Building 33 - Free Product Investigation	–	–	–	Complete
C2	East (WWTP)	54	Former Surface Impoundment (SWMU #31)	Nonregulated; Inactive	Soil/sediment sampling	–	Inactive
C2	East (WWTP)	55	General Waste Solids Separator (SWMU #18)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C2	East (WWTP)	56	Acid Waste Sludge Tanks (SWMU #19)	Nonregulated; Active	No further action	–	Active
C2	East (WWTP)	57	Sludge Filter Press (SWMU #20)	Nonregulated; Active	Air monitoring	–	Active
C2	East (WWTP)	58	Sludge Filter Press Sump (SWMU #21)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C2	East (WWTP)	59	Acid Waste Separator System (SWMU #22)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C2	East (WWTP)	60	Polymer Tank (SWMU #23)	Nonregulated; Inactive	No further action	–	Active
C2	East (WWTP)	61	Waste Pickle Acid Tank (SWMU #24)	RCRA regulated; Active	Verify RCRA performance standard	–	Active
C2	East (WWTP)	62	Cleaner Waste Separator (SWMU #25)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C2	East (WWTP)	63	Pickle Acid Treatment Tank (SWMU #26)	RCRA regulated; Active	Verify RCRA performance standard	–	Active
C2	East (WWTP)	64	Former Vacuum Filter Press (SWMU #27)	Nonregulated; Inactive	No further action	–	Removed from Service
C2	East (WWTP)	65	Oil Skimmer Storage Tank (SWMU #28)	Nonregulated; Active	Air monitoring	–	Active
C2	East (WWTP)	66	Wastewater Treatment Tank Area (SWMU #29)	Nonregulated; Active and Inactive subunit tanks	Multimedia testing; unit integrity testing	–	Active
C2	East (WWTP)	67	Lime Slaker (AOC) (SWMU #36)	Nonregulated; Active	Air monitoring	–	Active
C2	East (WWTP)	68	Drum Storage Area (AOC) (SWMU #37)	Nonregulated; Active	No further action	–	Active
C2	East (WWTP)	69	Container Storage Area (SWMU #1)	RCRA regulated; Active	Verify RCRA performance standard	–	Active
C2	East (WWTP)	70	Tank Storage Area (SWMU #4)	RCRA regulated; Inactive	Verify RCRA performance standard	–	Inactive
C2	East (WWTP)	71	Burn Pile Investigation/Remediation	–	–	–	Active
C3	East	72	Waste/Purge Solvent Tank Area (SWMU #8)	RCRA regulated; Active	Verify RCRA performance standard	–	Active
C3	East	73	Paint Sludge Room Area (SWMU #9)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C3	East	74	Former Container Storage Area (SWMU #3)	Temporary storage	Unit monitoring; determine regulatory status	–	Closed
C3	East	75	Former East Tank Farm Area (SWMU #2)	RCRA regulated; Inactive	Verify RCRA performance standard	–	Closed
C3	East	76	Waste Antichip Accumulation Area (SWMU #11)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C3	East	77	Waste Oil Accumulation Tanks (SWMU #10)	Nonregulated; Active	Unit integrity testing	–	Active
C3	East	78	Waste Lift Stations (SWMU #17)	Nonregulated; Active	Air monitoring; unit integrity testing	–	Active
C4	East	79	Former "J" Lot Fill Area Investigation (SWMU #30)	Nonregulated; Inactive	Soil/sediment sampling	–	Inactive
Other	East	80	Murphy Drain (AOC) (SWMU #35)	NPDES discharge permit	Verify NPDES performance standard	–	Active
Other	Central	81	Pits and Sumps	–	–	Decommissioned, demolished, excavated, removed/disposed	Redeveloped

Notes:

Decommissioned - the AOI has been cleaned, and inspected for structural integrity.
GM Action Taken - detailed information of these AOIs will be forwarded December 1, 1995 as per attached cover letter.
Redeveloped - these areas currently form part of either the GM Truck Product Center, parking lot or landscaping.
Removed From Service - the AOI has been dismantled and removed.
Active - the AOI is currently in operation.
Inactive - the AOI is no longer in use.



LEGEND

PROPERTY BOUNDARIES

43 BUILDING NUMBER

№	Revision	Date	Initial

Approved

GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

SITE PLAN – 1987

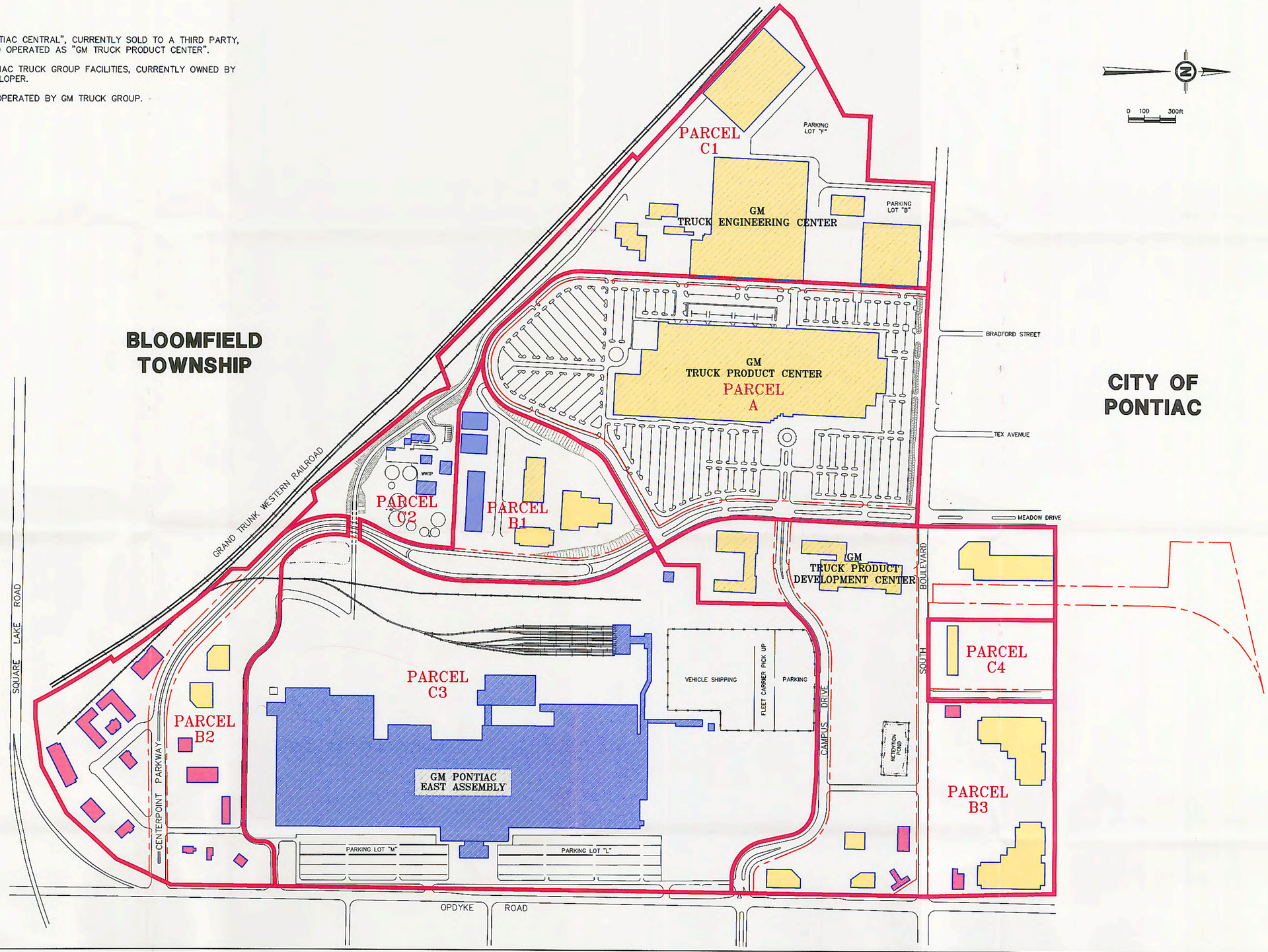
CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: I.W.R.	Scale: 1"=300'	Date: SEPTEMBER 1995	File №: P-03	Rev.№: 0
Designed by:				
Checked by:	Field book:	Project №: 7097	Drawing №: PLAN 1	

SEPT 25/95(W)

PARCEL LIST:

A	FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK BY GM AND OPERATED AS "GM TRUCK PRODUCT CENTER".
B1,B2,B3	FORMERLY PART OF PONTIAC TRUCK GROUP FACILITIES, CURRENTLY OWNED BY GM AND LEASED TO DEVELOPER.
C1,C2,C3,C4	CURRENTLY OWNED AND OPERATED BY GM TRUCK GROUP.



LEGEND

- PROPERTY BOUNDARIES
- EXISTING COMMERCIAL
- EXISTING OFFICE/RESEARCH
- EXISTING MANUFACTURING/DISTRIBUTING
- APPROXIMATE LIMIT OF PARCEL BOUNDARY
- PROPOSED COMMERCIAL
- PROPOSED OFFICE/RESEARCH
- PROPOSED MANUFACTURING/DISTRIBUTING

№	Revision	Date	Initial

Approved

GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

PARCEL SUMMARY PLAN
(PROPOSED SITE PLAN)

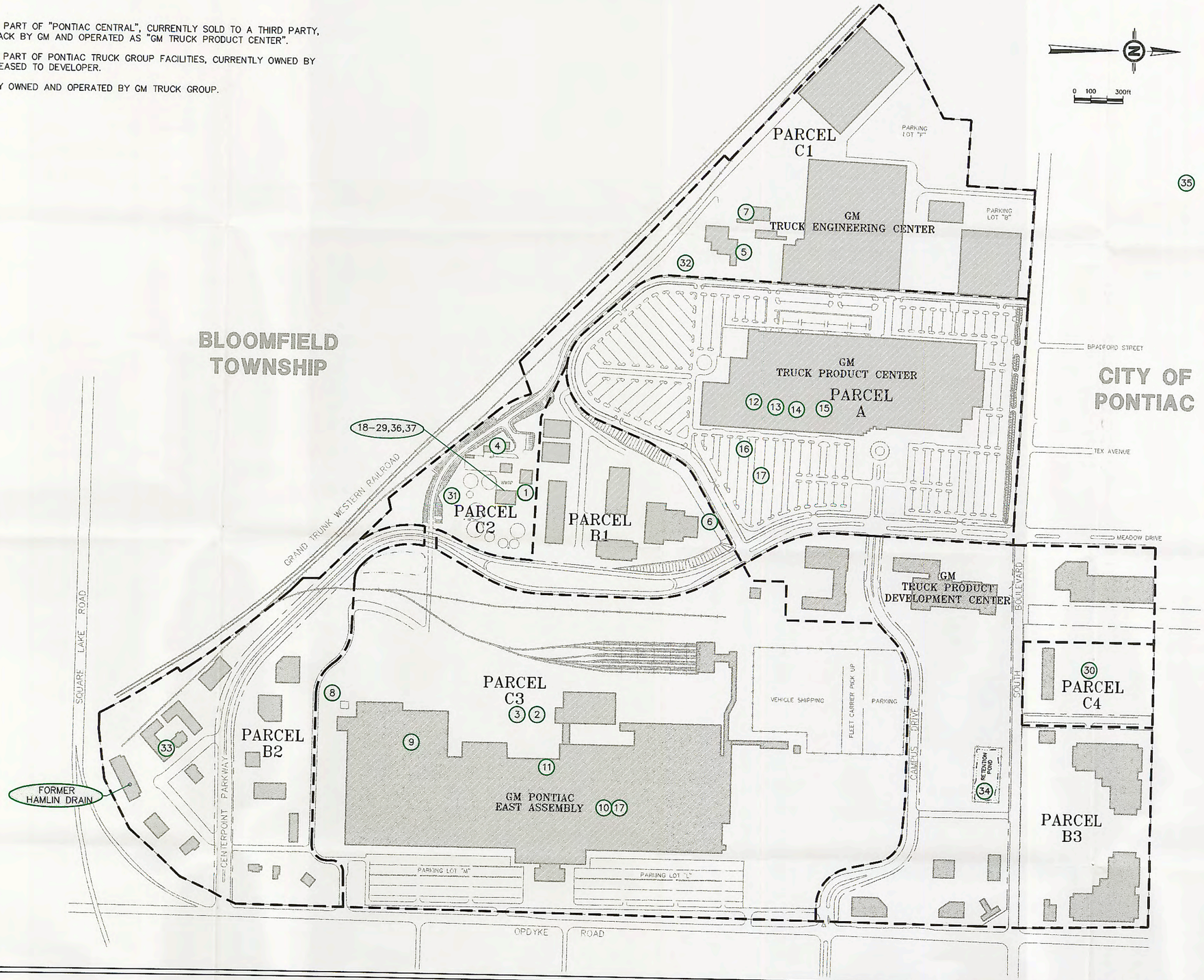
CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: I.W.R.	Scale: 1"=300'	Date: SEPTEMBER 1995	File №: P-07	Rev.№: 0
Designed by:	Field book:	Project №: 7097	Drawing №: PLAN 2	
Checked by: M.S.K.				

SEPT 25/95(W)

PARCEL LIST:

A	FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK BY GM AND OPERATED AS "GM TRUCK PRODUCT CENTER".
B1,B2,B3	FORMERLY PART OF PONTIAC TRUCK GROUP FACILITIES, CURRENTLY OWNED BY GM AND LEASED TO DEVELOPER.
C1,C2,C3,C4	CURRENTLY OWNED AND OPERATED BY GM TRUCK GROUP.



U.S. EPA AREAS OF CONCERN

PARCEL A

- (12) FORMER DELUGE TANK AREA
- (13) FORMER WASTE SOLVENT COLLECTION AREA
- (14) FORMER WASTE PURGE SOLVENT COLLECTION PITS
- (15) FORMER FLUID COLLECTION PITS
- (16) FORMER SLUDGE DOCK
- (17) FORMER WASTE LIFT STATIONS

PARCEL B1

- (6) FORMER UNDERGROUND TANK AREA

PARCEL B2

- (33) FORMER SOUTH RETENTION POND

PARCEL B3

- (34) NORTH RETENTION POND

PARCEL C1

- (7) REFUSE PROCESS FACILITY
- (5) DRUM DRAINING AREA
- (32) COAL STORAGE UNIT

PARCEL C2

- (4) TANK STORAGE AREA
- (31) FORMER SURFACE IMPOUNDMENT
- (18) GENERAL WASTE SOLIDS SEPARATOR
- (19) ACID WASTE SLUDGE TANKS
- (20) SLUDGE FILTER PRESS
- (21) SLUDGE FILTER PRESS SUMP
- (22) ACID WASTE SEPARATOR SYSTEM
- (23) POLYMER TANK
- (24) WASTE PICKLE ACID TANK
- (25) CLEANER WASTE SEPARATOR
- (26) PICKLE ACID TREATMENT TANK STORAGE AREA
- (27) VACUUM FILTER PRESS
- (28) OIL SKIMMER STORAGE TANK
- (29) WASTEWATER TREATMENT TANK AREA
- (36) LIME SLAKER
- (37) DRUM STORAGE AREA
- (1) CONTAINER STORAGE AREA

PARCEL C3

- (8) WASTE/PURGE SOLVENT TANK AREA
- (9) PAINT SLUDGE ROOM AREA
- (3) FORMER CONTAINER STORAGE AREA
- (2) FORMER EAST TANK FARM AREA
- (11) WASTE ANTICHIP ACCUMULATION AREA
- (10) WASTE OIL ACCUMULATION TANKS
- (17) WASTE LIFT STATIONS

PARCEL C4

- (30) FORMER LANDFILL

OTHER

- (35) MURPHY DRAIN

LEGEND

- PROPERTY BOUNDARIES
- APPROXIMATE LIMIT OF PARCEL BOUNDARY
- PROPOSED BUILDINGS
- (34) U.S. EPA AREA OF CONCERN
- EXISTING BUILDINGS OR BUILDINGS UNDER CONSTRUCTION

№	Revision	Date	Initial

Approved

GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

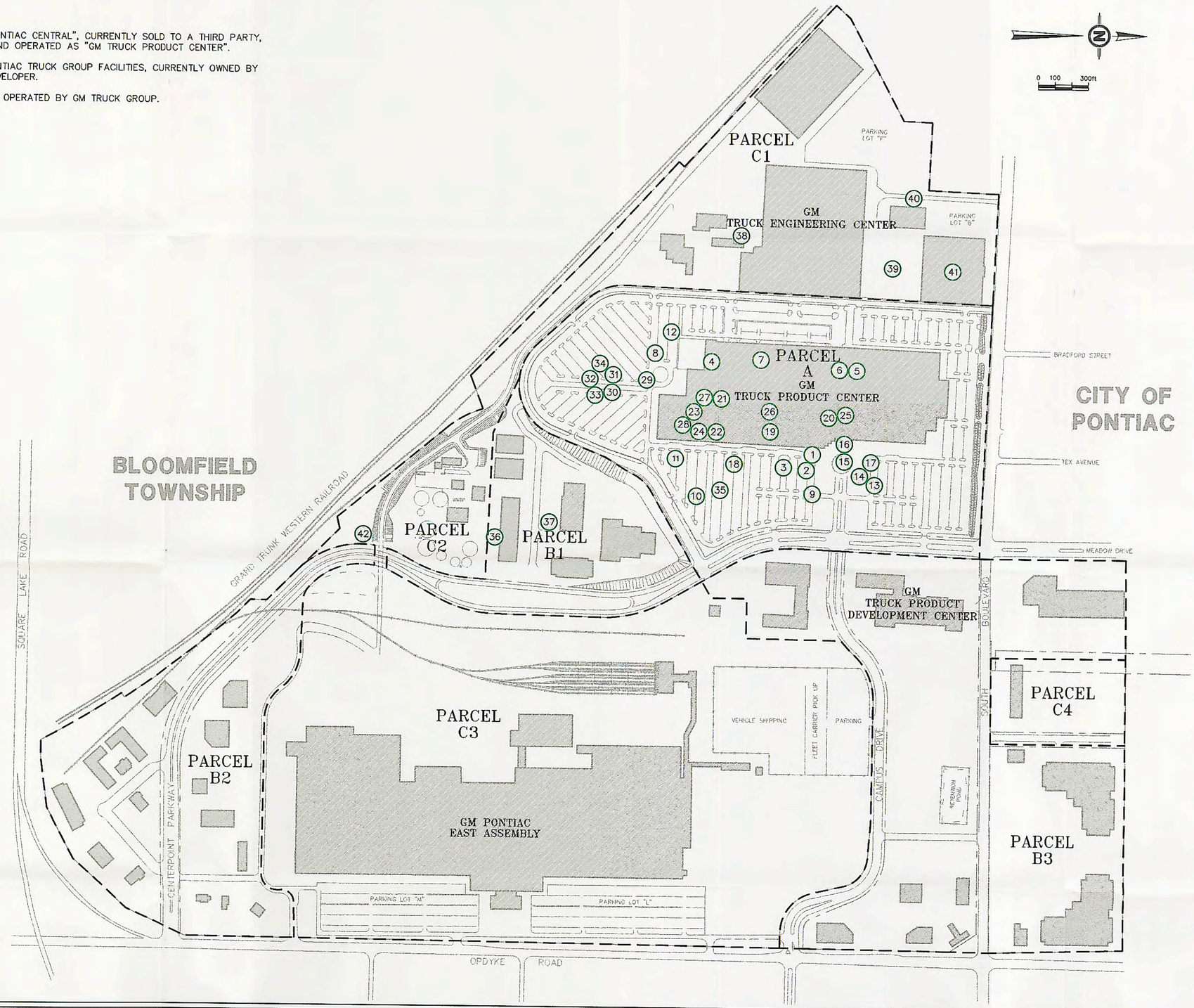
U.S. EPA AREAS OF CONCERN

CRA
CONESTOGA-ROVERS & ASSOCIATES

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Designed by:				
Checked by: M.S.K.	Field book:	Project №: 7097	Drawing №: PLAN 3	

PARCEL LIST:

A	FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK BY GM AND OPERATED AS "GM TRUCK PRODUCT CENTER".
B1,B2,B3	FORMERLY PART OF PONTIAC TRUCK GROUP FACILITIES, CURRENTLY OWNED BY GM AND LEASED TO DEVELOPER.
C1,C2,C3,C4	CURRENTLY OWNED AND OPERATED BY GM TRUCK GROUP.



GM AREAS OF CONCERN

PARCEL A

1. FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
2. FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
3. FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
4. FORMER CREOSOTE TANK
5. FORMER #32791 PRESS PIT
6. FORMER #21310 PRESS PIT
7. FORMER #29470 PRESS PIT
8. FORMER SPRAY PRIMER MIX ROOM PIT
9. FORMER CYANIDE DESTRUCTION OPERATION
10. FORMER BUILDING 29 TANK FARM
11. FORMER PAINT MIX ROOM FIRE DUMP TANK
12. PROCESS TRASH COMPACTOR SUMP
13. FORMER BLACK DIP TANK
14. FORMER PHOSPHATING LOCATION
15. FORMER PHOSPHATING LOCATION
16. FORMER PHOSPHATING LOCATION
17. FORMER TOP COAT PIT
18. FORMER ELEVATOR TIRE SHAFT
19. FORMER PLATING DEPARTMENT
20. FORMER BLACK DIP TANK
21. FORMER IRON PHOSPHATING AREA
22. FORMER ENAMEL PIT
23. FORMER SPRAY BOOTH
24. FORMER ENAMEL PIT
25. FORMER PHOSPHATING AREA
26. FORMER SPRAY BOOTH
27. FORMER PHOSPHATING AREA
28. FORMER LOWERATOR
29. FORMER TRANSFORMER ACCIDENT SITE
30. FORMER ZINC PLATERS
31. FORMER WASTEWATER SUMP
32. FORMER WASTEWATER TUNNEL
33. FORMER ANODIZER
34. FORMER ANODIZER
35. FORMER CHIP DOCK

PARCEL B1

36. FORMER CONSTRUCTION DEBRIS SITE
37. BUILDING 43 INVESTIGATION/REMEDIATION

PARCEL C1

38. DUCO STORIES INVESTIGATION/REMEDIATION
39. BUILDING 33 FUEL ISLAND INVESTIGATION/REMEDIATION
40. BUILDING 35 TANK FARM INVESTIGATION/ REMEDIATION
41. BUILDING 33 FREE PRODUCT INVESTIGATION

PARCEL C2

42. BURN PILE INVESTIGATION/REMEDIATION
43. PITS AND SUMPS (NOT SHOWN ON PLAN)

LEGEND

- PROPERTY BOUNDARIES
- PROPOSED BUILDINGS
- EXISTING BUILDINGS OR BUILDINGS UNDER CONSTRUCTION
- APPROXIMATE LIMIT OF PARCEL BOUNDARY
- (7) GM AREAS OF CONCERN

№	Revision	Date	Initial

Approved

GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

GM AREAS OF CONCERN

CRA
CONESTOGA-ROVERS & ASSOCIATES

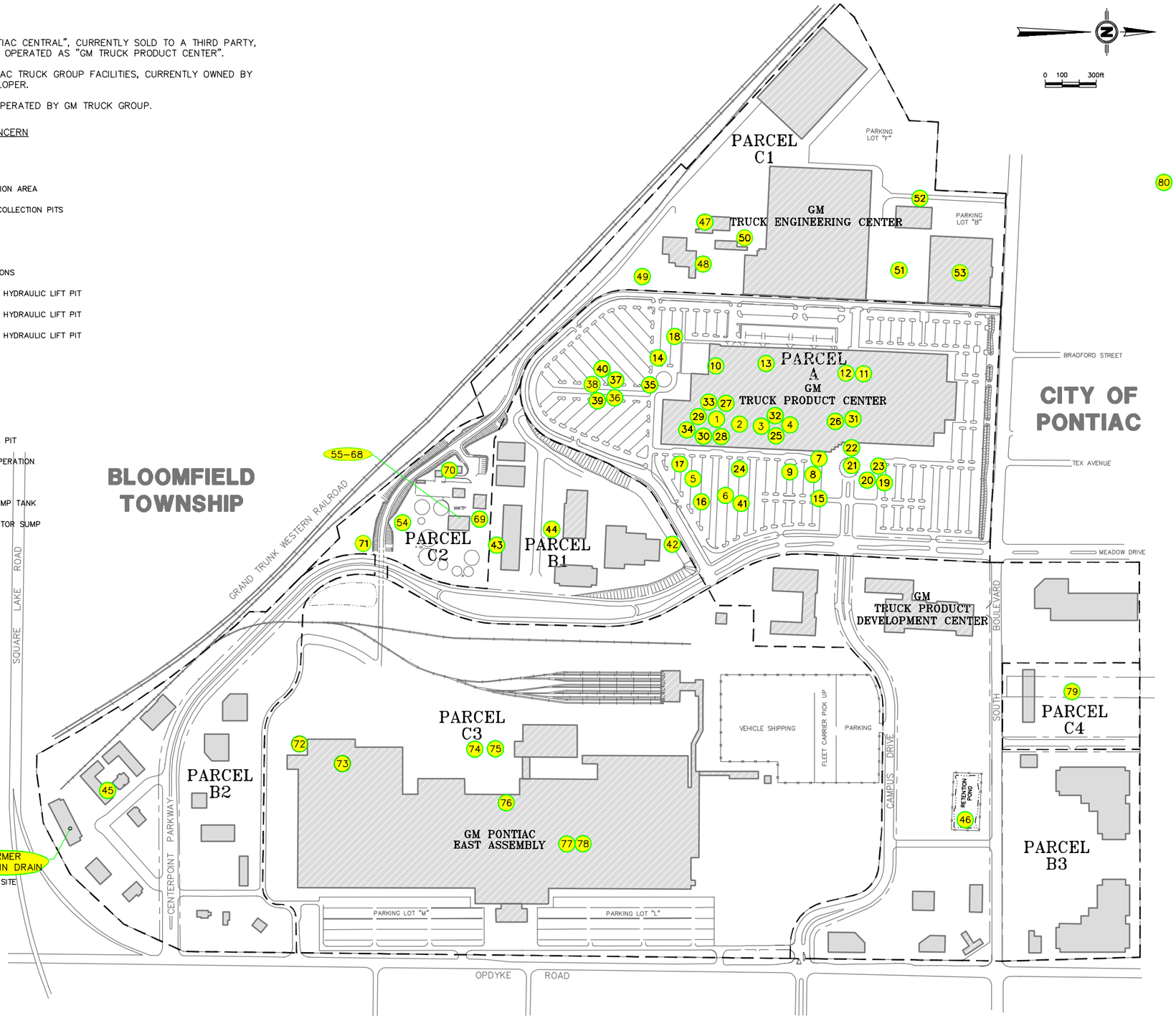
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Designed by:				
Checked by: M.S.K.	Field book:	Project №: 7097	Drawing №: PLAN 4	

SEPT 25/95(W)

PARCEL LIST:

A	FORMERLY PART OF "PONTIAC CENTRAL", CURRENTLY SOLD TO A THIRD PARTY, LEASED BACK BY GM AND OPERATED AS "GM TRUCK PRODUCT CENTER".
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C1,C2,C3,C4	CURRENTLY OWNED AND OPERATED BY GM TRUCK GROUP.

AOI	U.S. EPA SWMUs/AREAS OF CONCERN
	PARCEL A
1	12 FORMER DELUGE TANK AREA
2	13 FORMER WASTE SOLVENT COLLECTION AREA
3	14 FORMER WASTE PURGE SOLVENT COLLECTION PITS
4	15 FORMER FLUID COLLECTION PITS
5	16 FORMER SLUDGE DOCK
6	17 FORMER WASTE WATER LIFT STATIONS
7	FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
8	FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
9	FORMER HEAVY DUTY BODY SHOP HYDRAULIC LIFT PIT
10	FORMER CREOSOTE TANK
11	FORMER #32791 PRESS PIT
12	FORMER #21310 PRESS PIT
13	FORMER #29470 PRESS PIT
14	FORMER SPRAY PRIMER MIX ROOM PIT
15	FORMER CYANIDE DESTRUCTION OPERATION
16	FORMER BUILDING 29 TANK FARM
17	FORMER PAINT MIX ROOM FIRE DUMP TANK
18	FORMER PROCESS TRASH COMPACTOR SUMP
19	FORMER BLACK DIP TANK
20	FORMER PHOSPHATING LOCATION
21	FORMER PHOSPHATING LOCATION
22	FORMER PHOSPHATING LOCATION
23	FORMER TOP COAT PIT
24	FORMER ELEVATOR TIRE SHAFT
25	FORMER PLATING DEPARTMENT
26	FORMER BLACK DIP TANK
27	FORMER IRON PHOSPHATING AREA
28	FORMER ENAMEL PIT
29	FORMER SPRAY BOOTH
30	FORMER ENAMEL PIT
31	FORMER PHOSPHATING AREA
32	FORMER SPRAY BOOTH
33	FORMER PHOSPHATING AREA
34	FORMER LOWERATOR
35	FORMER TRANSFORMER ACCIDENT SITE
36	FORMER ZINC PLATERS
37	FORMER WASTEWATER SUMP
38	FORMER WASTEWATER TUNNEL
39	FORMER ANODIZER
40	FORMER ANODIZER
41	FORMER CHIP DOCK



AOI	U.S. EPA SWMUs/AREAS OF CONCERN
	PARCEL B1
42	6 FORMER UNDERGROUND TANK AREA
43	FORMER CONSTRUCTION DEBRIS SITE
44	BUILDING 43 INVESTIGATION/REMEDIATION
	PARCEL B2
45	33 FORMER SOUTH RETENTION POND
	PARCEL B3
46	34 NORTH RETENTION POND
	PARCEL C1
47	7 REFUSE PROCESS FACILITY
48	5 DRUM DRAINING AREA
49	32 COAL STORAGE UNIT
50	DUCO STORES INVESTIGATION/REMEDIATION
51	BUILDING 33 FUEL ISLAND INVESTIGATION/REMEDIATION
52	BUILDING 35 TANK FARM INVESTIGATION /REMEDIATION
53	BUILDING 33 FREE PRODUCT INVESTIGATION
	PARCEL C2
54	31 FORMER SURFACE IMPOUNDMENT
55	18 GENERAL WASTE SOLIDS SEPARATOR
56	19 ACID WASTE SLUDGE TANKS
57	20 SLUDGE FILTER PRESS
58	21 SLUDGE FILTER PRESS SUMP
59	22 ACID WASTE SEPARATOR SYSTEM
60	23 POLYMER TANK
61	24 WASTE PICKLE ACID TANK
62	25 CLEANER WASTE SEPARATOR
63	26 PICKLE ACID TREATMENT TANK
64	27 FORMER VACUUM FILTER PRESS
65	28 OIL SKIMMER STORAGE TANK
66	29 WASTEWATER TREATMENT TANK AREA
67	36 LIME SLAKER
68	37 DRUM STORAGE AREA
69	1 CONTAINER STORAGE AREA
70	4 TANK STORAGE AREA
71	BURN PILE INVESTIGATION/REMEDIATION
	PARCEL C3
72	8 WASTE/PURGE SOLVENT TANK AREA
73	9 PAINT SLUDGE ROOM AREA
74	3 FORMER CONTAINER STORAGE AREA
75	2 FORMER EAST TANK FARM AREA
76	11 WASTE ANTICHIP ACCUMULATION AREA
77	10 WASTE OIL ACCUMULATION TANKS
78	17 WASTE LIFT STATIONS
	PARCEL C4
79	30 FORMER "J" LOT FILL AREA INVESTIGATON
	OTHER
80	35 MURPHY DRAIN
81	PITS AND SUMPS (NOT SHOWN ON PLAN)

LEGEND

PROPERTY BOUNDARIES

PROPOSED BUILDINGS

EXISTING BUILDINGS OR BUILDINGS UNDER CONSTRUCTION

APPROXIMATE LIMIT OF PARCEL BOUNDARY

7 AREAS OF INTEREST

17 U.S. EPA SWMUs/AREAS OF CONCERN

Nº	Revision	Date	Initial

Approved

GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

AREAS OF INTEREST
SUMMARY PLAN

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by:	Scale:	Date:	File Nº:	Rev.Nº:
I.W.R.	1"=300'	AUGUST 1995	P-41	0
Designed by:				
Checked by: M.S.K.	Field book:	Project Nº: 7097	Drawing Nº: PLAN 5	

MAR 25/96(W)

APPENDIX A

DEVELOPMENT PLAN PROMOTIONAL MATERIALS









Top: Volkswagen of America Headquarters, Auburn Hills, Michigan

Left: Brookfield Office Park, Farmington Hills, Michigan

Right: Crossroads Mixed Use Development, Fairlane Area, Detroit, Michigan

Developer Etkin Equities Brings Outstanding Credentials To Centerpoint Business Campus

Centerpoint Business Campus is a long-term development of Etkin Equities, one of the nation's leading full-service real estate organizations with major regional offices in Southfield, Michigan and Denver, Colorado. The firm's diverse portfolio contains over 5,000,000 square feet of corporate, professional, industrial, retail, hotel, and residential properties.

Etkin is a valued resource for many of the world's best known corporations which has resulted in a wide range of significant build-to-suit headquarters assignments. Recent examples include: The Technical Center for General Motors Inland Fisher Guide Division in Troy, Michigan; The Volkswagen of America Headquarters in Auburn Hills, Michigan; Delco Chassis Division of General Motors in Brighton, Michigan; The Wickes Manufacturing Company Headquarters in Southfield, Michigan; Rhone-Poulenc's Computer Disk Manufacturing Facility in Colorado Springs, Colorado; and The Core Industries Headquarters in Bloomfield Hills, Michigan.

In 1993, Etkin Equities earned the most prestigious honor in the real estate industry when the Building Owners and Managers Association International presented the 350,000 square foot Brookfield Office Park with the coveted "Suburban Office Park of the Year" award during its annual convention in Baltimore. This award recognizes Brookfield Office Park as the outstanding office park in the United States and Canada. BOMA International recognizes owners whose buildings have demonstrated excellence in office building management, operations, community involvement, tenant relations programs, emergency evacuation procedures, design and overall exceptional service.

Several other Etkin Equities' developments including Franklin Center, City Center Office Park, Timberland Office Park and Volkswagen of America Headquarters have previously won local and six state BOMA regional awards which confirm Etkin's leadership position in delivering the most responsive management, consistent quality and unequalled value.

For leasing information and the availability of prime build-to-suit sites contact our Southfield, Michigan office.

ETKIN EQUITIES, INC.

200 Franklin Center
29100 Northwestern Highway
Southfield, Michigan 48034
810•358•0800
FAX 358•2180

1512 Larimer Street
Suite 325
Denver, Colorado 80202
303•629•5354
FAX 629•5451

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CENTERPOINT BUSINESS CAMPUS

PERSPECTIVE

VOLUME ONE, ISSUE TWO



insight

Centerpoint Business Campus is destined to become one of the nation's premier mixed-use business parks.

Developer Etkin Equities, in association with General Motors and the City of Pontiac, has established a leading-edge master plan calling for a precise blend of flexibility, efficiency and quality. The result will be a technologically advanced business environment for companies that are as concerned about the quality of life as they are about the quality of their products.

GM's Latest Commitment Brings Etkin Equities' Build-to-Suit Total to 1.5 Million Sq. Ft. at Centerpoint

Once again, Etkin Equities has been singled-out by General Motors to serve as Development Manager for its second major Truck Group facility in the 350-acre Centerpoint Business Campus located in the southeast corner of Pontiac, Michigan.

Construction is set to begin on the new 400,000 square foot Development Center for GM's Truck Group. The majority of the space will be utilized as open office, design and engineering areas for approximately 1,500 employees. A fully equipped "Mock-Up" area of 25,000 square feet will be utilized for vehicle tear-down, prototype assembly and related design development functions. When completed in the summer of 1996, the three-story Development Center will further showcase GM's leadership in the truck industry.

Etkin is currently completing construction of GM's new Truck Product Center and Group Headquarters at Centerpoint. The 1.1 million square foot structure spans over one-third of a mile in length which is comparable in size to a 60-story office tower. Over 3 million square feet of the former Pontiac Central Truck Assembly plant was razed and recycled to create the state-of-the-art facility. More than 4,000 engineers and support personnel will begin to occupy the center later this year.



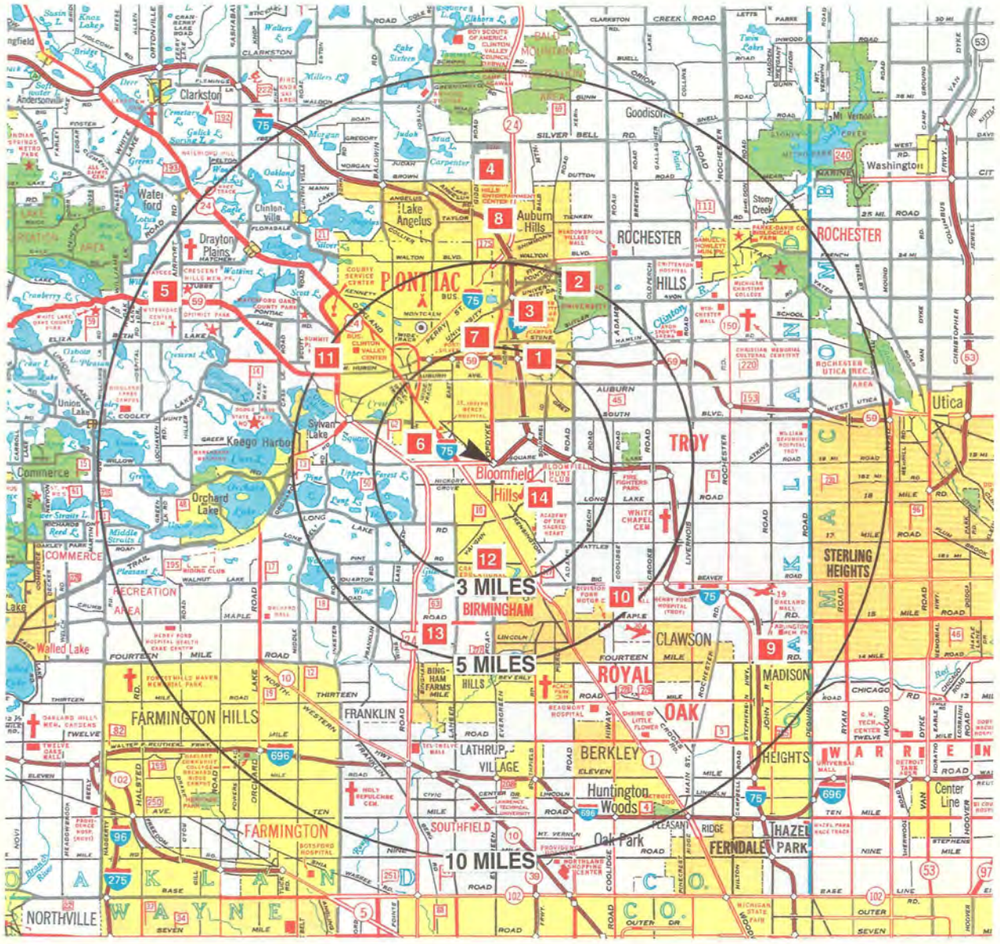
Southfield-based Giffels Associates designed General Motors' new Development Center with a contemporary metal and glass exterior to compliment GM's Truck Product Center shown in the background.

CENTERPOINT BUSINESS CAMPUS

A Development of:
ETKIN EQUITIES, INC.

Master Planned to World-Class Standards...

Superior From Every Perspective



1. Oakland Community College
2. Oakland University
3. Chrysler Technology Center
4. GM-Orion Assembly Plant
5. Oakland Pontiac Airport
6. St. Joseph Mercy Hospital
7. Pontiac Silverdome
8. Palace of Auburn Hills
9. Oakland Mall
10. Somerset Collection
11. Summit Place Mall
12. Cranbrook Educational Community
13. Oakland Hills Country Club
14. Bloomfield Open Hunt

Centerpoint is ideally situated in the heart of Oakland County. Many leading international corporations have long recognized the wisdom of locating in this thriving area.

Now, Centerpoint presents the finest address for those who choose to be at the center of this world-class location.

Centerpoint Business Campus Market Dynamics...

Accessibility

Access to Centerpoint is exceptionally convenient via Interstate-75, Telegraph Road and Woodward Avenue to Square Lake Road. Opdyke Road also serves as a major north/south feeder running through Bloomfield Township, Pontiac and Auburn Hills.



Centerpoint Parkway provides public roadway access through the center of the site. The parkway also offers unparalleled accessibility to every building in the campus.

Daily traffic volumes adjoining the site exceed 90,000 vehicles:

■ Square Lake Road	62,800
■ Opdyke Road	16,063
■ South Boulevard	13,045

High Income & Population

Household Income	3 Mile Radius	5 Mile Radius	10 Mile Radius
%Under $15,000	15.4	14.9	11.7
%$15,000-$24,999	9.6	9.8	10.0
%$25,000-$34,999	9.5	9.8	12.0
%$35,000-$49,999	13.0	14.0	17.2
%$50,000-$74,999	17.1	18.3	22.9
%$75,000-$99,999	10.7	11.0	11.7
%$100,000+	24.6	22.0	14.4
Average HH Income	**$92,778**	**$84,431**	**$67,111**

Population	3 Mile Radius	5 Mile Radius	10 Mile Radius
1990	53,130	171,040	708,384
1994	54,519	174,349	729,197
1998	56,706	179,343	762,009

Built-In Market

When completed, the Centerpoint Business Campus population alone will provide significant retail and service opportunities. General Motors currently employs approximately 4,500 people at its West Engineering Center and East Truck Manufacturing Facility.

The two new GM Truck facilities will increase that base by an additional 6,000 employees. Phases I & II of the peripheral Centerpoint development are planned to total 6,500 more employees.

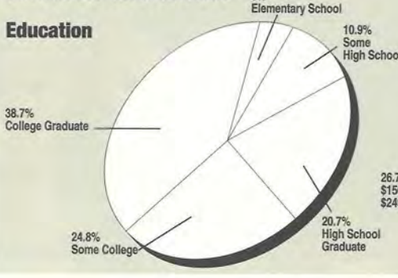
Based on this burgeoning potential and Oakland County's enterprising spirit, Centerpoint represents a remarkable opportunity to capture the forward movement of one of the midwest's most populous, prosperous and proud economic arenas.

Employment levels at Centerpoint Business Campus:

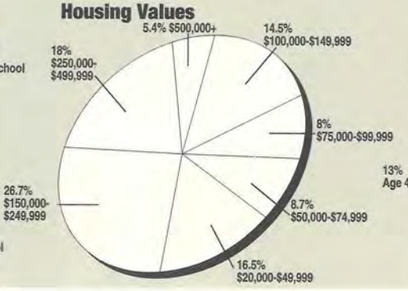
West Engineering Center	1,200 employees
East Truck Manufacturing Facility	4,300 employees/3 shifts
GM Truck Facilities	6,000 office/engineering employees
Future Centerpoint Peripheral Development	2,500 employees
Future Centerpoint Northwest Development	4,000 employees
Total Planned Development	**18,000 employees**

Overview Information

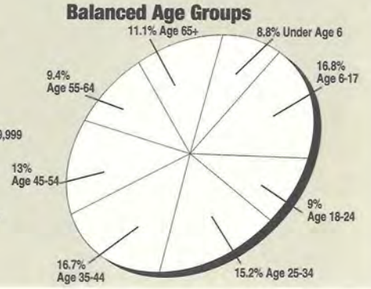
Education



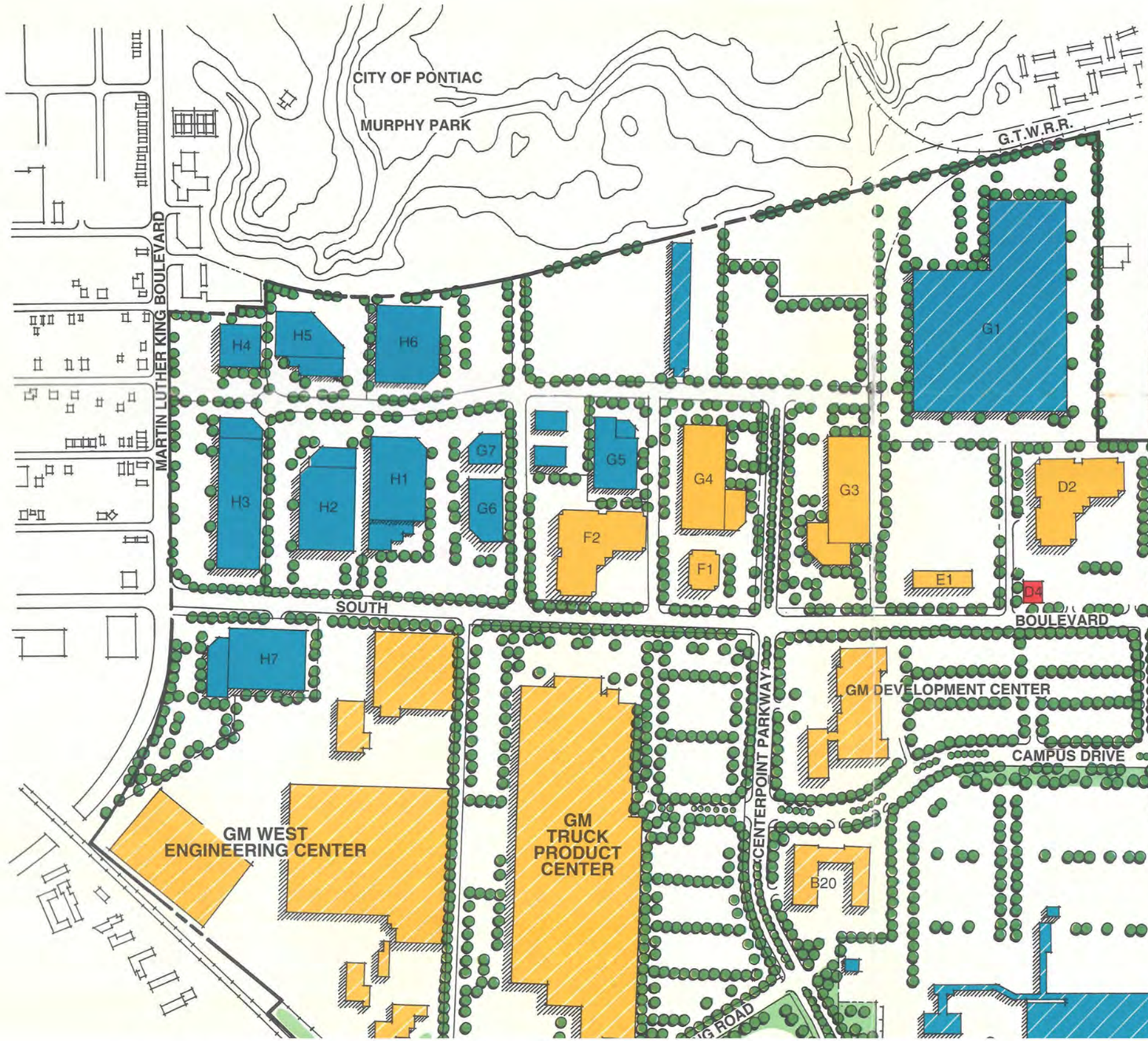
Housing Values



Balanced Age Groups



Master Planned to World-Class Standards...





The General Motors Truck Product Center is reflective of the diversity and excellence of Centerpoint's progressive architectural design. Ample nearby parking, tasteful landscaping, uniform lighting and signage enhance the campus-like setting.



The Vision For Tomorrow

Centerpoint Business Campus is destined to become one of the nation's premier mixed-use business parks. Developer Etkin Equities, in association with General Motors, has established a long-range master plan calling for a precise blend of flexibility, function, quality and efficiency. The result will be a technologically advanced business campus for people who are as concerned about the quality of life as they are about the quality of their products.

The wide variety of attractive residential neighborhoods, recreational opportunities and educational facilities in the immediate area provides strong demographic support for the carefully designed mix of office, engineering, retail, service and manufacturing facilities which are planned for the Centerpoint Business Campus.

The 350-acre site is strategically located off Square Lake Road between Woodward Avenue and Interstate-75 in the southeast corner of Pontiac, Michigan. This prime location has long enjoyed exceptionally high demand because of its close proximity to Auburn Hills, Troy and Bloomfield Township to the east and southeast, Bloomfield Hills and Birmingham to the south, and downtown Detroit which lies 30 miles southeast of the site.

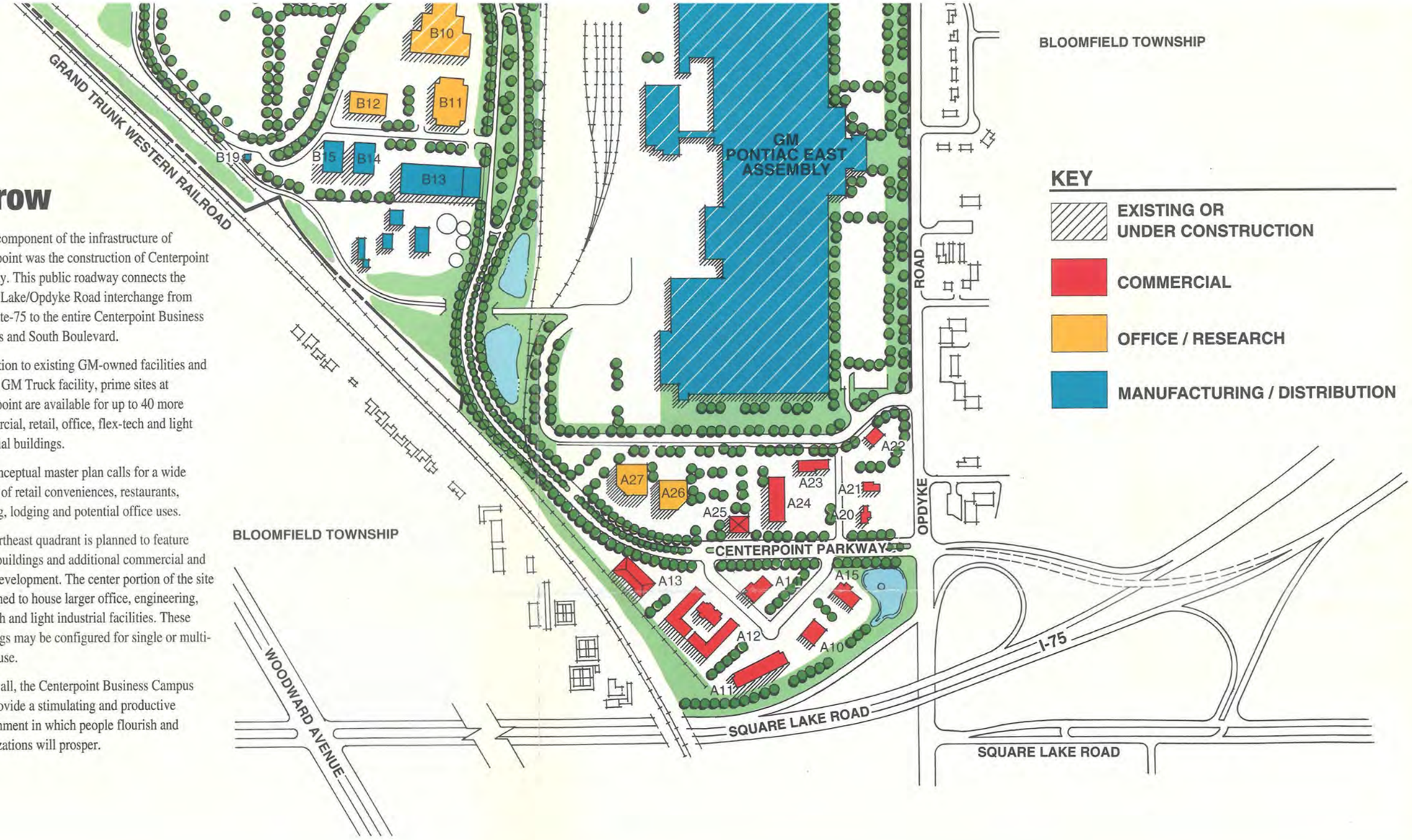
A key component of the infrastructure of Centerpoint was the construction of Centerpoint Parkway. This public roadway connects the Square Lake/Opdyke Road interchange from Interstate-75 to the entire Centerpoint Business Campus and South Boulevard.

In addition to existing GM-owned facilities and its new GM Truck facility, prime sites at Centerpoint are available for up to 40 more commercial, retail, office, flex-tech and light industrial buildings.

The conceptual master plan calls for a wide variety of retail conveniences, restaurants, banking, lodging and potential office uses.

The northeast quadrant is planned to feature office buildings and additional commercial and retail development. The center portion of the site is planned to house larger office, engineering, research and light industrial facilities. These buildings may be configured for single or multi-tenant use.

Above all, the Centerpoint Business Campus will provide a stimulating and productive environment in which people flourish and organizations will prosper.



CENTERPOINT
BUSINESS CAMPUS

A Development of:
ETKIN EQUITIES, INC.

PERSPECTIVE
CENTERPOINT
BUSINESS CAMPUS
VOLUME ONE, ISSUE TWO

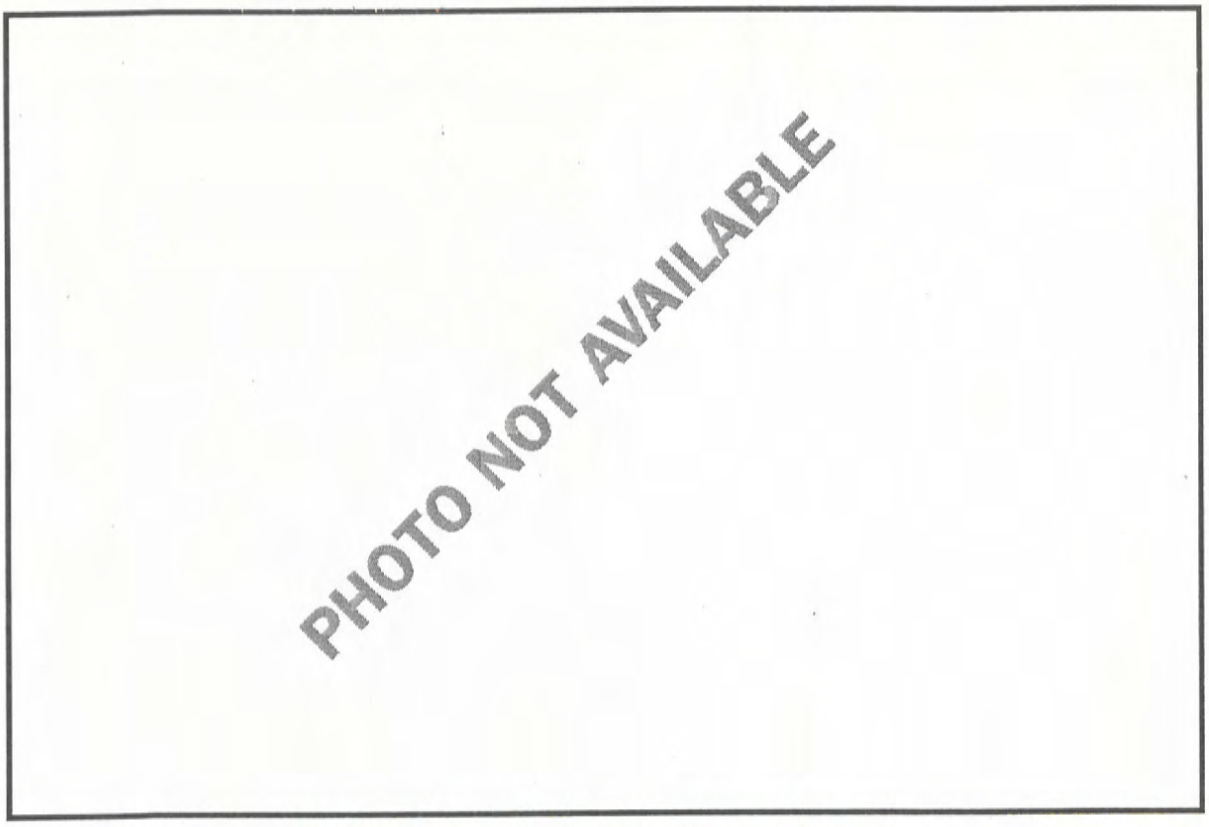


APPENDIX B

RCRA PERMIT MATERIALS

APPENDIX B.1

U.S. EPA AREAS OF CONCENRN - PHOTOGRAPHIC LOG



Former Deluge Tank Area (SWMU #12)



Former Waste Solvent Collection Area (SWMU #13)

PARCEL A



Former Waste Purge Solvent Collection Pit (SWMU #14)

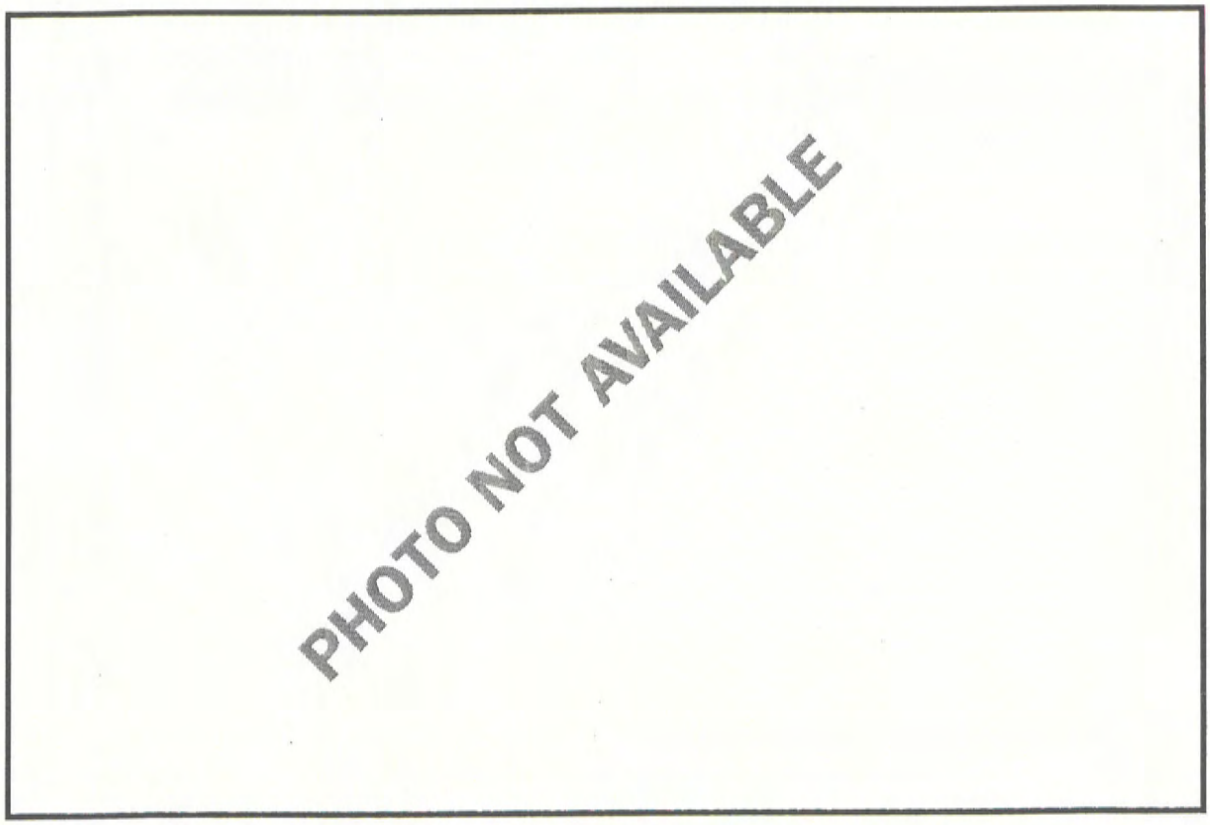


Former Fluid Collection Pits (SWMU #15)

PARCEL A

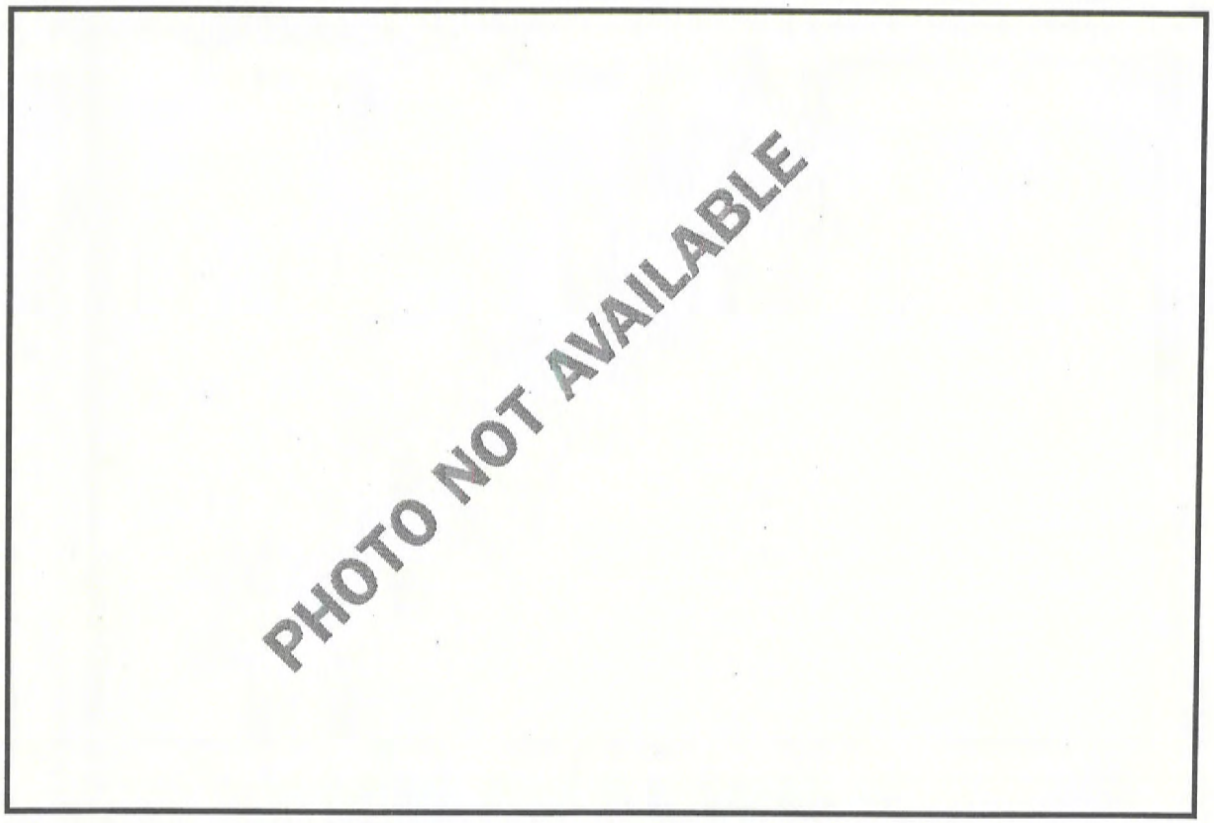


Former Sludge Dock (SWMU #16)



Former Waste Lift Station (SWMU #17)

PARCEL A



Former Underground Tank Area (SWMU #6)

PARCEL B1

CRA



Former South Retention Pond (AOC) (SWMU #33)

PARCEL B2

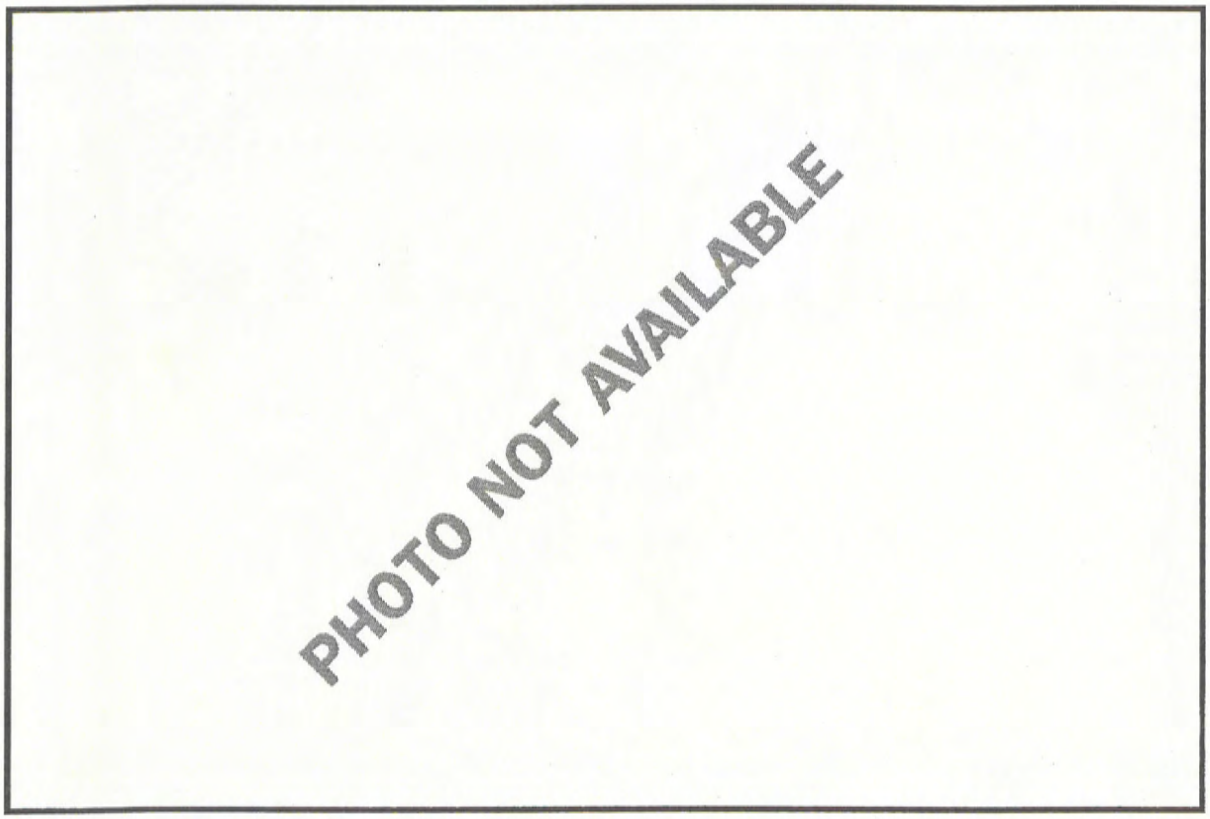
CRA



North Retention Pond (AOC) (SWMU # 34)

PARCEL B3

CRA



Refuse Process Facility (SWMU #7)

PARCEL C1

PHOTO NOT AVAILABLE

Drum Draining Area (SWMU #5)



Coal Storage Unit (AOC) (SWMU #32)

PARCEL C1

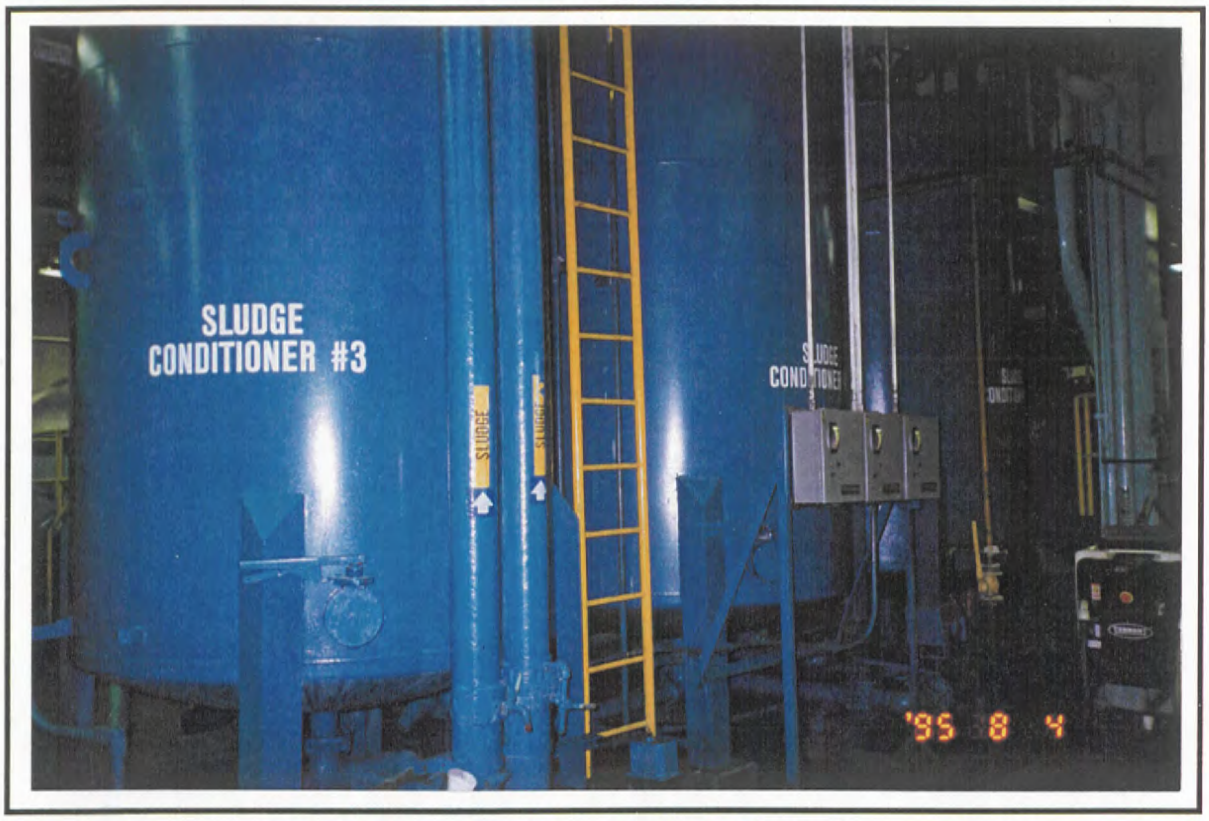


Former Surface Impoundment (SWMU #31)



General Waste Solid Separators (SWMU #18)

PARCEL C2



Acid Waste Sludge Tanks (SWMU #19)



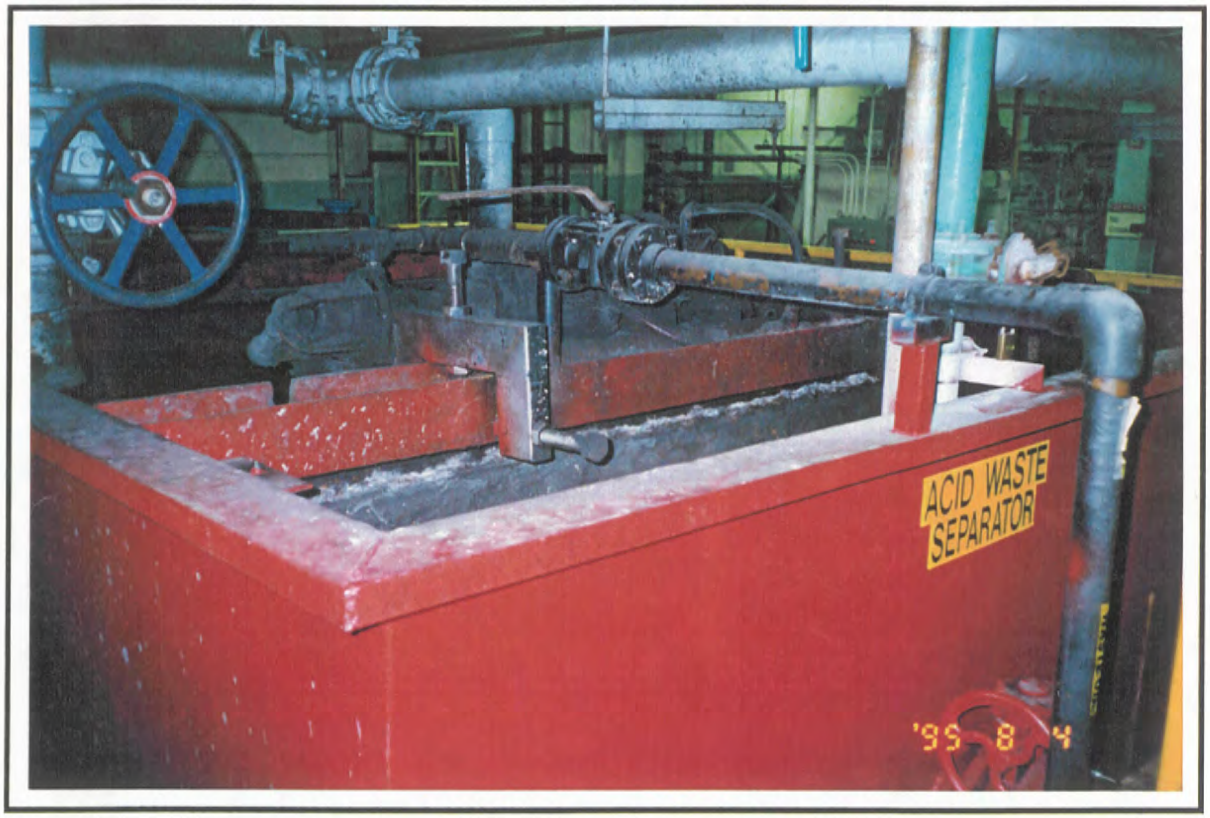
Sludge Filter Press (SWMU #20)

PARCEL C2

CRA



Sludge Filter Press Sump (SWMU #21)



Acid Waste Separator System (SWMU #22)

PARCEL C2

PHOTO NOT AVAILABLE

Polymer Tank (SWMU #23)



Waste Pickle Acid Tank (SWMU #24)

PARCEL C2



Cleaner Waste Separator (SWMU #25)



Pickle Acid Treatment Tank (SWMU #26)

PARCEL C2

CRA



Former Vacuum Filter Press (SWMU #27)



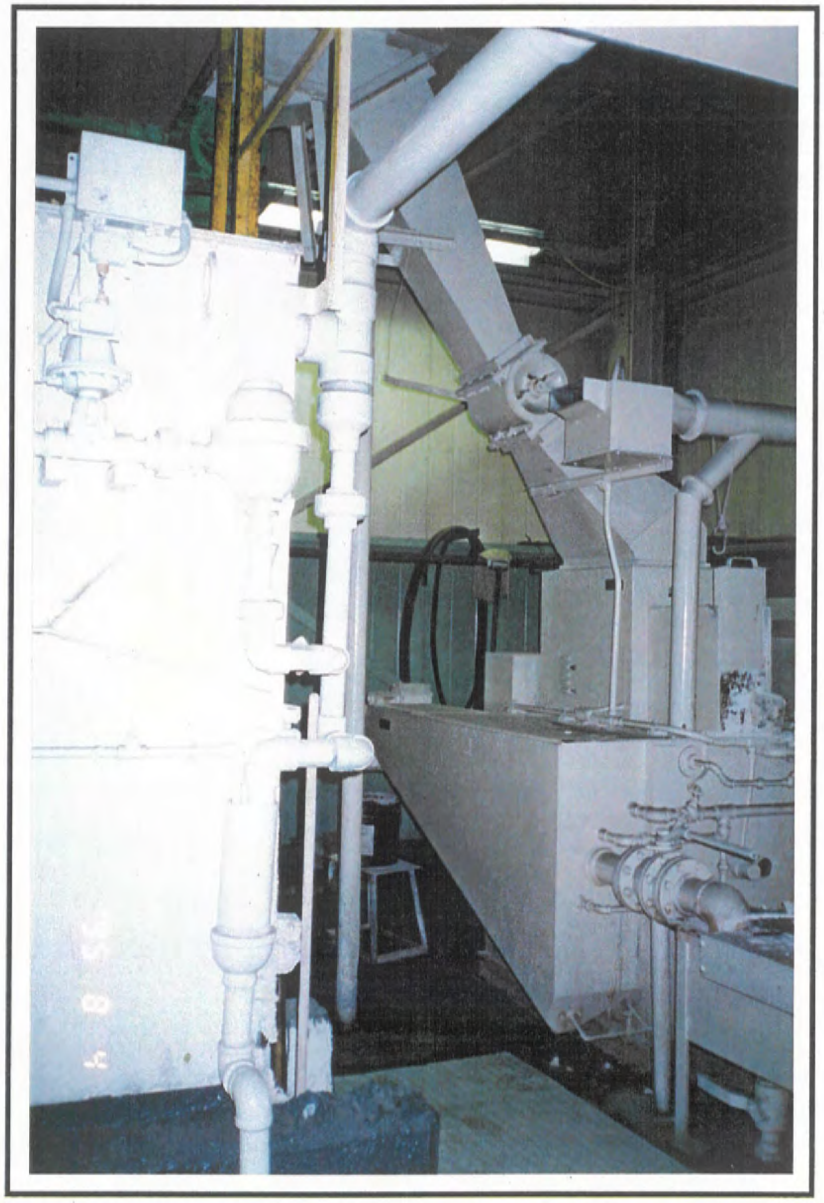
Oil Skimmer Storage Tank (SWMU #28)

PARCEL C2



Wastewater Treatment Tank Area (SWMU #29)

PARCEL C2



Lime Slaker (AOC) (SWMU #36)

PARCEL C2



Drum Storage Area (AOC) (SWMU #37)

PARCEL C2



Container Storage Area (SWMU #1)



Tank Storage Area (SWMU #4)

PARCEL C3



Waste / Purge Solvent Tank Area (SWMU #8)

PHOTO NOT AVAILABLE

Paint Sludge Room Area (SWMU #9)

PARCEL C3



Former Container Storage Area (SWMU #3)



Former East Tank Farm Area (SWMU #2)

PARCEL C3

CRA

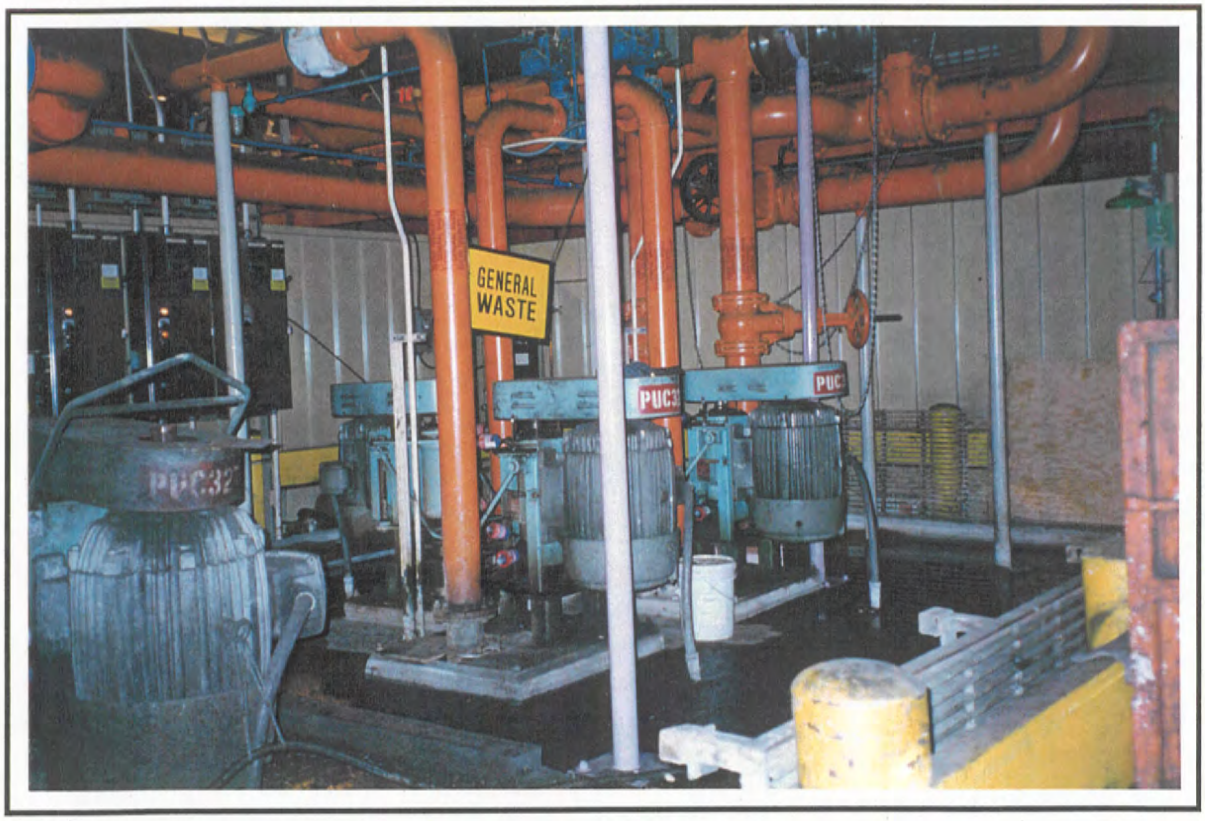


Waste Antichip Accumulation Area (SWMU #11)

PHOTO NOT AVAILABLE

Waste Oil Accumulation Tank (SWMU #10)

PARCEL C3



Waste Lift Stations (SWMU #17)



Former 'J' Lot Fill Area Investigation (SWMU #30)

PARCEL C4

CRA



Murphy Drain (AOC) (SWMU #35)

OTHER

APPENDIX B.2

EXCERPTS FROM THE PART B PERMIT APPLICATION

HAZARDOUS WASTE FACILITY

PERMIT APPLICATION

For

The Pontiac East Assembly/Pontiac
Central Manufacturing and Assembly Plant

Truck and Bus Group Operations
General Motors Corporation
Pontiac, Michigan
MID 005356902

Submitted to

The U.S. Environmental Protection Agency Region V

March 8, 1985

PART B CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment.

This certification is made on behalf of General Motors Corporation.

P. J. Coletta — (Date) 3/26/86

Vice President & Group Dir. of Operations

FORM 3 RCRA

EPA

U.S. ENVIRONMENTAL PROTECTION AGENCY

HAZARDOUS WASTE PERMIT APPLICATION

Consolidated Permits Program

(This information is required under Section 3005 of RCRA.)

I. EPA I.D. NUMBER: F M I D 0 0 5 3 5 6 9 0 2

FOR OFFICIAL USE ONLY

APPLICATION APPROVED	DATE RECEIVED (yr., mo., & day)	COMMENTS

II. FIRST OR REVISED APPLICATION

Place an "X" in the appropriate box in A or B below *(mark one box only)* to indicate whether this is the first application you are submitting for your facility or a revised application. If this is your first application and you already know your facility's EPA I.D. Number, or if this is a revised application, enter your facility's EPA I.D. Number in Item I above.

A. FIRST APPLICATION *(place an "X" below and provide the appropriate date)*

☐ 1. EXISTING FACILITY *(See instructions for definition of "existing" facility. Complete item below.)*

FOR EXISTING FACILITIES, PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED *(use the boxes to the left)*

C 8 — YR. | MO. | DAY

☐ 2. NEW FACILITY *(Complete item below.)*

FOR NEW FACILITIES PROVIDE THE DATE *(yr., mo., & day)* OPERATION BEGAN OR IS EXPECTED TO BEGIN

YR. | MO. | DAY

B. REVISED APPLICATION *(place an "X" below and complete Item I above)*

☐ 1. FACILITY HAS INTERIM STATUS

☐ 2. FACILITY HAS A RCRA PERMIT

III. PROCESSES – CODES AND DESIGN CAPACITIES

A. **PROCESS CODE** – Enter the code from the list of process codes below that best describes each process to be used at the facility. Ten lines are provided for entering codes. If more lines are needed, enter the code(s) in the space provided. If a process will be used that is not included in the list of codes below, then describe the process *(including its design capacity)* in the space provided on the form *(Item III-C)*.

B. **PROCESS DESIGN CAPACITY** – For each code entered in column A enter the capacity of the process.

1. AMOUNT – Enter the amount.
2. UNIT OF MEASURE – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Storage:		
CONTAINER *(barrel, drum, etc.)*	S01	GALLONS OR LITERS
TANK	S02	GALLONS OR LITERS
WASTE PILE	S03	CUBIC YARDS OR CUBIC METERS
SURFACE IMPOUNDMENT	S04	GALLONS OR LITERS
Disposal:		
INJECTION WELL	D79	GALLONS OR LITERS
LANDFILL	D80	ACRE-FEET *(the volume that would cover one acre to a depth of one foot)* OR HECTARE-METER
LAND APPLICATION	D81	ACRES OR HECTARES
OCEAN DISPOSAL	D82	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	D83	GALLONS OR LITERS

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
Treatment:		
TANK	T01	GALLONS PER DAY OR LITERS PER DAY
SURFACE IMPOUNDMENT	T02	GALLONS PER DAY OR LITERS PER DAY
INCINERATOR	T03	TONS PER HOUR OR METRIC TONS PER HOUR; GALLONS PER HOUR OR LITERS PER HOUR
OTHER *(Use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Item III-C.)*	T04	GALLONS PER DAY OR LITERS PER DAY

UNIT OF MEASURE	UNIT OF MEASURE CODE
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

EXAMPLE FOR COMPLETING ITEM III *(shown in line numbers X-1 and X-2 below)*: A facility has two storage tanks, one tank can hold 200 gallons and the other can hold 400 gallons. The facility also has an incinerator that can burn up to 20 gallons per hour.

LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	B. PROCESS DESIGN CAPACITY 2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY
X-1	S 0 2	600	G	
X-2	T 0 3	20	E	
1	S 0 1	210,000	G	
2	S 0 1	366,140	G	
3	S 0 1	374,000	G	
4	S 0 1	193,000	G	
5	T 0 4	1,200	U	
6	T 0 4	8,640	U	
7	T 0 4	26,260	U	
8	T 0 4	1,500	U	
9				
10				

C DUP 1

II. PROCESSES *(continued)*

SPACE FOR ADDITIONAL PROCESS CODES OR FOR DESCRIBING OTHER PROCESSES *(code "T04")*. FOR EACH PROCESS ENTERED HERE INCLUDE DESIGN CAPACITY.

Deleted per phone conv w/ Carol with Reg I

~~T04~~ - Spent pickling acid (K062) neutralizing - 1,200 gallons/day
T04 - Container washing - 8,640 gallons per day flow rate
T04 - Solidification of low viscosity sludges - 26,260 gallons per day mixing rate
T04 - Drum residues draining - 1,500 gallons per day

V. DESCRIPTION OF HAZARDOUS WASTES

. **EPA HAZARDOUS WASTE NUMBER** – Enter the four–digit number from 40 CFR, Subpart D for each listed hazardous waste you will handle. If you handle hazardous wastes which are not listed in 40 CFR, Subpart D, enter the four–digit number*(s)* from 40 CFR, Subpart C that describes the characteristics and/or the toxic contaminants of those hazardous wastes.

. **ESTIMATED ANNUAL QUANTITY** – For each **listed waste** entered in column A estimate the quantity of that waste that will be handled on an annual basis. For each **characteristic** or **toxic contaminant** entered in column A estimate the total annual quantity of all the non–listed waste*(s)* that will be handled which possess that characteristic or contaminant.

. **UNIT OF MEASURE** – For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate codes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
POUNDS	P	KILOGRAMS	K
TONS	T	METRIC TONS	M

i. acility records use any other unit of measure for quantity, the units of measure must be converted into one of the required units of measure taking into account the appropriate density or specific gravity of the waste.

. **PROCESSES**

1. PROCESS CODES:
   For listed hazardous waste: For each **listed** hazardous waste entered in column A select the code*(s)* from the list of process codes contained in Item III to indicate how the waste will be stored, treated, and/or disposed of at the facility.
   For non–listed hazardous wastes: For each characteristic or toxic contaminant entered in column A, select the code*(s)* from the list of process codes contained in Item III to indicate all the processes that will be used to store, treat, and/or dispose of all the non–listed hazardous wastes that possess that characteristic or toxic contaminant.
   Note: Four spaces are provided for entering process codes. If more are needed: (1) Enter the first three as described above; (2) Enter "000" in the extreme right box of Item IV-D(1); and (3) Enter in the space provided on page 4, the line number and the additional code*(s)*.

2. PROCESS DESCRIPTION: If a code is not listed for a process that will be used, describe the process in the space provided on the form.

OTE: HAZARDOUS WASTES DESCRIBED BY MORE THAN ONE EPA HAZARDOUS WASTE NUMBER – Hazardous wastes that can be described by ore than one EPA Hazardous Waste Number shall be described on the form as follows:

1. Select one of the EPA Hazardous Waste Numbers and enter it in column A. On the same line complete columns B,C, and D by estimating the total annual quantity of the waste and describing all the processes to be used to treat, store, and/or dispose of the waste.
2. In column A of the next line enter the other EPA Hazardous Waste Number that can be used to describe the waste. In column D(2) on that line enter "included with above" and make no other entries on that line.
3. Repeat step 2 for each other EPA Hazardous Waste Number that can be used to describe the hazardous waste.

XAMPLE FOR COMPLETING ITEM IV *(shown in line numbers X-1, X-2, X-3, and X-4 below)* – A facility will treat and dispose of an estimated 900 pounds r year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non–listed wastes. Two wastes e corrosive only and there will be an estimated 200 pounds per year of each waste. The other waste is corrosive and ignitable and there will be an estimated 00 pounds per year of that waste. Treatment will be in an incinerator and disposal will be in a landfill.

. O Z	A. EPA HAZARD. WASTE NO. *(enter code)*	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE *(enter code)*	D. PROCESSES 1. PROCESS CODES *(enter)*	D. PROCESSES 2. PROCESS DESCRIPTION *(If a code is not entered in D(1))*
-1	K 0 5 4	900	P	T 0 3 D 8 0	
-	D 0 0 2	400	P	T 0 3 D 8 0	
-3	D 0 0 1	100	P	T 0 3 D 8 0	
-4	D 0 0 2				*included with above*

EPA I.D. NUMBER (enter from page 1): W M I D 0 0 5 3 5 6 9 0 2 | T/A: | C: 1

FOR OFFICIAL USE ONLY: W | DUP | T/A: | C: 2 | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (If a code is not entered in D(1))
1	F001	10	T	S01	
2	F002				Incl. in above
3	F003	2000	T	S01 S02	
4	F005				Incl. in above
5	D001				Incl. in above
6	K062	1500	T	S02 T01	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
26					

IV. DESCRIPTION OF HAZARDOUS WASTES *(continued)*

E. USE THIS SPACE TO LIST ADDITIONAL PROCESS CODES FROM ITEM D(1) ON PAGE 3.

EPA I.D. NO. *(enter from page 1)*

													T/A	C
M	I	D	0	0	5	3	5	6	9	0	2			6

V. FACILITY DRAWING

All existing facilities must include in the space provided on page 5 a scale drawing of the facility *(see instructions for more detail).*

VI. PHOTOGRAPHS

All existing facilities must include photographs *(aerial or ground–level)* that clearly delineate all existing structures; existing storage, treatment and disposal areas; and sites of future storage, treatment or disposal areas *(see instructions for more detail).*

VII. FACILITY GEOGRAPHIC LOCATION

LATITUDE *(degrees, minutes, & seconds)*	LONGITUDE *(degrees, minutes, & seconds)*
42 30 40 N	083 15 27 W

VIII. FACILITY OWNER

[X] A. If the facility owner is also the facility operator as listed in Section VIII on Form 1, "General Information", place an "X" in the box to the left and skip to Section IX below.

B. If the facility owner is not the facility operator as listed in Section VIII on Form 1, complete the following items:

1. NAME OF FACILITY'S LEGAL OWNER	2. PHONE NO. *(area code & no.)*

3. STREET OR P.O. BOX	4. CITY OR TOWN	5. ST.	6. ZIP CODE
	G		

IX. OWNER CERTIFICATION

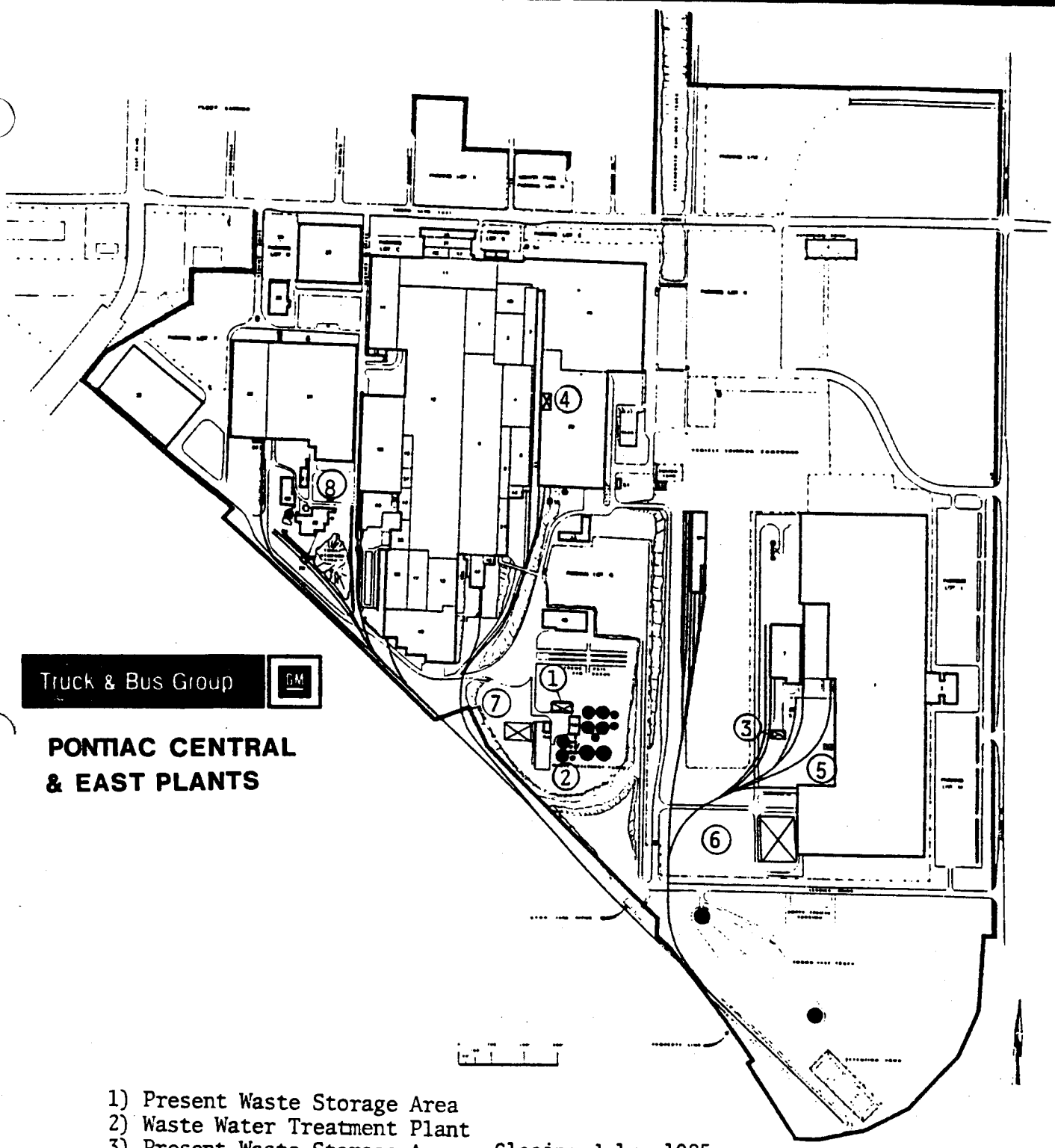
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED
P.J. Coletta, V.P. & Group Dir. of Operations Truck & Bus Group Operations	P.J. Coletta	3-7-85

X. OPERATOR CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

A. NAME *(print or type)*	B. SIGNATURE	C. DATE SIGNED



1) Present Waste Storage Area
2) Waste Water Treatment Plant
3) Present Waste Storage Area - Closing July, 1985
4) Past Cyanide Destruction Facility (Removed 1976)
5) Present Waste Collection Tanks - Closing July, 1985
6) Future Waste Container & Tank Storage Area
7) Future Waste Container & Tank Storage Area
8) Present Drum Draining Area

Fig. A-1 Facility Diagram.

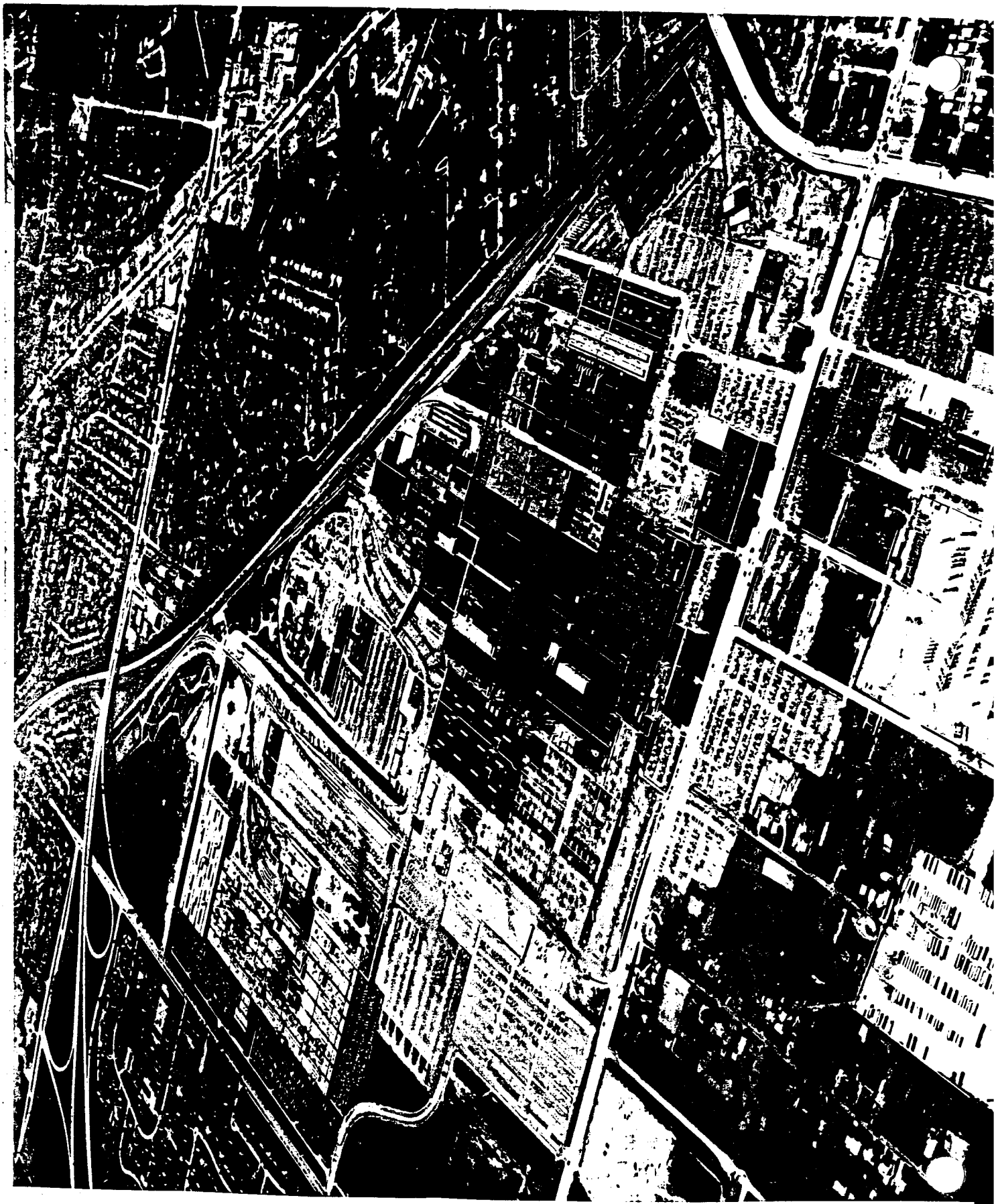


Figure A-2. Aerial view of the plant.

SECTION B
FACILITY DESCRIPTION

The Pontiac East Assembly Plant and the Pontiac Central Manufacturing and Assembly Plant, hereafter referred to together as "the plant", are located on one geographic site. These plants assemble trucks and buses and manufacture truck and bus components and together are treated as one facility holding EPA Identification No. MID 005356902. The plant, including all on-site hazardous waste facilities and operations, is currently owned and operated by the General Motors (GM) Corporation, Truck and Bus Group. The facility is located at 660 South Boulevard East in the southeastern portion of the City of Pontiac, Michigan, at a latitude of 42°30'40"N, and a longitude of 83°15'27"W. The plant has the following mailing address and telephone number:

Truck and Bus Group
Pontiac Central and East Plants
General Motors Corporation
31 Judson Street
Pontiac, Michigan 48058
(313) 456-4141

The plant, which began producing trucks in 1927, is a producer of medium and heavy duty trucks and buses. The plant is presently undergoing rearrangement so that assembly of light duty trucks can be added to current activities. These rearrangements are anticipated to continue into 1987. Since the plant is principally an assembly plant, most of the wastes generated at the facility result from metal finishing and painting operations, the use of sealers and adhesives, draining fluids from vehicles, and unpacking components and parts. The SIC codes which best reflect the principal products of the plant are: Code 3711, Motor Vehicles.

B.1 GENERAL DESCRIPTION

The hazardous wastes that will be generated include listed wastes such as F001, F002, F003, F005, F006, F019, and some D001, and D002 wastes. The hazardous waste activities at the plant include temporary storage of all the wastes generated at the plant, occasional separation of free liquids (retained wastewater) from sludges, occasional solidification of sludges with a treatment chemical (as required), and emptying of incompletely emptied drums. The container storage areas receive both waste-filled and empty virgin material containers arising from production activities on-site. Wastes and containers are processed here in preparation for separate off-site disposal. This is discussed in more detail in Section D.

B.2. PERMITTING HISTORY AND STATUS

The plant is currently operating under Resource Conservation and Recovery Act (RCRA) interim status for ownership and operation of a facility which stores and treats hazardous wastes. Part A of the Hazardous Waste Permit Application for the plant was acknowledged on August 3, 1981, by the United States Environmental Protection Agency (EPA), Region V.

B.3 MAPPING

B.3.1 Topographic Map (7.5 Minute)

Figure B-1 is a composite of portions of the Pontiac North, Pontiac South, Birmingham and Rochester, 7.5 Minute, USGS topographic maps and shows the land features within 1 mi of the facility. The plant does not have any intake structures, and discharge structures are limited to storm water. All process and sanitary wastewaters are discharged to public sewers. Because of the scale of the drawing, the location of discharge structures cannot be indicated on Figure B-1. The location of these structures and an indication of the plant areas drained by each is indicated on Figure B-2. The legal property boundaries of the plant are the heavy lines in the center of Figure B-1. There are no injection wells known to the applicant within 1/2 mi of the facility. Michigan Department of Public Health, the Michigan Department of Natural Resources, and the Oakland County Health Division were requested to supply information on any wells within 1 mi of the facility. A number of wells were identified to be within 1 mi of the plant property. A list of

the wells is presented in Table B-1 and the location of each well are indicated in Figure B-1 by its well number from Table B-1.

B.3.2 Topographic Map (1 in. = 200 ft)

The hazardous waste facilities at the plant are indicated on the detailed plant map, Figure B-3. The scale of this detailed topographic map is 1 in. = 200 ft, and the date of the maps given as Figures B-1 and B-3 are variable since they are compilations of data from the following list of maps.

Description	Source	Date
Master plan for Bloomfield Township	Bloomfield Township Planning Commission	1976
Zoning districts map, City of Bloomfield Hills	City of Bloomfield Hills Planning Commission	1983
Zoning Map, Pontiac, Michigan	City of Pontiac	1972
Pontiac, north, 7.5 min topographic	U.S. Geological Survey	1983
Rochester, 7.5 min topographic	U.S. Geological Survey	1981
Pontiac, south, 7.5 min topographic	U.S. Geological Survey	1973
Birmingham, 7.5 min topographic	U.S. Geological Survey	1981

TABLE B-1. WELL INFORMATION

Well no.	Location	Owner	Well type
1	Southwest corner of Auburn Road and I-75	Clawson Concrete	Transit mix
2	Southwest corner of Auburn Road and I-75	Clawson Concrete	Transit mix
3	Southwest corner of Auburn Road, east of I-75	Clawson Concrete	Transit mix
4	Southwest corner of property, approximately 1400 ft south of Building 29	General Motors	Industrial
5	2143 Somerset Road	Bloomfield Hills	Municipal
6	Southeast corner of Building 43	General Motors	Industrial
7	South of Building 52	General Motors	Industrial
8	Building 52	General Motors	Industrial
9	1400 ft south of Building 29	General Motors	Industrial
10	North of Building 22	General Motors	Industrial
11	South end of Building 29	General Motors	Industrial
12	Southeast corner of Building 23	General Motors	Industrial

well location #4 & 9 dont match map locations on figure B-1

B.3.2.1 100-yr Floodplain--

Based upon flood insurance rate maps, the plant is not located in the 100-yr or the 500-yr floodplain, but the 100-yr floodplain does come within 2600 ft of the northern side of the property as shown on the flood insurance map which is included as Figure B-4. Since the plant is not within the 500-yr floodplain, no flood control or drainage barriers are necessary to protect the plant.

B.3.2.2 Land Use--

The surrounding land uses are presented in Figure B-1. Within 1000 ft of the facility, the properties to the north are zoned industrial or commercial; to the east they are commercial, multi-family, and single family residential; to the south they are multi-family and single family residential; and to the west they are industrial, commercial, and single family residential.

B.3.2.3 Hazardous Waste Management Facility (HWMF) Boundaries--

The HWMF's at the Pontiac Assembly Plant include container storage areas, storage tank areas, sludge bulking areas, and a drum emptying area. All of these operations are on the plant site and HWMF boundaries are shown on Figure B-3.

B.3.2.4 Wind Rose--

An annual average wind rose is shown on Figures B-3 and B-5. This wind rose is based upon data collected at the Detroit City Airport during the years 1948 through 1978.

B.3.2.5 Access Control--

The entire assembly plant property is enclosed by a chainlink fence. The location of the fence and all gates are shown on Figure B-3. All vehicle access points are fitted with lockable gates. Plant security personnel are on duty 24 hr/day, 365 day/yr. Normal commercial vehicle traffic is limited to Gate 29. Normal personnel access to the property is through designated gates

for employees and through the main administrative entrance for visitors. Some deliveries of waste material are made through Gates 1 and 34.

In addition to the plant access control, the HWMF areas have warning signs posted and unauthorized persons are not permitted in these areas.

B.3.2.6 Injection and Withdraw Wells--

See Section B.3.1.

B.3.2.7 Buildings; Treatment, Storage, and Disposal Areas; and Other Structures--

Figure B-3 shows all buildings and other major structures within 1000 ft of the HWMF's. There are no disposal areas at this facility.

B.3.2.8 Recreation Areas--

There are no known recreation areas within 1000 ft of the HWMF.

B.3.2.9 Runoff Control Systems--

The container storage areas are designed to prevent runoff. All precipitation falling on the storage pads is accumulated either to be pumped to the on-site central wastewater treatment plant or transferrred to storage tanks. The runoff from all other areas of the plant not part of HWMF's is collected in stormwater retention ponds and/or is discharged by storm sewers. Run on is prevented by the diking and grading of the surrounding terrain.

B.3.2.10 Access and Internal Roads (Traffic Patterns)--

As seen in Figures B-1 and B-3, the access roads for the plant are South Boulevard and Opdyke Avenue. Most hazardous waste transportation vehicles will enter (see Figure B-3) off Opdyke Road through Gate 29 and proceed to the truck scale to be weighed. After weighing, the trucks will proceed to the HWMF area for loading. After loading, the trucks will be weighed and exit the plant the same way they entered. All internal roads are reinforced concrete or asphalt specifically designed with sufficient bearing for highway vehicle traffic consistent with state legal limits for highway

vehicle use. Under present conditions, shipments of hazardous waste average less than one per day. This is a very insignificant percentage of the total truck traffic in and out of the plant.

B.3.2.11 Sewers--

The on-site sanitary sewer lines handle sewage only (no process wastewater). These sewers discharge to the City of Pontiac public sewers. The locations where these sewer lines cross the property line are shown in Figure B-2.

There are a number of storm sewers which discharge storm water runoff from the property. The locations where storm sewers cross the property lines are shown in Figure B-2.

All process wastewaters are trucked or pumped to the on-site central wastewater treatment plant shown in Figure B-3. After pretreatment, the process wastewaters are discharged to the City of Pontiac public sewers. The location where the treated process wastewater discharge line crosses the property line is shown in Figure B-2.

B.3.2.12 Loading and Unloading Areas--

All hazardous wastes received or to be transported off site are loaded or unloaded in the container storage area and the tank storage areas. On-site accumulation areas and a sister plant are the primary sources of any unloaded waste at this time. Receipt of wastes from off site is primarily for the purpose of consolidation and reshipment.

B.3.2.13 Fire Control Equipment--

A detailed description of the fire control equipment is included in the Contingency Plan (Section F).

B.3.2.14 Surface Waters--

The surface waters within 1 mi of the facility are shown on Figure B-1. The Clinton River is approximately 1 mi to the northeast, and an unnamed tributary of the River Rouge is 4000 ft to the south.

B.4 OPERATIONS MANUAL

A copy of this permit application will also be used as an operations manual and will be reviewed annually, or more frequently, if required by the provisions of any section. If necessary, this manual will be revised after each review. The plant environmental engineer will be responsible for making revisions in the manual. The manual is placed in a three-ring binder so that revisions can be made by changing pages or entire sections. The entire manual is also on a word processing system which allows changes to be made relatively easily. Once a revision is made, the page or section changed will be noted in Table B-2. Each page is marked with a Julian date in the lower right hand corner of each page. This is the revision number that can be used to verify that the page is a copy of the latest revision. The plant environmental engineer will send a copy of any revision to each person holding a registered copy. The name, address, and manual number of each registered copy shall be noted in Table B-3. The original copy (Manual 1) shall be maintained by the plant environmental engineer.

B.5 COMPLIANCE WITH OTHER FEDERAL LAWS

Information will be provided in accordance with the requirements of 40 CFR 270.3 at the request of the EPA Region V office. At the present time, however, this facility is believed to be in compliance with the following Federal Laws: The Wild and Scenic Rivers Act, The National Historic Preservation Act, The Endangered Species Act, The Coastal Zone Management Act, and The Fish and Wildlife Coordination Act.

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SECTION C

WASTE CHARACTERIZATION

C.1 INTRODUCTION

The major activity at the plant is vehicle assembly. The wastes generated result from the use of paints, solvents, sealers, adhesives, vehicle fluids, and component part and packing materials. Hazardous wastes that are managed include listed wastes such as F001, F002, F003, F005, F006, F019, and some characteristic wastes such as D001 and D002. The hazardous waste activities at the plant will include temporary storage of all the wastes generated at the plant, occasional separation of free liquids (retained wastewater) from sludges, occasional solidification of sludges with a drying agent (as required), and emptying of incompletely emptied drums.

C.2 WASTE CHARACTERIZATION

Table C-1 summarizes all of the wastes that are generated at the plant and indicates the various waste types; approximate quantities managed; hazardous waste listing number; hazardous waste characteristics; heating value; and primary waste management method. The information provided on waste generation rates and composition is based upon historical data and is subject to fluctuations based on production levels. Wastes which are known or assumed to be hazardous are underlined. Waste characterizations will be repeated as necessary to insure that they are accurate and up-to-date. At a minimum, they will be repeated annually. A more frequent analysis will be done if changes occur in the materials or process generating the hazardous waste.

There are some wastes received from a sister plant. This receipt is performed merely for the purpose of consolidation of shipments to ultimate disposal. In general, these wastes are similar to the wastes generated on

site. Table C-2 presents a summary of the wastes received from the sister ~~GM~~ plant. Characterization of these received wastes is presented later in this section.

All wastes listed as hazardous wastes in Subpart D of 40 CFR 261 are identified as listed hazardous wastes. None of the internal wastes are tested for reactivity nor for pesticides and herbicides content in the EP Toxicity Procedure because pesticides, herbicides, and reactive materials are not being used in the plant.

Following is a characterization of each waste managed including the process or processes producing the waste, handling methods, methods used to determine if each waste is a hazardous waste, and a detailed analysis (specific for the treatment or disposal method used). A waste data sheet is provided for each waste normally generated or received at the plant. These sheets provide a summary of characterization information and can be used with the Contingency Plan or to prepare manifests.

C.2.1 Paint Sludges (See Table C-3)

Paint sludges are essentially the paint overspray that is collected in wet paint spray booths. The paint sludge is separated from the water by a central sludge system. After separation from the water, the sludge is placed in containers and any free liquids that occur due to dewatering (gravity) are separated and discharged to the on site wastewater treatment plant. The container is transferred to the sludge bulking area where the contents are placed on a concrete pad with other compatible sludges. The sludges are loaded into a large highway vehicle and are hauled in bulk to a secure landfill for disposal. The sludge mixture may include phosphate sludge, filter media, a small amount of waste adhesives and sealers, and oil filters, as well as paint sludge depending on the capabilities of the preselected disposal facility.

The paint sludge is not a listed hazardous waste. Samples of paint sludge from Pontiac Central have been checked for ignitibility, and tested for corrosivity, and EP Toxicity to determine if the waste is a characteristic hazardous waste. Based upon all available information, this waste is not a hazardous waste but due to concerns about the suitability of nonhazardous disposal facilities it is handled as hazardous waste. Paint sludge is being disposed of as a hazardous waste by plant preference. In the future, GM may choose to dispose of paint sludges as nonhazardous waste so long as they do not show the characteristics of being hazardous. There is no analysis available for the new sludge from Pontiac East modernization since that plant will not operate until 1986. When the plant reopens, the analysis will be performed and results submitted.

C.2.2 Waste Purge Solvent (Table C-4)

This waste is generated when the paint in the automatic paint spray equipment is purged during a color change by introducing a purge solvent before a new color is used. The waste solvent is collected and pumped to a storage tank or containers. The containers are taken to the container storage area and the contents transferred to a bulk collection tank or larger container. The waste is currently recycled and reconstituted off site.

This waste is listed as an F003 or F005 hazardous waste. The safety data sheets for the purge solvent and paints indicate the principal solvents in the waste to be toluene, xylene, and methyl ethyl ketone. The waste data sheet for this waste is Table C-4. This waste is managed as hazardous because it is listed.

C.2.3 Phosphate Sludge (Table C-5)

This waste is the sludge that is generated in the phosphating process which is used to prepare the metal surfaces for painting. The waste and disposable filter media are collected in a container as the waste is discharged from the filter. These sludges and filter media are placed in

containers at the source of generation. The contents of the container are transferred to larger containers which are transported to the sludge bulking area. After co-mingling with other compatible sludges, the sludge is hauled to a secure landfill site for disposal. The estimated annual generation rate of combined paint sludge, adhesives and sealers, and phosphate sludge is approximately 3000 tons.

Although GM does not consider this waste to be a wastewater treatment sludge from electroplating, we have elected to manage it as through it were an F006 or F019 waste. This sludge consists of both a filtrate and a process tank precipitate from phosphating operations.

C.2.4 Waste Gasoline

This waste is generated by spillage during vehicle fueling operations, the disposal of off-spec gasoline and the draining of damaged gas tanks. A minimal quantity of this waste is generated and is collected with the waste oil. Gasoline tainted waste oil is skimmed from the bulk collection tank (currently a parked highway tanker) and is mixed with waste paint for disposal.

Waste gasoline is not listed, but it is an ignitable waste (D001). Since the waste is a specified material and contains little or no contamination, no sample analysis has been done. Moreover, once mixed with the waste paint the hazard status of paint is not changed.

C.2.5 Waste Oils (Table C-6)

Waste and lubricating oils are generated by spillage during vehicle and production equipment fluid filling and repair operations. The wastes are pumped from pits along with glycol and occasionally a small amount of waste gasoline. This waste is taken to the bulk collection tanks (currently a highway tanker). The glycol separates by gravity at this point and is removed. The bulk collection storage tank is tested prior to shipment for

flash point and any phase with a flash point under 140°F is managed as gasoline tainted (Section C.2.4). The waste oils are shipped off site for recycling.

This waste is not a listed hazardous waste. Based upon available information, this waste is not a characteristic hazardous waste.

C.2.6 Waste Glycol and Brake Fluid (Table C-7)

This waste represents spillage from fluid fill and repair operations with antifreeze (glycol). This material phase separates as a phase beneath waste oil. The waste is collected in pits and delivered by trucks to bulk collection tanks (currently highway tankers). The waste is shipped off site for incineration or occasionally for reuse by others.

This waste is not a listed hazardous waste, and when previously tested for ignitability had a flash point greater than 200°F. Based upon all available information, this waste is not a hazardous waste.

C.2.7 Central Wastewater Treatment Plant Sludges (Tables C-8, C-9, and C-10)

Two of these sludges are produced by the on-site central wastewater treatment system and are discharged from the grit separators and the water treatment sludge dewatering equipment into containers. Free liquids (wastewater) which are separated by gravity dewatering from the separators are discharged to the wastewater treatment system. Both sludges are placed in containers at the sludge dewatering system. The containers are emptied on the containment sludge bulking area pad and the sludges are hauled in bulk to a secure hazardous waste landfill for disposal.

The EPA had previously made the interpretation that this sludge should be listed as hazardous waste (F006 and F019), but in December 1983, the plant was granted a temporary delisting for this waste. Samples of the wastewater

sludge were analyzed for EP Toxicity. Based upon all available information, the sludge is a temporarily delisted waste and does not have any hazardous waste characteristics.

A third sludge is a precipitate sludge that accumulates in the Central Wastewater Treatment Plant pits and tanks. While we do not consider this a hazardous waste, it has been so managed due to a lack of clarity on its regulatory status. Unless otherwise directed by the EPA or unless determined to have hazardous waste characteristics, GM proposes that this material is not a hazardous waste and need not be managed as a hazardous waste.

C.2.8 Waste Paint (Tables C-11 and C-12)

Two waste paint streams result from operations at the plant. These are designated the high Pb and low Pb waste paints and estimated generation rates are 75 tons per year (TPY) and 100 TPY, respectively. The wastes are removed from the plant for incineration at an approved site.

These wastes are listed because low volumes of F003 and F005 solvents (not to be reclaimed) are co-mingled with the waste paint.

C.2.9 Chlorinated Solvents (Tables C-13 and C-14

This waste is generated from equipment cleaning operations and painting equipment cleanup. Since this is an assembly plant, only a small amount of this waste (4 TPY) is generated. The waste composition varies from a liquid to a sludge. If sufficient quantities of this waste are generated, they will be placed in containers and stored at the container storage area until the waste is pumped into a tank truck to haul it to a reclaimer's facility. Methylene chloride and 1,1,1-trichloroethlane are the chlorinated solvents managed and they are managed separately.

This waste is managed as a listed hazardous waste (F001, F002) because of the toxicity of chlorinated solvents. No characteristic testing has been conducted.

C.2.10 Adhesives and Sealers (Table C-15)

This waste is usually the unused residue left in the original container that has hardened or lost its properties because of solvent evaporation. These wastes are combined with the paint sludge for disposal.

This waste is not a listed hazardous waste, although the virgin material is listed as a Department of Transportation (DOT) flammable material. The waste is not ignitable because of the solvent loss which caused the material to become a waste. Because of the impermeability of this waste, the organic nature of the waste, and expected low metal content, the waste should not be EP toxic for metals. Based upon all available information, this waste is not a hazardous waste. Currently, this waste is co-mingled with a waste which is managed as hazardous.

C.2.11 Waste Received From Sister Plants (Table C-17)

With the exception of the NALCO paint sludge, all wastes currently received from a sister plant have the same characteristics as those wastes as generated at the plant. Wastes are received into the plant under

appropriate waste manifests and are blended into or stored with appropriate on-site generated wastes until sufficient quantities are accumulated for shipment to off-site disposal.

C.3 WASTE ANALYSIS PLAN

The plant does two different types of testing, hazardous waste determination and hazardous waste disposal facility acceptability testing. Wastes are tested periodically in accordance with regulations and to verify their individual acceptability at a particular preselected disposal facility.

C.3.1. Characterization

C.3.1.1 Parameters and Rationale--

All the wastes generated at the plant were evaluated initially to establish their classification as hazardous or nonhazardous wastes. Since some of the wastes are either listed or known to exhibit a hazardous characteristic, those wastes were assumed hazardous and no further hazard determination testing will be performed. Subsequent testing to determine whether a waste is hazardous will be performed if process changes are made which could be expected to alter the nature of the wastes. Characterizations will be repeated as necessary to insure that analyses are accurate and current. At a minimum they will be repeated annually.

Some wastes will continue to be monitored on a routine basis for parameters relevant to their management. These wastes are indicated in Table C-18 along with the test parameters and frequency of analysis. Test parameters and the rationale for their selection are given in Table C-18a. As stated previously, more frequent analyses will be performed if process changes are made which could be expected to alter the nature of the wastes.

C.3.1.2 Sampling Methods--

Table C-19 lists the methods used to sample each category of wastes at the facility. The listed methods are contained in Test Methods for Evaluating Solid Wastes, U.S. EPA SW846, 1982.

TABLE C-1. WASTE CHARACTERIZATION SUMMARY

Type of waste	Quantity (tons/yr)	EPA waste code	Characteristic of concern monitored	Btu/lb	Waste mgt method
Paint sludges	2600	None	I, T	6,300	Secure landfill
Purge solvent	1500	F003, F005	I, T	15,000	Recycle/reclaim
Phosphate sludge	100	None	No	<1,000	Secure landfill
Waste gasoline*		D001	I	15,000	Incinerate/alternate fuels
Waste glycol	80	None	None	5,000	Incinerate/recycle
Waste oils	500	None	I, T	15,000	Recycle/reclaim
Wastewater sludges	4400	Delisted (F006, F019)	T	<2,000	Secure landfill
Chlorinated solvents	<10	F001, F002	None	N/A	Recycle/reclaim
Adhesives and sealers	300	None	I, T	10,000	Secure landfill
Waste paint					
Low lead	100	F003, F005	I	14,300	Alternate fuels/ incineration
High lead	70	F003, F005	I, T	9,850	Incineration/alternate fuels

* Volume included with waste paint.

TABLE C-2. SUMMARY OF WASTES RECEIVED FROM ~~OFF SITE~~ SISTER PLANT

Type of waste	EPA waste code	Characteristics of concern tested for	Btu/lb	Waste Management Method
Waste oils	None	I, T	15,000	Recycle/reclaim
Waste glycol	None	None	5,000	Incinerate/recycle
Paint sludges	None	I, T	9,820	Secure landfill

If quantities transferred in c-1 then add here 01C

TABLE C-3

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Paint Sludge

Proper DOT shipping name: Waste paint related materials, UN 1263
EPA waste No.: None (managed as F006, F019)
EPA hazard class code:
DOT hazard class: Combustible (no placard required)
Waste source: Vehicle spray paint booth operations

Generation rate: 2600 TPY (includes Plant 6 and phosphate sludge)
Potential hazards: Toxic vapors, combustible, heavy metals
Primary disposal method: Secure landfill off site
Alternative disposal method: Incineration off site
Alternative disposal method:
Comments: Contains small amount of waste adhesives and sealers; co-mingled with phosphate sludge and caustic sludge. Transporter to cover loads prior to transit. Must be free of releasable liquids.

Analysis date March 23, 1984
Ignitibility (Solid) no
pH 6.4

Physical state @ 70°F Sludge
Unit weight 73.4 lb/ft^3

Specific weight 1.13 gr/mL
Heat content 7290 Btu/lb
Moisture content % wt
Ash content % wt
Sulfur % wt
Halogens % wt
PCB N.D. @5.0 mg/L
Liquid phase % vol
Solids 70.1 % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	N.D. @0.20
Cadmium	N.D. @0.02
Chromium	0.48
Lead	N.D. @0.10
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.43
Zinc	

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	600
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-4

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Purge Solvent

Proper DOT shipping name: Flammable liquid, N.O.S UN 1993
EPA waste No.: F003, F005
EPA hazard class code: 07
DOT hazard class: Flammable liquid (placard required)
Waste source: Paint mix room, paint equipment cleaning

Generation rate: 1500 TPY
Potential hazards: Flammibility toxic organics
Primary disposal method: Reclamation - off site
Alternative disposal method: Alternate fuels - off site
Alternative disposal method: Incineration - off site
Comments: Avoid mixing with waste paint. Avoid mixing with chlorinated solvents. Obtain unit weight prior to shipment.

Analysis date March 23, 1984
Ignitibility Flash point <70°F
pH 5.0

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	N.D. @0.20
Cadmium	N.D. @0.02
Chromium	N.D. @0.04
Lead	5.5
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.18
Zinc	0.42

Physical state @ 70°F Liquid

Unit weight	7.6	lb/gal
Specific weight		gr/mL
Heat content		Btu/lb
Moisture content		% wt
Ash content		% wt
Sulfur		% wt
Halogens	1100	mg/L
PCB	N.D. @5.0	mg/L
Liquid phase		% vol
Solids	7	% wt
B,S,W (oil)		% vol

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Toluene	
Xylene	
Methyl ethyl ketone	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-5

GM TRUCK AND BUS GROUP WASTE DATA SHEET

PONTIAC PLANTS

Waste Stream Name: Phosphate Sludge

Proper DOT shipping name: Hazardous waste, solid, N.O.S. NA 9189
EPA waste No.: None
EPA hazard class code:
DOT hazard class: ORM-E (no labels required - orange panel or white placard preferred)
Waste source: Zinc phosphating (considered electoplating by U.S. EPA)
Generation rate: 100 TPY
Potential hazards: None known
Primary disposal method: Secure landfill
Alternative disposal method: None
Alternative disposal method:
Comments: Mixed with paint sludge. Transporter to cover load while in transit. Must be free of releasable liquids.

Analysis date: March 7, 1984
Ignitibility: (Solid) no
pH: 4.9

Physical state @ 70°F: Sludge
Unit weight:

Specific weight	1.3	gr/mL
Heat content	<1000	Btu/lb
Moisture content	95	% wt
Ash content	4	% wt
Sulfur	0.01	mg/L
Halogens	0.017	mg/L
PCB		mg/L
Liquid phase		% vol
Solids		% wt
B,S,W (oil)		% vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	0.0028
Barium	N.D. @0.3
Cadmium	N.D. 00.03
Chromium	N.D. @0.05
Lead	N.D. @0.048
Mercury	N.D. @0.014
Selenium	N.D. @0.0004
Silver	N.D. @0.03
Copper	
Zinc	

Metals g/g

Arsenic	
Barium	
Cadmium	
Chromium	27
Lead	160
Mercury	
Selenium	
Nickel	950

Volatile Organics (%)

N/A	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-6

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste Oil

Proper DOT shipping name: None
EPA waste No.: None
EPA hazard class code: None
DOT hazard class: None
Waste source: Vehicle filling and equipment maintenance

Generation rate: 500 TPY
Potential hazards: No hazardous characteristics, combustible
Primary disposal method: Reclaim - off site
Alternative disposal method: Alternate fuel - off site
Alternative disposal method:
Comments: Skim any gasoline tainted phase prior to transit, check flash point and unit weight and B,S, and W prior to shipment release.

Analysis date
Ignitibility: Flash point >200°F
pH: 8.3

Physical state @ 70°F: Liquid
Unit weight: 7.5 lb/gal

Specific weight: 0.99 gr/mL
Heat content: Btu/lb
Moisture content: % wt
Ash content: % wt
Sulfur: % wt
Halogens: % wt
PCB: N.D. @5.0 mg/L
Liquid phase: % vol
Solids: % wt
B,S,W (oil): 25 % vol
Water and sediment: 75 % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	N.D. @0.20
Cadmium	N.D. @0.02
Chromium	N.D. @0.04
Lead	N.D. @0.1
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.40
Zinc	2.5

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-7

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste Glycol

Proper DOT shipping name: None
EPA waste No.: None
EPA hazard class code: None
DOT hazard class: None
Waste source: Radiator fill and vehicle maintenance operation

Generation rate: 80 TPY
Potential hazards: No hazardous characteristics, combustible, potential water contaminant
Primary disposal method: Incinerate - off site
Alternative disposal method: Reuse - off site
Alternative disposal method:
Comments: Glycol fluid. Obtain unit weight prior to shipment.

Analysis date March 23, 1984
Ignitibility Flash point >200°F
pH 8.7

Physical state @ 70°F Liquid
Unit weight 8.6 lb/gal

Specific weight ____ gr/mL
Heat content ____ Btu/lb
Moisture content ____ % wt
Ash content ____ % wt
Sulfur ____ % wt
Halogens ____ % wt
PCB N.D. @5.0 mg/L
Liquid phase ____ % vol
Solids 4.7 % wt
B,S,W (oil) ____ % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	0.55
Cadmium	0.06
Chromium	0.6
Lead	0.6
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.05
Copper	0.18
Zinc	7.6

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-8

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS

Waste Stream Name: Central Wastewater Treatment Filter Cake

Proper DOT shipping name: None
EPA waste No.: None
EPA hazard class code:
DOT hazard class: None
Waste source: On-site industrial wastewater treatment plant

Generation rate: 3600 TPY
Potential hazards: No hazardous waste characteristics, delisted (F006, F019)
Primary disposal method: Secure landfill
Alternative disposal method:
Alternative disposal method:
Comments: Transporter to cover load in transit

Analysis date March 23, 1984
Ignitibility (Solid) no
pH 8.6

Physical state @ 70°F Sludge
Unit weight 77.4 lb/ft^3

Specific weight 1.25 gr/mL
Heat content Btu/lb
Moisture content % wt
Ash content % wt
Sulfur % wt
Halogens % wt
PCB N.D. @0.04 mg/L
Liquid phase % vol
Solids 47.7 % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	0.12
Barium	N.D. @0.20
Cadmium	0.03
Chromium	N.D. @0.04
Lead	N.D. @0.1
Mercury	N.D. @0.003
Selenium	0.02
Silver	N.D. @0.02
Copper	0.28
Zinc	0.42

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-9

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Grit Separator Sludge

Proper DOT shipping name: None
EPA waste No.: None
EPA hazard class code:
DOT hazard class: None
Waste source: On-site industrial wastewater treatment plant

Generation rate: 800 TPY
Potential hazards: No hazardous waste characteristics, delisted (F006, F019)
Primary disposal method: Secure landfill
Alternative disposal method:
Alternative disposal method:
Comments:

Analysis date March 23, 1984
Ignitibility (Solid) no
pH 8.3

Physical state @ 70°F Sludge
Unit weight

Specific weight 1.53 gr/mL
Heat content Btu/lb
Moisture content % wt
Ash content % wt
Sulfur % wt
Halogens % wt
PCB N.D. @5.0 mg/L
Liquid phase % vol
Solids 54.0 % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	0.08
Barium	0.52
Cadmium	0.02
Chromium	N.D. @0.04
Lead	0.1
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.22
Zinc	0.14

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-10

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS

Waste Stream Name: Wastewater Treatment System Intermediate Pit and Tank Precipitate Sludges

Proper DOT shipping name: Hazardous waste, solid, N.O.S. NA 9189
EPA waste No.: F006, F019
EPA hazard class code: 12
DOT hazard class: ORM-E
Waste source: Wastewater treatment system pit and tank precipitate
Generation rate:
Potential hazards: Toxicity (metals)
Primary disposal method: Secure landfill - off site
Alternative disposal method: Physical treatment on or off site
Alternative disposal method:
Comments: Must not contain releasible liquids to be landfilled

Analysis date
Ignitibility
pH

Physical state @ 70°F
Unit weight

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	
Copper	
Zinc	

Specific weight		gr/mL
Heat content		Btu/lb
Moisture content		% wt
Ash content		% wt
Sulfur		% wt
Halogens		% wt
PCB		mg/L
Liquid phase		% vol
Solids		% wt
B,S,W (oil)		% vol

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-11

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste Paint (High Lead)

Proper DOT shipping name: Waste paint related material, UN 1263
EPA waste No.: F003, F005
EPA hazard class code: 07
DOT hazard class: Flammable liquid (placards required)
Waste source: Paint operations

Generation rate: 75 TPY
Potential hazards: Flammability, toxic organics
Primary disposal method: Incineration - off site
Alternative disposal method: Alternate fuel - off site
Alternative disposal method:
Comments: Can accept waste gasoline. May be mixed with low lead paint in controlled amounts for disposal.

Analysis date March 23, 1984
Ignitibility Flash point 75 to 80°F
pH

Physical state @ 70°F Liquid
Unit weight 7.5 lb/gal

Specific weight 1.07 gr/mL
Heat content 9850 Btu/lb
Moisture content % wt
Ash content % wt
Sulfur 0.17 mg/kg (wet)
Halogens % wt
PCB N.D. @5.0 mg/L
Liquid phase % vol
Solids % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	N.D. @0.20
Cadmium	N.D. @0.02
Chromium	0.05
Lead	0.6
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.17
Zinc	6.7

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	41000
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Xylene	
Toluene	
Methyl ethyl ketone	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-12

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste Paint (Low Lead)

Proper DOT shipping name: Waste paint related material, UN 1263
EPA waste No.: F003, F005
EPA hazard class code: 07
DOT hazard class: Flammable liquid (placards required)
Waste source: Paint operations

Generation rate: 100 TPY
Potential hazards: Flammability, toxic organics
Primary disposal method: Alternate fuel - off site
Alternative disposal method: Incineration - off site
Alternative disposal method:
Comments: Can accept waste gasoline and limited amounts of high lead paint. Low lead paint may be mixed with high lead paint.

Analysis date March 23, 1984
Ignitibility Flash point <70°F
pH 4.6

Physical state @ 70°F Liquid
Unit weight 7.5 lb/gal

Specific weight 0.94 gr/mL
Heat content 14300 Btu/lb
Moisture content % wt
Ash content % wt
Sulfur <2.0 as S^{2-} mg/L
Halogens <120 as Cl mg/L
PCB <5.0 mg/L
Liquid phase % vol
Solids % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	N.D. @0.20
Cadmium	N.D. @0.02
Chromium	N.D. @0.04
Lead	2.1
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	0.17
Zinc	0.46

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	2400
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Xylene	
Toluene	
Methyl ethyl ketone	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-13

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste Methylene Chloride

Proper DOT shipping name: Waste methylene chloride, UN 1593
EPA waste No.: F001, F002
EPA hazard class code: None
DOT hazard class: ORM-A (no labels required)
Waste source: Equipment machinery paint booth surface cleaning and degreasing and paint stripping
Generation rate: 10 TPY
Potential hazards: Toxic (ingestion and inhalation)
Primary disposal method: Recycle - off site
Alternative disposal method: Incinerator - off site
Alternative disposal method:
Comments: Normally must be at least 50 percent methylene chloride to be acceptable for reclamation. Incinerators may not accept more than 5 percent methylene chloride.

Analysis date
Ignitibility N/A
pH N/A

Physical state @ 70°F ~~Pumpable~~ semi solid liquid
Unit weight

Specific weight gr/mL
Heat content N/A Btu/lb
Moisture content N/A % wt
Ash content N/A % wt
Sulfur N/A % wt
Halogens % wt
PCB mg/L
Liquid phase % vol
Solids % wt
B,S,W (oil) % vol

Extraction Procedure Toxicity (mg/L)

Cyanide	N/A
Arsenic	N/A
Barium	N/A
Cadmium	N/A
Chromium	N/A
Lead	N/A
Mercury	N/A
Selenium	N/A
Silver	N/A
Copper	N/A
Zinc	N/A

Metals µg/g

Arsenic	N/A
Barium	N/A
Cadmium	N/A
Chromium	N/A
Lead	N/A
Mercury	N/A
Selenium	N/A
Silver	N/A

Volatile Organics (%)

N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

333/59

059/85

TABLE C-14

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Waste 1,1,1-Trichloroethane

Proper DOT shipping name: Waste trichloroethane, UN 2831
EPA waste No.: F001, F002
EPA hazard class code: None
DOT hazard class: ORM-A (no labels required)
Waste source: Equipment/machinery/paint booth surface cleaning and degreasing
Generation rate: Negligible
Potential hazards: Toxic (ingestion and inhalation)
Primary disposal method: Recycle - off site
Alternative disposal method: Incineration - off site
Alternative disposal method:
Comments:

Analysis date N/A
Ignitibility N/A
pH N/A

Extraction Procedure Toxicity (mg/L)

Cyanide	N/A
Arsenic	N/A
Barium	N/A
Cadmium	N/A
Chromium	N/A
Lead	N/A
Mercury	N/A
Selenium	N/A
Silver	N/A
Copper	N/A
Zinc	N/A

Physical state @ 70°F Pumpable Liquid
Unit weight 10 to 12 lb/gal

Specific weight		gr/mL
Heat content	N/A	Btu/lb
Moisture content	N/A	% wt
Ash content	N/A	% wt
Sulfur		% wt
Halogens		% wt
PCB		mg/L
Liquid phase		% vol
Solids		% wt
B,S,W (oil)		% vol

Metals µg/g

Arsenic	N/A
Barium	N/A
Cadmium	N/A
Chromium	N/A
Lead	N/A
Mercury	N/A
Selenium	N/A
Silver	N/A

Volatile Organics (%)

N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	
N/A	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-15

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: Adhesives and Sealers

Proper DOT shipping name: None
EPA waste No.: None
EPA hazard class code: None
DOT hazard class: None
Waste source: Unused residue from vehicle assembly

Generation rate: 300 TPY
Potential hazards: Combustible
Primary disposal method: Secure landfill
Alternative disposal method:
Alternative disposal method:
Comments: Mixed in paint sludge for disposal

Analysis date
Ignitibility
pH

Physical state @ 70°F Solid
Unit weight

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	
Copper	
Zinc	

Specific weight		gr/mL
Heat content	10,000	Btu/lb
Moisture content	0	% wt
Ash content		% wt
Sulfur		% wt
Halogens		% wt
PCB		mg/L
Liquid phase		% vol
Solids		% wt
B,S,W (oil)		% vol

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	
Mercury	
Selenium	
Silver	

Volatile Organics (%)

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-17

GM TRUCK AND BUS GROUP WASTE DATA SHEET
PONTIAC PLANTS
Waste Stream Name: NALCO Paint Sludge - PWA

Proper DOT shipping name: Waste paint related material, UN 1263
EPA waste No.: None
EPA hazard class code: None
DOT hazard class: None
Waste source: Vehicle spray paint booth operations

Generation rate: Include with Table C-3
Potential hazards: Toxic vapors, combustible, heavy metals
Primary disposal method: Secure landfill - off site
Alternative disposal method: Incineration - off site
Alternative disposal method:
Comments: Co-mingled with phosphate sludge and caustic sludge at PCM. Transporter to cover load in transit. Must be free of releasable liquids.

Analysis date: September 13, 1984
Ignitibility: (Solid) no
pH:

Physical state @ 70°F: Sludge
Unit weight:

Specific weight		gr/mL
Heat content	9820	Btu/lb
Moisture content		% wt
Ash content		% wt
Sulfur		% wt
Halogens		% wt
PCB		mg/L
Liquid phase		% vol
Solids		% wt
B,S,W (oil)		% vol

Extraction Procedure Toxicity (mg/L)

Cyanide	
Arsenic	N.D. @0.02
Barium	0.28
Cadmium	N.D. @0.02
Chromium	N.D. @0.04
Lead	0.48
Mercury	N.D. @0.003
Selenium	N.D. @0.01
Silver	N.D. @0.02
Copper	
Zinc	

Metals µg/g

Arsenic	
Barium	
Cadmium	
Chromium	
Lead	1300
Mercury	
Selenium	
Silver	

Volatile Organics (%)
Detected by EPA 601 and 602

Liquid phase		
none		
Solid phase		
1,1,1,-trichloroethane	85	mg/kg wet
trichloroethane	0.37	mg/kg
Benzene	0.86	
Ethyl benzene	29	
Toluene	2.4	

Instruction for use: If a parameter is tested for and not detected, enter N.D. @ _____ and insert the appropriate detection limit for that analysis. If a parameter is not tested for, leave that line blank.

TABLE C-18. ROUTINE WASTE ANALYSES

Waste	Parameters	Frequency
Paint sludge	EP Toxicity (metals) Solid ignitability	Annually
Waste paint	Flash point EP Toxicity (metals)	Annually
Water treatment sludge	EP Toxicity (metals)	Annually
Waste purge solvents	Flash point EP Toxicity (metals)	Annually Annually

TABLE C-18a PARAMETERS AND RATIONALE FOR SELECTION

Hazardous Waste	Parameters	Rationale
Purge solvent	Flash point, toxic	This waste is ignitable and is listed on the basis of Xylene, toluene and MEK.
Gasoline	Flash point	Gasoline as purchased, has a flash point of -40°F making it readily ignitable.
Wastewater treatment sludge	Delisted toxic*	This waste was listed on the basis of cadmium, nickel, chromium (6) and cyanide. Testing is performed to verify that this waste stays within EP toxicity limits and thus qualifies for exclusion.
Waste paint	Flash point	This waste is ignitible based on the flash points of its constituent solvents (see purge solvent, above).
Chlorinated solvents	Toxic	Listed waste F001.

*Additional revisions to be made at a later date.

APPENDIX B.3

WORK PLAN FOR THE REMOVAL OF TWO ABOVEGROUND STORAGE TANKS AND A CONCRETE CONTAINMENT PAD FROM THE HAZARDOUS WASTE STORAGE AREA OF THE PONTIAC EAST ASSEMBLY FACILITY IN PONTIAC, MICHIGAN

"Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area of the Pontiac East Assembly Facility, in Pontiac, Michigan"

Prepared by:

C-E ENVIRONMENTAL, INC.

Prepared for:

General Motors Corporation
Pontiac East Assembly

September 21, 1989

INTRODUCTION

General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (GMC-PEA) retained C-E Environmental, Inc. (C-EE) to assist it with the closure of its hazardous waste storage area. Closure of this waste storage area is to proceed in accordance with the closure plan dated September 1987.

GMC-PEA retained C-EE to monitor the closure activities and to conduct confirmatory sampling. As a part of these responsibilities, C-EE collected nine subsurface soil samples from the waste storage area (sample points E-1 through E-9, as shown in Figure 1), six background soil samples (sample points B-1 through B-6), four samples of rinsate generated during the decontamination of the waste area's aboveground tanks and concrete pad (samples C-1 through C-4), and nine series of photoionization readings from the waste storage area (collected at sample points E-1 through E-9). The analytical results for samples E-1 through E-9 were presented in a letter report dated May 25, 1989. The analytical results for samples B-1 through B-6 and C-1 through C-4 were presented in C-EE's report dated July 12, 1989. Copies of these reports are presented in Attachment A. The results of the photoionization readings are presented in Attachment B.

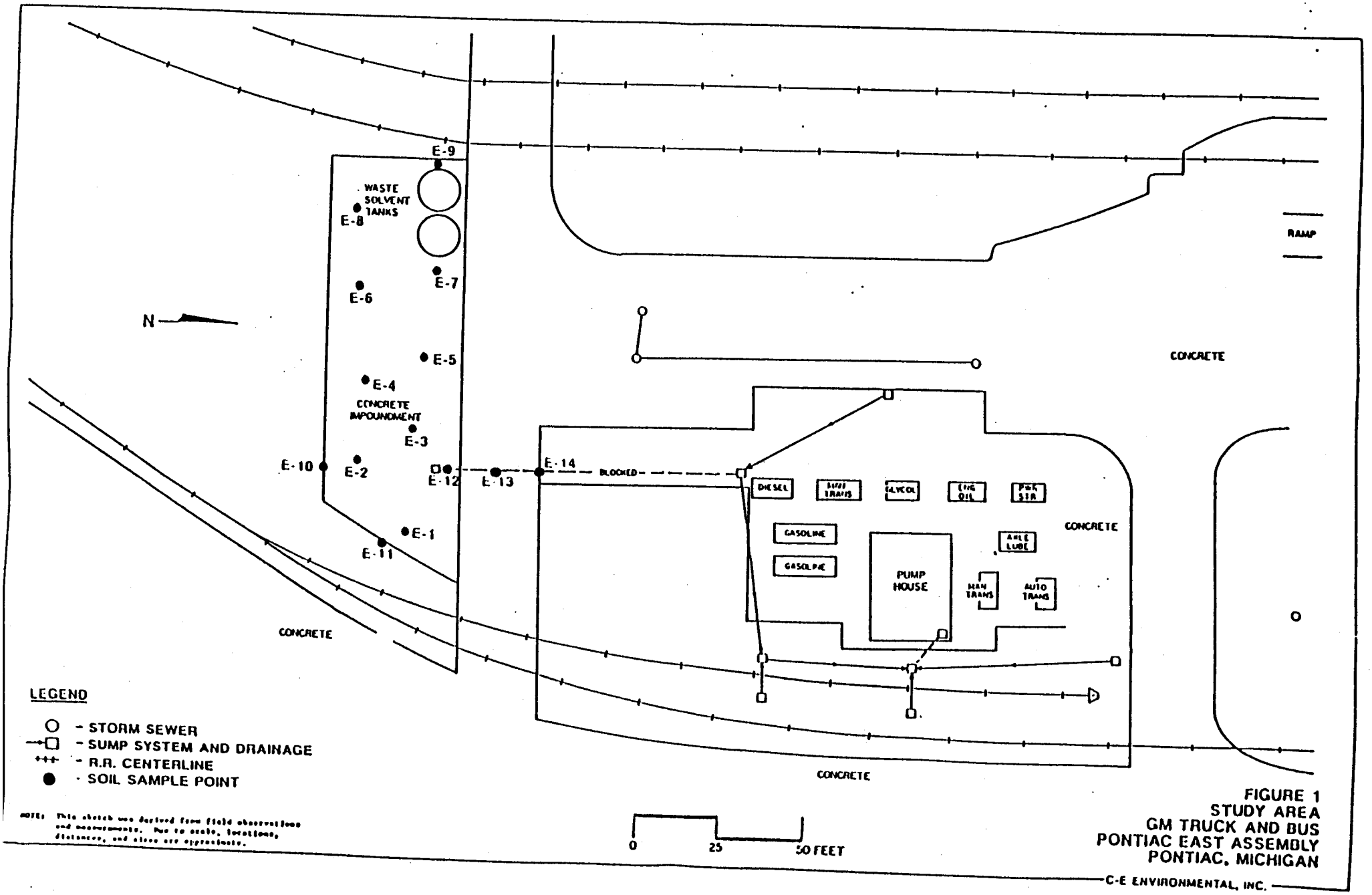
The analytical results for these samples indicate elevated levels of volatile organics and lead near the eastern side of the waste storage area. Due to the presence of these contaminants in this area, C-EE has prepared this work plan to present a plan of action for further investigating the contamination observed in soils at the waste storage area, and establish removal/disposal protocol for the contaminated soils. These items, as well as a brief summary of the analytical findings to date are discussed below.

SUMMARY OF FINDINGS

In accordance with the closure plan, the concrete pad and two aboveground waste storage tanks in the waste storage area were decontaminated. As discussed in the July 12 report, C-EE collected samples of the rinsate generated during these decontamination activities (samples C-1 through C-4). The results of these samples indicated that cleanup standards as specified in the closure plan had been achieved. At this time, GMC-PEA intends to remove and dispose of the tanks and concrete pad. The disposal fate of these materials is discussed below.

As discussed in the May 25 report, volatile organics (ethyl benzene, toluene, and xylene) were detected in soil samples collected at sample points E-1 and E-3 at a depth of 6 to 12 inches. In addition, an elevated level of lead (660 milligrams per kilogram) was observed in the soil sample from sample point E-2 at a depth of 0 to 6 inches.

Volatile organics were detected with a photoionization detector (PID) at all nine sampling points (E-1 through E-9). The highest levels were observed at sampling locations E-1 (300 units) and E-3 (240 units). The PID readings



NOTE: This sketch was derived from field observations and measurements. Due to scale, locations, distances, and sizes are approximate.

FIGURE 1
STUDY AREA
GM TRUCK AND BUS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E ENVIRONMENTAL, INC.

correspond to parts-per-million when the instrument is measuring benzene - for other vapors and mixtures, these numbers are relative. The next highest PID reading observed was at sampling point E-2 (70 units). The PID readings at the remaining sampling points (E-4 through E-9) decreased as sampling proceeded to the west; however, none of these readings exceeded 26 units. The volatile organics observed with the PID at these sampling points are likely attributable to the migration of the volatile compounds in the soil vapor space beneath the waste storage area concrete pad.

SCOPE OF WORK FOR ADDITIONAL SAMPLING

Based on the analytical results for samples collected from sample points E-1, E-2, and E-3, additional sampling and analyses are required to define the lateral and vertical extent of contamination within the waste storage area and to determine the source of the observed contamination.

To investigate the extent of contamination within the waste storage area, GMC-PEA will collect additional soil samples at sample locations E-1, E-2, E-3, E-10, and E-11. Soil sampling at these locations will commence upon the removal of the concrete pad and tanks located in the waste storage area.

Samples will be collected at 1-foot intervals and screened in the field for volatile organics using a photoionization detector (PID). Soil sampling from locations E-1 through E-3 will begin at a depth of 1 foot since prior sampling at these points proceeded to a depth of 1 foot. Field screening with the PID will be in accordance with the procedures established in the closure plan. If PID readings for the soil samples collected at the shallowest depth indicate that volatile organics are present, soil samples will be collected from the next 1-foot interval and screened with the PID. The process will be repeated until a sample is collected which does not yield a significant PID meter reading. At this sampling level, soil samples will then be collected and analyzed for total lead and (MDNR Scan II) volatile organics.

Method 7420 will be followed for total lead analyses and Method 8020 will be followed for volatile organic analyses. The anticipated level of detection (LOD) for the lead is 20mg/g while the anticipated LOD for the volatile organics is 5mg/g. The selected soil samples from the sampling points is anticipated to be analyzed by Swanson Environmental Services in Novi, Michigan.

The source of contamination observed in the waste storage area is believed to be gasoline which was released in the adjacent tank farm area and migrated to the waste storage area via the sump/drain system which connects the two areas. To confirm that these gasoline spills are the source of contamination observed in the waste storage area, samples of the fill material along the storm drain line between the two areas will be collected at three locations (sample points E-12 through E-14 in Figure 1). Sampling from these three sampling points will proceed in accordance with the procedures established above for sampling points E-1 through E-3, E-10 and E-11.

REMOVAL/DISPOSAL OF CONTAMINATED SOILS

Once the analytical results of the additional subsurface soil samples are received and interpreted, GMC-PEA will arrange for the removal and proper disposal of all contaminated soils located at the waste storage area. Soil removal will begin at sample points E-1 and E-3 and proceed in all directions to the nearest sample point not exhibiting detectable levels of volatile organics or elevated levels of total lead.

The contaminated soils will be excavated by either a tracked or rubber-tired excavator, or similar excavation equipment. Excavated soils will be placed in 20 cubic yard rolloff boxes and covered with tarpaulin (or a similar cover) to prevent exposure to precipitation and wind. Once full, the rolloff boxes shall be moved to the hazardous waste storage pad located at the Central Assembly facility to await proper disposal.

If it is determined that the source of contamination is spilled gasoline from the tank farm area and that the soils are not ignitable as defined by the Resource Conservation and Recovery Act (RCRA) and Michigan Act 64, the contaminated soils will be landfilled at the Michigan Disposal facility in Belleville, Michigan.

If the soils are classified as hazardous due to ignitability or E.P. Toxic lead levels, or if the volatile organic contamination cannot be attributed to the spilled gasoline, the soils will be transported by Inland Waters (EPA ID# MID 982606287) to Wayne Disposal with suitable treatment as necessary.

REMOVAL OF CONCRETE PAD AND TANKS

Based on the analytical results of the rinsate samples collected during the decontamination of the concrete pad and tanks, both the concrete pad and the tanks have been decontaminated in accordance with the decontamination procedures established in the closure plan. Accordingly, these decontaminated items can now be removed and disposed of to allow for the construction of an aboveground storage tank facility in this area.

The concrete pad will be removed with demolition equipment, placed in 20-cubic yard rolloffs, and transported as an inert material to Pollards Landfill (a City Management Facility) in Montrose Township, Michigan. The decontaminated aboveground tanks will be dismantled and scrapped.

APPENDIX B.4

CLOSURE REPORTS

C-E ENVIRONMENTAL, INC.

CLOSURE REPORT
FOR
THE PONTIAC EAST ASSEMBLY
HAZARDOUS WASTE STORAGE AREA

Prepared for:

GENERAL MOTORS CORPORATION
Truck & Bus Group
Pontiac East Assembly
Pontiac, Michigan

AUGUST 31, 1990

COMBUSTION ENGINEERING

CLOSURE REPORT
FOR
THE PONTIAC EAST ASSEMBLY HAZARDOUS WASTE STORAGE AREA

Prepared for:

GENERAL MOTORS CORPORATION
TRUCK & BUS GROUP
PONTIAC EAST ASSEMBLY
Pontiac, Michigan

Prepared by:

C-E ENVIRONMENTAL, INC.
39255 Country Club Drive
Farmington Hills, Michigan 48331

AUGUST 31, 1990

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Owner/Operator Closure Certification

I, George B. Sloan, Jr., Plant Manager of General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (31 Judson Street, Pontiac, Michigan) certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. As Plant Manager of the Pontiac East Assembly Facility, I am authorized to sign this certification statement in accordance with 40 CFR Section 270.11 (a)(1)(ii).

Signature

Date

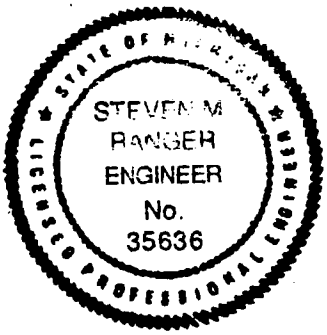
90838.WP

Professional Engineer Closure Certification

I, Steven M. Ranger, a certified professional engineer in the State of Michigan and an employee of C-E Environmental, Inc., 39255 Country Club Drive, Suite B-25, Farmington Hills, Michigan, certify under penalty of law that this document and all attachments with the exception of the Closure Plan presented in this document as Appendix A, were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. The Closure Plan in Appendix A was prepared under the direction and supervision of General Motors Corporation personnel. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature

9-31-90
Date



1.0 INTRODUCTION

In accordance with the closure activities outlined in the plan "Hazardous Waste Storage Facility Closure Plan," dated December 2, 1987, General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (GMC-PEA) has accomplished the closure of its hazardous waste storage area. The purposes of this closure report are to a) document the methods and events followed by GMC-PEA in accomplishing its closure, and b) certify that the closure activities outlined in the closure plan have been achieved.

The closure plan was developed and implemented by GMC-PEA in accordance with 40 CFR Part 265.111 through 265.115 and the Michigan Act 64, Rule R299.9613. C-E Environmental, Inc. (C-EE) of Farmington Hills, Michigan assisted GMC-PEA with the implementation of the closure plan. A copy of this closure plan, which includes a figure depicting the location of the hazardous waste storage area relative to the GMC-PEA facility, is included in this report as Appendix A.

Over the course of the closure project, the December 1987 Closure Plan was revised/clarified by the documents "Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area of the Pontiac East Assembly Facility in Pontiac, Michigan," (dated September 21, 1989) and "Analytical Results of Additional Soil Samples Collected at the Pontiac East Assembly Waste Storage Area" (dated November 27, 1989), both by C-EE, and the Michigan Department of Natural Resources' written comments on those two documents dated July 14, 1989; October 5, 1989; October 16, 1989, and January 10, 1990. Copies of the two C-EE documents are presented in Appendix B. Copies of the MDNR's written comments are presented in Appendix C.

2.0 CLOSURE EVENTS

The events and activities associated with the closure of the hazardous waste storage area include the following:

- The powerwashing of the storage area's two aboveground storage tanks and concrete containment pad;
- The collection and analysis of six background soil samples and nine soil samples from below the concrete containment pad;
- The collection and analysis of additional soil samples to define the depth and extent of contamination observed below the containment pad;
- The removal and disposal of the two storage tanks and the concrete containment pad;
- The removal and disposal of contaminated soils located below the concrete containment pad, and
- The collection and analysis of cleanup confirmation soil samples.

These events and activities are discussed in order of occurrence in the following sections.

2.1 POWER-WASHING OF THE WASTE STORAGE TANKS AND CONTAINMENT PAD

Cleanup of the waste storage tanks and the waste storage area concrete containment pad proceeded on March 29 and March 30, 1989, and consisted of power-washing these items with a high-pressure water spray in accordance with the closure plan. Inland Waters, Inc. conducted the power-washing operations. Mr. Timothy Palmer, Environmental Scientist at C-EE, monitored the cleanup operations.

In accordance with the closure plan, Mr. Palmer collected samples of the rinsate from the tank and pad cleaning operations. A letter report summarizing the analytical findings of these rinsate samples was prepared by C-EE and dated July 12, 1989. A copy of this report is included as Appendix D. As discussed in the report, the concrete pad rinsate sample did not exhibit detectable levels of hexavalent chromium (level of detection was 0.05 milligrams per liter, (mg/L)). Lead was detected in the pad rinsate sample at a level of 0.27 mg/L, but this level is below the action level of 5.0 mg/L established in the closure plan.

With the exception of chloroform in a tap water sample collected from the site and in the tank rinsate sample, no volatile organics (by Method 8010/8020, SW-846) were observed in the water samples submitted for analysis. Chloroform detected in the tank rinsate sample (4 micrograms per liter, ug/L) appears to be an artifact similar to the chloroform observed in the tap water (15 to 20 ug/L).

Based on the analytical results of the rinsate samples collected during the decontamination of the concrete pad and tanks, both the pad and the tanks were decontaminated in accordance with the procedures established in the closure plan.

2.2 SAMPLING OF BACKGROUND SOILS

On April 19, 1989, C-EE collected surface soil samples from a total of six locations at the GMC-PEA and the Pontiac Central Assembly sites for the purpose of defining the total lead and total hexavalent chromium background concentrations for both facilities. The analytical results for these samples were presented in C-EE's letter report dated July 12, 1989 (included in this report as Appendix D). The approximate locations

of these background samples are shown in Figure 1 of that report. Data sheets which more accurately indicate the locations of these six samples are presented in Appendix E.

As the July 12 report indicates, no detectable levels (detection level of 0.5 milligrams per kilogram, mg/kg) of total hexavalent chromium were observed in any of the six soil samples collected. The total lead levels observed in the background soil samples ranged from 15 to 240 mg/kg. Per the MDNR's October 5, 1989, letter to GMC-PEA (Appendix C), the four lowest total lead values (15, 24, 57, and 65 mg/kg) observed in the background samples were used to establish the background total lead level for the GMC-PEA site.

2.3 SAMPLING OF SOILS BENEATH THE CONTAINMENT PAD

On April 19, 1989, Mr. Tim Palmer collected soil samples from nine locations (sample locations E-1 through E-9) beneath the waste storage area containment pad in accordance with the closure plan. The methods employed in collecting these samples, the approximate locations of the sampling points, and the analytical results of the samples were presented and discussed in detail in C-EE's letter report dated May 25, 1989 (Appendix F).

As discussed in the May 25 report, an elevated level of total lead (660 mg/kg) was observed in the 0" to 6" core sample collected from sample location E-2. The lead levels in the remaining eight soil samples, however, fell within the background total lead level range established for the site. In addition, no total hexavalent chromium was detected in any of the nine soil samples.

Volatile organics were detected in two of the nine soil samples submitted for analysis. Volatile organics observed in the soil sample from location E-1 at a depth of 6" to 12" included ethyl benzene (300 mg/kg), toluene (175 mg/kg), and total xylenes (1,100 mg/kg). Volatile organics observed in the soil sample from sample location E-3 at a depth of 6" to 12" included ethyl benzene (25 mg/kg) and total xylenes (125 mg/kg). No other volatile organics were detected in the E-1 or E-3 samples. No detectable levels (the level of detection was 10 mg/kg) of volatile organics were observed in the other seven samples.

Based on the analytical results, it was concluded in the May 25 report that soil contamination beneath the waste storage pad appeared limited to the northeastern corner. Additional soil sampling, however, was deemed necessary to help define the extent of the contamination and its source.

The approach to further investigating the observed contamination and establishing removal/disposal methods for the contaminated soils was established in the C-EE prepared work plan dated September 21, 1989 (Appendix B). This plan outlined a sampling strategy which focused around the three sampling points (E-1, E-2, and E-3) exhibiting elevated contaminant levels as well as the stormwater drain line leading up to the containment pad, along which gasoline contaminants from the tank farm area were believed to have migrated. The plan also established removal and disposal methods for the concrete containment pad and the two waste storage tanks.

This work plan was accepted by the MDNR as a modification to the closure plan in its letter dated October 5, 1989. As conditions for approval, however, the MDNR outlined 9 modifications to the work plan in its acceptance letter (Appendix C).

2.4 ADDITIONAL SAMPLING OF SOILS BENEATH CONTAINMENT PAD

In accordance with the MDNR-approved work plan, C-EE collected additional soil samples from beneath the containment pad and to the north of the containment pad along the stormwater drain line servicing the area. The samples were collected by Mr. Steven Ranger, Environmental Engineer at C-EE, and Mr. Thomas Winebrenner, Senior Environmental Technician at C-EE, on October 5 and 6, 1989. The sampling methodologies, sample locations, and analytical results were presented in C-EE's report "Analytical Results

of Additional Soil Samples Collected at the Pontiac East Assembly Waste Storage Area," dated November 27, 1989 (Appendix B).

As discussed in that report, 11 soil samples were collected from 9 locations and analyzed for total lead levels. Included as one of the 11 soil samples was a repeat sample of the soils from location E-2 which had exhibited total lead levels of 660 mg/kg during the initial soil sampling and analysis study. The levels of total lead observed in all of the 11 soil samples (including the E-2 repeat sample) ranged from 6 to 20 mg/kg, well within the total lead level background range established for the site. Based on the high lead levels observed earlier at E-2, a soil sample from E-2 at a depth of 0 to 1 foot was also analyzed for extractable lead (E.P. Toxicity, Lead). No detectable levels of E.P. Toxicity lead were observed in this sample.

Because the analytical results for other samples collected near E-2, and the repeat sample collected at E-2, did not reveal elevated (above background) levels of total lead, the total lead level initially observed in soils from E-2 could not be explained but is believed to be attributable to laboratory error, sampling error, an anomaly, or any combination of the three.

Field analytical measurements made with a photoionization detector as well as laboratory analytical results for benzene, ethyl benzene, toluene, and xylene revealed volatile organic contamination beneath the containment pad in the area of sample locations E-1, E-2, and E-3 to a depth of approximately 2.0 to 2.5 feet, and near sample location E-12 to a depth of approximately 4.0 to 4.5 feet. These four soil sample locations were located around and in proximity to the stormwater sewer manhole located in the waste storage area. Additionally, apparent oil-stained soils (likely resulting from transmission oil releases occurring in the tank farm) were observed at sample locations E-12, E-13, and E-14, along the stormwater drainage line servicing both the waste storage area and the tank farm area.

Though the source of contamination in the waste storage area is not known, based on the observations made during sampling and the analytical results of the additional soil sampling effort, the contamination observed in the waste storage area appeared to emanate from the sewer manhole and the associated drainage line. It was the opinion of GMC-PEA, therefore, that the source of BTEX contamination beneath the waste storage area's containment pad was gasoline releases which migrated along with transmission oil releases along the stormwater drainage trench from the tank farm area into the waste storage area. Accordingly, GMC-PEA proposed to handle the contaminated soils as non-hazardous waste provided they did not meet the characteristic of ignitability.

In its letter dated January 10, 1990 (Appendix C), the MDNR concurred with GMC-PEA that existing data did not appear to indicate that the source of the soil contamination was a listed waste, and agreed that the contaminated soils could be managed as solid wastes provided they did not exhibit the characteristic of an ignitable waste.

2.5 REMOVAL AND DISPOSAL OF THE CONTAINMENT PAD AND STORAGE TANKS

Removal and disposal of the waste storage area's concrete containment pad and two carbon steel aboveground storage tanks commenced on October 4, 1989, and was completed on October 6, 1989. Inland Waters, Inc. conducted the removal operations and arranged for the transportation of the wastes. Ms. Nancy Gassel, Environmental Engineer with C-EE, and Mr. Steve Ranger monitored the removal procedures.

The concrete pad and containment walls were broken down with a jack-hammer attached to an excavator. Once broken down to manageable pieces, the concrete pieces were picked up with the excavator, rinsed down with a high-pressure water spray, and placed in 20 cubic yard rolloff boxes. The underside of the concrete pad was rinsed with the water spray so as to ensure that no contaminated soils were disposed of with the concrete materials. At the conclusion of each working day, plastic tarpaulin was used to cover the exposed soils beneath the concrete pad.

The removed concrete pad and walls were disposed as inert material at the Pollards Landfill Facility (a City Management facility) in Montrose Township, Michigan. A total of approximately 150 cubic yards of concrete was removed.

As specified in the work plan, the aboveground storage tanks were dismantled and scrapped. So as to ensure that they would not again be used for storage purposes, the tanks were quartered prior to transportation offsite.

2.6 EXCAVATION OF CONTAMINATED SOILS AND CLEANUP CONFIRMATION SAMPLING

Excavation and disposal of volatile organic-contaminated soils located at and near the waste storage area proceeded in accordance with the MDNR-approved closure and work plans. Inland Waters, Inc. excavated and transported the contaminated soils from the waste storage area. Soils removed during excavation were disposed of at the Pollards Landfill facility in Montrose Township. Mr. Dave Belan, Geologist at C-EE, and Mr. Ranger monitored the excavation activities on behalf of GMC-PEA. Specific information relating to the excavation and disposal of the soil is presented in the sections below.

2.6.1 Soil Excavation Schedule and Quantities Removed

Soil was removed from the waste storage area over three separate excavation phases. The first excavation phase began on February 12, 1990 and was completed on February 28, 1990. Excavation during this removal phase originally focused upon those contaminated soils delineated in C-EE's November 27, 1989 report "Analytical Results of Additional Soil Samples Collected at the Pontiac East Assembly Waste Storage Area." A total of 17 transport vehicles, equaling approximately 300 cubic yards of soil, were loaded during the first phase of excavation. The lateral and vertical extent of the Phase I excavation and the approximate locations of confirmatory samples collected at the conclusion of the first excavation phase are depicted in Figure 1.

The second excavation phase began on March 12, 1990 and was completed March 14, 1990. Excavation during this second phase of removal focused upon those boundary areas of the original excavation which still exhibited elevated volatile organic contamination based upon confirmatory sampling conducted during the first excavation phase. A total of 23 transport vehicles, equaling approximately 400 cubic yards of soil, were loaded during the second phase of excavation. The lateral and vertical extent of the excavation as it appeared at the conclusion of the second phase of excavation procedures and the approximate locations of confirmatory samples collected at the conclusion of the second excavation phase are depicted in Figure 2.

The third excavation phase began on March 28, 1990 and was completed on March 29, 1990. Like the second excavation phase, excavation on these dates focused on the boundary and floor areas of the excavation area which still exhibited elevated volatile organic contamination based upon the confirmatory sample results from the second phase excavation. A total of 4 transport vehicles, equaling approximately 80 cubic yards of soil, were loaded during the third phase of excavation. The lateral and vertical extent of the excavation as it appeared at the conclusion of the third and final phase of excavation procedures and the approximate locations of confirmatory samples collected at the conclusion of the third excavation phase are depicted in Figure 3.

In general, excavation for all three phases began in the area formerly occupied by the northeast corner of the waste storage area containment pad, and proceeded to the south, west, and then to the north. As the soils were excavated, they were either placed directly into rolloff boxes/dump trains or temporarily placed along the northern edge of the excavation area to await loadout. The last areas excavated centered around that portion of the waste storage area formerly occupied by the stormwater sewer manhole and the area where excavated soils were temporarily stockpiled until loadout.

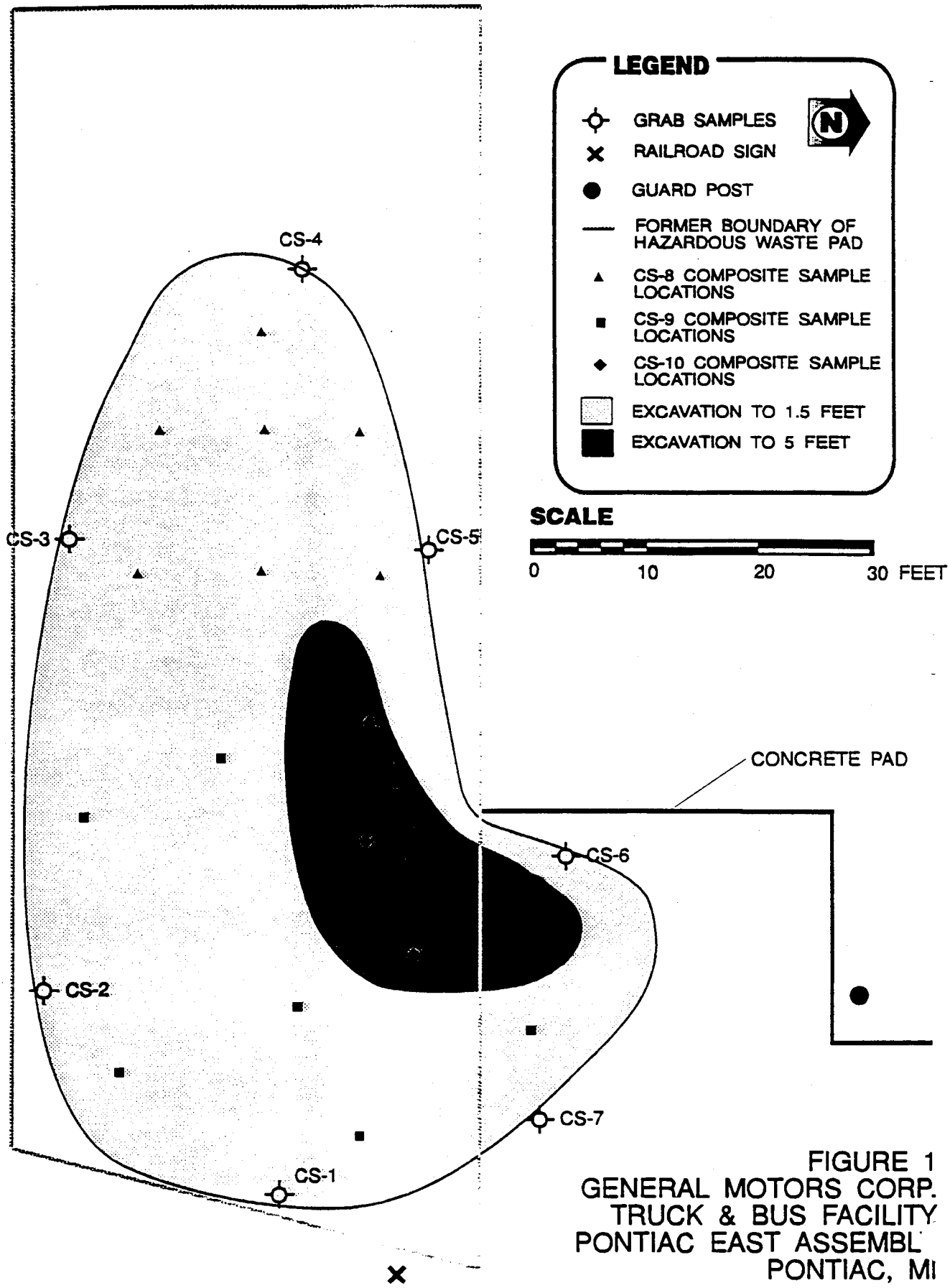


FIGURE 1
GENERAL MOTORS CORP.
TRUCK & BUS FACILITY
PONTIAC EAST ASSEMBL
PONTIAC, MI

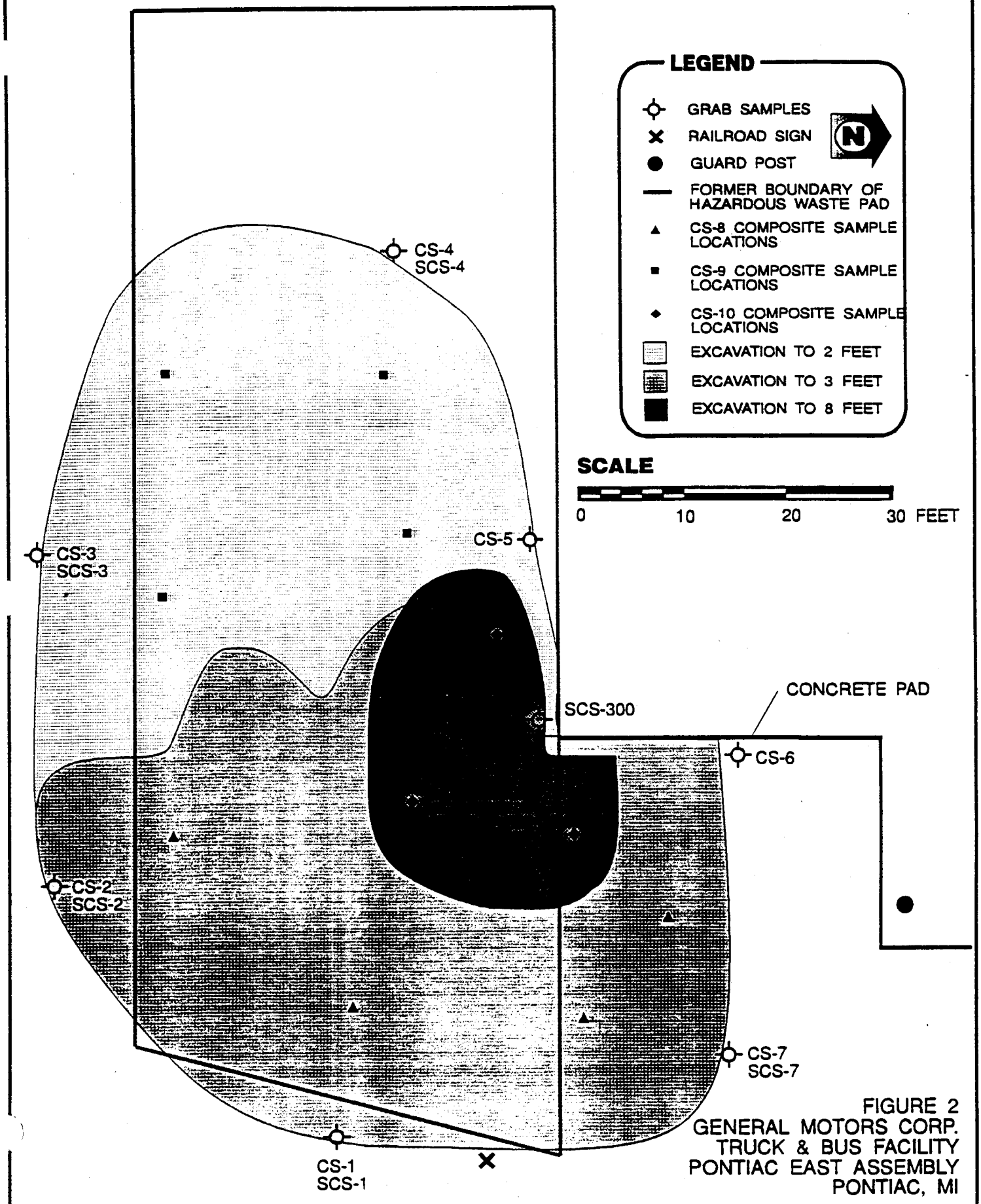


FIGURE 2
GENERAL MOTORS CORP.
TRUCK & BUS FACILITY
PONTIAC EAST ASSEMBLY
PONTIAC, MI

C-E ENVIRONMENTAL, INC.

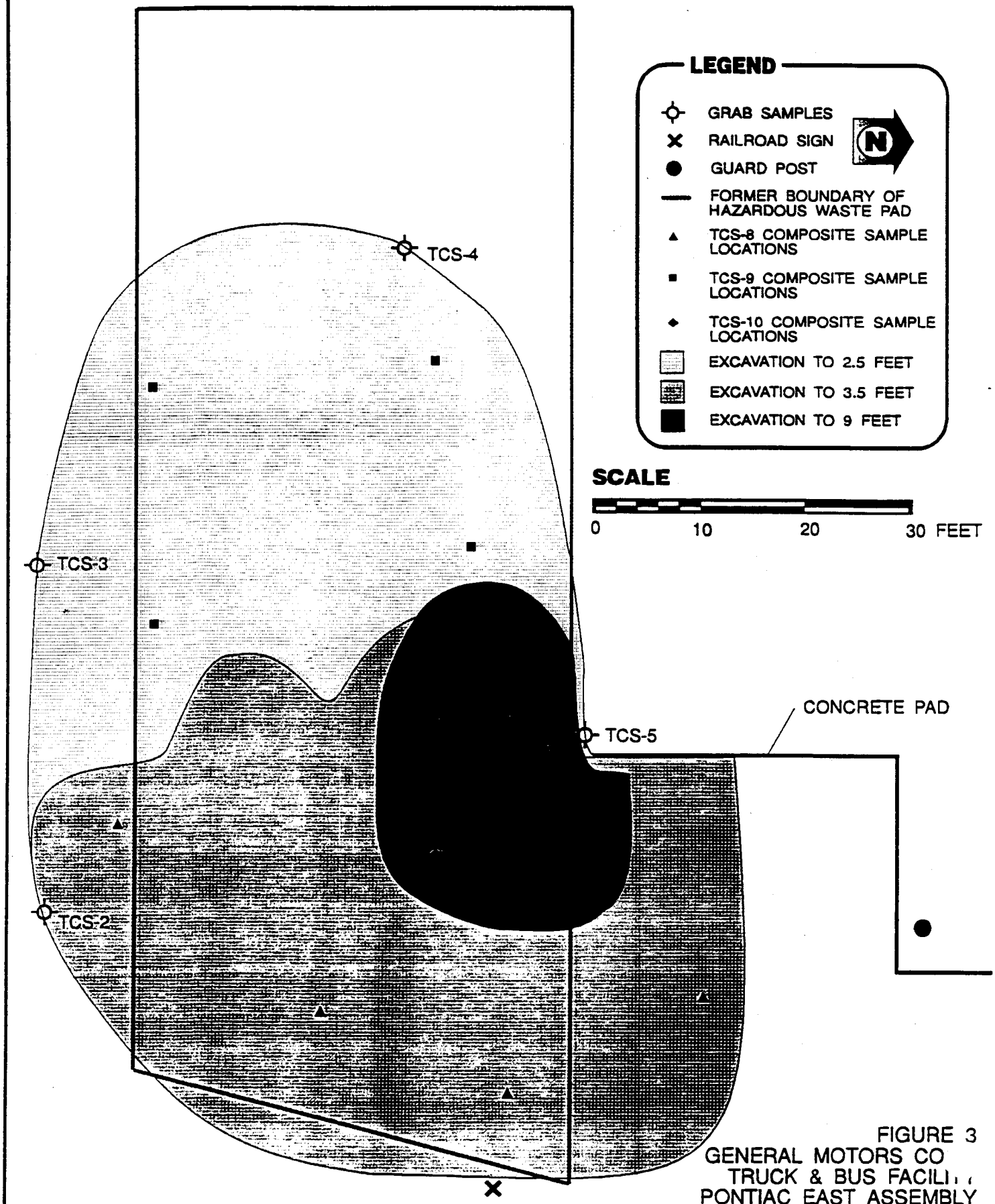


FIGURE 3
GENERAL MOTORS CO
TRUCK & BUS FACILI
PONTIAC EAST ASSEMBLY
PONTIAC, MI

C-E ENVIRONMENTAL, INC.

2.6.2 Observations Made During Excavation Procedures

In general, the soils encountered in the top one to two feet beneath the waste storage pad consisted of a fine to medium grained sand, most likely a backfill sand placed in the area at the time of the concrete containment pad's construction. Below this backfill sand, silty clays and hard-packed gray clays extended to the base of the excavation.

A gravel/sand mix was encountered in the top two feet of the excavation along the eastern and northeastern ends of the concrete containment area in proximity to a surface water drainage ditch which ran along the eastern wall of the concrete containment pad. This sand/gravel seam was moist and appeared to be a source of water infiltration into the excavation during periods of precipitation. Hard-packed clay was observed below this sand/gravel seam.

A sand/gravel seam was also encountered along the north wall of the excavation, under the concrete driveway which borders the waste storage area to the north. This sand/gravel seam extends to a depth of approximately 3 feet. Hard packed clays were observed below the sand/gravel seam. It appears that this sand/gravel seam is a backfill material placed during the construction of the concrete driveway area. A drain tile system services the driveway area and is situated in the sand/gravel seam. During excavation procedures, this drain tile line was severed and several hundred gallons of water were released to the excavation. Clays from another area of the excavation were temporarily backfilled along this northern wall to help prevent future water intrusion into the excavation area from this drain tile system.

The location of the concrete driveway drain tile line (around which the sand/gravel seam was noted) and the area of the excavation from which the clays were borrowed to temporarily seal the ruptured drain tile line are shown in Figure 4. At the conclusion of all excavation procedures, clays from an offsite source were used to reinforce the temporary clay barrier placed along the north wall near the drain tile line. The area of the excavation which was backfilled with clay is also shown in Figure 4.

A moist sand seam extending to a depth of approximately 8 to 10 feet at and to the west of the area formerly occupied by the concrete pad's stormwater sewer manhole and its associated drain line was encountered. Odors resembling sewage and elevated photoionization meter readings were noted in this sand seam. Hard-packed clays were observed below this sand seam. This entire sand seam was excavated. Its approximate location is shown in Figure 4 as the area of excavation extending to a depth of 9 feet (darkly shaded area).

A ceramic drain line which lead into this sand seam is also shown in Figure 4. During excavation procedures, this ceramic line was broken and approximately 500 gallons of water from the line poured into the excavation. This line was sealed with concrete beyond the northern edge of the excavation so as to prevent additional stormwater from the tank farm area from migrating towards the excavated area.

Water which collected in the excavation area due to precipitation, infiltration through the gravel seams noted above, and/or when the two drain lines were excavated/ruptured was removed from the excavation by vacuum truck and delivered to the onsite wastewater treatment plant for processing.

Plastic visqueen sheeting was placed over the tank farm area during the period between the removal of the concrete containment pad and the first phase of soil excavation in an effort to protect the area from precipitation. Plastic sheeting was also placed over the excavation area during the first phase of excavation during periods of inactivity.

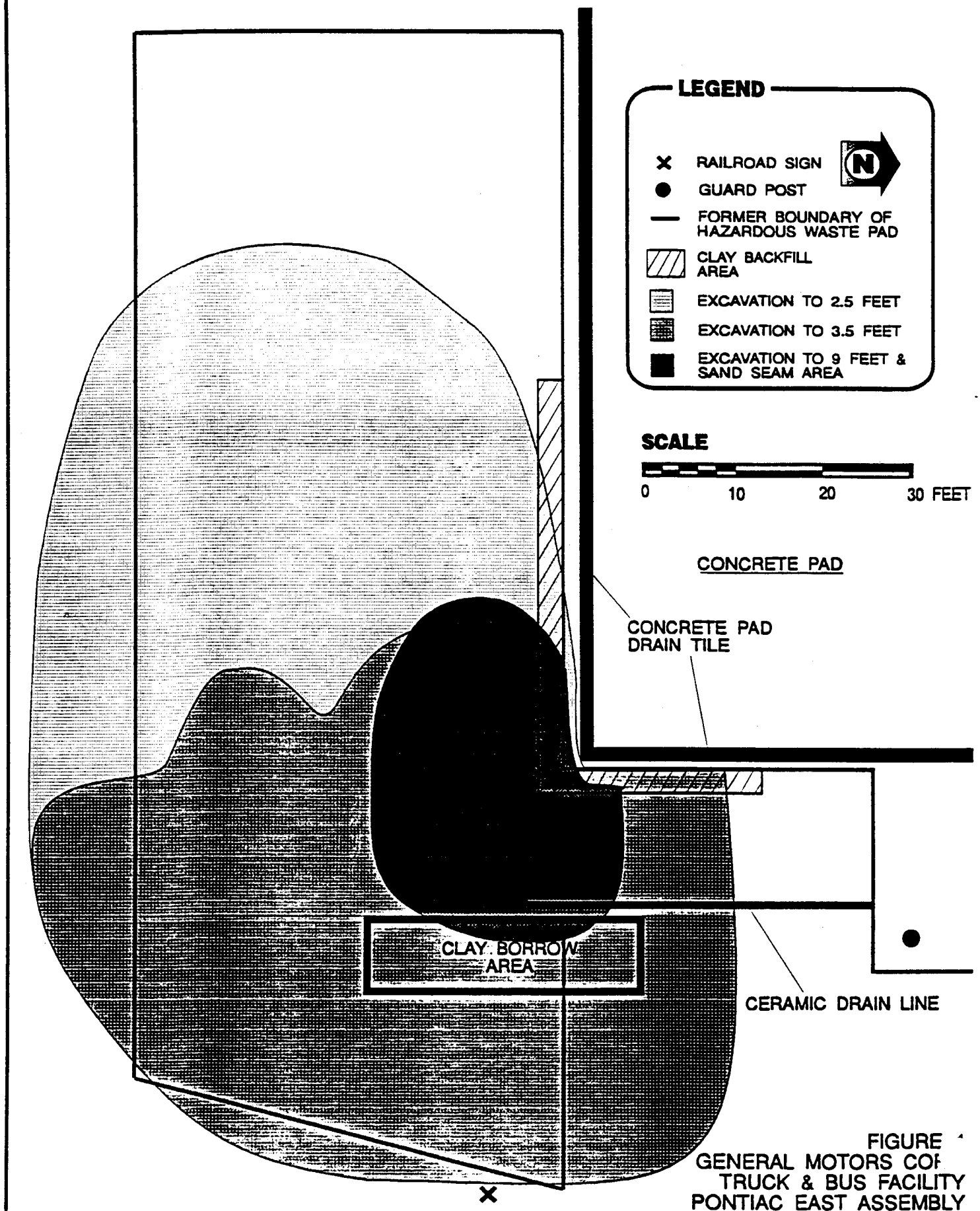


FIGURE
GENERAL MOTORS CO
TRUCK & BUS FACILITY
PONTIAC EAST ASSEMBLY
PONTIAC, MI

C-E ENVIRONMENTAL, INC.

2.6.3 Use of Field Organic Vapor Monitor

During excavation procedures, C-EE personnel collected photoionization meter volatile organic readings of the soils to be excavated using an Organic Vapor Monitor (OVM) Model 580A, manufactured by Thermo-Environmental. Soils which exhibited readings on the OVM above background/ambient readings were excavated by Inland for disposal. Soils not exhibiting detectable levels of volatile organic constituents on the OVM were left in place. OVM readings were also collected for each soil sample submitted for confirmatory and ignitability testing. The OVM was used during all three excavation phases as a means of delineating the extent of excavation. The unit was calibrated on a daily basis using isopropylene vapors at a concentration of 110 parts-per-million as a standard.

2.6.4 Sampling of Contaminated Soils for the Characteristic of Ignitability

Loadout samples of the contaminated soil were collected from each of the rolloff boxes/dump trains used over the course of the project. Each sample collected was a composite of soils placed into each transport vehicle. In accordance with the work plan and the MDNR letter dated January 10, 1990, each sample collected from the transport vehicles was analyzed for the characteristic of ignitability to determine if the waste soils were to be managed as hazardous wastes. National Environmental Testing Laboratories, Inc. (NET) in Pontiac, Michigan performed the ignitability tests on the loadout samples. A total of 44 samples were submitted for ignitability testing. As presented in Table 1, none of these samples exhibited the characteristic of ignitability.

2.6.5 Cleanup Confirmation Sampling Results

At the conclusion of excavation procedures for each excavation phase, C-EE personnel collected cleanup confirmation grab samples from the perimeter sidewalls of the excavation and composite samples from the various floor levels of the excavation. The location of confirmatory samples collected after the first, second and third excavation phases are shown in Figures 1, 2, and 3, respectively. Repeat samples of the second phase confirmation samples were also collected, and are indicated in Figure 2. Confirmatory samples were collected using a stainless steel sampling spoon or a shovel. Sampling equipment was washed in a trisodium phosphate solution and rinsed with water between each sampling event. To help prevent the release of potential volatiles in the soil samples, composite samples from the floor of the excavation were not mixed prior to placement in the sampling jars. Grab soil samples from the sidewalls of the excavation included soils from the top to the base of the excavation. All soil samples were packed in coolers with frozen cold-packs for delivery to the laboratory.

The confirmatory soil samples were analyzed for benzene, ethyl benzene, toluene, and xylene (BTEX) by USEPA Method 8020 (SW-846). The analytical results of the soil samples are shown in Table 2. Unless noted, the level of detection for all samples analyzed was 0.010 mg/kg. Field data sheets for the collected samples are shown in Appendix E. All of the confirmatory samples designated CS and SCS were analyzed by NET. Four duplicate SCS samples and all of the samples designated TCS were analyzed by C-EE's laboratory in Camarillo, California. This C-EE laboratory participates in the EPA's Contract Laboratory Program (CLP).

As shown in Table 2, total xylenes above the level of detection and ranging from 0.021 to 5.500 mg/kg were observed in all ten of the first phase excavation confirmatory samples submitted for analysis. Ethyl benzene and toluene ranging from 0.044 to 1.200 mg/kg and 0.012 to 0.490, respectively, were also observed in the samples CS-1 (2/26), CS-6 (2/28), CS-7 (2/28), CS-8 (2/26), CS-9 (2/26), and CS-10 (2/26). Benzene was not detected in any of the soil samples. Ethyl benzene and toluene were not detected in samples CS-2 (2/26), CS-3 (2/26), CS-4 (2/26), CS-5 (2/28).

Because the OVM did not detect any volatile organics in the soils sampled during excavation procedures, and no odors were observed, the presence of the elevated levels of ETX constituents observed in the confirmatory soil samples were difficult to explain. Possible causes include a) migration of the ETX contaminants from

TABLE 1
LOADOUT SAMPLE RESULTS FOR IGNITABILITY
GM TRUCK AND BUS PONTIAC EAST ASSEMBLY
Pontiac, Michigan

SAMPLE DESCRIPTION	DATE SAMPLED	IGNITABILITY (FLASH POINT)
PHASE I		
Rolloff 1	2/12/90	> 200 (Degrees F)
Rolloff 2	2/12/90	> 200 (Degrees F)
Rolloff 3	2/20/90	> 200 (Degrees F)
Rolloff 4	2/21/90	> 200 (Degrees F)
Dump Train #5	2/21/90	> 200 (Degrees F)
Dump Train #6	2/22/90	> 200 (Degrees F)
Dump Train #7	2/22/90	> 200 (Degrees F)
Dump Train #8	2/22/90	> 200 (Degrees F)
Dump Train #9	2/22/90	> 200 (Degrees F)
Dump Train #10	2/23/90	> 200 (Degrees F)
Dump Train #11	2/23/90	> 200 (Degrees F)
Dump Train #12	2/23/90	> 200 (Degrees F)
Dump Train #13	2/23/90	> 200 (Degrees F)
Dump Train #14	2/28/90	> 200 (Degrees F)
Dump Train #15	2/28/90	> 200 (Degrees F)
Dump Train #16	2/28/90	> 200 (Degrees F)
Dump Train #17	2/28/90	> 200 (Degrees F)
PHASE II		
Dump Train #1	3/12/90	> 200 (Degrees F)
Dump Train #2	3/12/90	> 200 (Degrees F)
Dump Train #3	3/12/90	> 200 (Degrees F)
Dump Train #4	3/12/90	> 200 (Degrees F)
Dump Train #5	3/13/90	> 200 (Degrees F)
Dump Train #6	3/13/90	> 200 (Degrees F)
Dump Train #7	3/13/90	> 200 (Degrees F)
Dump Train #8	3/13/90	> 200 (Degrees F)
Dump Train #9	3/13/90	> 200 (Degrees F)
Dump Train #10	3/13/90	> 200 (Degrees F)
Dump Train #11	3/14/90	> 200 (Degrees F)
Dump Train #12	3/14/90	> 200 (Degrees F)
Dump Train #13	3/14/90	> 200 (Degrees F)
Dump Train #14	3/14/90	> 200 (Degrees F)
Dump Train #15	3/14/90	> 200 (Degrees F)
Dump Train #16	3/14/90	> 200 (Degrees F)
Dump Train #17	3/14/90	> 200 (Degrees F)
Dump Train #18	3/14/90	> 200 (Degrees F)
Dump Train #19	3/14/90	> 200 (Degrees F)
Dump Train #20	3/14/90	> 200 (Degrees F)
Dump Train #21	3/14/90	> 200 (Degrees F)
Dump Train #22	3/14/90	> 200 (Degrees F)
Dump Train #23	3/14/90	> 200 (Degrees F)
PHASE III		
Dump Train #24	3/28/90	> 200 (Degrees F)
Dump Train #25	3/28/90	> 200 (Degrees F)
Dump Train #26	3/28/90	> 200 (Degrees F)
Dump Train #27	3/28/90	> 200 (Degrees F)

TABLE 2
CLEANUP CONFIRMATION ANALYTICAL RESULTS
GM TRUCK AND BUS PONTIAC EAST ASSEMBLY
Pontiac, Michigan

SAMPLE/DATE COLLECTED	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	LIMIT OF DETECTION
CS-1 (2/26/90)	< 0.010	0.250	0.057	2.300	0.010
CS-2 (2/26/90)	< 0.010	< 0.010	< 0.010	0.130	0.010
CS-3 (2/26/90)	< 0.010	< 0.010	< 0.010	0.070	0.010
CS-4 (2/26/90)	< 0.010	< 0.010	< 0.010	0.048	0.010
CS-5 (2/28/90)	< 0.010	< 0.010	< 0.010	0.021	0.010
CS-6 (2/28/90)	< 0.010	0.910	0.490	5.500	0.010
CS-7 (2/28/90)	< 0.010	0.044	0.021	0.530	0.010
CS-8 (2/26/90)	< 0.010	0.048	0.012	0.140	0.010
CS-9 (2/26/90)	< 0.010	1.200	0.150	5.200	0.010
CS-10 (2/26/90)	< 0.010	0.097	0.095	0.270	0.010
CS-1 (3/12/90)	< 0.010	< 0.010	< 0.010	0.050	0.010
CS-2 (3/12/90)	< 0.010	< 0.010	< 0.010	0.034	0.010
CS-3 (3/12/90)	< 0.010	< 0.010	< 0.010	0.048	0.010
CS-4 (3/13/90)	< 0.010	< 0.010	< 0.010	0.040	0.010
CS-5 (3/14/90)	< 0.010	< 0.010	< 0.010	0.035	0.010
CS-6 (3/14/90)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
CS-7 (3/14/90)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
CS-8 (3/13/90)	< 0.010	0.025	0.013	0.110	0.010
CS-9 (3/13/90)	< 0.010	0.012	< 0.010	0.240	0.010
CS-10 (3/13/90)	< 0.010	< 0.010	< 0.010	0.025	0.010
SCS-1	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-2	< 0.010	1.800	0.011	9.400	0.010
SCS-3	< 0.010	0.019	0.400	0.110	0.010
SCS-4 *	< 0.010	0.017	0.980	0.120	0.010
SCS-4 ** (Duplicate)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-7	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-8 *	< 0.010	0.016	< 0.010	0.081	0.010
SCS-8 ** (Duplicate)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-9 *	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-9 ** (Duplicate)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-10 *	< 0.010	< 0.010	< 0.010	0.016	0.010
SCS-10 ** (Duplicate)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-100 (Background)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-200 (Dup of SCS-9)	< 0.010	< 0.010	< 0.010	< 0.010	0.010
SCS-300	0.046	0.017	0.046	0.140	0.010
TCS-2	< 0.001	0.001	0.040	0.010	0.001
TCS-3	< 0.001	< 0.001	< 0.001	< 0.001	0.001
TCS-4	< 0.001	< 0.001	< 0.001	< 0.001	0.001
TCS-5	< 0.001	0.034	0.028	0.011	0.001
TCS-8	< 0.001	< 0.001	< 0.001	< 0.001	0.001
TCS-9	< 0.001	< 0.001	< 0.001	< 0.001	0.001
TCS-10	< 0.001	< 0.001	< 0.001	< 0.001	0.001
TCS-100 (Duplicate of TCS-8)	< 0.001	0.0011	0.0073	0.0014	0.001

Notes:
1. All concentrations in mg/kg (parts per million).
2. * - Sample analyzed by National Environmental Testing, Inc., Pontiac, Michigan.
3. ** - Duplicate sample analyzed by C-E Environmental Laboratory, Camarillo, California.

"hot" sources to excavated areas via excavation equipment or foot-traffic tracking, b) carryover by precipitation/water which collected in the excavation area during the time between when OVM readings and confirmatory samples were collected (in the case of the CS-1 through CS-4 samples, this was over one week), c) laboratory error, and/or d) the continued migration of contaminants from the tank farm located north of the waste storage area via the drainage ditch located east of the waste storage area (in proximity to the sample locations of CS-1 and CS-2) and the stormwater drainage line and associated backfill sands (in proximity to the sample locations CS-6, and CS-7).

Based on the relatively high levels of volatile organics observed in the first phase confirmatory samples (most notably samples CS-6 and CS-9), additional soil excavation in the area formerly occupied by the waste storage area was deemed necessary by GMC-PEA.

The results of the confirmatory samples collected at the completion of the second phase of soil excavation are presented in Table 2. As the results show, detectable levels of total xylene ranging from 0.025 to 0.240 mg/kg were detected in all of the second phase excavation confirmatory samples with the exception of CS-6 (3/14) and CS-7 (3/14). Additionally, ethyl benzene was detected in sample CS-8 (3/13) at 0.025 mg/kg and in CS-9 (3/13) at 0.012 mg/kg; and toluene was observed in sample CS-8 (3/13) at 0.013 mg/kg. Though these contaminant levels are approximately two orders of magnitude less than those observed for the first phase excavation confirmatory samples, their presence was again unexplainable.

In an effort to confirm the presence of the contaminants in the soil samples and assess the reliability of the analytical results, the second phase excavation confirmatory samples (except for CS-6) were re-collected and resubmitted for BTEX analysis at NET, and four duplicate samples were submitted to C-EE's laboratory in Camarillo, California. A background soil sample collected approximately 200 feet south of the waste storage area was also collected.

The analytical results for these samples are shown in Table 2. As shown in the table, the analytical results for the repeated samples differ from the original results of the second phase excavation confirmatory results. Most notably, the levels of contaminants observed in the SCS-2 sample were over two orders of magnitude higher than those observed in the CS-2 sample; the levels of contaminants observed in the SCS-3 and SCS-4 samples were approximately one order of magnitude higher than those levels observed in samples CS-3 and CS-4, respectively; and no detectable levels of BTEX were observed in samples SCS-1 and SCS-9 (whereas total xylenes were detected in the CS-1 and CS-9 samples, respectively). No detectable levels of BTEX were observed in the background sample (SCS-200).

Duplicate samples of SCS-4, SCS-8, SCS-9, and SCS-10 were submitted to C-EE's laboratory. No detectable levels of BTEX were observed in these samples, in contrast to the NET obtained analytical results for SCS-4, SCS-8, and SCS-10.
Though contradictory analytical results were obtained during the second phase excavation confirmatory sampling events, GMC-PEA made the decision to proceed with excavation procedures in those sample areas were elevated levels of volatile organic contamination was observed (in proximity to SCS-2, SCS-3, SCS-4, SCS-5, and the base of the excavation).

The analytical results for the cleanup confirmation samples collected at the conclusion of this third excavation phase are shown in Table 2. Two of the samples collected, TCS-2 and TCS-5, exhibited relatively low levels (less than 0.050 mg/kg) of ethyl benzene, toluene, and total xylenes. Both of these samples were collected from locations outside the area formerly occupied by the hazardous waste storage containment pad. The duplicate sample of TCS-8 (TCS-100) exhibited detectable ETX but all at levels less than 0.010 mg/kg. No detectable levels of BTEX were observed in the other TCS samples collected.

As shown in Figure 3, the TCS-2 and TCS-5 samples were collected from locations located outside the lateral extent of the former waste storage area containment pad. These two samples were collected in proximity to

a drainage ditch leading from the tank farm area and the drain tile pipe believed to service the concrete driveway and tank farm area, respectively. The source of contaminants in these two samples will be addressed by GMC-PEA in conjunction with its future dismantlement of the tank farm area. In an effort to prevent the potential migration of contaminants from the tank farm area, GMC-PEA constructed a trench drain system along the northern perimeter of the excavation, and an enhanced drainage system along the eastern perimeter of the excavation.

The portions of the Waste Storage Area which were excavated during the removal of the concrete pad and the subsequent clean-up activities were backfilled during the period of April 23 through 30, 1990, by the Inland Group of Detroit, Michigan. All of the excavated areas were backfilled with clean sand with the exception of the north edge of the Waste Storage Area where a clay wall was installed. The clean sand was compacted to a minimum of 95 percent maximum dry density, and the clay to 90 percent maximum dry density, as determined by using optimum moisture-maximum density curves in accordance with ASTM D 1557. The field densities of each lift of sand and clay backfill were checked by GZA Inc. of Livonia, Michigan, by using a nuclear moisture-density device.

3.0 CONCLUSION

In summary, GMC-PEA has undertaken the closure of its hazardous waste storage area. Events and activities associated with the closure of this hazardous waste storage area included power-washing and removal of the storage area's aboveground storage tanks and concrete containment pad, and the removal and disposal of contaminated soils observed below the area formerly occupied by the concrete containment pad.

The closure activities were conducted in accordance with the "Hazardous Waste Storage Facility Closure Plan" dated December 1987 and approved by the MDNR's Waste Management Division (WMD) for implementation on March 7, 1988. Closure activities were also performed in accordance to the "Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area," dated September 21, 1989 and approved, with modifications, by the WMD in its letter dated October 5, 1989.

Based on the information provided above in Section 2.0 and the documentation presented in the Appendices, the closure of the Pontiac East Assembly hazardous wastes storage area is deemed complete.

Volatile organic contaminants observed in two of the samples collected during the final phase of confirmatory sampling procedures have been attributed to the nearby tank farm area to the north. The source of contaminants in these two samples will be addressed by GMC-PEA in conjunction with its future dismantlement of the tank farm area. In an effort to prevent the potential migration of contaminants from the tank farm area, GMC-PEA constructed a trench drain system along the northern perimeter of the excavation and an enhanced drainage system along the eastern perimeter of the excavation. Additionally, compacted, clays were placed along the northern perimeter of the excavated area as an additional barrier to contaminant migration from the existing tank farm area.

APPENDIX A

HAZARDOUS WASTE STORAGE FACILITY CLOSURE PLAN

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
MARLENE J FLUHARTY
KERRY KAMMER
O. STEWART MYERS
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STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

GORDON E. GUYER, Director

March 7, 1988

Mr. D. S. Harrett
Environmental Engineering
GMC - Truck & Bus Group
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Harrett:

SUBJECT: Revised Closure Plan
Truck & Bus Central and East Plants
MID 005 356 902

The Michigan Department of Natural Resources (MDNR) has completed a review of your revised closure plan dated December 2, 1987, pursuant to the requirements of 40 CFR, Part 265, which are adopted by reference in MAC R 299.11003 of the Act 64 administrative rules. Based on this review, and the fact that no significant comments were received during the 30-day public comment period, the MDNR hereby approves your closure plan subject to the conditions enclosed with this letter.

Closure of RCRA interim status units does not release the facility from its responsibilities under the Hazardous and Solid Waste Amendments of 1984 (HSWA). All interim status facilities are subject to the corrective action requirements of these amendments.

If you have any questions, please contact Ms. Andrea Schoenrock, of my staff, at 517-373-3988.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-2730

cc: Ms. Becky Kocsis, MDNR
Ms. Andrea Schoenrock, MDNR
Mr. Ken Burda/C&E File
Ms. Lynne King, MDNR
Ms. Carol Witt, U.S. EPA
Ms. Marilyn Sabadaszka, U.S. EPA

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ATTACHMENT TEN D

Truck & Bus Group

Truck & Bus Gro
General Motors Corporat
31 Judson Ste
Pontiac, Michigan 480

December 2, 1987

Michigan Department of Natural Resources
Waste Management Division
P.O. Box 30028
Lansing, MI 48909

Attn: Andrea Schoenrock

Dear Ms. Schoenrock:

Enclosed is a revised closure plan for the waste management areas at our Pontiac Central and East plants.

Per your request, the DNR offices will be notified in advance of key events in the closure activities.

If you have any questions, please call me at (313) 456-7529.

Very truly yours,

D. S. Harrett

D. S. Harrett
Environmental Engineering
Pontiac Central Mfg. & Assy.

DSH/dg

Enclosure

CPE17.008

HAZARDOUS WASTE STORAGE FACILITY
CLOSURE PLAN

FOR

TRUCK & BUS GROUP
PONTIAC CENTRAL PLANT
PONTIAC EAST PLANT

EPA #MID005356902

SEPTEMBER, 1987

CPE15.036

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APPENDICES

Appendix A Pontiac Central and East Plants - Annual Waste Summaries

Appendix B Waste Characterizations

1.0 Introduction

This closure plan describes the methods and sequence of events necessary to close (2) hazardous waste management areas at Truck & Bus - Pontiac Central and East plants. The following plan was developed in accordance with 40CFR 265.111 - 265.115 and Michigan Act 64 Rule R299.9613.

1.1 Background

General Motors Truck & Bus - Pontiac Submitted a RCRA Part A application to the EPA on November 17, 1980 for treatment of hazardous wastes on site, storage of hazardous wastes on site over 90 days, and/or receipt of hazardous wastes from off site. In April, 1985, Truck & Bus - Pontiac Central and East submitted a part B application. On July 1, 1987, the plant requested withdrawal of the part B application after determining that the additional operating latitude afforded by permitted status was not needed: no hazardous wastes require treatment on site, storage over 90 days is not necessary for economical disposal, and all Pontiac Truck & Bus plants manage their hazardous wastes independently, so receipt from off site is not required. When final closure is accomplished Truck & Bus - Pontiac Central will continue its waste management activities under 40CFR262 and Act 64 Part 3 (Generator) rules.

1.2 Purpose and Scope

The purpose of this closure plan is to provide documentation of compliance with 40 CFR 265.111, closure performance standard, which states that an owner or operator of a hazardous waste management facility must close his facility in a manner which:

- Minimizes the need for further maintenance.
- Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

The scope of this closure plan includes the following waste management units operated at the Truck & Bus - Pontiac Central and East plants:

- Central plant containerized and bulk waste management pad (storage of listed hazardous wastes).
- East plant container and tank waste management area (storage of listed hazardous waste).

This closure plan describes the steps necessary to remove waste and waste residue from regulated waste management units, decontaminate facility equipment, and document closure. Estimates are also included for the maximum hazardous waste inventory, closure schedule, and final closure date.

2.0 General Facility Information

2.1 Facility Name and Location

Name - General Motors Corporation
Truck & Bus Group
Pontiac Central Mfg. & Assy. / Pontiac East Assembly
Address - 660 S. Boulevard East / 820 S. Opdyke Rd.
Pontiac, Michigan 48053
Facility Contacts
Central - Mr. Dan Harrett
(313) 456-7529
East - Mr. Ken Gembel
(313) 452-2781
EPA ID# - MID005356902

2.2 Facility Description

The General Motors Truck & Bus Group - Pontiac Central and East plants are located in the southeast corner of Pontiac, on a property bounded by South Boulevard on the North, Opdyke Road on the East, East Boulevard on the West, and the Grand Trunk Western Railroad Tracks on the South. Geographical coordinates are the northeast, northwest and southeast 1/4 of section 03, tier 2 north, range 10 east. The facility occupies some 400 acres, of which less than one acre is dedicated to hazardous waste management. A map of the plant property is given as figure 2-1.

2.3 Waste Characteristics

2.3.1 Wastes Managed in Central Plants Waste Management Pad

The Central plants waste management pad receives non-hazardous paint sludges in bulk from all three Truck & bus - Pontiac plants, solidifies them with lime as needed, and loads them into 35 yard licensed hazardous waste hauling vehicles for shipment (by plant preference) to a licensed hazardous waste landfill. Laboratory analyses show this waste stream to be consistently non-hazardous. In addition, wastewater treatment sludges were managed in bulk here while they were under a temporary delisting, and are now managed in 15 yard licensed rolloff boxes as a F019 listed waste. (This waste stream was listed as F006/F019 until the F006 listing was revised to exclude phosphating in December, 1986.)Parked road tankers on this pad are used to store non-hazardous oils and glycol. Containers of waste paint and solvent (listed wastes F003, F005) chlorinated solvents (listed waste F001), and non-hazardous oils are brought to the pad from the plant to be emptied and consolidated in the appropriate bulk tank here or at the Pontiac East facility (described in the next section). Incompletely emptied containers of non-hazardous adhesives and sealers are brought to this pad to be emptied and the residue consolidated with the paint sludges. Pebble lime is stored in a pile on the pad and is used as required to solidify

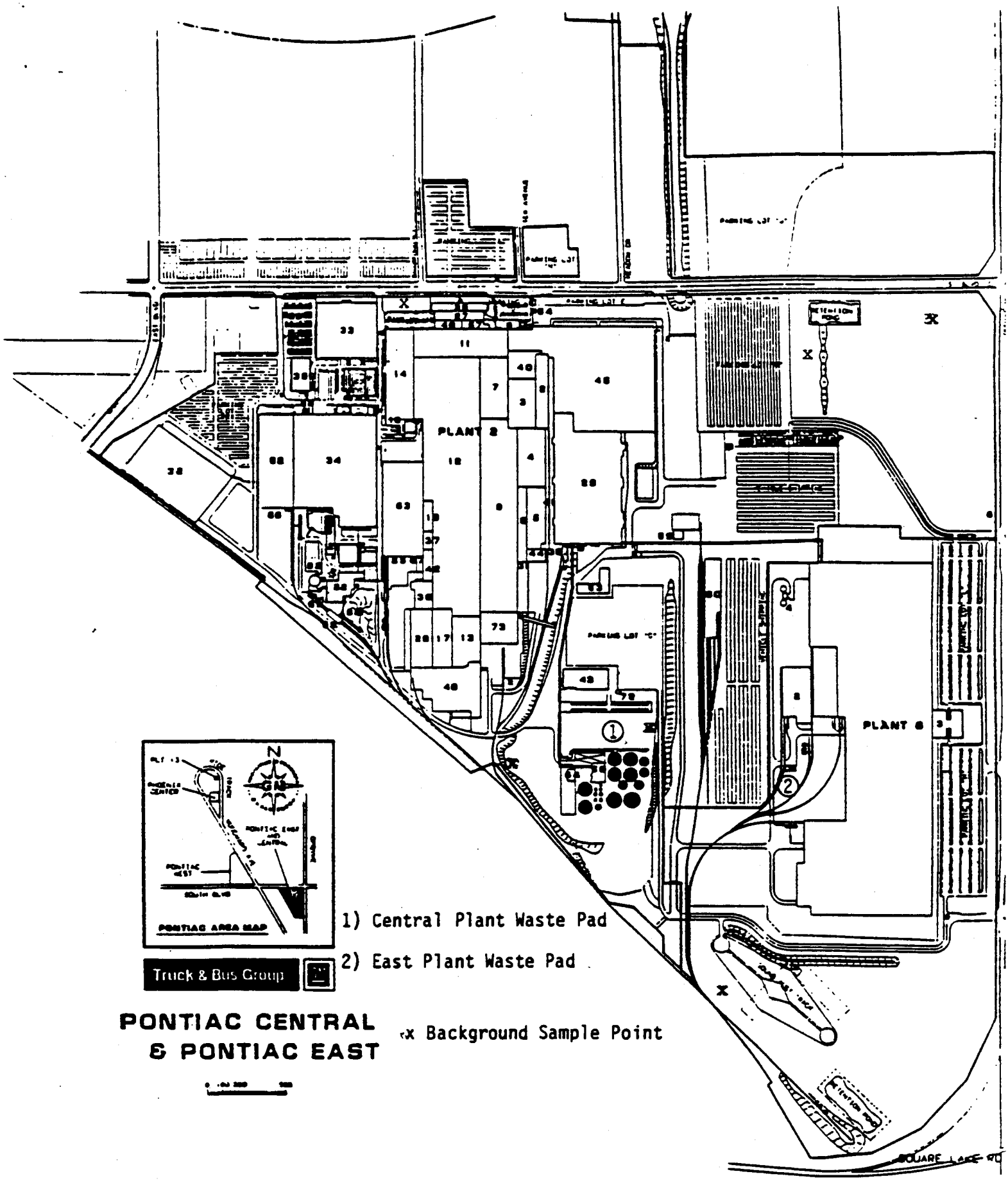


Fig. 2-1 Facility Map

the sludges to meet the acceptance criteria of the disposal facility. All transporting vehicles are owned by contract haulers, who decontaminate the vehicle prior to its return to this facility.

The Pontiac Central waste management pad consists of a 12,543 square foot, 8 inch thick concrete area constructed in 1980, reinforced with PVC waterstop in all joints. Two drains carry precipitation and free liquids into the adjoining wastewater treatment plant; this plant in turn discharges to the City of Pontiac POTW and is beholden to its discharge limitations. (No discharge excursions of any sort have occurred; therefore it may be concluded that runoff from hazardous waste operations may be properly handled in the wastewater treatment system.) Recent inspections of this facility indicate it to be in excellent condition with no apparent cracks or other evidences of failure.

2.3.2 Wastes Managed in the East Plant Waste Management Pad

The East Plant waste management pad received drummed waste paints, solvents, chlorinated solvents, non-hazardous sealers and adhesives, and empty drums generated in the East Plant until the end of 1984. At that time the plant shut down for retooling and the production operations were relocated to the Central plant. A new waste management pad was constructed at Pontiac East to be operated as an accumulation facility and the old waste management pad was converted to secondary containment for hazardous waste tanks being used by Pontiac Central plants. These tanks were relocated from another containment area (since closed and covered by a building expansion). These tanks are presently used for waste paint and waste solvent (listed wastes F003, F005). With the activation of a new tank group at Pontiac Central these tanks will be idled; neither Pontiac Central nor Pontiac East plants foresee reusing this installation.

The Pontiac East pad consists of a 4,500 square foot irregular concrete slab. During its use as a container management area it had 4 inch curbing all around; the diking was raised to 18" to provide tank secondary containment. The age and details of construction of this pad are not known but it serviced a plant constructed in 1972; visual inspection indicates it to be in excellent condition.

Previous hazardous wastes brought to this area in drums include:

1) Waste paints - F003, F005, D001
2) Waste solvents - F003, F005, D001
3) Chlorinated solvents - F001

Some containers of hazardous wastes may have remained in this area over 90 days. All containerized waste has long since been removed from this containment area; as noted previously its present use is solely as secondary containment for two hazardous waste storage tanks. These tanks have not leaked or overflowed since their installation in this area. The tanks are freestanding, with no associated pumps or piping.

2.4 Estimated Maximum Hazardous Waste Inventory

The following table lists the expected maxima of hazardous wastes to be found in either containment area. These maxima may not represent the current quantities stored as waste removal activities are ongoing.

Hazardous Waste	Tank/Container/Bulk	Central Pad	East Pad
CWT Sludge (F019)	Container	30 YD^3	-
Waste Paint (F003/ F005)	Tank	-	12,000 gal.
Waste Paint (F003/ F005)	Container	1,000 gal.	-
Waste Solvent (F003/ F005)	Tank	-	12,000 gal.
Waste Solvent (F003/ F005)	Container	1,000 gal.	-
Other Wastes			
Paint Sludges	Bulk	40 YD^3	-
Waste Oil	Tank	Gal.	-
Waste Glycol	Tank	Gal.	-
Waste Sealers/Adhesives	Bulk	5 YD^3	-

3.0 Closure Methods

3.1 Central Plants Waste Management Pad

The Central plants waste management pad will continue in use as an accumulation facility; therefore, closure will entail removal of wastes and investigation only to the extent necessary to determine whether contamination has escaped the confines of the facility. If contamination is found outside the waste management area, closure will then encompass sampling, testing and removals as appropriate to define and abate the contaminated areas. As the production operations are dependent on this facility, half the area will be investigated, remediated and restored at a time. When closure is complete, the entire facility will be returned to operation.

3.2 East Plant Waste Management Pad

The East plants waste management pad will undergo decontamination sampling, testing and remediation as appropriate to render the area clean. Closure will be final; there are no plans to reactivate this facility in any capacity. The tanks will be decontaminated and stored for future reuse; the concrete will be cored and if contamination is found, excavated as necessary to define and abate any contamination. Restoration of any excavated areas following decontamination is at the option of Pontiac East Assembly and is not within the scope of this closure plan.

4.0 Decontamination Methods

4.1 Central Plants Waste Management Pad

The Pontiac Central waste management pad is to be divided into two sections by a concrete wall; this wall will serve as a barrier between the covered and open areas of the facility and will form the division between areas of investigation and closure activity: half the area will undergo closure while the other half remains active. Following is the decontamination method for either half.

All loose material will be removed by shoveling or scraping and disposed of in the same manner as paint sludge, i.e., secure landfill by preference. Following this, cleaning will proceed using high pressure or ultrahigh pressure water. The collected liquid will be disposed of to the wastewater treatment plant which routinely receives runoff from this area. Cleaning will be repeated until no solids appear in samples of the wash water. At this point the liquid from the cleaning activity will be sampled and analyzed for volatile organics, lead and chromium (VI) using the EPA methods described in Section 4.3. The pad will be considered clean when lead and chromium (VI) in the rinsate is not statistically above soil background, and volatile organic constituents are below detection limits. (Although cyanide is also a listed constituent of F019 sludges, no cyanide has been used in any process at Pontiac Central since 1967. The area being decontaminated dates from 1980; therefore, no cyanide was introduced to the pad.)

Soils underlying the waste management pad will be sampled by coring the concrete at the low points in each section of the pad. These low points will be adjacent to the drains in each section. Inspection of the pad for cracks or other evidence of loss of integrity will determine if other locations are to be sampled. The soil sampling procedure is described in section 5.1.2.

All sampling and handling procedures will be consistent with SW-846, Test Methods for Evaluating Solid Wastes (2nd edition).

4.2 East Plant Waste Management Area

The tanks at the Pontiac East facility will be emptied of all pumpable contents, then waterblasted to remove adhering residue using ultrahigh pressure equipment. Liquids generated by the cleaning process will be collected for disposal as an F003/F005 waste. The tank interior will be considered clean when volatile organic compounds in the rinsate are nondetectable. The tanks have no associated pumps or piping to be decontaminated. Following the cleaning of the tanks the concrete containment pad will be cleaned using high pressure water; the liquids collected will be disposed to the central wastewater system as was done for the Central plants waste management pad. Scrubbing will be repeated until no further residue can be collected. The liquid

collected will be analyzed for volatile organics, lead and chromium (VI) using EPA test methods described in section 4.3. The concrete will be considered clean when lead and chromium (VI) in the rinsate is not statistically above soil background at the 95% confidence level, and volatile organic compounds are below detection limits. All sampling and handling procedures will be in accordance with EPA SW-846, 'Test Methods for Evaluating Solid Waste' (second edition). Soils underlying the waste management pad will be sampled by coring the concrete at the indicated grid locations.

4.3 Test Methods

Analytical methods to be used to document decontamination are as follows:

Parameter	Test Method
Lead	SW-846 Method 7420 or 7421
Chromium (VI)	SW-846 Method 7195, 7196 or 7197
Volatile Organic Compounds	SW-846 - 8010, EPA Method 601
	SW-846 - 8020, EPA Method 602

5.0 Closure Documentation

5.1 Central Plants Waste Management Pad

Documentation of closure of the central plants waste pad will consist of the following:

- Documentation of pad decontamination.
- Documentation of removal of underlying soils shown to contain hazardous wastes or hazardous constituents.

Documentation of closure in these areas is designed to be consistent with MDNR's draft guidance document 'how clean is clean'.

5.1.2. Sampling of Underlying Soils

The sampling points are shown in figure 5-1. Owing to the small area involved, a maximum of nine samples will be collected. At a minimum, the samples will be drawn at the lowest point in each area, with additional samples taken at cracks if any are found to be present following cleaning. Soil samples will be taken initially at the 0-.5 foot and .5-1.0 foot level. Samples will be taken with a hand auger through the concrete coring. Between samples the sampling auger will be decontaminated by scraping off adhering soils, washing with detergent and rinsing with distilled or deionized water. The following procedure will be used to analyze and interpret the soils samples obtained.

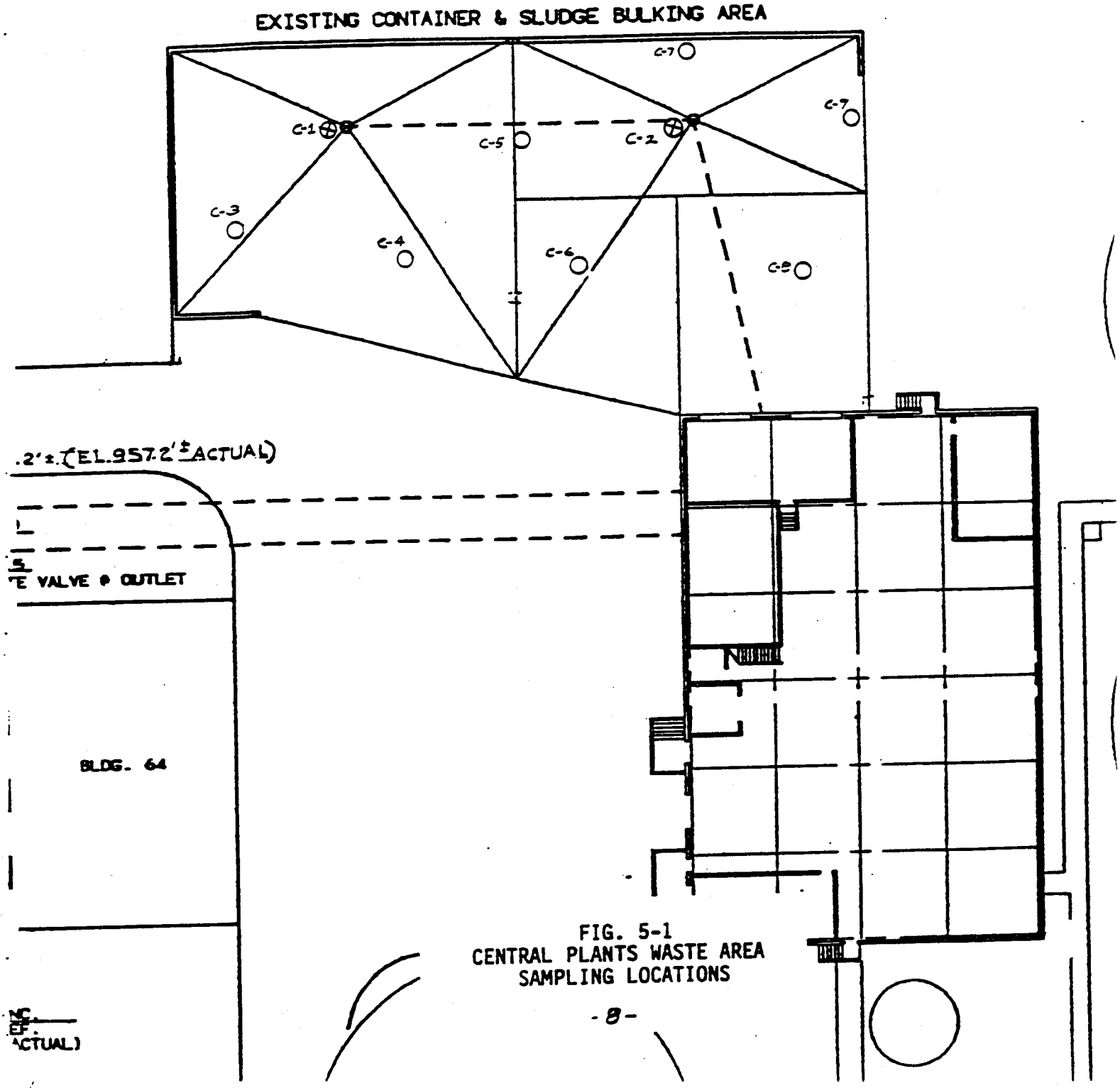


FIG. 5-1
CENTRAL PLANTS WASTE AREA
SAMPLING LOCATIONS

5.1.2 a Establishing Soil Background

Background soil parameters will be determined by samples taken at six background locations as indicated on Figure 2-1. The samples will be collected from approximately the same soil types and elevations as the soils underlying the pad. The background soil samples will be analyzed for total metals.

5.1.2 b Soils Analyses

These analyses may be performed on samples taken at the site:

- Total metals analyses for lead and chrome (VI)
- EP toxicity for lead and chrome (VI)
- Photoionization detection readings
- Volatile organics (methods 601 and 602)

Total metal concentrations of the underlying soils will be compared with the levels in the background samples to determine if contaminants have penetrated the concrete pad and impacted the underlying soils. Comparison will be by the Gossett Student's T-test at the 95% confidence level. This method is used to determine if a statistically significant difference exists between background soils and soils in areas at risk of contamination. If a statistically significant difference is found, soils impaction by contaminants will be presumed to have occurred. EP toxicity analyses of soils samples showing statistically elevated levels of metals will determine the disposition of impacted soils requiring removal. If the EP toxicity threshold levels are exceeded the soils will be removed and disposed as a hazardous waste. If the EP toxicity thresholds are not exceeded the soils will be removed and disposed as an Act 641 waste.

Photoionization detection (PID) readings will be taken at the site with a PID meter at the sampling location identified. The meter will be calibrated according to the manufacturer's recommendations. Readings will be taken on all samples from various depths at each location. Samples will be placed in sample jars and covered with foil. After 30 minutes the instrument probe will be inserted through the foil into the sample jar headspace and a reading taken.

If the samples taken at the shallowest depth indicate that volatile organics are present, samples will be taken from the next lowest level and tested in a like manner. The process will be repeated until a sample is obtained which yields a negative result with the PID meter. This sampling level will then be sampled using appropriate containers for volatile organics analysis (40 ml vials).

Laboratory VOA will be made using EPA method 601 for purgeable halocarbons hand method 602 for aromatic hydrocarbons. Samples taken will observe appropriate sample preservation and chain of custody practices.

The sample screening technique described above is designed to expedite the portion of the closure process devoted to definition of the scope of remediation, while still meeting the intent of MDNR's closure guidelines. This procedure will ensure that at least one sample from each sampling location undergoes analysis for volatile organics using EPA methods 601 and 602.

5.1.2 c Criteria for Determination of Scope of Removal

If the following criteria are all met the soil will be left in place:

- Volatile organic compounds using EPA methods 601 and 602 are nondetectable.

- Total lead and chrome (VI) are not statistically above background according to the Gossett Student's T-test.

If soils at any sampling plant fail either criteria they will be removed. Removal of soil around a contaminated point will be within a radius equal to the distance between adjacent boring locations. Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an act 641 waste. Soils contaminated with metals above EP toxicity limits or with volatile organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminants found in the previous level. If contaminants are found, additional soil removal will be performed. If no contaminants are found, cleanup is complete.

5.1.2 d Restoration of Concrete Containment

Since the Central plants waste management pad is to continue in service after decontamination, the facility will be restored following soils sampling and any soils removal. After all contamination has been removed, the underlying voids will be backfilled and compacted to original grade. Reinforcing mesh will be placed and the original concrete edges will be treated with an epoxy bonding agent, per the manufacturer's instructions, to ensure a seal between the new and existing concrete. Corings where no contamination was found will be repaired in a similar manner with the exception of reinforcing steel.

5.2 Pontiac East Waste Management Area

5.2.1 Decontamination of Tanks

The tanks at Pontiac East managed listed hazardous wastes (paint and solvents, EPA codes F003, F005). All pumpable waste will be removed and disposed of in the normal manner. Following this the

tanks will be cleaned three times using high pressure or ultrahigh pressure water. Liquids generated from the first cleaning at a minimum will be disposed of as a listed hazardous waste; waste from subsequent cleanings will be tested to determine its acceptability in the central wastewater treatment system. The tanks will be considered clean when the rinsate contains nondetectable levels of volatile organics as determined by EPA methods 601 and 602.

5.2.2 Cleaning of Containment Area

Following the tank cleaning the concrete containment area will be cleaned by high pressure water. The rinsate will be collected and analyzed for volatile organics using EPA methods 601 and 602. The concrete will be considered clean when volatile organics in the rinsewater are nondetectable by the above methods.

5.2.3 Sampling of Underlying Soils

The sampling locations are shown in figure 5-2. Owing to the small area involved a maximum of nine samples will be collected. At a minimum, samples will be collected in low areas and cracked or otherwise unsound locations of the containment area. Soils samples will be taken at 0-.5 feet and .5-1.0 feet below the bottom of the concrete slab. Samples will be taken with a hand auger through the concrete coring. Between samples the sampling auger will be decontaminated by scraping off adhering soils, followed by washing with detergent and rinsing with distilled or deionized water.

The following procedure will be used to analyze and interpret the soil samples obtained.

5.2.3 a Establishing Soil Background

Background soil parameters will be as determined from soil samples taken at six background locations as shown on Figure 2-1. The samples will be taken from approximately the same soil types and elevations as the soils underlying the pad. The background samples will be analyzed for total metals.

5.2.3 b Soils Analyses

These analyses may be performed on samples taken at the site.

- Total metals analyses for lead and chrome (VI).
- EP toxicity for lead and chrome (VI).
- Photoionization detection readings.
- Volatile organics (EPA methods 601 and 602)

Total metals concentrations of the underlying soils will be compared with the levels in the background samples to determine if contaminants have penetrated the concrete pad and impacted the

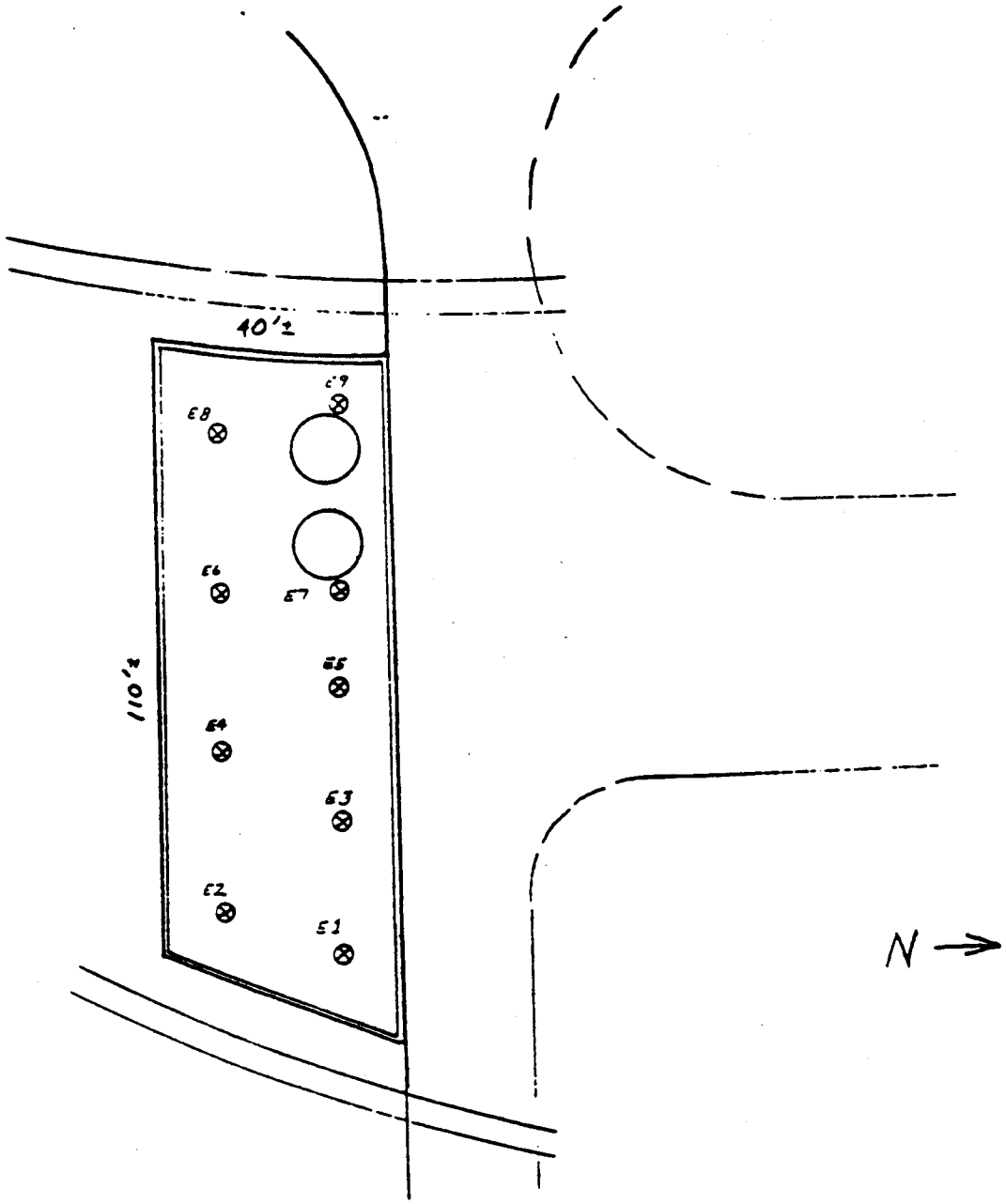


FIG. 5-2
EAST PLANT WASTE AREA
SAMPLING LOCATIONS

underlying soils. Comparison will be by the Gossett Student's T-test. This method is used to determine if a statistically significant difference exists between the background soils and soils in areas at risk of contamination. If a statistically significant difference is found, soils impaction by contaminants will be presumed to have occurred. EP toxicity analyses of soils showing statistically elevated levels of metals will determine the disposition of impacted soils requiring removal. If the EP toxicity thresholds are exceeded the soils will be removed and disposed of as a hazardous waste. If the EP toxicity thresholds are not exceeded the soils will be removed and disposed of as an Act 641 waste.

Photoionization detection (PID) readings will be taken at the site with a PID meter at each identified sampling location. The meter will be calibrated according to the manufacturer's recommendations. Readings will be taken on all samples from various depths at each location. Samples will be placed in glass sample jars and covered with foil. After 30 minutes the meter probe will be inserted through the foil into the sample jar headspeace and a reading taken.

If readings taken on samples from the shallowest depth indicate volatile organics are present, samples will be taken from the next lowest level and tested in a similar manner. The process will be repeated until a sample is obtained which yields a negative result with a PID meter. This sampling level will then be sampled will then be sampled using appropriate methods and containers for volatile organics analysis (40 ml glass vials).

Laboratory VOA will be made using EPA method 601 for purgeable halocarbons and EPA method 602 for aromatic hydrocarbons. Samples taken will observe appropriate sample preservation and chain of custody practices.

The sample screening technique described above is designed to expedite the portion of the closure process devoted to definition of the scope of remediation, while still meeting the intent of EPA's closure guidelines. The procedure will ensure that at least one sample from each sampling location undergoes analysis for volatile organics using EPA methods 601 and 602.

5.2.3 C Criteria for Determination of Scope of Removal

If the following criteria are all met the soils will be left in place:

- Volatile organics using EPA methods 601 and 602 are nondetectable.
- Total lead and chrome (VI) are not statistically above background according to the Gossett Student's T-test.

If soils at any sampling location fail either criteria they will be removed. Removal of soil around a contaminated area will be within a radius equal to the distance between adjacent boring locations.

Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an Act 641 waste. Soils contaminated with metals above EP toxicity limits or with organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminents found in the previous level. If contaminants are found, additional soil removals will be performed. If no contaminants are found, cleanup is complete.

As no reuse of this area is contemplated once closure is completed, restoration of the area is not within the scope of closure.

6.0 Decontamination of Equipment

Heavy equipment used in soils excavation will be cleaned with high pressure water in a contained area. The collected rinsate will be tested to determine its acceptability in the central wastewater treatment system. The equipment shall be considered clean when the rinsate contains nondetectable concentrations of volatile organics using EPA methods 601 and 602.

7.0 Closure Documentation Report

Upon completion of onsite closure activities GM Truck & Bus Pontiac will submit to MDNR a report documenting that closure activities were conducted according to the approved closure plan. The items addressed in the report will include all the applicable items in MDNR's 'draft certification closure checklist'. The documentation report will be signed and sealed by a registered professional engineer. Truck & Bus - Pontiac will also submit a letter to MDNR certifying that closure was completed according to the approved closure plan.

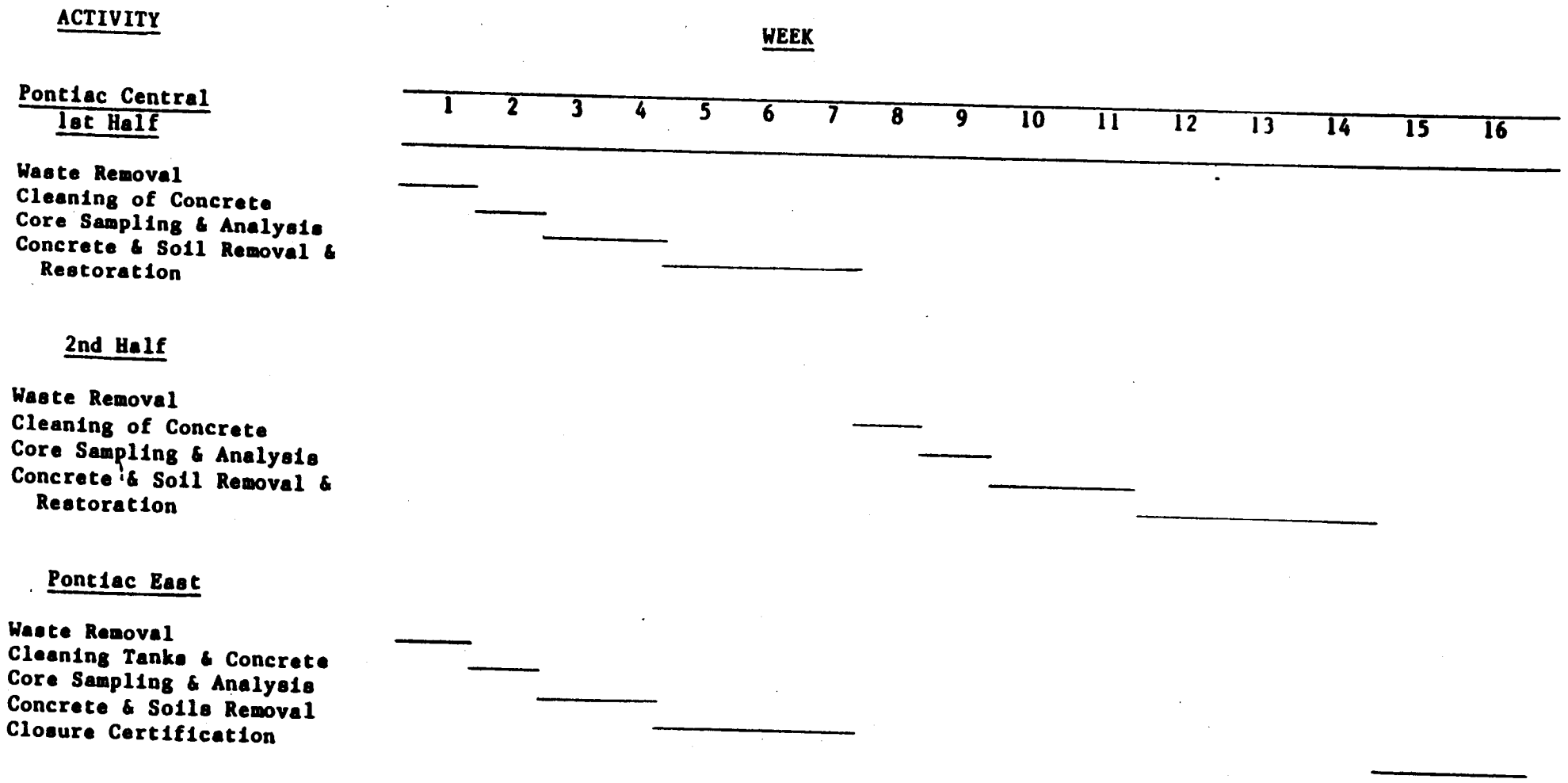
8.0 Estimated Closure Schedule

Truck & Bus - Pontiac will begin closure activity within 30 days of receipt of approval of the closure plan. The closure schedule detailed in figure 6-1 is predicated upon receipt of approval during a season when frost is not or will not become an impediment to closure sampling and remediation activities.

9.0 Closure Cost Estimate

The estimated cost to close the hazardous waste storage areas at Truck & Bus - Pontiac is estimated at $45,000 to $50,000. Table 6-2 details the costs associated with closure.

FIG. 6-1
CLOSURE SCHEDULE



cpel6.014

Table 6-2
Closure Cost Estimate

CENTRAL AND EAST

Item	Quantity	Per Unit	Total
Hazardous Waste Inventory Removal	-	-	(Included in Operating Costs)
Concrete Coring	18	50	900
Soil Sampling	(Lot)	1,200	1,200
Analyses			
VOA	25 Samples	200	5,000
Total Metals	18 Samples	150	2,700
EP Tox (Metals)	18 Samples	250	4,500
Tank Cleaning	(Lot)	3,000	3,000
Concrete Cleaning	(Lot)	2,500	2,500
Concrete Demolition	40 YD^3	80	3,200
Concrete Replacement	40 YD^3	250	10,000
Soil Removal / Disposal			
Nonhazardous	30 YD^3	40	800
Hazardous	10 YD^3	80	800
Closure Certification Report	(Lot)	4,500	4,500
Administrative Costs	5%		1,950
Contingency Costs	20%		7,800
			48,850
		1983 x 1.0354 =	50,600 (1989)

APPENDIX A

PONTIAC CENTRAL AND EAST PLANTS
ANNUAL WASTE SUMMARIES

1981-1986

LF 133 Rev.
Print. U.S.A.

HAZARDOUS & LI D WASTE DISPOSAL:

WASTE - 1981 TONS/MONTH	JAN.	FEB.	MAR. 3 MO. AVE	APR.	MAY	JUNE 6 MO. AVE	JULY	AUG.	SEPT. 9 MO. AVE	OCT.	NOV.	DEC. AVE. YR.	PREV YRS.
SLUDGE-WASTE TREAT (LANDFILL)	534.4	392.9	457.4 384.9	382.5	304.5	499.2 464.4	1067.3	843.3	609.6 [illegible]13.4	648.7	1135.7	662.2 676.5	[illegible]
SLUDGE-PAINT, GRIND ETC. (LANDFILL)	238.6	170.1	214.2 233.9	180.7	95.8	168.3 90.5	51.8	-----	118.0	-----	-----	88.4	
PAINT & SOLVENT (SOLIDIFIED)	105.4	59.0	81.1 78.9	46.1	55.8	71.3 82.7	57.1	-----	53.9	-----	-----	40.2	
PAINT & SOLVENT (INCINERATED)			-0-			-0-			8.7			26.6	
SOLVENT - PURGE (SOLD FOR RECLAIM)	-----	-----	-0-	-----	-----	-0-	19.0	-----	78.5 2.1	122.5	22.6	96.7 3.6	
SOLVENT-METH. CHLOR (SOLD FOR RECLAIM)			-0-			-0-			-0-	24.7	-----	.42	
VENT-1,1,1 TRICHLOR (SOLD FOR RECLAIM)									-----	5.1	-----		
YCOL & BRAKE FLUID (SOLD FOR RECLAIM)													
YCOL & BRAKE FLUID (INCINERATED)	-----	-----	-0-	-----	-----	-0-	-----	-----	-0-	95.3	-----	7.9	
OIL (SOLD FOR RECLAIM)	29.8	91.4	70.4 90.0	29.6	87.4	59.4 28.3	60.6	55.3	60.3 70.5	30.4	51.7	54.4 26.05	
OIL - (DRIED & FILTERED FOR REUSE)													
P.C.B. CAP & TRANS. (SECURE LANDFILL)	-----	1.0	0.3 -----	-----	.2	0.14 -----	-----	.08	0.1 -----	4.7	-----	0.66	
ASBESTOS (LANDFILL)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
CRUSHED PAILS & DRUMS (SOLD)	-----	-----	-0- -----	14.0	-----	0.3 -----	-----	-----	1.6	-----	-----	1.1	
OTHERS - (SEE REVERSE FOR DETAILS)			-0-			-0-	-----	185.2	62.8 317.6	45.0		50.5	
TOTAL	908.2	714.4	803.4 787.7	652.9	563.7	798.8 1165.9	1255.8	1083.8	917.0 1122.0	980.4	1210.0	936.9 799.2	
MANIFESTS & number/ CONTAINERS month													
MANIFESTS ISSUED — shipment/ total							45/54	31/43	45/48	33/55	38/52	28 48	
CONTAINERS CRUSHED — pails/ drums	-----	-----	(379) 838 (27) 812	1942 415	1084 309	1735 (933-2) (278) 134	1751 122	5075 447	(443) 405 (20) 67	505 85	2286 480	(1307) 673 (267) 331	
CONTAINERS FLUSHED — pails/ drums	-----	91	(215) 554	811	783	(NRA) 652	518	847	(NRA) 168	413	140 445 217 176	(951) 1002 1078 763 45	
DEPOSIT ITEMS FLUSHED - [illegible]													

CURRENT YEAR 1982

HAZARDOUS & LIQUID WASTE DISPOSAL

PREV YEAR

WASTE NAME (Given in Tons Per Month)	JAN	FEB	MAR 3-MO-AVG	APR	MAY	JUN 6-MO-AVG	JUL	AUG	SEP 9-MO-AVG	OCT	NOV	DEC YEARS-AVG	MONTHL AVERAG
SLUDGE-Waste Treatment (Landfilled)	612.5	539.1	(643.7) 779.6	483.8	543.9	(599.2) 636.6	632.7	545.1	(576.1) 430.2	382.1	172.0	(550.6) 350.6	75
SLUDGE-Paint-Grindings-Etc. (Landfilled)													
PAINT & SOLVENT (Incinerated)	24.5	22.1	(15.5)	24.5		(19.3) 44.7	72.6		(23.9) 26.8	26.7	-0-	(21.1) 11.8	2
SOLVENT-PURGE (Sold for Reclamation)	47.2		(24.4) 26.2	62.1		(37.0) 86.7	47.4		(32.4) 22.7	20.2	22.8	(29.9) 24.0	
SOLVENT-METHYLENE/CHLORIDE (Sold for Reclamation)				3.4		(0.56)			(0.37)			(0.E4)	
SOLVENT-1,1,1,TRICHLOROETHANE (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)						(2.6) 15.8			(1.7)	27.4	-0-	(3.6)	
GLYCOL & BRAKE FLUID (Incinerated)	106.1	20.6	(42.2)	26.5	25.2	(29.7)		23.1	(22.3)		32.4	(19.4)	
OIL (Sold for Reclamation)		50.5	(35.6) 54.7	60.4	52.5	(41.9) 33.3	28.3	64.8	(41.9) 33.2	28.9	-0-	(38.0) 49.9	5
OIL (Dried & Filtered for Reuse)			(7.2) (3)** 21.6		+ (4) 2.3	(3.9)			(2.6)			(1.9)	
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES (See Below) (Indicate - 1, 2, 3, 4, 5,										++ (5) 16.0		(1.3)	* 9
TOTALS (Including Aggregated Quarterly Averages)	790.3	632.3	(768.2) 882.1	660.7	623.9	(734.4) 817.1	780.7	633.0	(703.6) 512.9	501 3	527.2	(666.4) 636.3	93
MANIFESTS ISSUED Shipments	31	22	29	24	21	27	26	20	17	14	18	22	276
MANIFESTS ISSUED Total	44	93	46	35	36	59	49	30	31	28	28	31	444
CONTAINERS CRUSHED PAILS	1440	1774	1844	1552	2254	1473	1826	2477	-0-	2078	687	342	17,692
CONTAINERS CRUSHED DRUMS	115	303	593	273	357	100	639	224	-0-	582	447	39	3,672
CONTAINERS FLUSHED PAILS	759	210	224	-0-	330	-0-	-0-	-0-	80	-0-	283	-0-	1,886
CONTAINERS FLUSHED DRUMS	517	856	1685	1726	929	1186	1434	1669	949	1056	659	1131	12,992
DEPOSIT-DRUMS (Flushed)	373	605	1272	392	731	917	902	771	743	698	469	870	8,793

OTHER WASTES:
1. PCB CAPACITORS & TRANSFORMERS
2. ASBESTOS
3. DIESEL FUEL** (Reclaimed)
4. PHOSPHATE ESTER +
5. BUTYL ACETATE++ (Reclaimed)

*Includes (40.4) Paint & Solvent Solidified

cc: E.G. Beck
A.L. Di Vito
R.F. Keller
R.J. Wyatt

CURRENT YEAR 1983 EAST-CENTRAL COMPLEX — HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL — EPA I.D. MID 005356902 — PREVIOU YEAR 19

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE*
SLUDGE-Waste Treatment (Landfilled)	198.6	441.0	404.3 573.3	320.7	492.8	415.1 464.4	462.7	782.5	483.8 618.7	294.8	515.0	455.8 305.8	550.6
SLUDGE-Paint-Grindings-Etc. (Landfilled)													
PAINT & SOLVENT (Incinerated)	20.8	-0-	6.9 -0-	19.4	22.3	14.9 26.9		28.9	13.1	27.1	27.2	16.3 23.5	21.1
SOLVENT-Purge (Sold for Reclamation)	19.6	-0-	6.5 -0-		23.2	10.7 21.9		23.5	12.2 21.9	23.0	22.0	13.3	29.9
SOLVENT-Methylene Chloride (Sold for Reclamation)													0.28
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)													3.6
GLYCOL & BRAKE FLUID (Incinerated)				24.5		4.0	23.0	21.8	7.7 6.3			8.2 23.8	19.4
OIL (Sold for Reclamation)	14.3	49.5	48.4 81.6	31.6	24.8	42.3 52.5	18.7	52.7	41.8 50.2	22.2	27.2	48.1 53.6	38.0
OIL (Dried & Filtered for Reuse)													1.9
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)	(5) 19.7		6.5			3.2			2.1		(1) 0.8	1.7	1.3
TOTALS (Including Aggregated Quarterly Averages)	273.0	490.5	472.8 654.9	396.2	563.1	490.5 565.7	504.4	909.4	562.1 702.3	367.1	592.2	535.4 406.7	666.4
TOTAL MANIFESTS ISSUED	19	23	28	17	23	23	20	40	28	18	27	22	288(2
TOTAL SHIPMENTS FOR DISPOSAL	19	21	28	17	22	23	20	38	26	18	27	22	281(2
MANIFESTS ISSUED INTERNALLY	0	2	0	0	1	0	0	2	2	0	0	0	7(0
MANIFESTS RECEIVED INTERNALLY	18	17	22	15	15	15	11	1	14	17	18	21	184(1
TOTAL MANIFESTS RECEIVED	18	18	25	18	18	18	13	4	16	21	19	25	213(1
PAILS CRUSHED	680	494	406	510	252	814	797	839	1,325	354	585	486	7,542(6
DRUMS CRUSHED	237	255	119	61	78	179	134	47	298	206	246	146	2,006(1
PAILS FLUSHED	167	331	71	214	272	510	412	1598	677	356	380	782	5,770(4
DRUMS FLUSHED	394	539	633	719	753	1022	767	712	868	879	786	631	8,703(7
DEPOSIT DRUMS FLUSHED	282	384	528	638	649	844	628	624	675	696	611	426	6,985(5

OTHER WASTES .1. PCB CAPACITORS & TRANSFORMERS
2. PCB CONTAMINATED DEBRIS
3. BESTOS
4. BATTERIES
5. WASTE OIL RES[illegible]ES
6.

cc: R.E.WARD P.S. GRAHAM
R.J. WYATT R.J. PF
E.G. BECK

* Monthly Averages for 1982 reflect total for east and west complexes combined

Revised 06-10-83

CURRENT YEAR 1984 — PONTIAC CENTRAL & EAST — HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL — PREVIOU YEAR 19

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE
SLUDGE-Waste Treatment (Landfilled)(NON-HAZARDOUS)	292.9	486.2	434.1 523.4	371.0	303.5	364.3 209.0	362.8	308.1	349.0 284.8	252.9	407.0	356.2 473.9	475.5 455.8
SLUDGE-Paint-Grindings-Etc. (Landfilled)	151.2	225.4	182.5 170.9	202.5	298.5	219.7 270.2	209.3	437.0	243.8 229.3	258.8	460.0	254.4 140.0	3,053.1
PAINT & SOLVENT (Incinerated)			14.3 43.1		24.2	14.9 22.6		71.9	17.9			13.4	161.8 16.7
SOLVENT-Purge (Sold for Reclamation)	24.2		16.2 24.6	24.2	25.0	20.2 23.7	23.3	48.8	23.4 16.8	23.8		21.3 22.1	258.5 19.3
SOLVENT-Methylene Chloride (Sold for Reclamation)								9.6	1.0			0.8	
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)		8.2	2.7			1.3			0.9			1.2 6.3	4.5
GLYCOL & BRAKE FLUID (Incinerated)				18.5		7.4 25.9			7.6 24.4			5.7	68 8.2
OIL (Sold for Reclamation)	42.9	24.7	31.4 26.7	27.5	66.6	42.6 67.4	24.3	25.0	39.6 51.7	31.4	42.5	40.4 54.5	485.2 48.1
OIL (Dried & Filtered for Reuse)													
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)		(5) 14.8				2.4 (1)0.035			1.6	(1) 0.23		1.5 (3)3.5	1.7
TOTALS (Including Aggregated Quarterly Averages)	218.3	248.4	244.0 265.3	272.7	414.3	304.8 409.8	256.9	592.3	333.3 322.2	314.3	502.5	336.9 226.4	535.4
TOTAL MANIFESTS ISSUED	18	17	14	12	19	19	12	25	13	18	23	14	24.0
TOTAL SHIPMENTS FOR DISPOSAL	18	17	14	12	19	19	12	25	13	18	23	14	23.4
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0.58
MANIFESTS RECEIVED INTERNALLY	1	23	18	12	19	16	23	27	13	32	26	19	15.3
TOTAL MANIFESTS RECEIVED	5	25	20	15	21	19	23	28	13	32	26	19	17.7
PAILS CRUSHED	219	843	704	761	532	2,206	998	2,285	751	516	751	1,462	628.5
DRUMS CRUSHED	92	284	410	203	178	346	155	552	214	387	212	119	167.1
PAILS FLUSHED	629	484	1,331	1,046	499	2,041	1,138	1,825	1,216	524	1,064	3,049	480.8
DRUMS FLUSHED	568	864	1,126	902	841	791	461	1,617	780	982	952	1,133	752.2
DEPOSIT DRUMS FLUSHED	435	729	765	620	641	626	520	1,110	562	707	779	927	582.0

OTHER WASTES
1. PCB CAPACITORS & TRANSFORMERS
2. PCB CONTAMINATED DEBRIS
3. ASBESTOS
4. BATTERIES
5. WASTE OIL RESIDUES
6.

Revised 06-10-83

CURRENT YEAR 1985 PONTIAC CENTRAL & EAST PLANTS HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL

PREVIOUS YEAR 1984

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE
SLUDGE-Waste Treatment (CWT) (Landfilled)(NON-HAZARDOUS)	567.5	576.6	547.2 497.7	549.9	382.5	471.0 252.0	314.9	250.9	389.0 109.1	172.2	290.3	347.1 201.9	356.2
SLUDGE-Paint-Grindings-Etc. (Landfilled)	90.0	125.3	192.7 363.0	235.6	238.7	244.3 413.5	298.3	346.9	321.0 779.1	608.9	356.2	332.4 134.0	254.4
PAINT & SOLVENT (Incinerated)		20.1	12.8 18.3	42.8	48.4	33.3 70.4	61.5	73.7	42.1 43.9	54.9	43.6	39.8	13.4
SOLVENT-Purge (Sold for Reclamation)	23.6	47.3	23.6	21.6	23.3	23.9 27.7	27.0	43.3	23.7			17.8	21.3
SOLVENT-Methylene Chloride (Sold for Reclamation)												0.0	0.8
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)												0.0	1.2
GLYCOL & BRAKE FLUID (Incinerated)		20.1	6.7			6.9 21.4			7.2			5.4	5.7
OIL (Sold for Reclamation)	21.4	47.7	40.2 51.5		137.8	46.4 20.3	46.2	105.6	47.8	23.8	46.7	41.7	40.4
OIL (Dried & Filtered for Reuse)													
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)	(3) 1.8	(3) 3.6	33.8 (6)84.5	(6) 38.6	(3) .375	23.3			15.5		(3) 6.4	12.2	1.5
			(3)11.5										
TOTALS (Including Aggregated Quarterly Averages)	136.8	264.1	309.9 528.8	300.0	448.5	368.5 533.0	433.0	569.2	463.2 955.6	687.6	452.9	453.6 134.0	336.9
TOTAL MANIFESTS ISSUED	8	15	23	16	20	21	19	24	27	24	17	7	17
TOTAL SHIPMENTS FOR DISPOSAL	8	15	23	16	20	21	19	24	27	24	17	7	17
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0
MANIFESTS RECEIVED INTERNALLY	14	17	28	27	43	32	44	40	26	29	27	23	19
TOTAL MANIFESTS RECEIVED	14	17	31	29	46	34	46	42	27	32	30	25	21
PAILS CRUSHED	743	585	627	1,963	1,680	1,674	3,661	3,327	2,336	1,191	757	1,424	1,002
DRUMS CRUSHED	468	197	442	527	402	547	508	830	512	483	224	238	263
PAILS FLUSHED	906	894	559	2,248	1,715	1,773	3,661	3,327	2,336	1,011	747	1,424	1,237
DRUMS FLUSHED	973	779	707	940	859	858	740	1,425	1,045	682	341	365	933
DEPOSIT DRUMS FLUSHED	600	612	461	695	595	462	394	899	684	311	103	67	702

OTHER WASTES 1. PCB CAPACITORS & TRANSFORMERS
2. F CONTAMINATED DEBRIS
4. BATTERIES
5. WASTE OIL RESID
6. WASTE SLUDGE

Revised 06-10-83

CURRENT YEAR 1986 — PONTIAC CENTRAL PLANT — HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL — PREVIOUS YEAR 1985

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE
SLUDGE-Waste Treatment (Landfilled)	N/H 571.3	N/H 721.3	H 499.0 / 204.6	H 629.0	H 476.1	H 518.5 / 509.0	H 403.0	H 453.1	N 473.9 / H 297.7	N/H 436.8	N/H 262.9	N 440.5 / H 322.2	347.1
SLUDGE-Paint-Grindings-Etc. (Landfilled)	328.7	158.6	284.1 / 365.2	230.0	181.2	256.2 / 273.6	82.6	15.0	243.0 / 582.1	278.5	78.5	225.3 / 130.7	332.4
PAINT & SOLVENT (Incinerated)	46.2	43.2	—	41.2	14.9	37.4 / 42.8	39.9	44.0	41.4 / 18.3	20.0	41.7	34.3 / 24.3	39.8
SOLVENT-Purge (Sold for Reclamation)			—			—			—			—	17.8
SOLVENT-Methylene Chloride (Sold for Reclamation)			—			—			—			—	0.0
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)			—			—			—			—	
GLYCOL & BRAKE FLUID (Sold for Reclamation)			—			—			—			—	0.0
GLYCOL & BRAKE FLUID (Incinerated)			—			—		22.6	4.9 / 22.1			3.7	5.4
OIL (Sold for Reclamation)	23.9	43.0	22.3	72.5	19.1	29.4 / 18.4	48.8		30.9 / 52.5	25.5	21.3	28.7 / 19.4	41.7
OIL (Dried & Filtered for Reuse)			—			—			—			—	
DRUMS & PAILS (Crushed and Sold)			—			—			—			—	
OTHER WASTES-Indicate 1-2-3-4 (See List Below)		(1) 2.0	.66		(3) 8.9	2.3 / (3) 2.6			1.6 / (1) .98	(3) 6.9		1.7	12.2
			—			—			—			—	
TOTALS (Including Aggregated Quarterly Averages)	398.8	246.8	417.2 / 606.0	972.7	700.2	620.9 / 864.4	574.3	534.7	617.3 / 675.9	330.9	141.5	516.8 / 174.4	453.6
TOTAL MANIFESTS ISSUED	17	17	31	66	49	56	42	35	33	14	9	9	18.4
TOTAL SHIPMENTS FOR DISPOSAL	18	18	31	66	49	56	42	35	33	14	9	9	18.4
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0
MANIFESTS RECEIVED INTERNALLY	154	39	31	28	18	11	8	20	5	0	0	0	29.1
TOTAL MANIFESTS RECEIVED	157	42	32	31	20	15	11	23	8	2	0	0	31.0
PAILS CRUSHED	1,037	1,138	1,432	1,258	811	879	1606	1,348	406	1,596	725	551	1,664.0
DRUMS CRUSHED	249	270	475	338	317	243	357	267	287	449	402	271	448.1
PAILS FLUSHED	1,039	1,170	1,434	1,427	811	879	1606	1,526	798	1,651	725	649	1,716.7
DRUMS FLUSHED	515	349	556	671	447	360	571	425	437	632	533	385	809.5
DEPOSIT DRUMS FLUSHED	134	96	128	263	138	125	204	335	152	193	167	116	490.2

OTHER WASTES
1. PCB CAPACITORS & TRANSFORMERS
2. PCB CONTAMINATED DEBRIS
3. ASBESTOS
4. BATTERIES
5. WASTE OIL RESIDUES
6. WASTE ELPO

Revised 06-10-83

APPENDIX B

WASTE CHARACTERIZATIONS

WATER TREATMENT SLUDGE
PAINT SLUDGE
WASTE PAINT
WASTE SOLVENT

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04-01-87

SAMPLE NO: 5216

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 9 - 00226

TAKEN

RECEIVED
03-16-87

FILTER CAKE SLUDGE (CENTRAL WATER TREATMENT)

Lead	1,084	ppm
Chlorine Residual	<0.003	percent
Oil & Grease	2.20	percent
Solids	50.81	percent
VOLATILES		
Acrolein		
Acrylonitrile		
Benzene		
Bis (Chloromethyl) Ether		
Bromoform		
Carbon Tetrachloride		
Chlorobenzene		
Clorodibromomethane		
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform		
Dichlorobromomethane		
Dichlorodiflouromethane		

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04-01-87

SAMPLE NO: 5216

GMC TRUCK
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660 S. BOULEVARD EAST
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BILL MILLWARD

SAMPLE DESCRIPTION: 9

TAKEN

RECEIVED
03-16-87

1,1-Dichloroethane		
1,2-Dichloroethane		
1,1-Dichloroethylene		
1,2-Dichloropropane		
1,2-Dichloropylene		
Ethylbenzene		
Methyl Bromide		
Methylene Chloride		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene		
Toluene		
1,2-Trans-dichloroethylene	0.156	ppm
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene		
Trichlorofluoromethane		
Vinyl Chloride		

EP TOXICITY STUDY

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PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 9

TAKEN

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EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm

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04-03-87

SAMPLE NO: 5216

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

RECEIVED
03-16-87

Toxicity Characteristic Leaching Procedure (TCLP) METHOD: Federal Register/ Vol. 51, NO. 216/Friday, November 7, 1986 Rules & Regulations		
Volatile Organic Compounds		
Acetone	<0.1	ppm
n-Butyl Alcohol	<0.1	ppm
Carbon disulfide	<0.1	ppm
Carbon tetrachloride	<0.1	ppm
Chlorobenzene	<0.1	ppm
Cresols (cresylic acid)	<0.1	ppm
Cyclohexanone	<0.1	ppm
1,2 - Dichlorobenzene	<0.1	ppm
Ethyl acetate	<0.1	ppm

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BILL MILLWARD

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TAKEN

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03-16-87

Ethylbenzene	<0.1	ppm
Ethyl ether	<0.1	ppm
Isobutanol	<0.1	ppm
Methanol	<0.1	ppm
Methylene chloride	<0.1	ppm
Methyl ethyl ketone	<0.1	ppm
Methyl isobutyl ketone	<0.1	ppm
Nitrobenzene	<0.1	ppm
Pyridine	<0.1	ppm
Tetrachloroethylene	<0.1	ppm
Toluene	<0.1	ppm
1,1,1 - Trichloroethane	<0.1	ppm
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.1	ppm
Trichloroethylene	<0.1	ppm
Trichlorofluoromethane	<0.1	ppm
Xylene	<0.1	ppm
Lead	1,084	ppm

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SAMPLE NO: 5216

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

RECEIVED
03-16-87

Chlorine Residual	<0.003	percent
Oil & Grease	2.20	percent
Solids	50.81	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm

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BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

RECEIVED
03-16-87

Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	non-corrosive pH=8.63	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	<100	BTU/lb.

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04-01-87

SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4 - 00221

TAKEN

RECEIVED
03-16-87

PAINT SLUDGE - COMPOSITE ALL STREAMS (CONTAINMENT PAD)

Chlorine Residual	1.348	percent
Oil & Grease	11.14	percent
Solids	71.78	percent
VOLATILES		
Acrolein		
Acrylonitrile		
Benzene		
Bis (Chloromethyl) Ether		
Bromoform		
Carbon Tetrachloride		
Chlorobenzene		
Clorodibromomethane		
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform		
Dichlorobromomethane		
Dichlorodiflouromethane		
1,1-Dichloroethane		

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SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4

TAKEN

RECEIVED
03-16-87

1,2-Dichloroethane		
1,1-Dichloroethylene		
1,2-Dichloropropane		
1,2-Dichloropylene		
Ethylbenzene		
Methyl Bromide		
Methylene Chloride		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene		
Toluene	0.989	ppm
1,2-Trans-dichloroethylene		
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene		
Trichlorofluoromethane		
Vinyl Chloride		
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	

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Francis B. Mc Laughlin, FAIC
Director of Laboratories
FBM/sjk
Preliminary Report

CERTIFIED LABORATORY — U.S. DEPARTMENT OF AGRICULTURE
U.S. DRUG ENFORCEMENT ADMINISTRATION
UNITED STATES FOOD AND DRUG METHODOLOGY
UNITED STATES NUCLEAR REGULATORY COMMISSION
AMERICAN COUNCIL OF INDEPENDENT LABORATORIES
INSTITUTE OF FOOD TECHNOLOGISTS

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DIPLOMAT — AMERICAN BOARD OF BIOANALYSTS
AMERICAN CHEMICAL SOCIETY
AMERICAN SOCIETY FOR MICROBIOLOGY
UNION INTERNATIONALE DES LABORATORIES INDEPENDANTS
ASSOCIATION OF OFFICIAL ANALYTICAL CHEMISTS

Analytic & Biological
Laboratories, Inc.

29079 FORD ROAD ■ GARDEN CITY, MICHIGAN 48135 ■ PHONE: (313) 422-7474 ■ TELEX: 234080

04-01-87

SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4

TAKEN

RECEIVED
03-16-87

Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm

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SAMPLE DESCRIPTION: 4

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Corrosivity - pH	corrosive pH=12.57	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	4,069	BTU/lb.

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04-03-87

SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

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03-16-87

Toxicity Characteristic Leaching Procedure (TCLP) METHOD: Federal Register/ Vol. 51, NO. 216/Friday, November 7, 1986 Rules & Regulations		
Volatile Organic Compounds		
Acetone	<0.1	ppm
n-Butyl Alcohol	<0.1	ppm
Carbon disulfide	<0.1	ppm
Carbon tetrachloride	<0.1	ppm
Chlorobenzene	<0.1	ppm
Cresols (cresylic acid)	<0.1	ppm
Cyclohexanone	<0.1	ppm
1,2 - Dichlorobenzene	<0.1	ppm
Ethyl acetate	<0.1	ppm

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04-03-87

SAMPLE NO: 5211
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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

RECEIVED
03-16-87

Ethylbenzene	<0.1	ppm
Ethyl ether	<0.1	ppm
Isobutanol	<0.1	ppm
Methanol	<0.1	ppm
Methylene chloride	<0.1	ppm
Methyl ethyl ketone	<0.1	ppm
Methyl isobutyl ketone	<0.1	ppm
Nitrobenzene	<0.1	ppm
Pyridine	<0.1	ppm
Tetrachloroethylene	<0.1	ppm
Toluene	<0.1	ppm
1,1,1 - Trichloroethane	<0.1	ppm
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.1	ppm
Trichloroethylene	<0.1	ppm
Trichlorofluoromethane	<0.1	ppm
Xylene	<0.1	ppm
Chlorine Residual	1.348	percent

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

RECEIVED
03-16-87

Oil & Grease	11.14	percent
Solids	71.78	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm

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SAMPLE NO: 5211
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GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

RECEIVED
03-16-87

Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	corrosive pH=12.57 *	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	4,069	BTU/lb.

* FROM LIME ADDITION FOR SOLIDIFICATION

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04-01-87

SAMPLE NO: 5212

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 5 - 00222

TAKEN

RECEIVED
03-16-87

WASTE PAINT & SOLVENT (TANK 61)

Lead	3,759	ppm
Chlorine Residual	0.243	percent
Solids	27.70	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm

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PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 5

TAKEN

RECEIVED
03-16-87

Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	non-corrosive pH=6.26	units
Ignitability	flash at 70	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	12,293	BTU/lb.

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APPENDIX B

REVISIONS/CLARIFICATIONS TO THE CLOSURE PLAN DATED SEPTEMBER 21, 1989 AND NOVEMBER 27, 1989

"Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area of the Pontiac East Assembly Facility, in Pontiac, Michigan"

Prepared by:

C-E ENVIRONMENTAL, INC.

Prepared for:

General Motors Corporation
Pontiac East Assembly

September 21, 1989

INTRODUCTION

General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (GMC-PEA) retained C-E Environmental, Inc. (C-EE) to assist it with the closure of its hazardous waste storage area. Closure of this waste storage area is to proceed in accordance with the closure plan dated September 1987.

GMC-PEA retained C-EE to monitor the closure activities and to conduct confirmatory sampling. As a part of these responsibilities, C-EE collected nine subsurface soil samples from the waste storage area (sample points E-1 through E-9, as shown in Figure 1), six background soil samples (sample points B-1 through B-6), four samples of rinsate generated during the decontamination of the waste area's aboveground tanks and concrete pad (samples C-1 through C-4), and nine series of photoionization readings from the waste storage area (collected at sample points E-1 through E-9). The analytical results for samples E-1 through E-9 were presented in a letter report dated May 25, 1989. The analytical results for samples B-1 through B-6 and C-1 through C-4 were presented in C-EE's report dated July 12, 1989. Copies of these reports are presented in Attachment A. The results of the photoionization readings are presented in Attachment B.

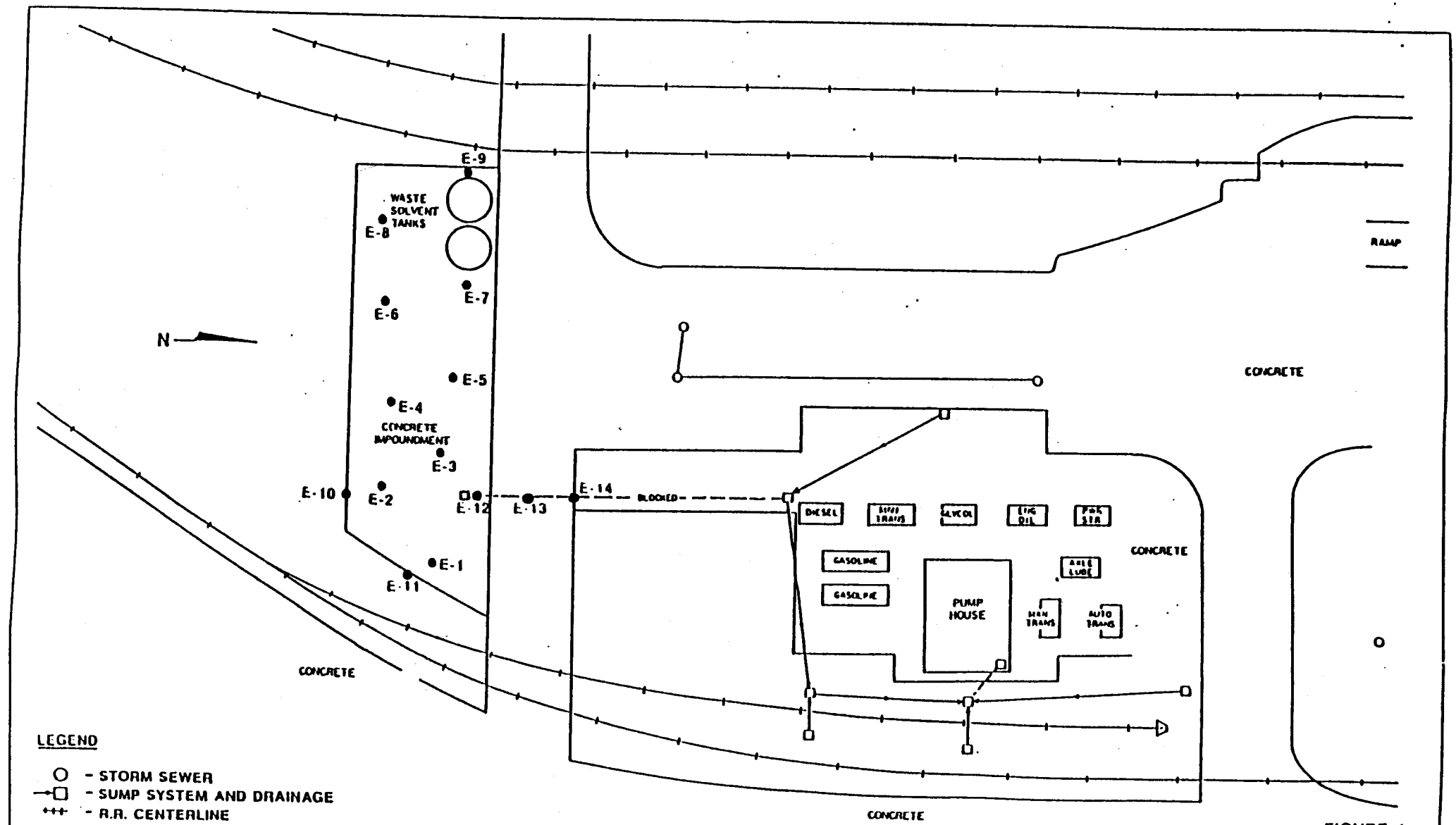
The analytical results for these samples indicate elevated levels of volatile organics and lead near the eastern side of the waste storage area. Due to the presence of these contaminants in this area, C-EE has prepared this work plan to present a plan of action for further investigating the contamination observed in soils at the waste storage area, and establish removal/disposal protocol for the contaminated soils. These items, as well as a brief summary of the analytical findings to date are discussed below.

SUMMARY OF FINDINGS

In accordance with the closure plan, the concrete pad and two aboveground waste storage tanks in the waste storage area were decontaminated. As discussed in the July 12 report, C-EE collected samples of the rinsate generated during these decontamination activities (samples C-1 through C-4). The results of these samples indicated that cleanup standards as specified in the closure plan had been achieved. At this time, GMC-PEA intends to remove and dispose of the tanks and concrete pad. The disposal fate of these materials is discussed below.

As discussed in the May 25 report, volatile organics (ethyl benzene, toluene, and xylene) were detected in soil samples collected at sample points E-1 and E-3 at a depth of 6 to 12 inches. In addition, an elevated level of lead (660 milligrams per kilogram) was observed in the soil sample from sample point E-2 at a depth of 0 to 6 inches.

Volatile organics were detected with a photoionization detector (PID) at all nine sampling points (E-1 through E-9). The highest levels were observed at sampling locations E-1 (300 units) and E-3 (240 units). The PID readings



NOTE: This sketch was derived from field observations and measurements. Due to scale, locations, distances, and sizes are approximate.

FIGURE 1
STUDY AREA
GM TRUCK AND BUS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E ENVIRONMENTAL, INC.

correspond to parts-per-million when the instrument is measuring benzene - for other vapors and mixtures, these numbers are relative. The next highest PID reading observed was at sampling point E-2 (70 units). The PID readings at the remaining sampling points (E-4 through E-9) decreased as sampling proceeded to the west; however, none of these readings exceeded 26 units. The volatile organics observed with the PID at these sampling points are likely attributable to the migration of the volatile compounds in the soil vapor space beneath the waste storage area concrete pad.

SCOPE OF WORK FOR ADDITIONAL SAMPLING

Based on the analytical results for samples collected from sample points E-1, E-2, and E-3, additional sampling and analyses are required to define the lateral and vertical extent of contamination within the waste storage area and to determine the source of the observed contamination.

To investigate the extent of contamination within the waste storage area, GMC-PEA will collect additional soil samples at sample locations E-1, E-2, E-3, E-10, and E-11. Soil sampling at these locations will commence upon the removal of the concrete pad and tanks located in the waste storage area.

Samples will be collected at 1-foot intervals and screened in the field for volatile organics using a photoionization detector (PID). Soil sampling from locations E-1 through E-3 will begin at a depth of 1 foot since prior sampling at these points proceeded to a depth of 1 foot. Field screening with the PID will be in accordance with the procedures established in the closure plan. If PID readings for the soil samples collected at the shallowest depth indicate that volatile organics are present, soil samples will be collected from the next 1-foot interval and screened with the PID. The process will be repeated until a sample is collected which does not yield a significant PID meter reading. At this sampling level, soil samples will then be collected and analyzed for total lead and (MDNR Scan II) volatile organics.

Method 7420 will be followed for total lead analyses and Method 8020 will be followed for volatile organic analyses. The anticipated level of detection (LOD) for the lead is 20mg/g while the anticipated LOD for the volatile organics is 5mg/g. The selected soil samples from the sampling points is anticipated to be analyzed by Swanson Environmental Services in Novi, Michigan.

The source of contamination observed in the waste storage area is believed to be gasoline which was released in the adjacent tank farm area and migrated to the waste storage area via the sump/drain system which connects the two areas. To confirm that these gasoline spills are the source of contamination observed in the waste storage area, samples of the fill material along the storm drain line between the two areas will be collected at three locations (sample points E-12 through E-14 in Figure 1). Sampling from these three sampling points will proceed in accordance with the procedures established above for sampling points E-1 through E-3, E-10 and E-11.

REMOVAL/DISPOSAL OF CONTAMINATED SOILS

Once the analytical results of the additional subsurface soil samples are received and interpreted, GMC-PEA will arrange for the removal and proper disposal of all contaminated soils located at the waste storage area. Soil removal will begin at sample points E-1 and E-3 and proceed in all directions to the nearest sample point not exhibiting detectable levels of volatile organics or elevated levels of total lead.

The contaminated soils will be excavated by either a tracked or rubber-tired excavator, or similar excavation equipment. Excavated soils will be placed in 20 cubic yard rolloff boxes and covered with tarpaulin (or a similar cover) to prevent exposure to precipitation and wind. Once full, the rolloff boxes shall be moved to the hazardous waste storage pad located at the Central Assembly facility to await proper disposal.

If it is determined that the source of contamination is spilled gasoline from the tank farm area and that the soils are not ignitable as defined by the Resource Conservation and Recovery Act (RCRA) and Michigan Act 64, the contaminated soils will be landfilled at the Michigan Disposal facility in Belleville, Michigan.

If the soils are classified as hazardous due to ignitability or E.P. Toxic lead levels, or if the volatile organic contamination cannot be attributed to the spilled gasoline, the soils will be transported by Inland Waters (EPA ID# MID 982606287) to Wayne Disposal with suitable treatment as necessary.

REMOVAL OF CONCRETE PAD AND TANKS

Based on the analytical results of the rinsate samples collected during the decontamination of the concrete pad and tanks, both the concrete pad and the tanks have been decontaminated in accordance with the decontamination procedures established in the closure plan. Accordingly, these decontaminated items can now be removed and disposed of to allow for the construction of an aboveground storage tank facility in this area.

The concrete pad will be removed with demolition equipment, placed in 20-cubic yard rolloffs, and transported as an inert material to Pollards Landfill (a City Management Facility) in Montrose Township, Michigan. The decontaminated aboveground tanks will be dismantled and scrapped.

GENERAL MOTORS CORPORATION

TRUCK & BUS GROUP

PONTIAC CENTRAL MANUFACTURING & ASSEMBLY

WASTE MANAGEMENT FACILITY

CLOSURE REPORT

Prepared by

McNamee Industrial Services, Inc.
Ann Arbor, Michigan

March 1991

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Owner/Operator Closure Certification

I, Craig B. Parr, Plant Manager, General Motors Corporation, Truck and Bus Group, Pontiac Central Assembly Plant, hereby state and certify that, to the best of my knowledge and belief, the Hazardous Waste Storage Area of the Pontiac Central Assembly Plant has been closed in accordance with the approved closure plan and its approved revisions/clarifications (presented and discussed in the attached report), and that closure was completed according to the attached chronology. Certification made on behalf of General Motors Corporation.

Craig B Parr
Signature

April 10, 1991
Date

Professional Engineer Closure Certification

I, Thomas M. Doran, a certified professional engineer (State of Michigan, license number 27143) with McNamee Industrial Services, Inc., (3135 S. State, Ann Arbor, Michigan) hereby certify that I have knowledge of the aforementioned hazardous waste storage area and that closure of this aforementioned area has been performed in accordance with the approved closure plan and its approved revisions/clarifications (presented and discussed in the attached report).

Signature

4-5-91
Date

Signature

CLOSURE CERTIFICATION CHRONOLOGY

PHASE I

1/17/90	-	Began water blasting accumulation pad west
1/18/90	-	Completed water blasting accumulation pad west
	-	Sampled accumulation pad west rinsate
	-	Cored and sampled C-1 and C-3
1/29/90	-	Began and completed water blasting accumulation pad east
	-	Sampled accumulation pad east rinsate
	-	Began water blasting bulking pad west
	-	Cored and sampled C-4
1/30/90	-	Completed water blasting bulking pad west
	-	Sampled bulking pad west rinsate
1/31/90	-	Cored and sampled C-2, C-5, C-6 and C-7
2/8/90	-	Began and completed water blasting bulking pad east
	-	Sampled bulking pad east rinsate
	-	Cored and sampled C-8 and C-9

PHASE II

6/25/90	-	Began and completed water blasting accumulation pad west
	-	Sampled accumulation pad west rinsate
	-	Collected ambient sample of accumulation pad west rinsate
	-	Cored and sampled C-10, C-11, C-12, and C-13
11/27/90	-	Excavated and sampled soil north of bulking pad retaining wall
12/5/90	-	Additional excavation and sampling of soil north of bulking pad retaining wall

ANALYTICAL RESULTS OF ADDITIONAL SOIL SAMPLES COLLECTED AT THE PONTIAC EAST ASSEMBLY WASTE STORAGE AREA

Presented To

GENERAL MOTORS CORPORATION - TRUCK & BUS GROUP
Pontiac, Michigan

November 1989

1.0 INTRODUCTION

C-E Environmental, Inc. (C-EE) is presently assisting General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (GMC-PEA) with the closure of its waste storage area. In accordance with the document "Work Plan for the Removal of Two Aboveground Storage Tanks and a Concrete Containment Pad from the Hazardous Waste Storage Area of the Pontiac East Assembly Facility" dated September 21, 1989, and the Michigan Department of Natural Resource's comments concerning that Work Plan, C-EE collected additional soil samples from the waste storage area. This additional soil sampling was necessary to define the lateral and vertical extent of contamination within the waste storage area and to determine the source of the observed contamination. The location of the waste storage area in relation to the GMC-PEA plant and the analytical results from previous soil sampling efforts can be found in the Work Plan.

2.0 SOIL SAMPLING PROTOCOL

In accordance with the Work Plan, the additional soil sampling was conducted after the waste storage tanks and concrete containment pad had been decontaminated and removed. Soil samples were collected from ten different locations at depths varying between zero and four feet. The sampling locations are shown in Figure 1. Steven Ranger, Environmental Engineer at C-EE, and Thomas Winebrenner, Senior Environmental Technician for C-EE, collected the samples on October 5 and 6, 1989. A hand auger with a stainless-steel bucket was used to collect the samples. The sampling equipment was washed with a trisodium phosphate solution and rinsed with distilled water between each sampling event.

Samples were collected at 1-foot intervals and screened in the field for volatile organics using a photoionization detector (PID). Soil sampling from locations E-1 and E-3 began at a depth of 1 foot because prior sampling at these points proceeded to a depth of 1 foot. The sampling rationale for location E-2 is discussed below in Section 4.0.

Field screening with the PID was conducted in accordance with the procedures established in the hazardous waste storage area's closure plan. Due to the presence of operating construction equipment near the area, the background PID meter readings ranged unsteadily from 0 to 2 units. The PID results for the samples are presented in Table 1.

If PID readings for the soil samples collected at the shallowest depth indicated that volatile organics were present above background levels, soil samples were collected from the next 1-foot interval and screened with the PID. The process was repeated at each sample location until a sample was collected which did not yield a PID meter reading above background. At this sampling level, soil samples were collected for analysis.

3.0 SOIL SAMPLING OBSERVATIONS

During sample collection procedures, the surface soils near locations E-1, E-

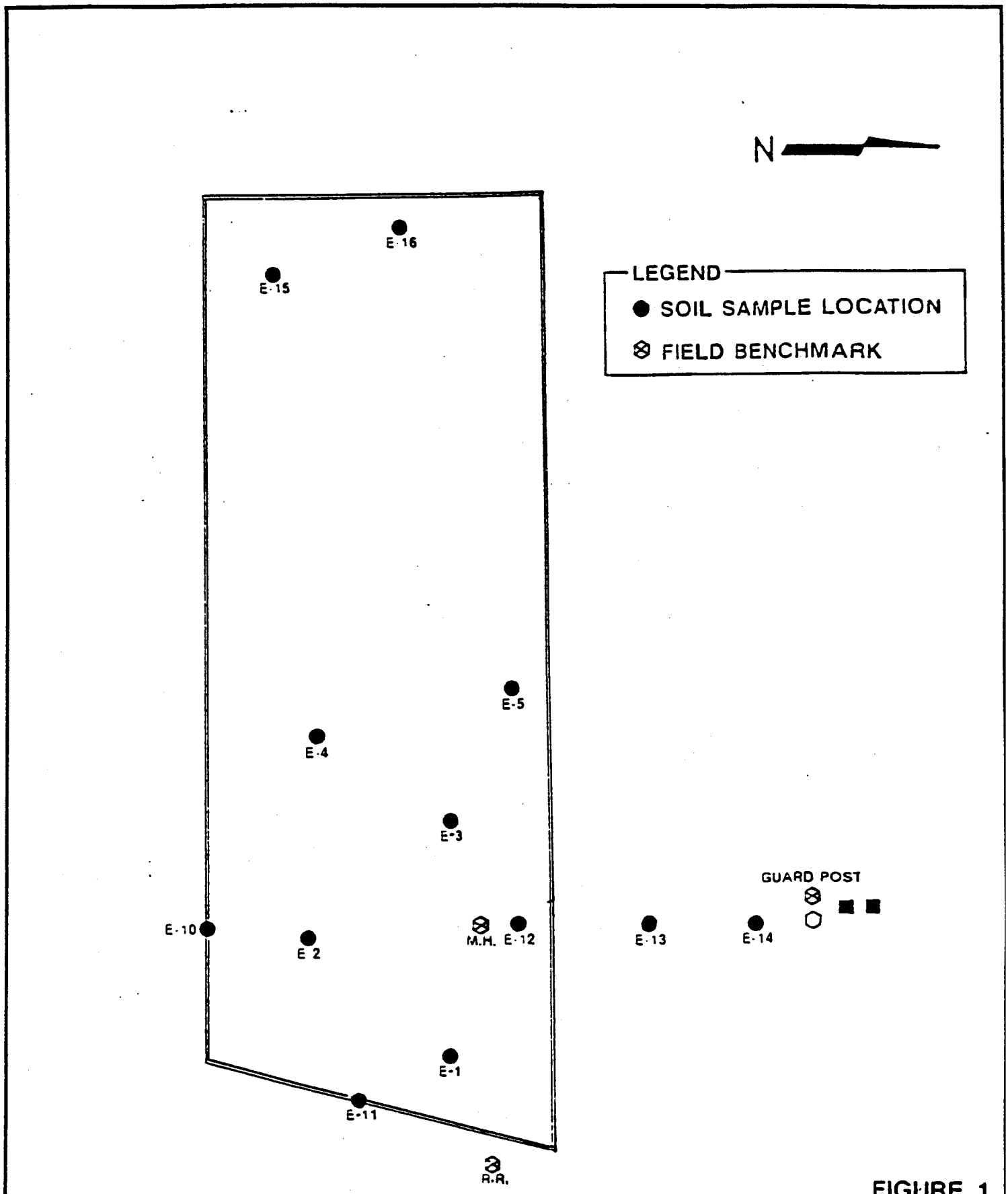


FIGURE 1
ADDITIONAL SAMPLING LOCATIONS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E Environmental, Inc.

TABLE 1

PHOTOIONIZATION DETECTOR READINGS FOR THE WASTE STORAGE AREA
GM Truck & Bus East Assembly, Pontiac, Michigan

SAMPLE POINT	DATE OF READINGS	TIME (MILITARY)	BOREHOLE DEPTH (FEET)	PID READING (UNITS)
E-1 (BOREHOLE)	10-5-89	13:15	2.0	ND
E-1 (JAR)	10-5-89	14:35	2.0	2-3
E-2 (BOREHOLE)	10-5-89	13:45	2.0	ND
E-2 (JAR)	10-5-89	14:35	2.0	1-2
E-3 (BOREHOLE)	10-5-89	14:10	2.0	ND
E-3 (JAR)	10-5-89	14:35	2.0	1-2
E-10 (BOREHOLE)	10-5-89	13:00	1.0	1.0
E-10 (JAR)	10-5-89	13:00	1.0	1.0
E-10 (JAR)	10-5-89	13:35	1.0	1-2
E-11 (BOREHOLE)	10-5-89	14:35	1.0	ND
E-12 (AMBIENT)	10-5-89	12:00	N/A	1.0
E-12 (SURFACE)	10-5-89	12:00	N/A	13.0
E-12 (BOREHOLE)	10-5-89	12:00	1.0	200
E-12 (BOREHOLE)	10-5-89	12:00	2.0	50
E-12 (JAR)	10-5-89	13:00	1.0	110
E-12 (JAR)	10-5-89	13:00	2.0	150
E-13 (AMBIENT)	10-6-89	13:00	N/A	ND
E-13 (SURFACE)	10-6-89	13:00	N/A	ND
E-13 (BOREHOLE)	10-6-89	13:00	4.0	2.0
E-13 (JAR)	10-6-89	13:00	1.0	ND
E-13 (JAR)	10-6-89	13:00	2.0	ND
E-13 (JAR)	10-6-89	13:00	3.0	1-2
E-14 (AMBIENT)	10-6-89	13:15	N/A	1.0
E-14 (BOREHOLE)	10-6-89	13:15	1.0	ND
E-14 (JAR)	10-6-89	13:00	4.0	1-2
E-14 (BOREHOLE)	10-6-89	14:20	1.0	ND
E-15 (JAR)	10-6-89	14:20	1.0	ND
E-16 (BOREHOLE)	10-6-89	14:30	1.0	ND

Notes:

1. PID calibrated to benzene-units are parts-per-million relative to benzene.
2. ND - Not Detectable.
3. N/A - Not Applicable.

3, and E-12 were distinguished by a strong solvent-like odor. No staining of these surface soils, however, was evident. Samples of these soils were labelled and allowed to sit undisturbed in sample jars for up to 1 hour. After concentrating in the sample jars, the vapors from the contaminated soils of E-1, E-3, and E-12 most closely resembled gasoline.

Visibly contaminated soils (appearing as heavily oil-stained) were observed at depths ranging from 2 to 4 feet at sample locations E-12, E-13, and E-14. The soils at these three locations were characterized as backfill sands to a depth of approximately 4.0 to 4.5 feet. Clayey sands were encountered at these locations at a depth of approximately 4.5 feet.

Backfill sands and gravel were encountered at sampling locations E-1, E-2, E-3, E-10, E-11, E-15, and E-16 at depths ranging from 0 to 1.0 feet. Clays were encountered in these 7 sampling locations at depths ranging from 0.5 feet to 2.0 feet.

4.0 ANALYSES PERFORMED ON THE SAMPLES

With the exception of sample E-2 at 0 to 1 foot, the samples submitted for analysis were analyzed for total lead (SW-846, Method 7420), and benzene, ethylbenzene, toluene, and xylene (BETX) volatile organic compounds (SW-846, Method 8020). As discussed below, sample E-2 at 0 to 1 foot was analyzed for extraction procedure toxicity lead (E.P. Tox Lead) instead of the BETX volatile organic compounds. Analysis of the soil samples was conducted by Swanson Environmental, Inc., in Brookfield, Wisconsin under a contract it holds directly with GMC-PEA.

Previous analysis of soil samples collected from location E-2 at a depth of 0 to 1 foot revealed the presence of total lead at 660 milligrams per kilogram of soil. Under this additional soil sampling program, a second soil sample was collected from E-2 and analyzed for both total lead and E.P. Tox Lead to a) either confirm or refute the findings of the initial sampling event, and b) determine if the soils were hazardous due to elevated lead levels.

5.0 ANALYTICAL RESULTS

The analytical results for the metals are presented in the attached Table 2, and the analytical results for the volatile organic compounds are presented in Table 3. As shown in Table 2, the total lead levels detected in the soil samples analyzed did not exceed background lead levels for the GMC-PEA site (background levels were presented in the July 12, 1989 letter report submitted by C-EE to GMC-PEA). In addition, no detectable levels of E.P. Toxicity lead was observed in the sample analyzed from sample location E-2 at 0-1'.

BETX volatile organic compounds were detected in three of the ten soil samples analyzed. However, one of these samples, which was from sampling location E-15 at 0.5-1.0 feet, was found to have toluene at the detection limit of 0.02 mg/kg and no other volatile organic compounds. Volatile organic compounds

TABLE 2

ANALYTICAL RESULTS FOR METALS
GM Truck & Bus East Assembly, Pontiac, MI

ANALYTE	E-1 1.5'-2.0'	E-2 0-1.0'	E-2 1.5'-2.0'	E-3 1.5'-2.0'	E-10 0.5'-1.0'	E-11 1.0'	E-13 1.0'	E-13 4.0'	E-14 4.0'	E-15 0.5-1.0'	E-16 0.5'-1.0'
Total Lead*	17	20	17	16	20	18	6	7	7	10	6
E.P. Tox Lead*	-	ND	-	-	-	-	-	-	-	-	-

Notes:

* All results in milligrams per kilogram (mg/kg).
** All results in milligrams per liter (mg/l).
ND - Not Detectable.

TABLE 3

ANALYTICAL RESULTS FOR ORGANIC VOLATILE COMPOUNDS
GM Truck & Bus East Assembly, Pontiac, MI

ANALYTE	E-1 1.5'-2.0'	E-2 0-1.0'	E-2 1.5'-2.0'	E-3 1.5'-2.0'	E-10 0.5'-1.0'	E-11 1.0'	E-13 1.0'	E-13 4.0'	E-14 4.0'	E-15 0.5-1.0'	E-16 0.5'-1.0'
Benzene	ND	-	0.06	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	0.11	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.16	-	ND	ND	ND	ND	ND	ND	ND	0.02	ND
Xylene	0.48	-	0.12	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. All results in milligrams per kilogram (mg/kg).
2. Detection limit 0.02 mg/kg.
3. ND - Not Detectable.

detected in the soil sample from sampling location E-1 at a depth of 1.5 to 2.0 feet include ethylbenzene (0.11 mg/kg), toluene (0.16 mg/kg), and xylene (0.48 mg/kg). Volatile organics detected in the soil sample from sampling location E-2 at a depth of 1.5 to 2.0 feet include benzene (0.06 mg/kg) and xylene (0.12 mg/kg).

6.0 DISCUSSION OF OBSERVATIONS AND ANALYTICAL RESULTS

Based on observations made during the soil sampling efforts and the analytical results from this and previous sample analyses, the contamination observed at the west storage area appears to eminate from the sewer manhole and associated drainage trench. While the source of the contamination in the waste storage area is not known, it is believed to be gasoline which was released in the adjacent tank farm area and has migrated to the waste storage area via the sump/drain system connecting the two areas. This belief is supported by the following:

- Only the typical gasoline constituents (namely ethyl benzene, toluene, and xylenes) were observed in the initial sampling results conducted at the waste storage area. If the soil contamination at the waste storage area was attributable to releases of waste solvent used at the site, analytes such as methyl ethyl ketone, acetone, and chlorinated solvents would be expected to be observed in the soils because they are and/or were commonly used as solvents at the site and were stored as wastes in the waste storage area.

- Oily material, whose source is believed to be spills of transmission fluid at the tank farm area, was observed in the drain system trench at sample locations E-12, E-13, and E-14 at depths of 2.0 to 4.5 feet. The appearance of oily materials in the drainage trench appears to indicate, therefore, that this drain system is a migratory pathway for materials released in the tank farm area.

- After allowing them to concentrate, the vapors from the contaminated soils collected at locations E-1, E-3, and E-12 exhibited an odor which resembled gasoline.

Based on the above supporting information, C-EE and GMC-PEA believe that the contamination in the soils at the waste storage area is attributable to releases of gasoline in the tank farm area. Accordingly, GMC-PEA will seek to dispose of this contaminated material as non-hazardous, gasoline-contaminated soil.

The elevated lead level observed at E-2 during the initial sampling program for the area cannot be explained. Because the results for other samples collected near E-2, and the repeat sample collected at E-2, do not reveal elevated lead levels, the relatively high lead level initially encountered at E-2 is believed to be attributable to laboratory error, sampling error, an anomaly, or any combination of the three.

7.0 EXTENT OF CLEANUP BASED ON SAMPLING RESULTS

Excavation of the contaminated soils at the waste storage area will proceed in the manner as specified in the Work Plan dated September 21, 1989. The projected extent of excavation is shown in Figure 2. Based on Figure 2, approximately 150 cubic yards of material will be removed. Water encountered during excavation of the drainage system area will be collected and sent to either the onsite wastewater treatment plant or, if untreatable onsite, sent offsite for treatment.

Confirmatory samples will be collected from the base and four of the walls of the excavation to ensure that all gasoline-contaminated materials have been removed from the waste storage area. These samples will be analyzed for benzene, ethylbenzene, toluene and total xylene by USEPA Method 8020. The base sample will be a composite of a minimum of four soil samples. The wall samples will be collected from randomly selected sampling points along the east, west, north and south walls of the excavation.

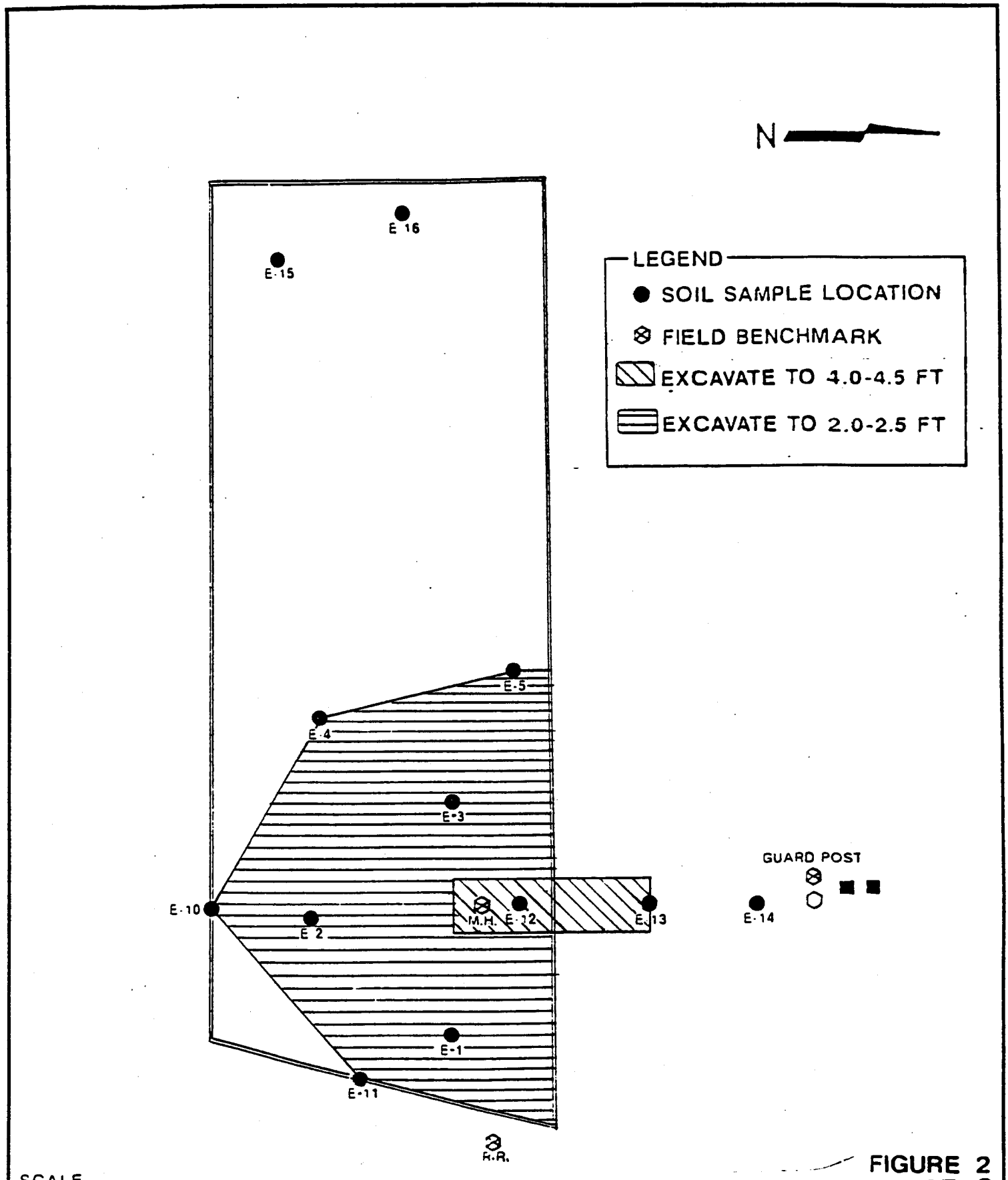


FIGURE 2
ESTIMATED EXCAVATION DEPTHS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E Environmental, Inc.

APPENDIX C

CORRESPONDENCE/COMMENTS FROM THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
O. STEWART MYERS
DAVID D. OLSON
RAYMONO POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

July 14, 1989

Mr. Ken Gembel
Pontiac East Assembly
GMC - Truck & Bus Group
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

Subject: Closure Activities
Pontiac East Assembly Hazardous Waste Storage Area

As we discussed at our meeting July 13, 1989, the Michigan Department of Natural Resources has reviewed the analytical results of the rinsate testing performed during cleaning of the concrete containment pad. Based on these results, it has been determined that it is acceptable for the concrete containment pad to be removed and disposed of as an inert material. Disposal of the concrete containment pad and the associated tanks may proceed immediately. However, further actions, such as sampling and/or excavation, should await review of the work plan which is to be submitted to MDNR for approval.

Sincerely,

Liane J. Shekter Smith

Liane J. Shekter Smith
Environmental Engineer
Waste Management Division
517-335-4790

cc: Mr. Steve Ranger, C-E Environmental
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Ms. Lynne King, DNR,
Mr. Steve Buda, DNR/C&E

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
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JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

October 5, 1989

Mr. Ken Gembel
GMC-Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

SUBJECT: Closure Activities-Additional Work Plan
Hazardous Waste Management Area
Pontiac East Assembly
MID 005 356 902

The Michigan Department of Natural Resources, Waste Management Division (WMD), has completed its review of GMC Truck & Bus Group-Pontiac East Assembly's (GMC-PEA) work plan for the above referenced hazardous waste management area, submitted on September 21, 1989.

The work plan was prepared by GMC-PEA following initial closure activities for the hazardous waste management area pursuant to the closure plan submitted on December 4, 1987, and approved by WMD on March 7, 1988. The work plan, as modified by the attached "Conditions for Approval," is hereby approved.

If you have any questions regarding this approval, please contact Ms. Liane Shekter Smith of my staff at 517-335-4790.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-9523

Attachment
cc: Mr. Steve Ranger, C-E Environmental
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Steve Buda, DNR/C&E File
Ms. Lynne King, DNR-Northville
Ms. Liane Shekter Smith, DNR

October 5, 1989

Conditions for Approval

General Motors Corporation
Truck & Bus Group
Pontiac East Assembly
820 S. Opdyke Road
Pontiac, Michigan 48053

MID 005 356 902

1. The statistical comparison of inorganic analytical data to the background results shall be done utilizing the four lowest values of the six background samples which were analyzed.

2. The limit of detection for soil samples analyzed for lead using SW-846 method 7420 shall be 10 mg/kg. The limit of detection for soil samples analyzed for MDNR Scan II compounds using SW-846 Method 8020 shall be 20 ug/kg. These levels shall be confirmed with the analytical laboratory prior to sampling.

3. Excavated materials shall be placed in roll off boxes and covered as described in the work plan. These contaminated materials shall then be sampled and tested as necessary to determine if the contaminated materials are hazardous waste. A minimum of four (4) samples shall be required to characterize the waste for disposal.

4. All hazardous wastes shall be disposed in accordance with the land disposal restrictions specified in 40 CFR Part 268.

5. If unexpected conditions develop or an unexpected event occurs during these activities which necessitates an amended closure plan or work plan, then an amended closure plan or work plan shall be submitted within 30 days after the unexpected event to WMD for approval.

6. After the concrete has been removed from the hazardous waste management area, steps shall be taken to ensure that contaminated soils are not exposed. The area shall be tarped or soil materials shall be excavated and placed in covered containers while awaiting necessary analytical results.

7. In addition to the sampling strategy described in the work plan, two confirmatory samples shall be obtained and analyzed for total lead (SW-846 Method 7420) and MDNR Scan II (SW-846 Method 8020) from the western area of the hazardous waste management area. The samples shall be taken at an approximate depth of six (6) inches at locations determined by GMC-PEA and approved by WMD.

8. Soil sampling at locations E-10 and E-11 shall be conducted in the same manner as described for E-1 through E-3 in the work plan. All samples taken at these locations (E-1 through E-3, E-10 and E-11)

shall be analyzed for total lead and MDNR Scan II as described in the work plan and subject to the conditions specified herein.

9. The third paragraph on page 4 shall be modified to reflect that contaminated soils will be landfilled at the Wayne Disposal facility consistent with paragraph four on the same page.

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

October 16, 1989

Mr. Ken Gembel
GMC-Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

Subject: Work Plan for Closure Activities
Hazardous Waste Management Area
Pontiac East Assembly
MID 005 356 902

As you requested, this letter is intended to clarify the statement in my letter of October 5, 1989, that the analytical testing required for MDNR Scan II compounds refers to the Purgeable Aromatic Hydrocarbons of benzene, ethylbenzene, toluene and xylene isomers. If you have any additional questions, please contact me.

Sincerely,

Liane J. Shekter Smith

Liane J. Shekter Smith
Environmental Engineer
Hazardous Waste Permits Section
Waste Management Division
517-335-4790

cc: Mr. Steve Ranger, C-E Environmental
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Steve Buda, DNR/C&E file
Ms. Lynne King, DNR, Northville

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
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DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

January 10, 1990

Mr. Ken Gembel
GMC - Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

SUBJECT: Closure Activities - Hazardous Waste Management Area
Pontiac East Assembly
MID 005 356 902

As you requested, this letter is intended to clarify the disposal options for soil materials removed as a result of closure activities for the Pontiac East Assembly hazardous waste management area. Since the soils show detectable levels of organic constituents, the soil is considered contaminated, and the management of contaminated soil is dependent upon the source of contamination. Existing data does not show or indicate that the source of contamination is a listed waste. It has been agreed that the source of contamination is therefore a characteristic waste. The soil must be managed as a hazardous waste if the soil exhibits any characteristic of a hazardous waste. In this instance, the organic constituents detected are aromatic hydrocarbons, so the soil must be sampled and analyzed for ignitability to determine if the soil is a hazardous waste. If the soil does not exhibit the characteristic of ignitability, then the soil may be managed as a solid waste.

If you have any additional questions, please contact me.

Sincerely,

Liane J. Shekter Smith

Liane J. Shekter Smith
Environmental Engineer
Hazardous Waste Permits Section
Waste Management Division
517-335-4790

cc: Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Steve Buda, DNR
Ms. Lynne King, DNR - Northville
C&E File

APPENDIX D

ANALYTICAL REPORT DATED JULY 12, 1989

COMBUSTION ENGINEERING

89718.DOC
5395-00 file

July 12, 1989

Mr. Ken Gembel
Pontiac East Assembly - Truck & Bus Group
General Motors Corporation
31 Judson Street
Pontiac, MI 48058

Dear Mr. Gembel:

Subject: Analytical Results of Rinsate Samples Collected During Cleanup of the Pontiac East Assembly Waste Storage Area

C-E Environmental, Inc. (C-EE) is presently assisting General Motors Corporation, Truck & Bus Group, Pontiac East Assembly (GM-PEA) with the closure of its waste storage area. As a part of this closure project, two tanks in, and the concrete containment pad of, the GMC-PEA waste storage area required cleaning.

On March 29 and 30, 1989, Mr. Tim Palmer, Environmental Scientist at C-EE monitored the cleanup of these items. The cleanup of the pad and tanks consisted of power-washing these items with a high-pressure water spray and was performed in accordance with the "Hazardous Waste Storage Facility Closure Plan" for GMC-PEA dated September, 1987. Inland Waters, Inc. conducted the cleanup of the pad and the two tanks.

In accordance with the closure plan, Mr. Palmer collected samples of the rinsate from the tank and pad cleaning operations. The tank rinsate sample (Sample C-3) was a composite sample consisting of rinse water collected from both tanks. This sample was analyzed for volatile organic compounds (SW-846, Method 8010/8020). The containment pad rinsate samples (Sample C-1 and C-4)

C-E Environmental, Inc.
A subsidiary of
Combustion Engineering, Inc.

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(313) 661-3100

consisted of rinse waters which were collected in the containment pad's sump. Sample C-1 was analyzed for volatile organic compounds, and sample C-4 was analyzed for hexavalent chromium (SW-846, Method 7195-7), and lead (SW-846, Method 7420). A sample of the tap water (Sample C-2) used for rinsing the tanks and containment pad was also collected and analyzed for volatile organic compounds.

Analysis of the water samples was conducted by Burmah Technical Services, Inc. of Pontiac, Michigan. The analytical results for the metals are presented in the attached Table 1. The analytical results for the volatile organic compounds are presented in Table 2.

No detectable level of hexavalent chromium was observed in the containment pad rinsate. The level of detection (LOD) for the hexavalent chromium was 0.05 milligrams per liter (0.05 mg/L). Lead was detected in the pad rinsate sample at a level of 0.27 mg/L. This level, however, is far below the action level of 5.0 mg/L established in the closure plan.

With the exception of chloroform in the tap water and tank rinsate samples, no detectable levels of volatile organics were observed in the collected water samples. The chloroform detected in the tank rinsate sample appears to be attributable to the chloroform detected in the tap water. The LOD for the volatile organic compounds is 10 micrograms per liter (10 ug/L).

On May 25, 1989, C-EE submitted a letter report to GMC-PEA on the analytical results for soil samples collected from the waste storage area. In this letter, C-EE referenced background soil samples which were collected by Mr. Palmer on April 19, 1989 and analyzed for lead and hexavalent chromium. As you requested during our telephone conversation of June 28, 1989, the approximate locations of these background samples are presented in the attached Figure 1 and the analytical results for these samples are presented in Table 1. More detailed location diagrams for these background samples will be provided in the final closure report.

COMBUSTION ENGINEERING

If you have any questions, please call me at 661-3100. I look forward to continued work with you on this project.

Sincerely,

C-E ENVIRONMENTAL, INC.

Steven M. Ranger
Environmental Engineer

SMR/baw

Enclosures

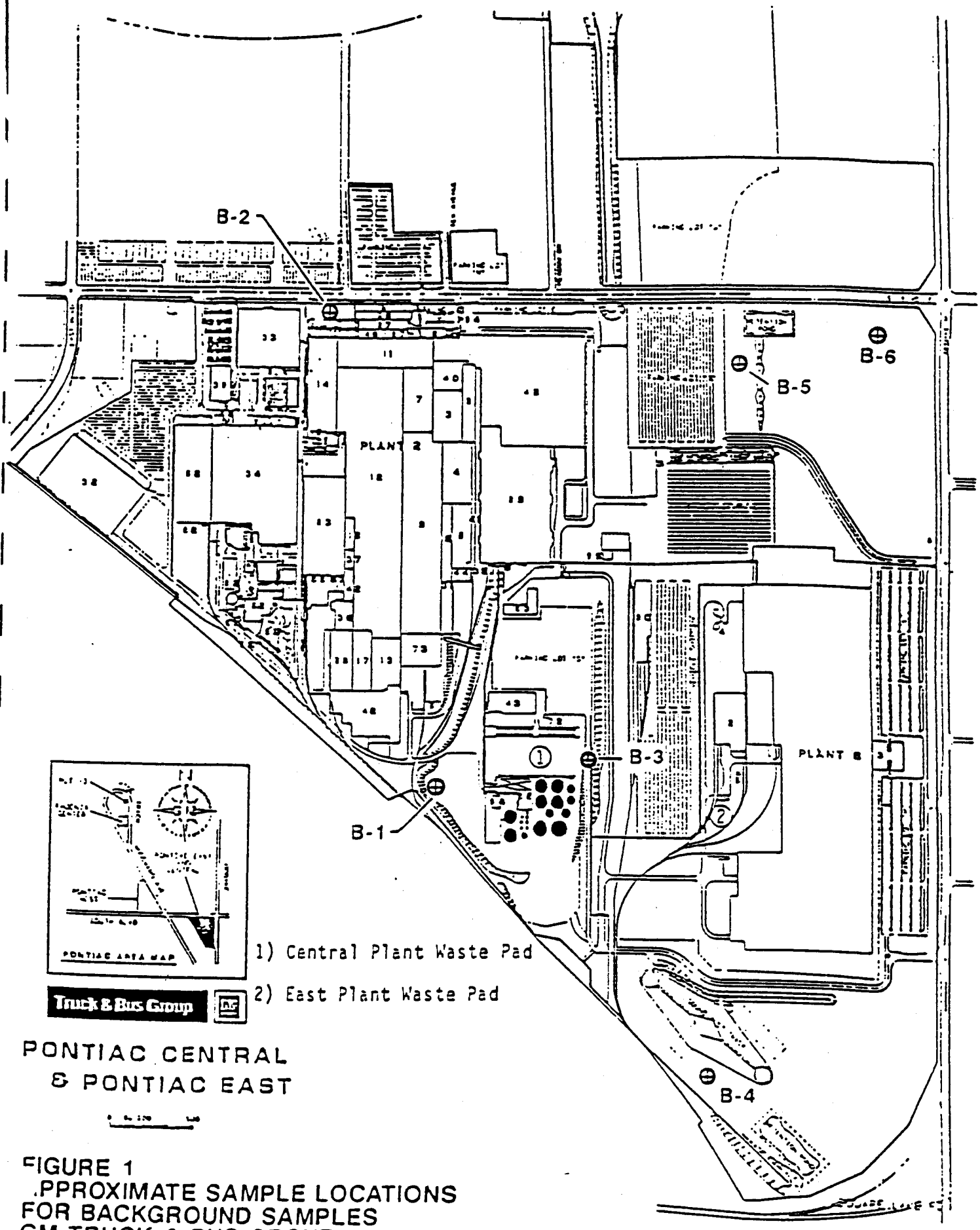


FIGURE 1
APPROXIMATE SAMPLE LOCATIONS
FOR BACKGROUND SAMPLES
GM TRUCK & BUS GROUP
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E ENVIRONMENTAL, INC.

TABLE 1

ANALYTICAL RESULTS FOR METALS
GM Truck & Bus East Assembly, Pontiac, Michigan

ANALYTE	C-4 Pad Rinsate	B-1	B-2	B-3	B-4	B-5	B-6	B-6 Duplicate
Total Hex Chromium	<0.5 mg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Lead	0.27 mg/L	65	240	140	15	24	57	64

Notes:

All results in milligrams per kilogram (mg/kg) unless otherwise noted.

TABLE 2
ANALYTICAL RESULTS FOR ORGANIC VOLATILE COMPOUNDS
GM Truck & Bus East Assembly, Pontiac, Michigan

ANALYTE	C-1 Pad Rinsate	C-2 Tap Water	C-3 Tank Rinsate
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND
Chlorobenzene	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND
Chloroform	ND	15 to 20	4
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND
Methylene Chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl Chloride	ND	ND	ND
Benzene	ND	ND	ND
Ethyl Benzene	ND	ND	ND
Toluene	ND	ND	ND
Xylenes (all isomers)	ND	ND	ND
Acetone	ND	ND	ND
MEK	ND	ND	ND
MIBK	ND	ND	ND

Notes:

All results in micrograms per liter (ug/L).
ND - Not detectable (detection limit of 10 ug/L).

APPENDIX E

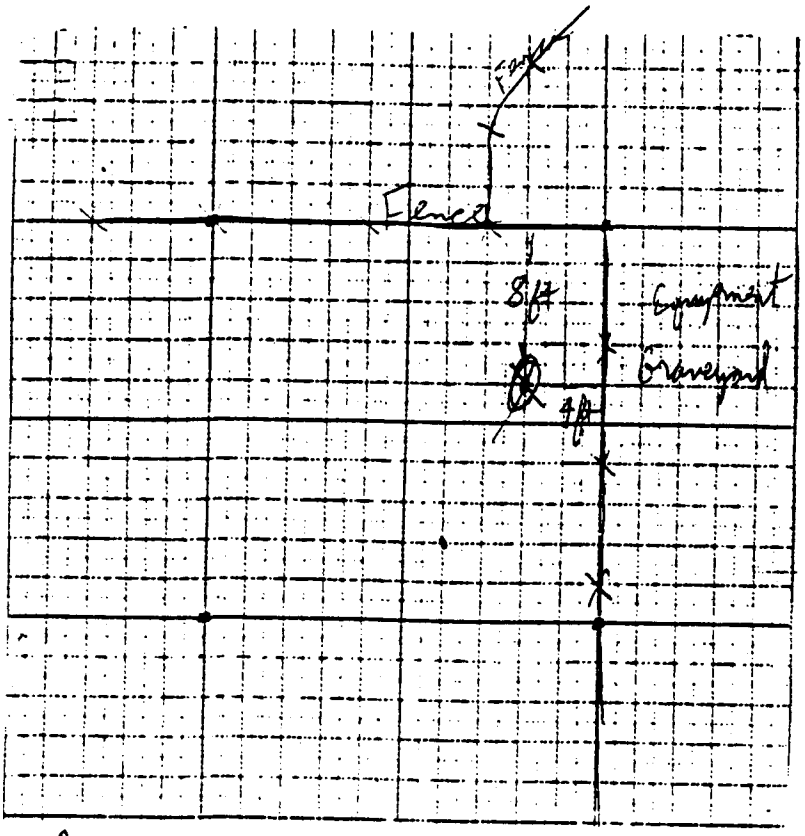
SAMPLE DATA SHEETS

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 593500 Site No. B-1

Date 19 Apr 89 Time Start 900 Time Finish 910



SKETCH MAP OF SAMPLE SITE

North

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	0.8 ppm	0.9 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 (11.7)

Protection Level: B C D

Sampling Crew

1. C Skielty
2. T. Palmer
3.

Sample Designations(s)

B-1 Background

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: 0.8 ppm Background Ground moist and covered with grass & weeds small thorn bush

Timothy J Palmer
(signed)

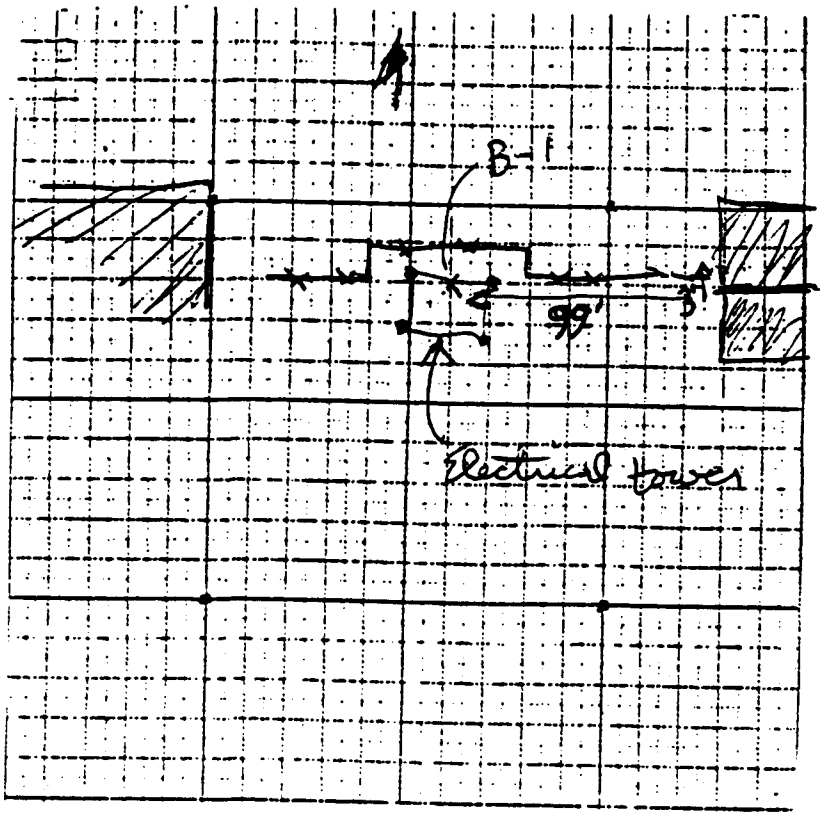
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. B-2

Date 19 April 89 Time Start 0930 Time Finish 0938



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	2.0 ppm	2.1 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C D

Sampling Crew

1. T. Palmer
2. C. Kielty
3.

Sample Designations(s)

B-2 Background

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Ground moist; 3" of wood chips and peat (removed) Sample taken from native soil.

Chris J. Kielty
(signed)

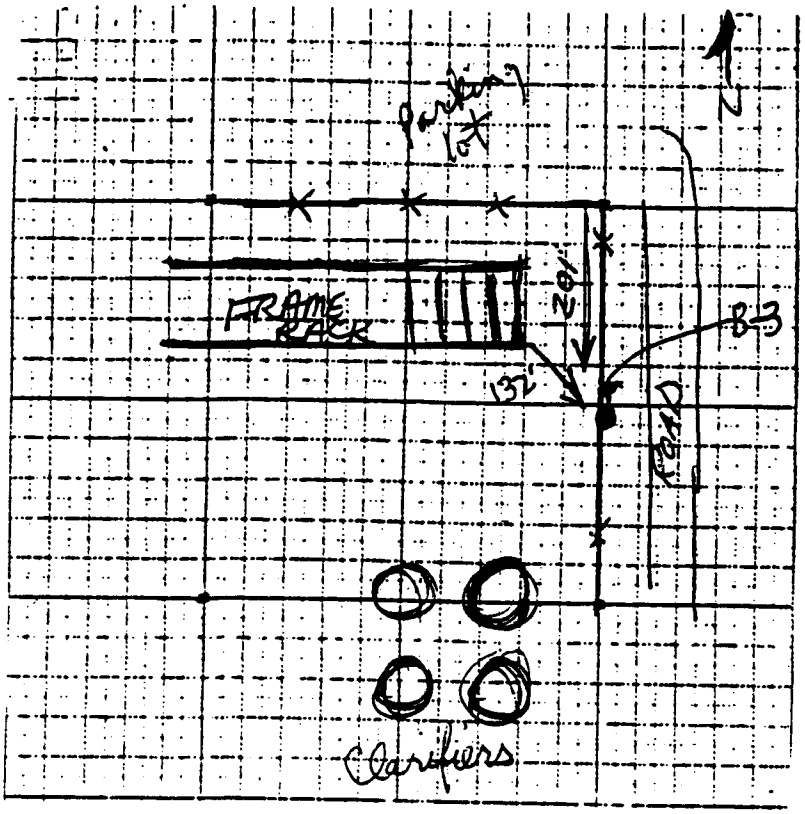
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. B-3

Date 19 April 87 Time Start 1000 Time Finish 1005



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	1.4 ppm	2.0 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 (1.7)

Protection Level: B C (D)

Sampling Crew

1. C. Kelly
2. T. Palmer
3.

Sample Designations(s)

B3 Background

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Moist to Wet Dark Brown Sand + Gravel (Fill)

(signed)

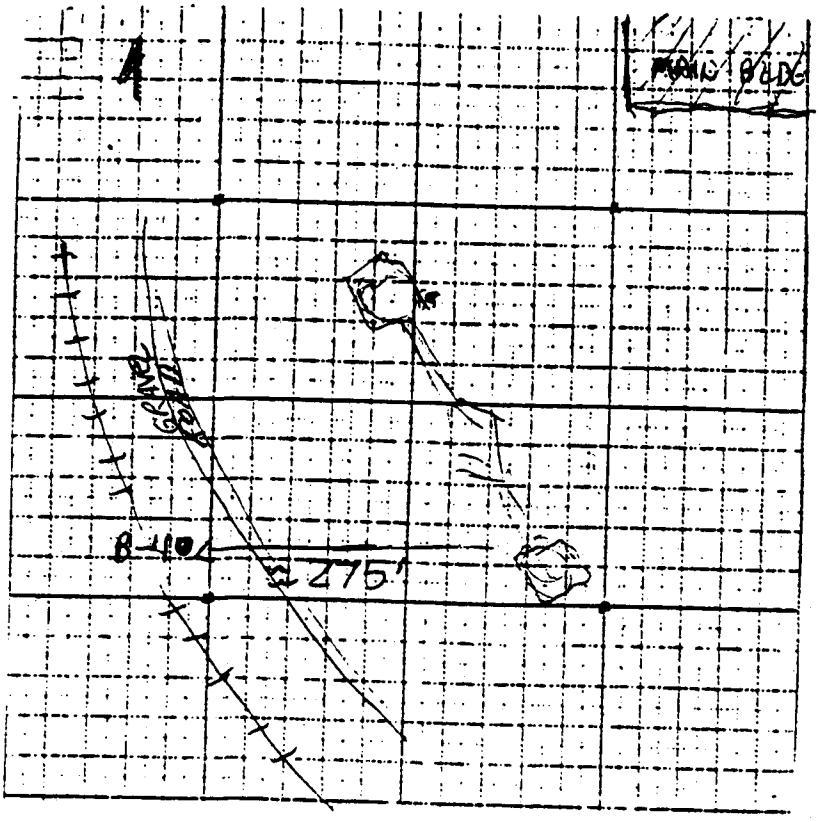
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. Gm PEA

Date 4/20/89 Time Start _____ Time Finish 1020



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	— ppm	— ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C (D)

Sampling Crew

1. C. Kelly
2. T. Palmer
3.

Sample Designations(s)

B-4

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Brown sand w/some gravel; very moist
Gray clay @ 6" — no odor

(signed) Jean Kelly

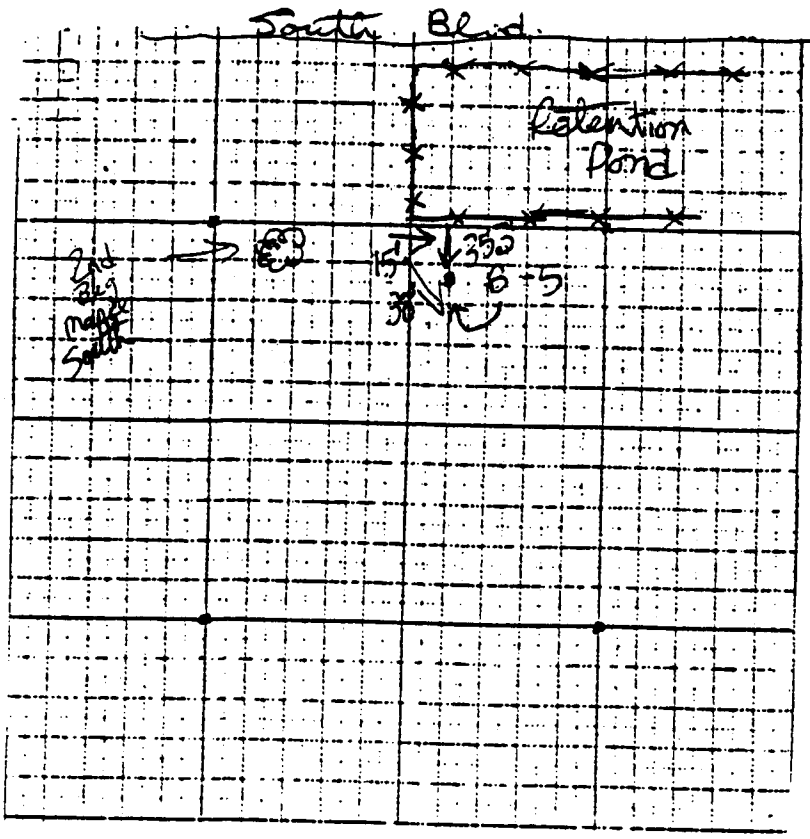
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-cc Site No. GM PEA

Date 4/20/89 Time Start _____ Time Finish 1040



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	ppm	ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C D

Sampling Crew

1. C. Kielty
2. T. Palmer
3.

Sample Designations(s)

B-5

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Brown Sand, some clay, trace fine gravel - no odor

Craig Kielty
(signed)

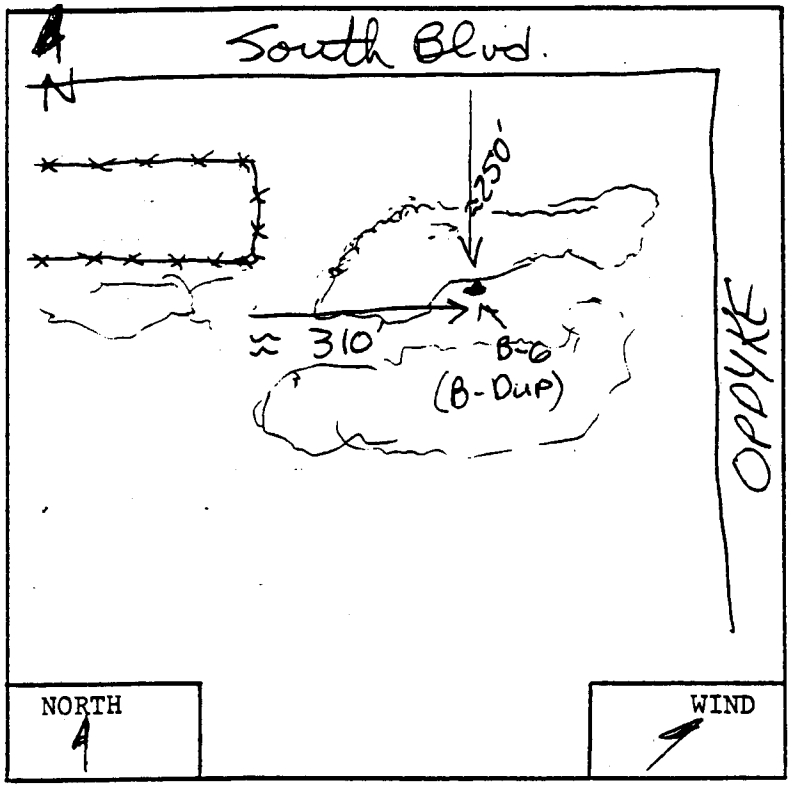
Reference:

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-00 PROJECT NAME GM PEA DATE 4/20/89

SAMPLE TYPE Soil SAMPLE DESIGNATION B-6 / B-DUP SAMPLE TIME 1055



LOCATION SKETCH

PID METER USED —

AMBIENT _____ ppm

SAMPLE _____ ppm

HEADSPACE _____ ppm

SAMPLING CREW C. Kielty
T. Palmer

EQUIPMENT USED _____

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

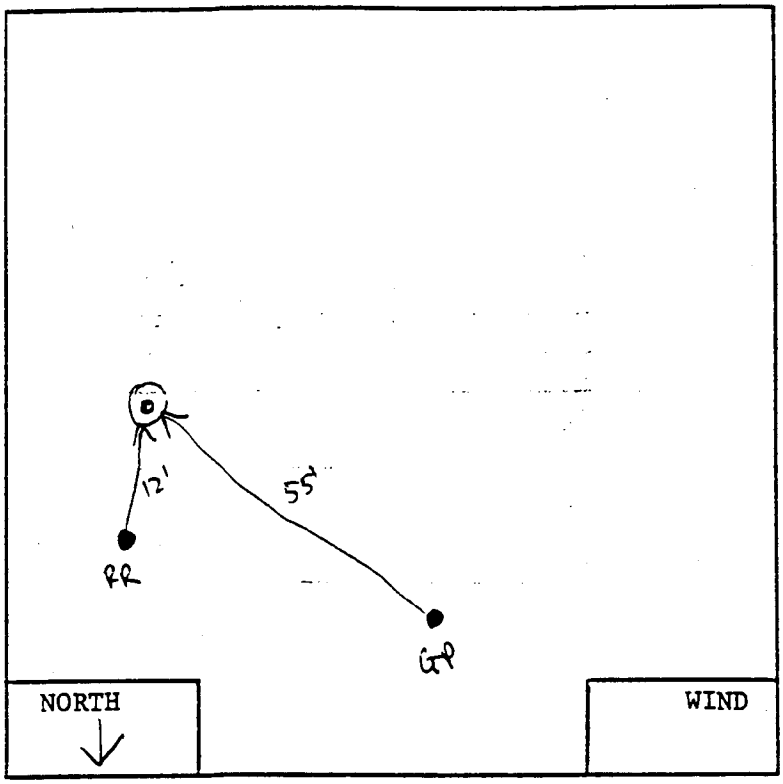
SAMPLE DESCRIPTION Brown Sand; natural organic material; some clay
- no odor -
Duplicate sample taken (B-dup)

SAMPLED BY Craig Kielty / Tom Palmer

C-E ENVIRONMENTAL, INC.
SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMC-PEA DATE 2/28/90

SAMPLE TYPE Soil / Grab SAMPLE DESIGNATION CS-1 SAMPLE TIME 13:30



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Belan
Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Sample from east wall of excavation

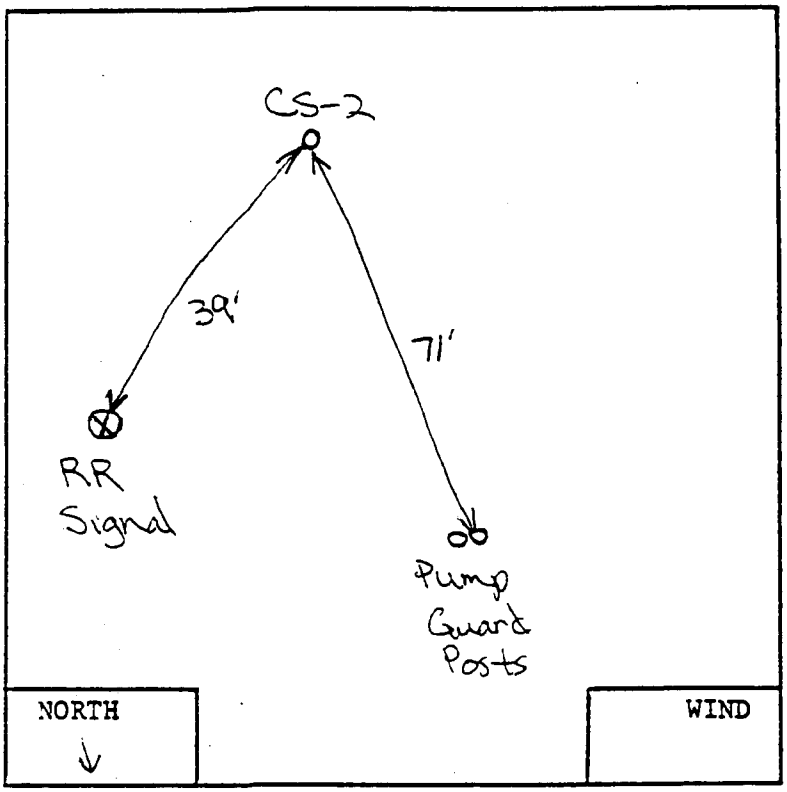
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 2/26/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-2 SAMPLE TIME 3:00 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT ——— ppm

SAMPLE ——— ppm

HEADSPACE ——— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

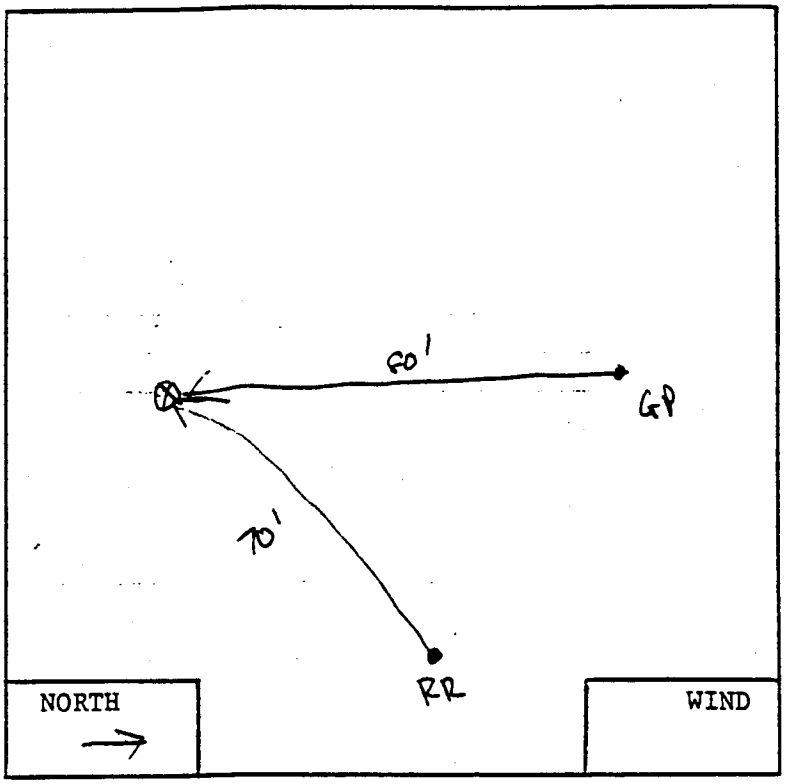
SAMPLE DESCRIPTION Black/gray gravel (possibly ballast) and sand from east side of south excavation wall.

SAMPLED BY Dave Belan

C-E ENVIRONMENTAL, INC.
SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMC-PEA DATE 2/26/90

SAMPLE TYPE Grab/Soil SAMPLE DESIGNATION CS-3 SAMPLE TIME 16:00



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

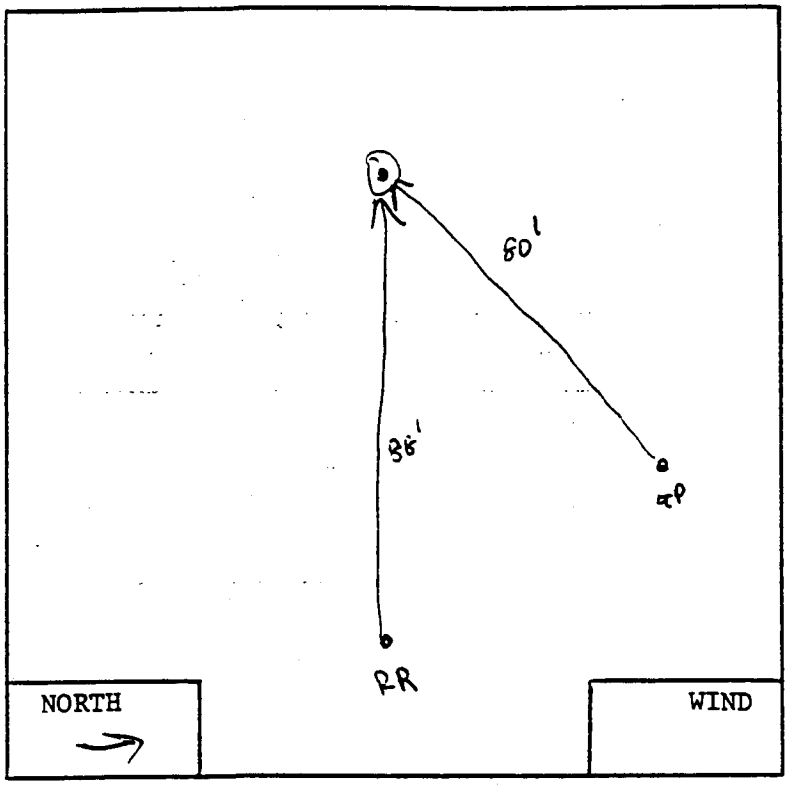
SAMPLE DESCRIPTION Soil Sample from South wall of excavation. Mostly Clay - some sands at surface

SAMPLED BY Dave Belan

C-E ENVIRONMENTAL, INC.
SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMC-PEA DATE 2/26/90

SAMPLE TYPE Grab/Soil SAMPLE DESIGNATION CS-4 SAMPLE TIME 16:30



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil Sample from West Wall of Excavation Mix of Sands and clay to base of excavation.

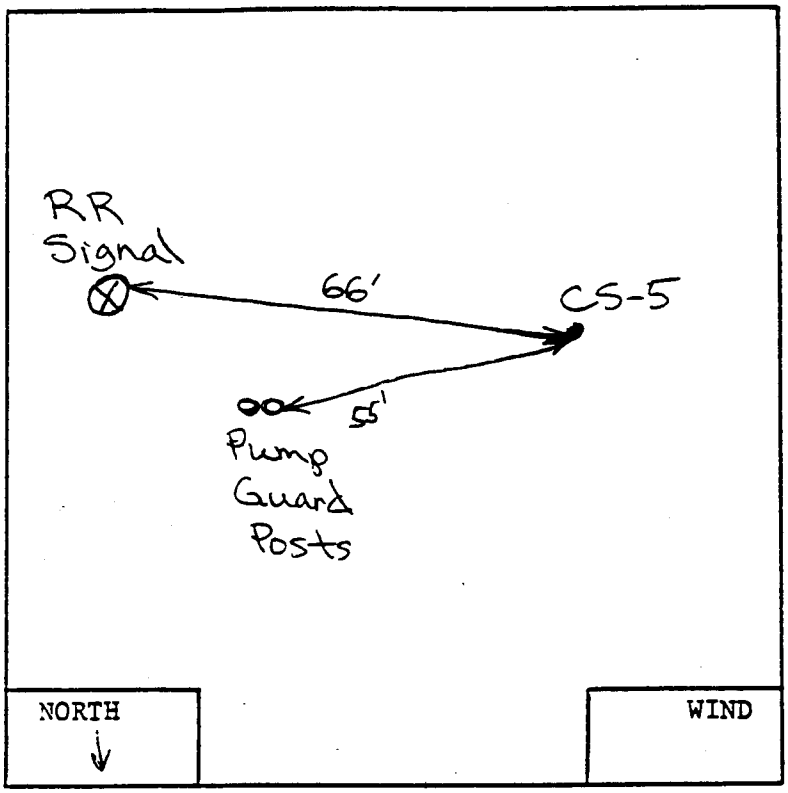
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 2/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-5 SAMPLE TIME 10:10 a.m.



LOCATION SKETCH

PID METER USED —

AMBIENT — ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from west side of north excavation wall.

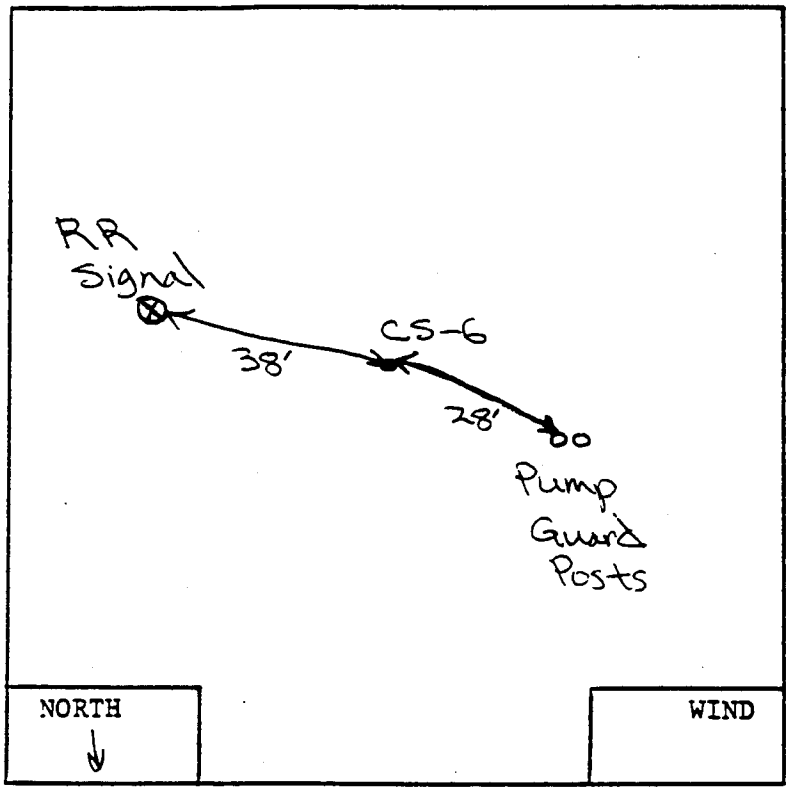
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 2/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-6 SAMPLE TIME 10:20 a.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED —

AMBIENT — ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from middle portion of north excavation wall.

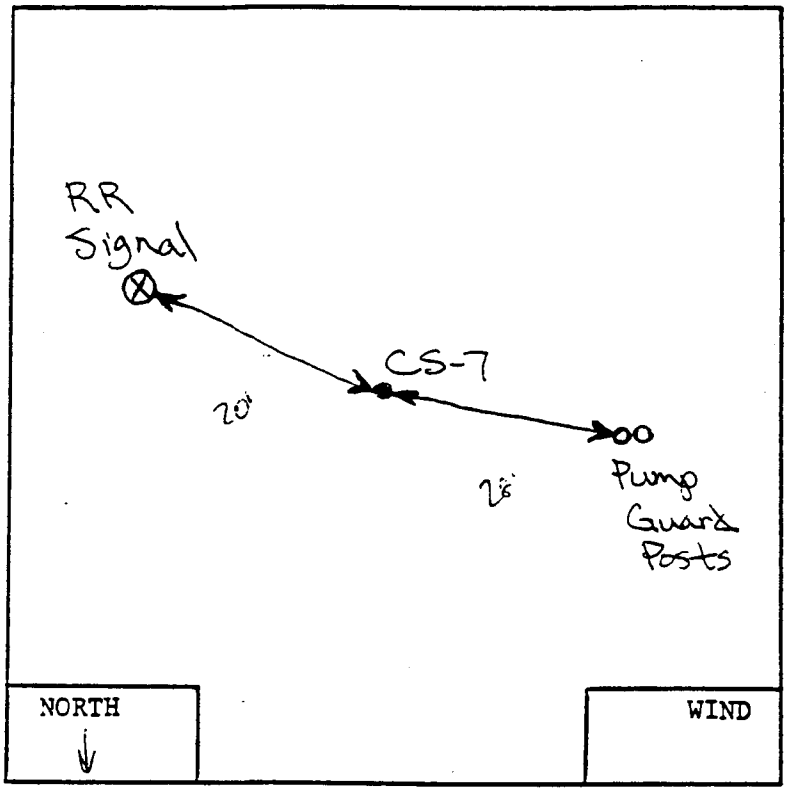
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 2/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-7 SAMPLE TIME 10:45a



LOCATION SKETCH

PID METER USED ——

AMBIENT —— ppm

SAMPLE —— ppm

HEADSPACE —— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from east side of north excavation wall.

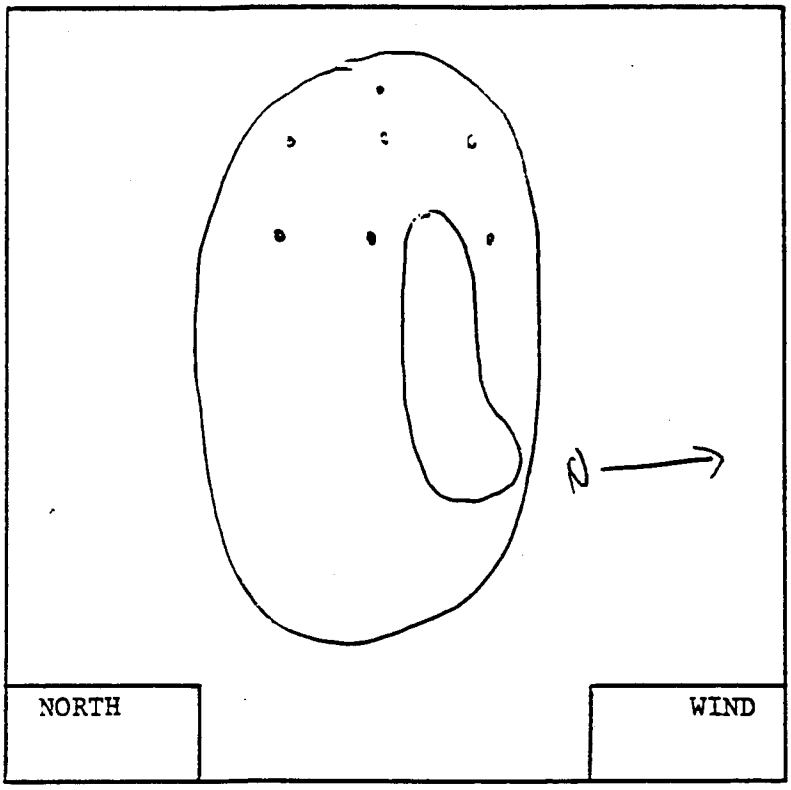
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B 9EA Waste Storage Area DATE 2/26/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-8 SAMPLE TIME 3:20 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☐ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT — ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan
Steve Range

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Floor soil composite from west end of 2.0 feet deep excavation. Sample collected from seven locations.

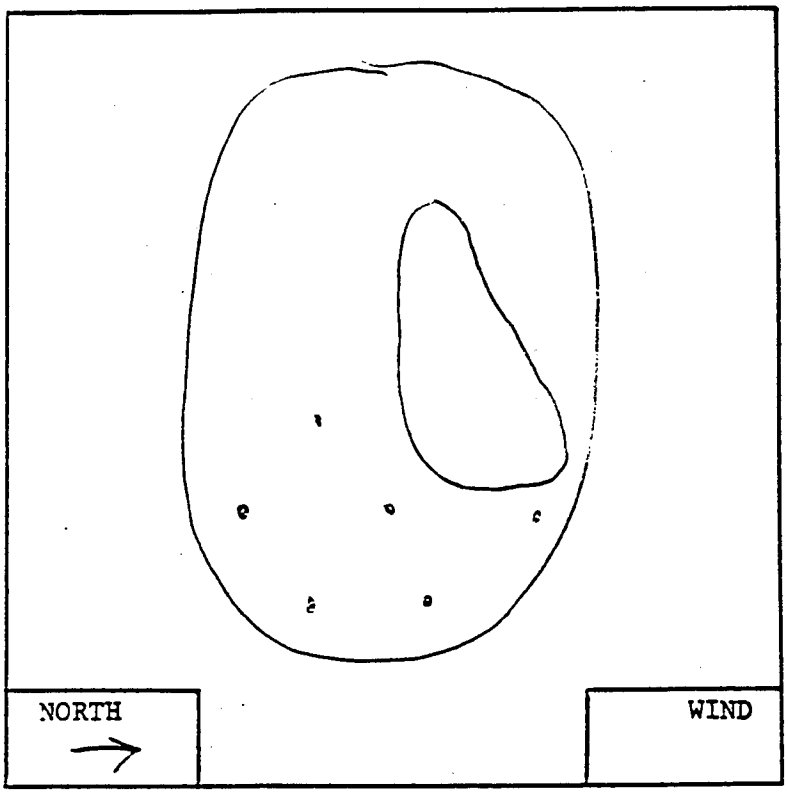
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&TB PEA Waste Storage Area DATE 2/26/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-9 SAMPLE TIME 3:25 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☐ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT ——— ppm

SAMPLE ——— ppm

HEADSPACE ——— ppm

SAMPLING CREW Dave Belan
Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Floor soil composite from east side of 2.0 feet deep excavation. Sample collected from six locations.

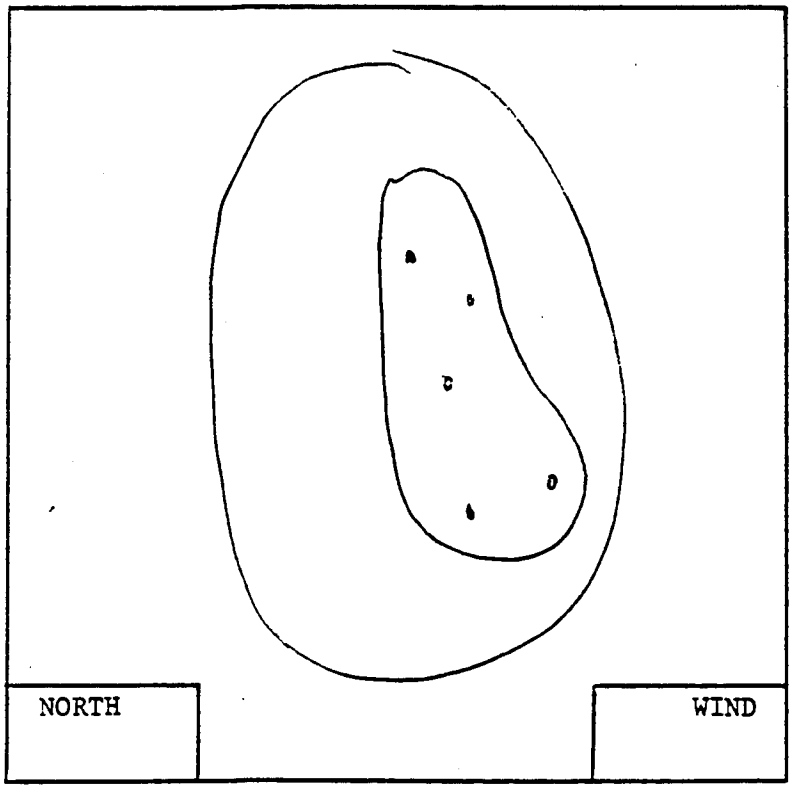
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 2/26/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-10 SAMPLE TIME 3:30 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT — ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan
Steve Ran

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☐ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Floor soil composite from deep excavation area near manhole. Sample collected from five locations.

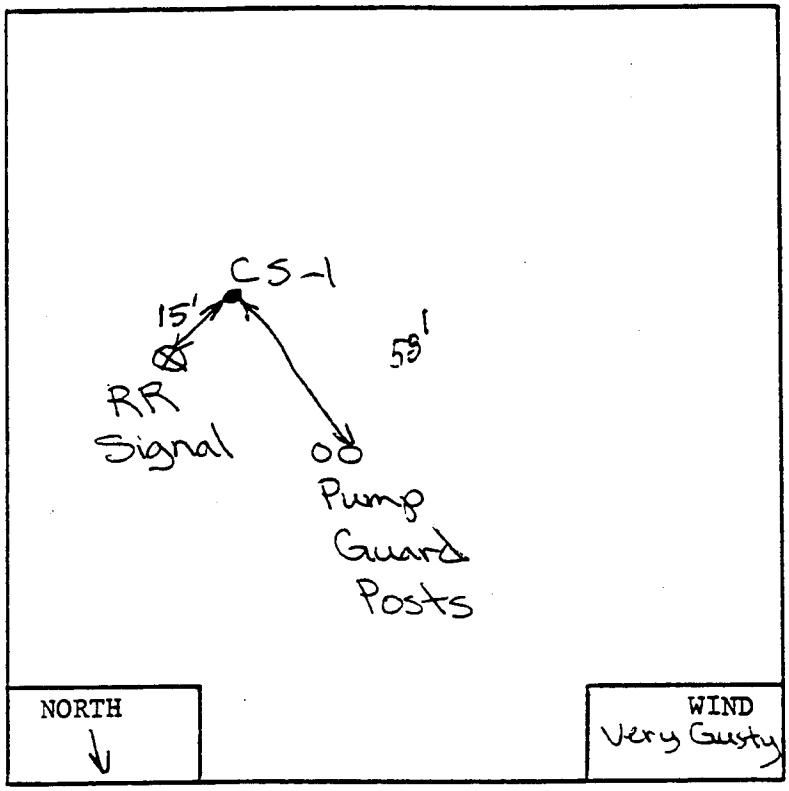
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/12/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-1 SAMPLE TIME 2:30 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT — ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from east wall of excavation.

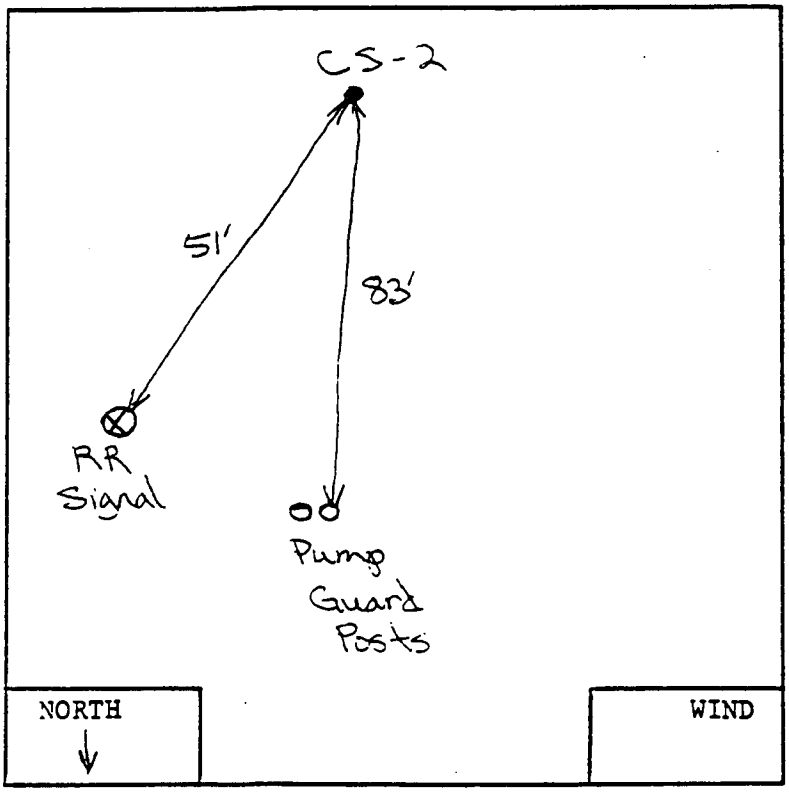
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 3/12/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-2 SAMPLE TIME 11:02a.m



LOCATION SKETCH

PID METER USED OVM

AMBIENT —— ppm

SAMPLE O ppm

HEADSPACE —— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from east side of south excavation wall.

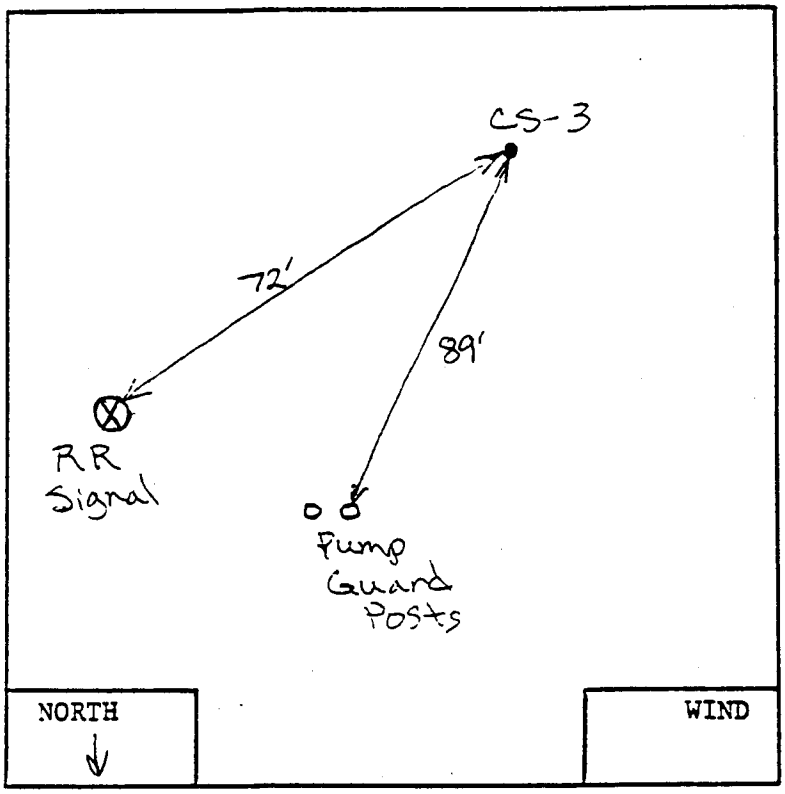
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMT&B PEA Waste Storage Area DATE 3/12/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-3 SAMPLE TIME 11:30a.m



LOCATION SKETCH

PID METER USED OVM

AMBIENT — ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from west side of south excavation wall.

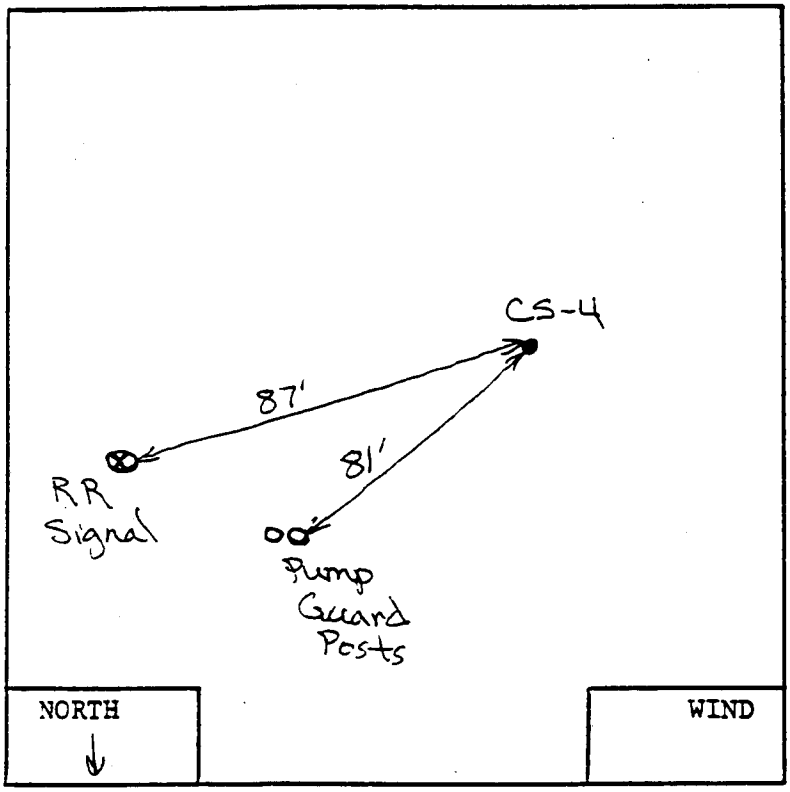
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/13/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-4 SAMPLE TIME 11:45 a.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT — ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from west wall of excavation.

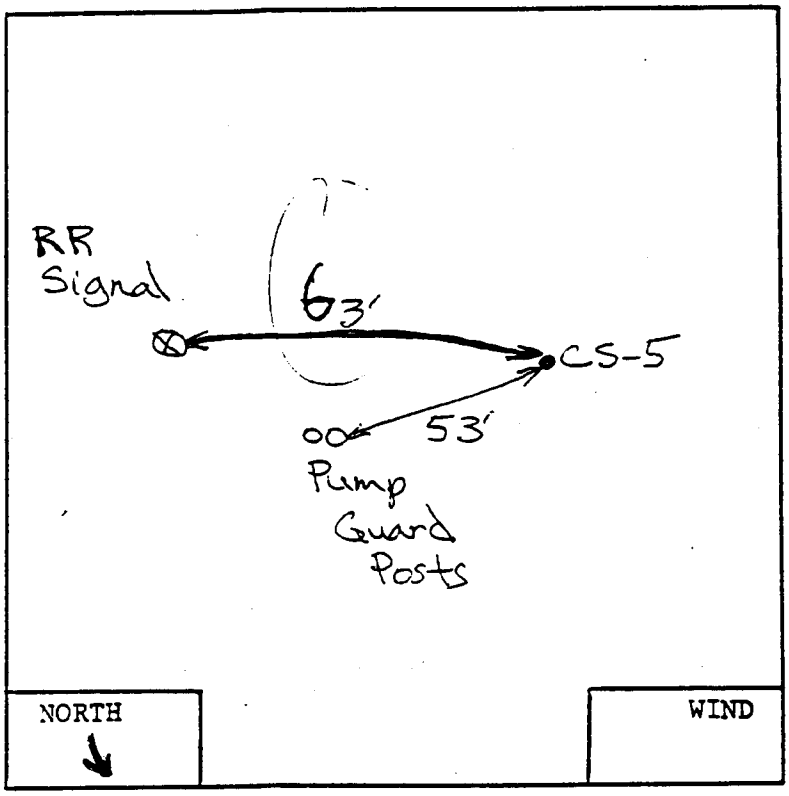
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T4B BEA Waste Storage Area DATE 3/14/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-5 SAMPLE TIME 1:25 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT ——— ppm

SAMPLE 0 ppm

HEADSPACE ——— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from west side of north excavation wall.

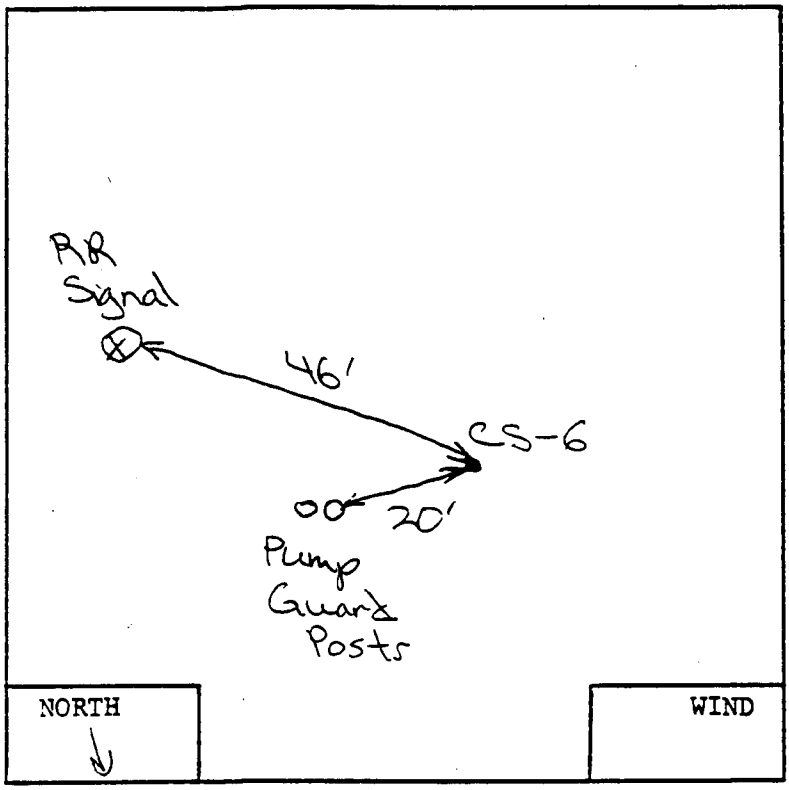
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 3/14/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-6 SAMPLE TIME 11:50 a.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT — ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from middle portion of north excavation wall.

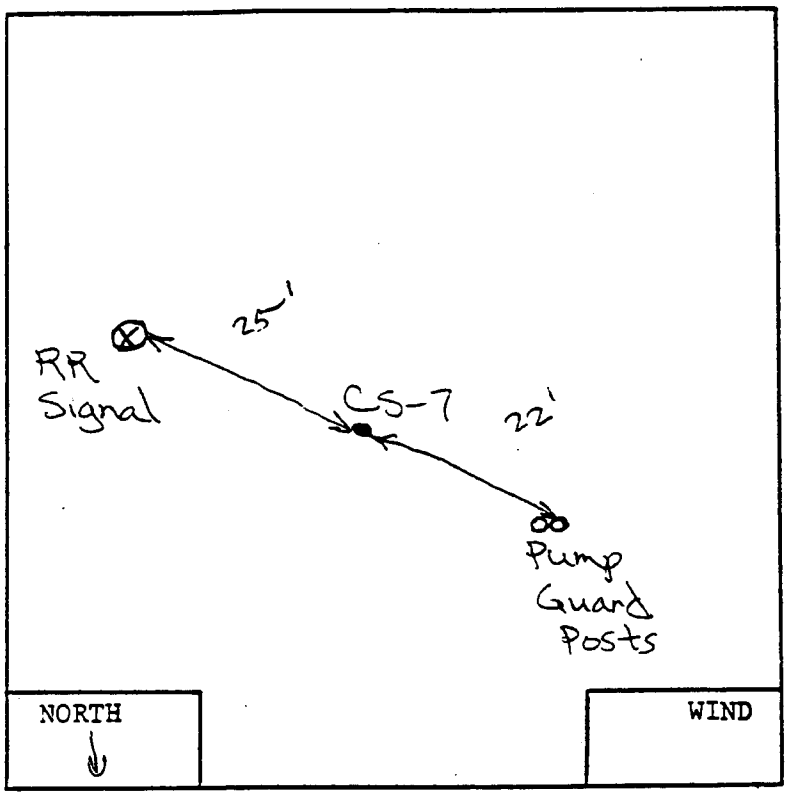
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/14/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-7 SAMPLE TIME 11:55a.m



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED O/M

AMBIENT —— ppm

SAMPLE 0 ppm

HEADSPACE —— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from east side of north excavation wall.

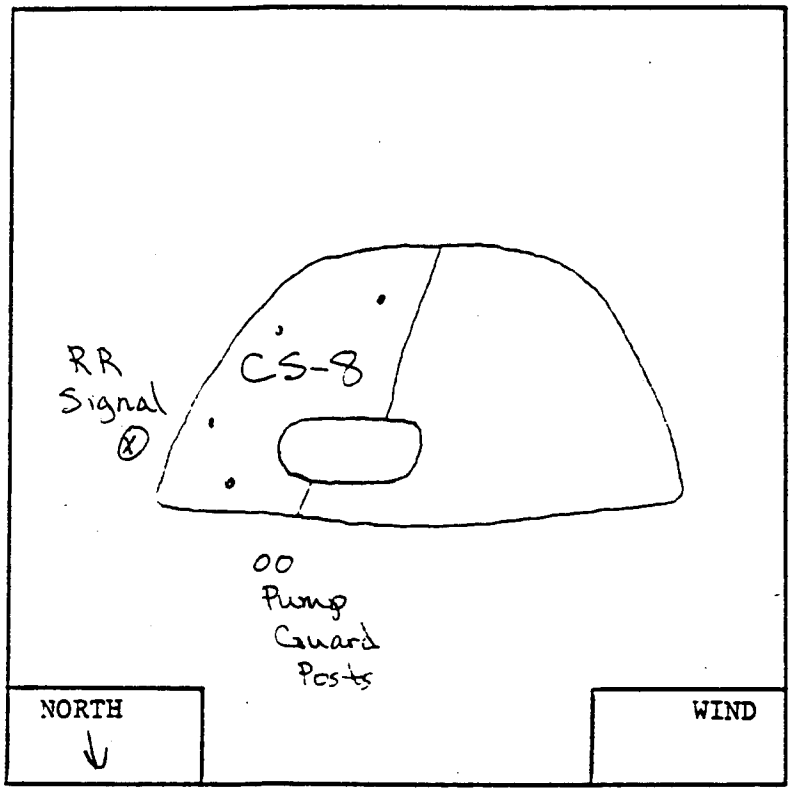
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMT&B PEA Waste Storage Area DATE 3/13/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-8 SAMPLE TIME 8:15 a.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil composite from floor on east end of excavation. 4 sample points. All clays - Semi-moist

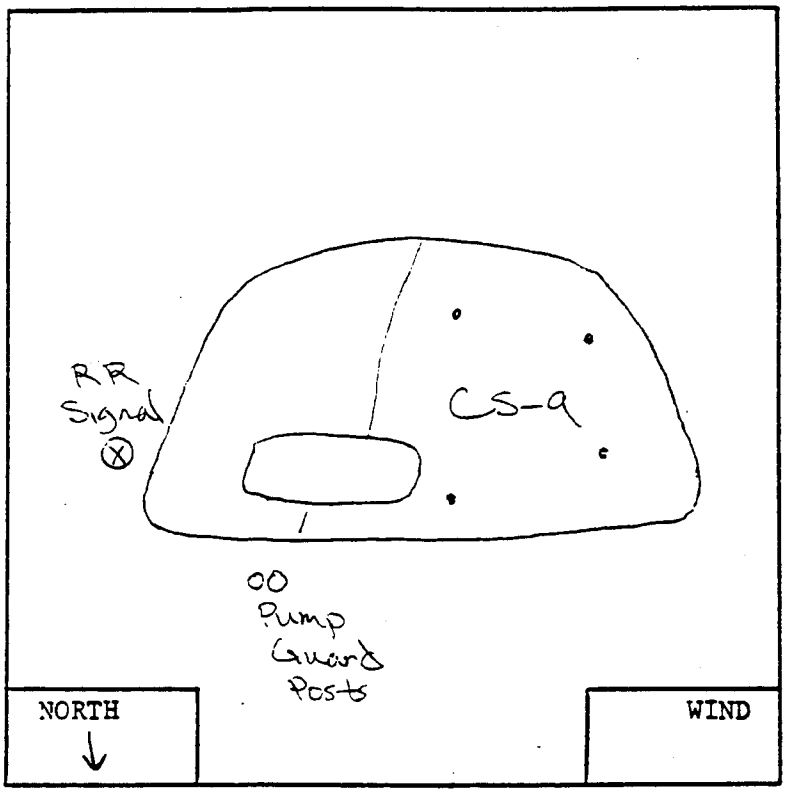
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B SEA Waste Storage Area DATE 3/13/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-9 SAMPLE TIME 11:40 a.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED O/M

AMBIENT —— ppm

SAMPLE 0 ppm

HEADSPACE —— ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil composite from floor on west end of excavation. 4 sample points all clays - dry.

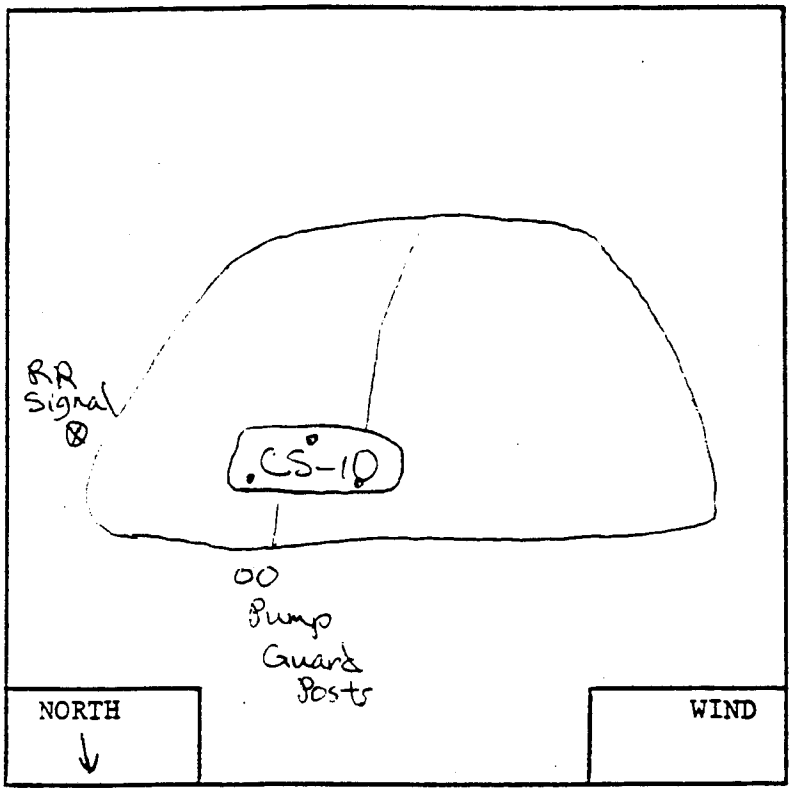
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B 9EA Waste Storage Area DATE 3/13/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION CS-10 SAMPLE TIME 12:55 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT — ppm

SAMPLE 1.5-6.0 ppm

HEADSPACE — ppm

SAMPLING CREW Dave Belan

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Floor soil composite from deep excavation area near manhole. 3 Sampling Points All clays very moist

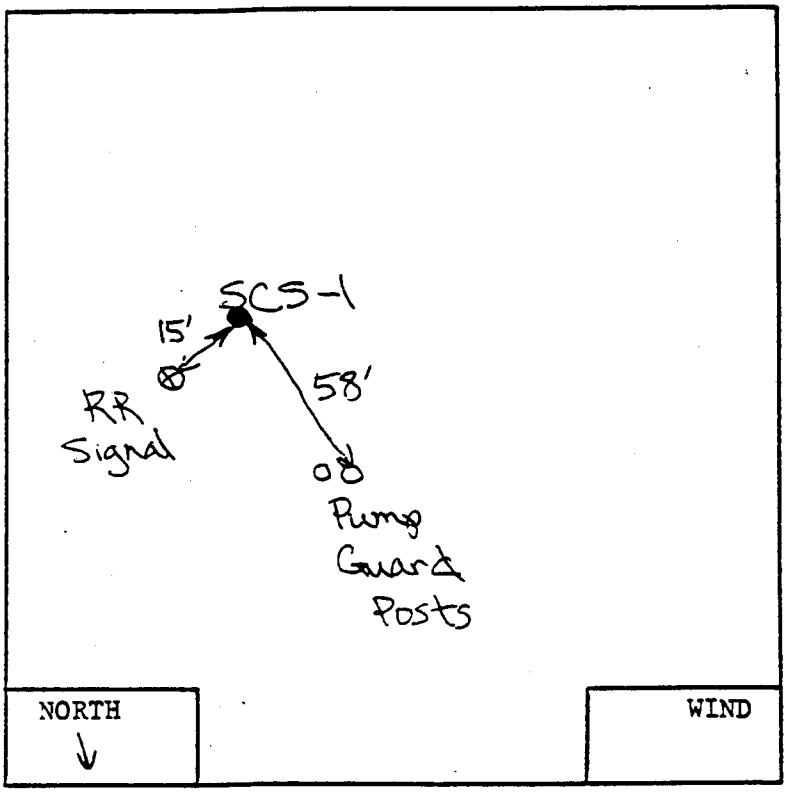
SAMPLED BY Dave Belan

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GW T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-1 SAMPLE TIME 12:40 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger
Nancy Grassel

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from 0 to 2 ~~feet~~ interval of excavation sidewall. Soil consisted of 1½ feet of gravelly sand overlying gray clay layer. Sample from east wall of excavation.

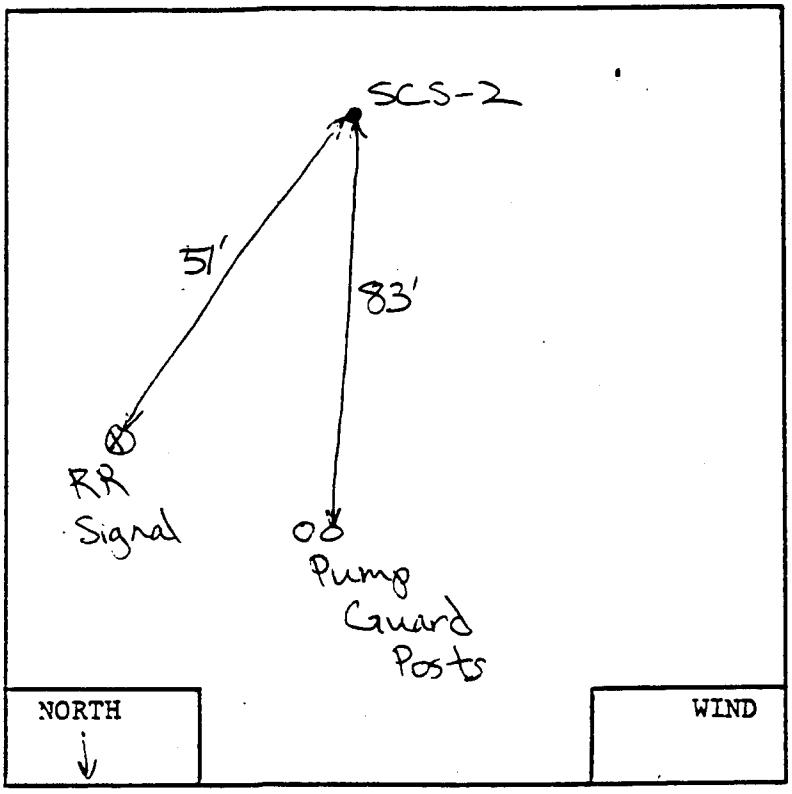
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-2 SAMPLE TIME 12:43 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger
Nancy Gassel

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from 0 to 2 ~~feet~~ interval of excavation sidewall. Soil consisted of alot of gravel with some dark staining in a gravel layer from 1 to 1½ feet. Sample from east side of south excavation wall.

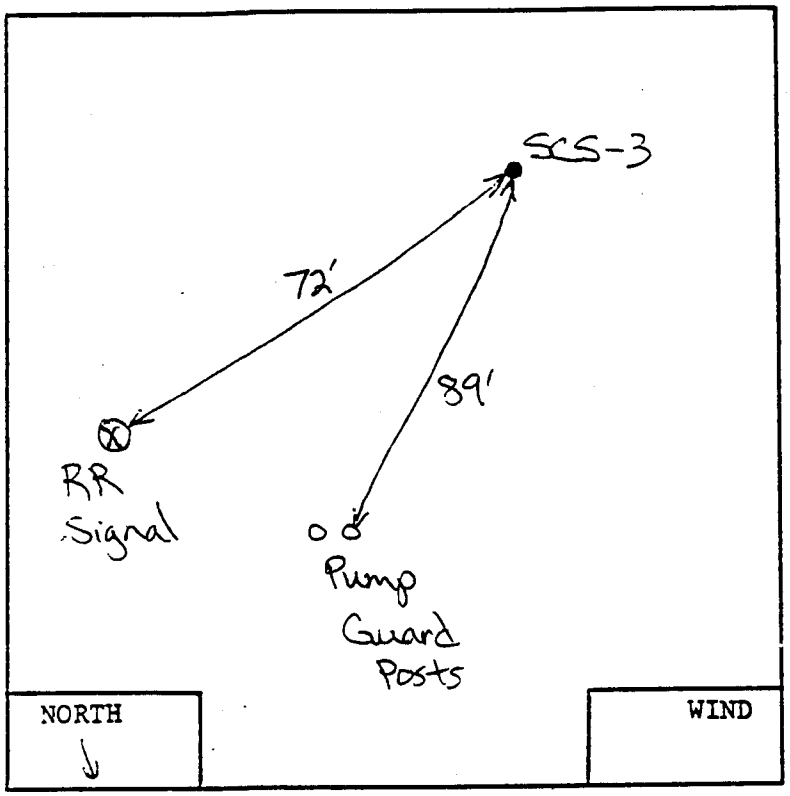
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-3 SAMPLE TIME 12:50 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger
Nancy Grassel

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from 0 to 1 foot interval of excavation wall. Soil consisted of dry orange clay from 3 inches to one foot. Sample from west side of south excavation wall.

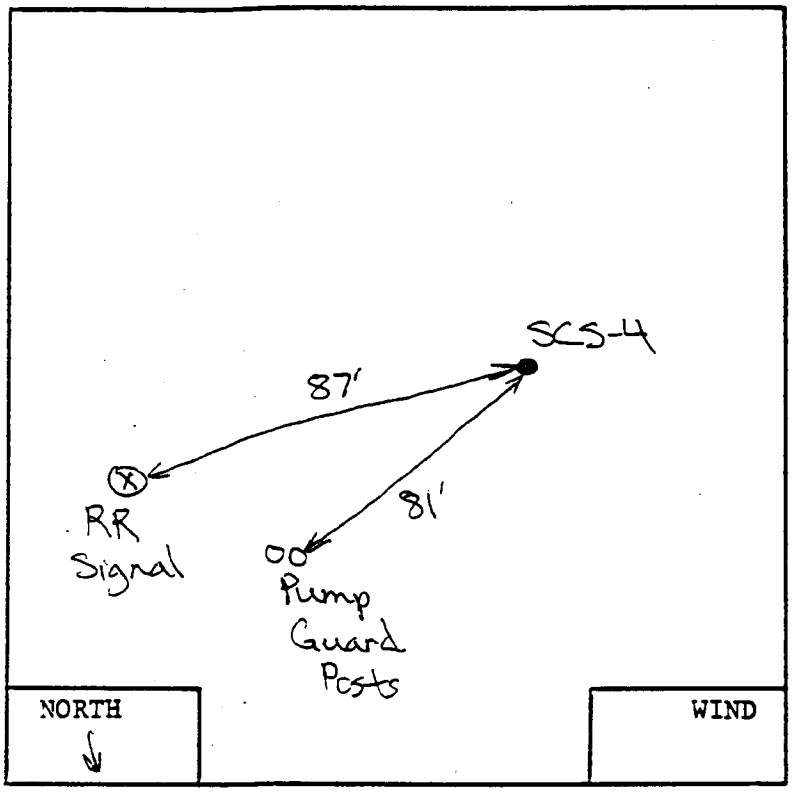
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-4 SAMPLE TIME 12:55 p.m



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger, Nancy Gassel

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from 0 to 1½ foot interval of excavation wall. Soil consisted of gravel mix from 0 to 1 foot, and moist gray clay from 1 to 1½ feet. Soil from west wall of excavation.

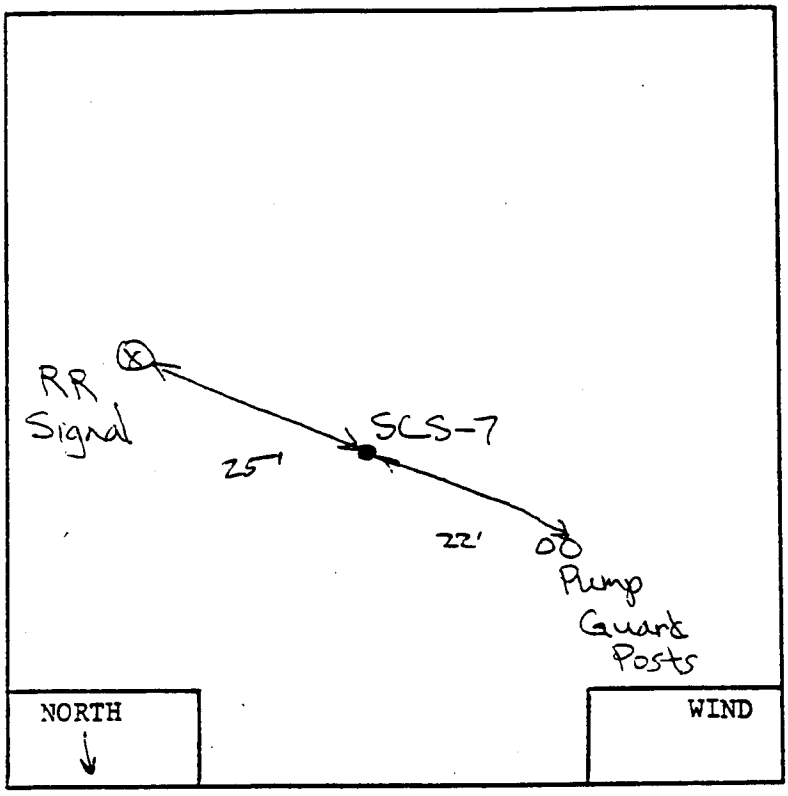
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA ~~Waste Storage Area~~ DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-7 SAMPLE TIME 12:35 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger
Nancy Gassel

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil from 0 to 2 ~~feet~~ interval of wall consisting of 6 inches of damp orange sand overlying moist gray clay. Collected one jar for NET lab analysis. Sample from east side of north excavation wall.

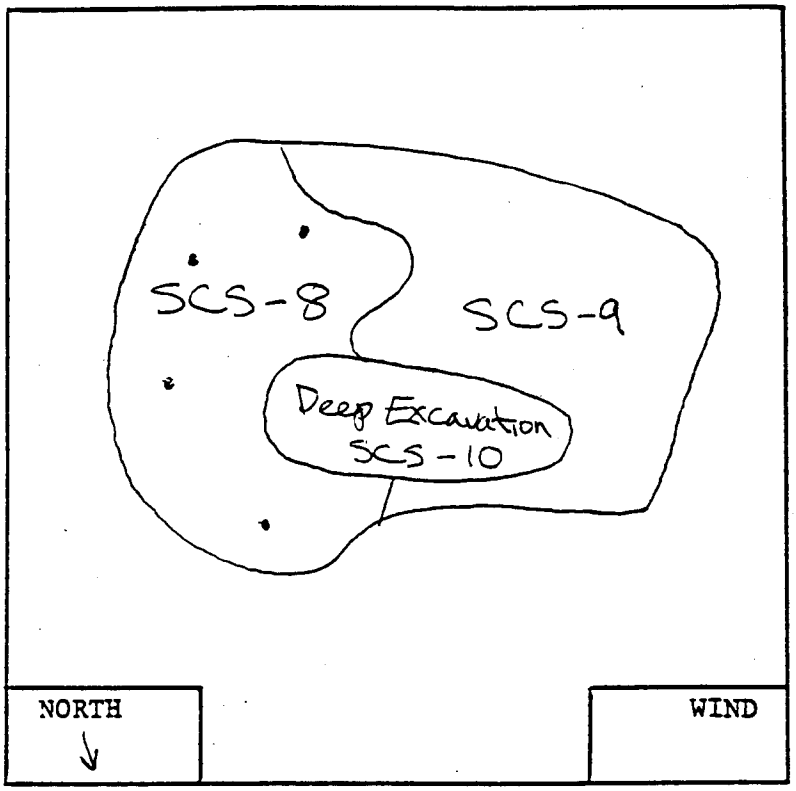
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Composite SAMPLE DESIGNATION SCS-8 SAMPLE TIME 11:50 a.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~: USE DIMENSIONS~~

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE ——— ppm

SAMPLING CREW Steve Ranger
Nancy Gassel

EQUIPMENT USED Jars

SAMPLE DESCRIPTION Soil composite from four locations consisting of 4 days. Collected one jar for NET lab analysis and one jar for C-EE lab analysis. Sample from east side of excavation.

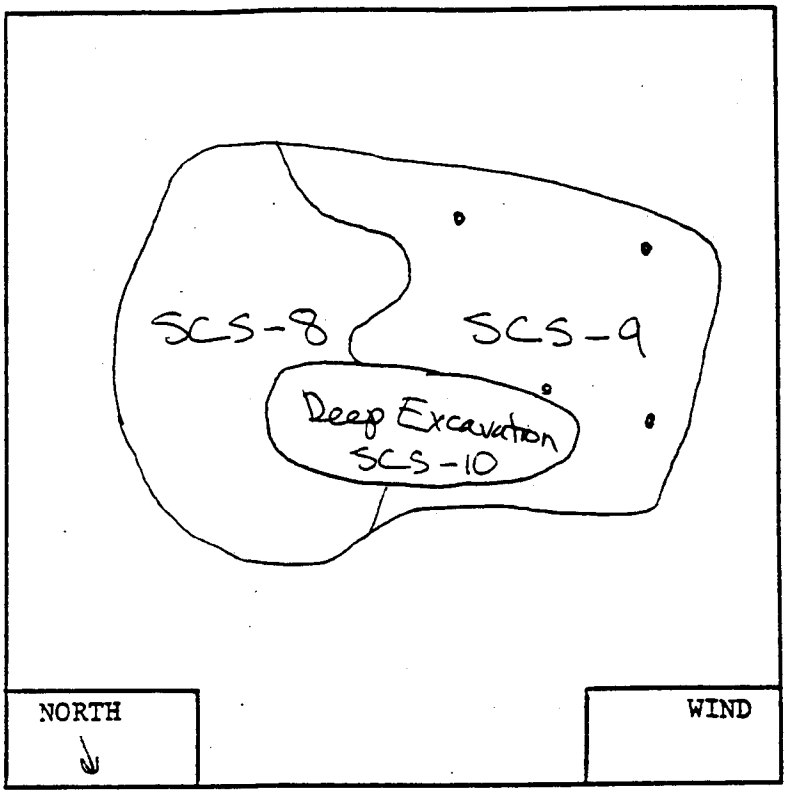
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 2/21/90

SAMPLE TYPE Soil Composite SAMPLE DESIGNATION SCS-9 SAMPLE TIME 11:10 a.m



LOCATION SKETCH

PID METER USED O.V.M

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jars

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Soil composite from 4 locations at west end of excavation from surface down to depth of 3 inches. Soil consisted of semi-dry clay. Collected 3 samples: one for NET lab analysis, one for C-EE lab analysis, and one duplicate (SCS-100).

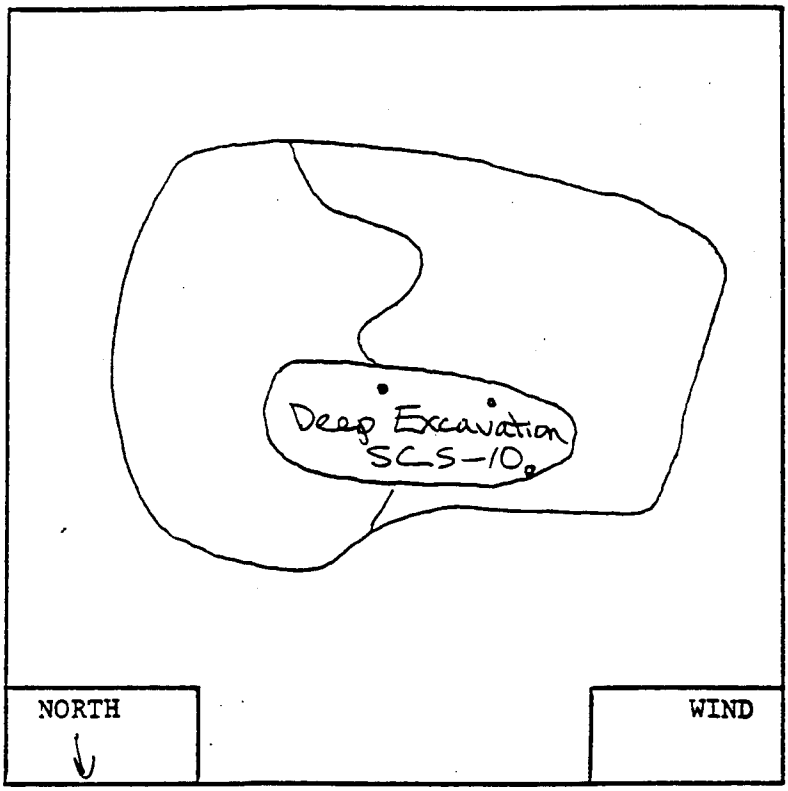
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Composite SAMPLE DESIGNATION SCS-10 SAMPLE TIME 12:10 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~; USE DIMENSIONS~~

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE ——— ppm

SAMPLING CREW Steve Ranger
Nancy Gasco

EQUIPMENT USED Jars

SAMPLE DESCRIPTION Soil composite from three locations in deep excavation. Collected one jar for NET lab analysis and one jar for C-EE lab analysis.

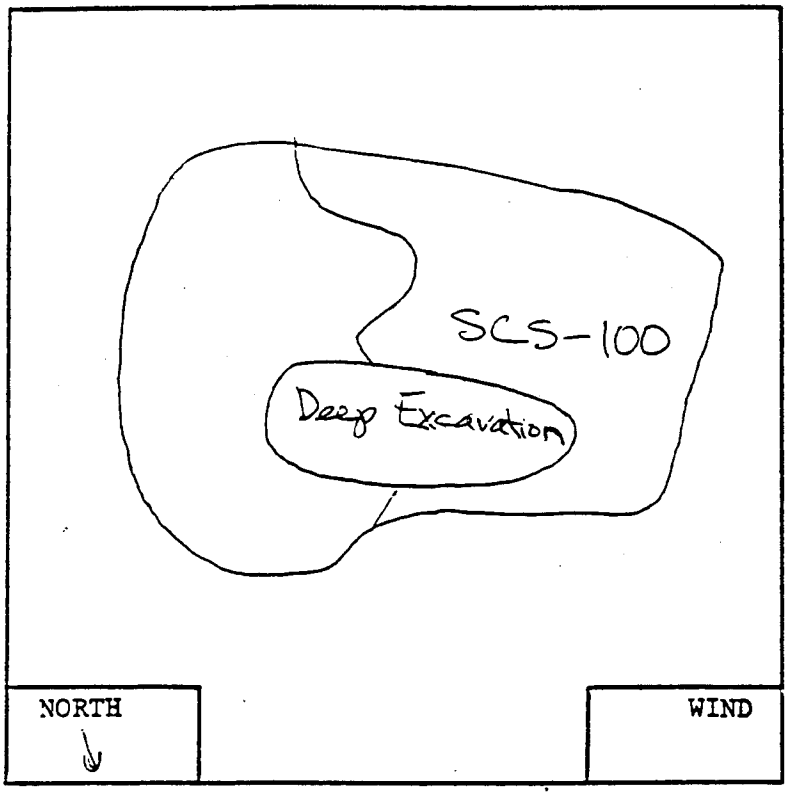
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Composite SAMPLE DESIGNATION SCS-100 (Duplicate of SCS-9) SAMPLE TIME 11:10 a.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE ——— ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION See grab sample data sheet for SCS-9.

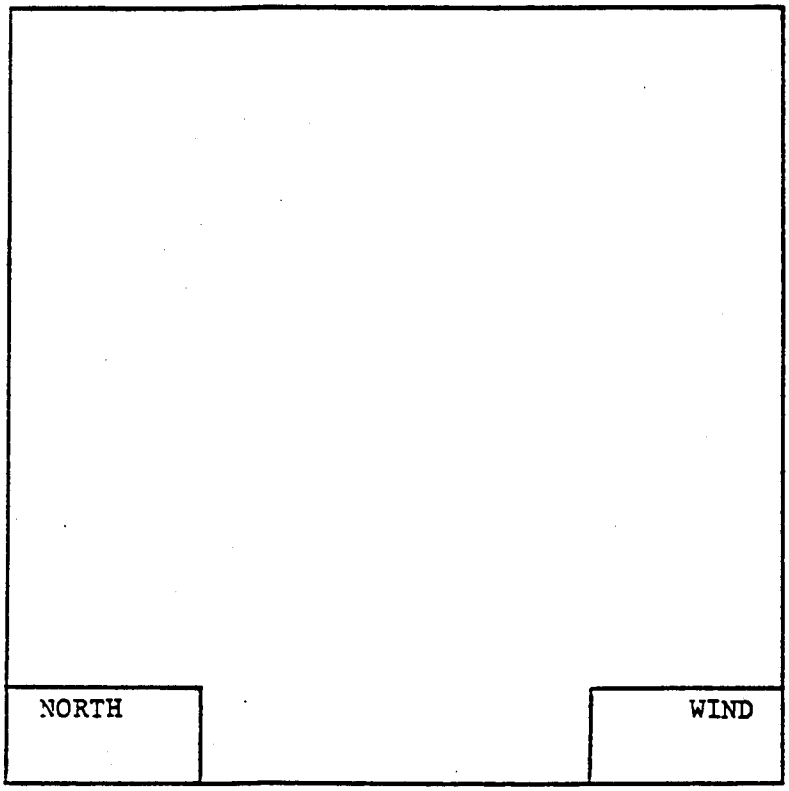
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B BEA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-200 SAMPLE TIME 11:10a.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT ——— ppm

SAMPLE ——— ppm

HEADSPACE 0 ppm

SAMPLING CREW Nancy Gassel
Steve Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☐ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Background soil sample from grass seeded area approximately 100 feet due south of excavation. Soil consisted of moist sandy top soil.

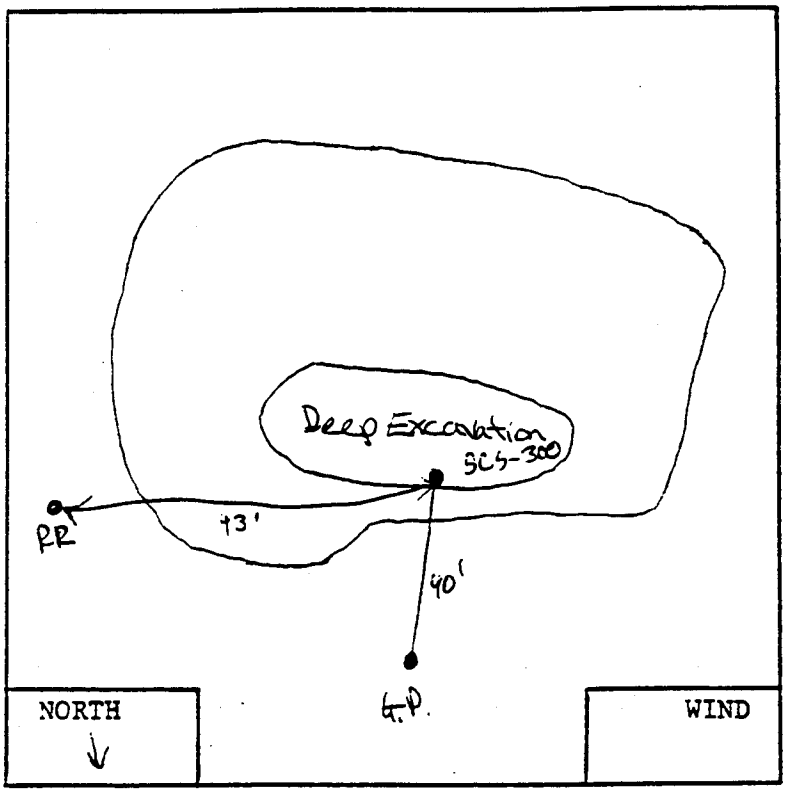
SAMPLED BY Nancy Gassel

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GMT&B REA Waste Storage Area DATE 3/21/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION SCS-300 SAMPLE TIME 11:30 a.m



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~: USE DIMENSIONS~~

SAMPLE DESCRIPTION Soil from north wall of deep excavation area. The soil was rust colored sandy gravel with clay. A clay layer was observed at a depth of 3 feet. Much of the rust colored area had a sheen

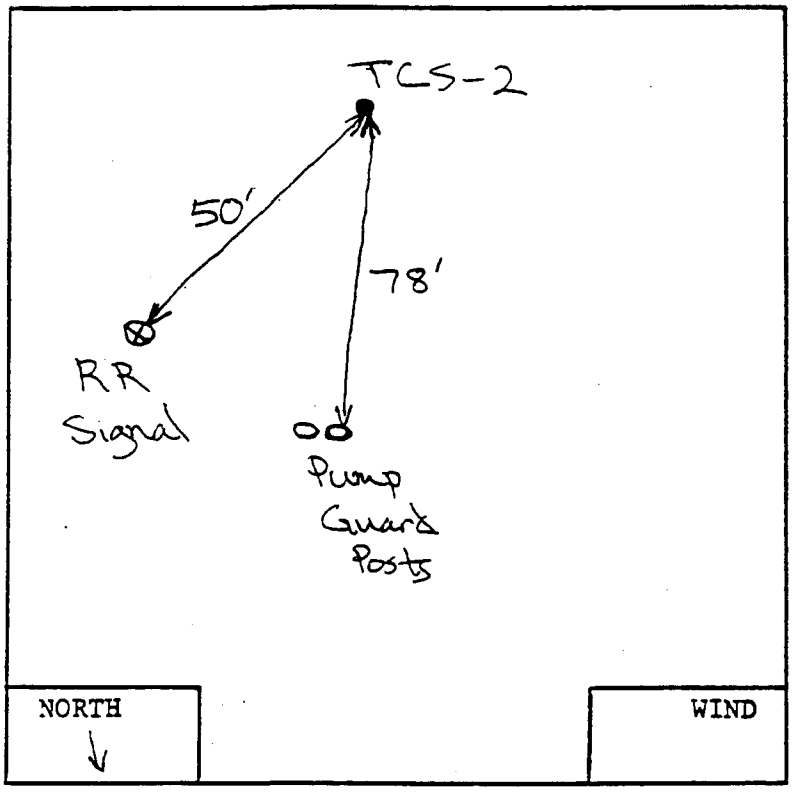
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/29/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-2 SAMPLE TIME 2:15 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT 1.2 ppm

SAMPLE 0 ppm

HEADSPACE _____ ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Mixture of sand and clay damp soil with no odor. Sand was present from 0 to 1.5 feet, gravel from 1.5 to 2 feet, and clay from 2 to 3 feet. Soil from east side of south excavation wall.

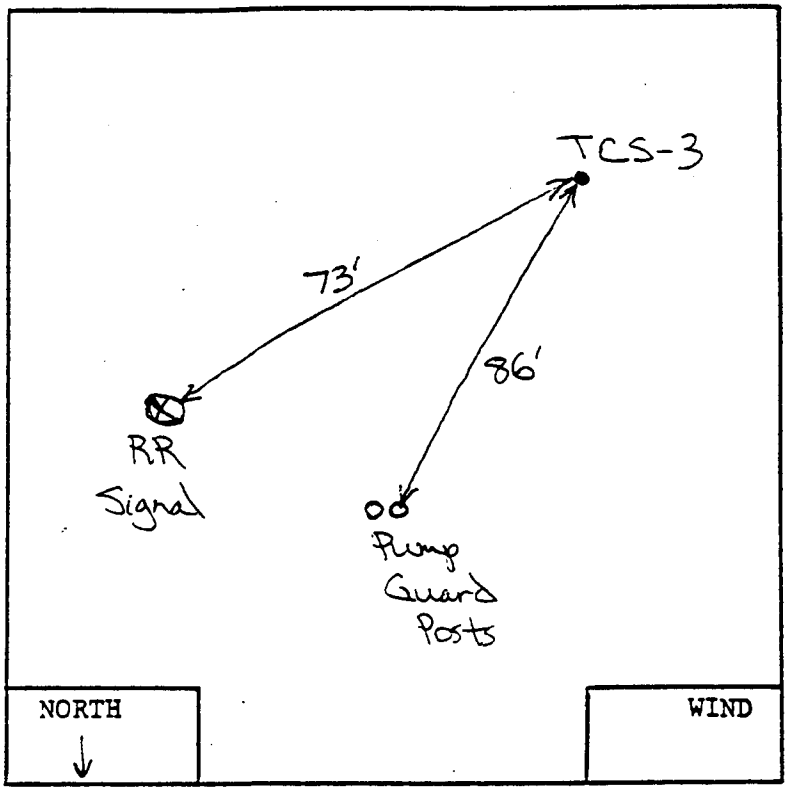
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-3 SAMPLE TIME 2:20 p.m



LOCATION SKETCH

PID METER USED OVM

AMBIENT 0.3 ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

SAMPLE DESCRIPTION Mixture of sand and clay that is very dry. Sand was present from 0 to 6 inches and clay was present below the sand. No odor. Soil from west side of south excavation wall.

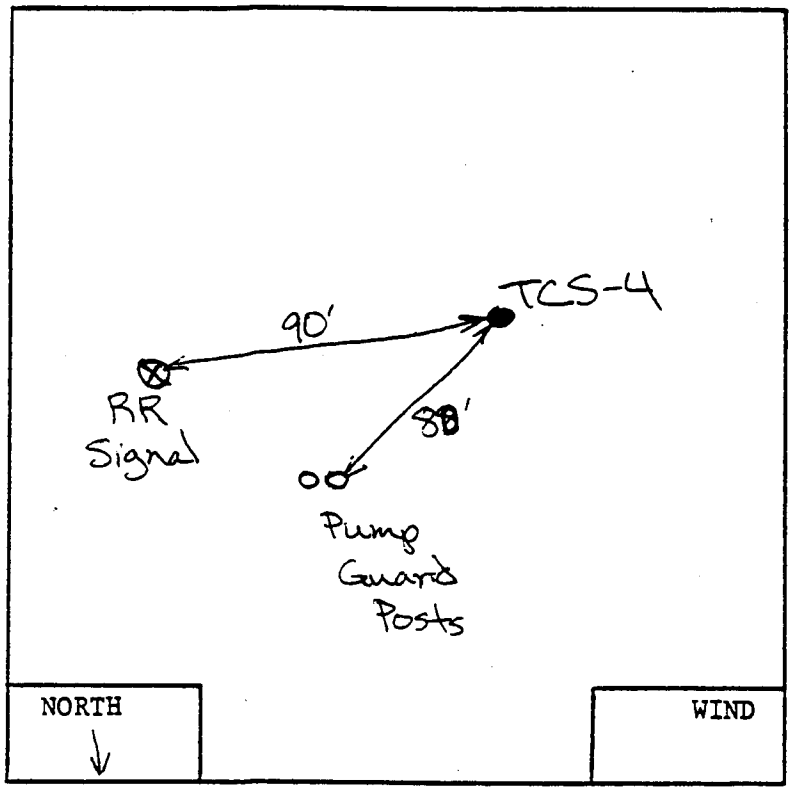
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-4 SAMPLE TIME 2:25 p.m



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT 0.3 ppm

SAMPLE — ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Mixture of sand and clay soil with very clean looking sand from 0 to 2 feet and hard dry gray clay from 2 feet to bottom of excavation. Soil from west wall of excavation.

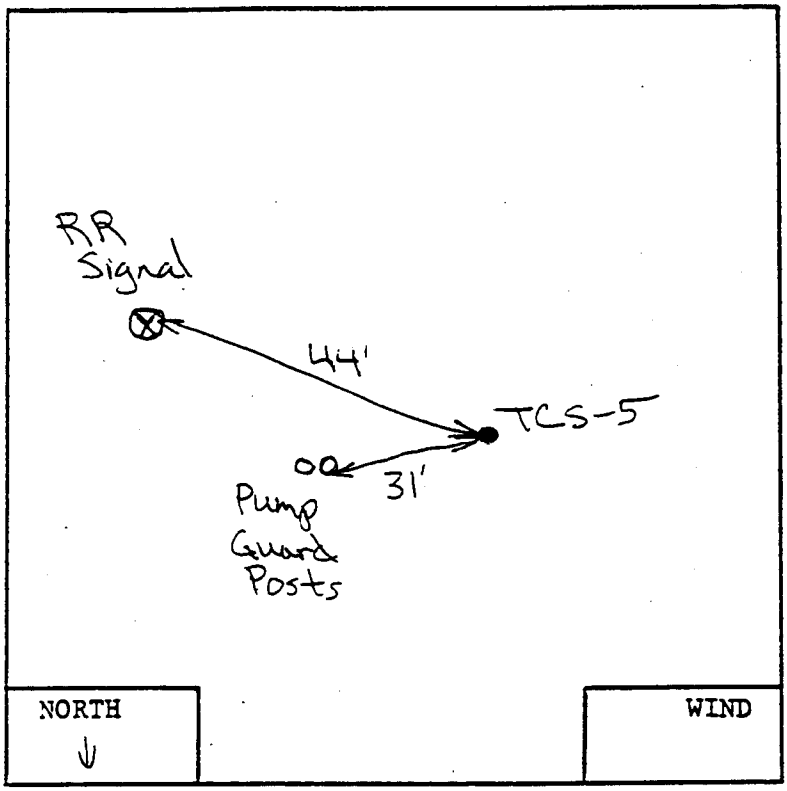
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-5 SAMPLE TIME 2:05 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE : USE DIMENSIONS

PID METER USED OVM

AMBIENT 0.3 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from corner of concrete at north edge of excavation. Sickly sweet decay odor.

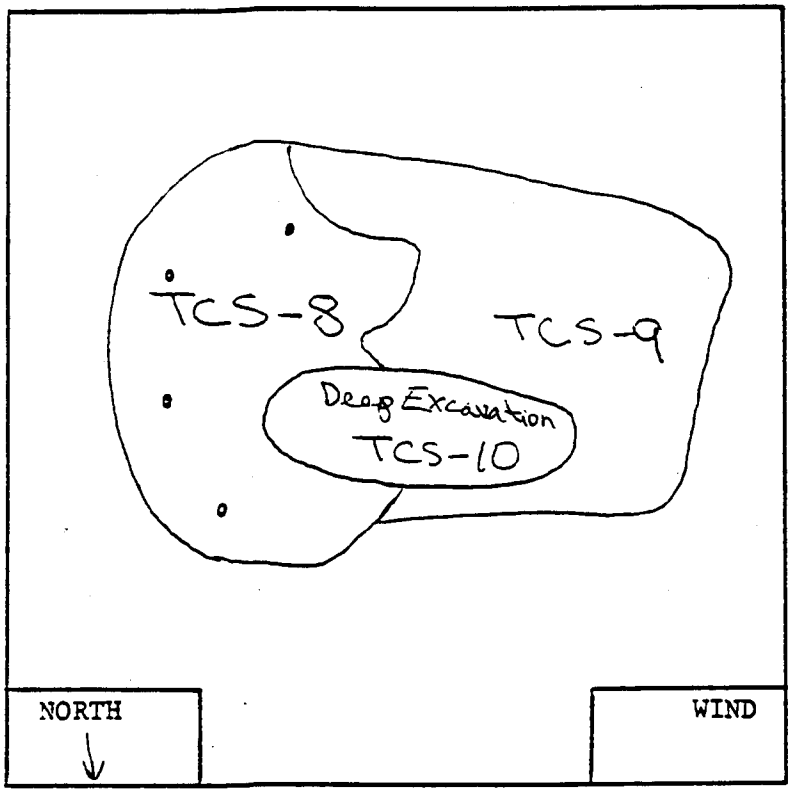
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B DEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-8 SAMPLE TIME 1:35 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~- USE DIMENSIONS~~

PID METER USED OVM

AMBIENT 1.2 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jars

SAMPLE DESCRIPTION Very dry clay soil was collected from four locations in east side of excavation. TCS-100 was collected as a duplicate. No odor.

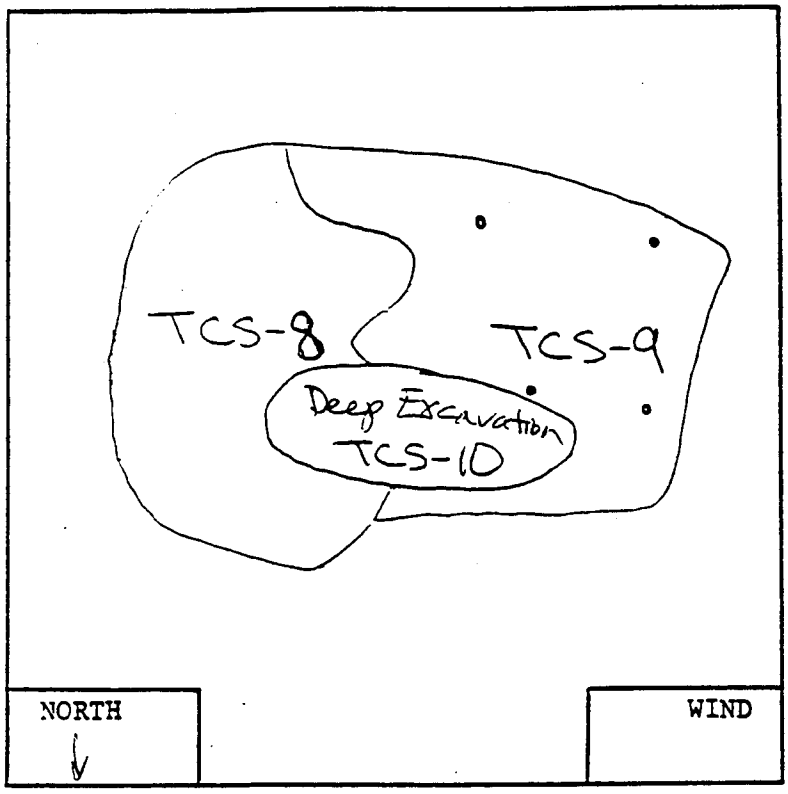
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-9 SAMPLE TIME 1:50 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~; USE DIMENSIONS~~

PID METER USED OVM

AMBIENT 0.3 ppm

SAMPLE 0 ppm

HEADSPACE ——— ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Soil from four locations at west end of excavation. Soil was dry clay. No odor.

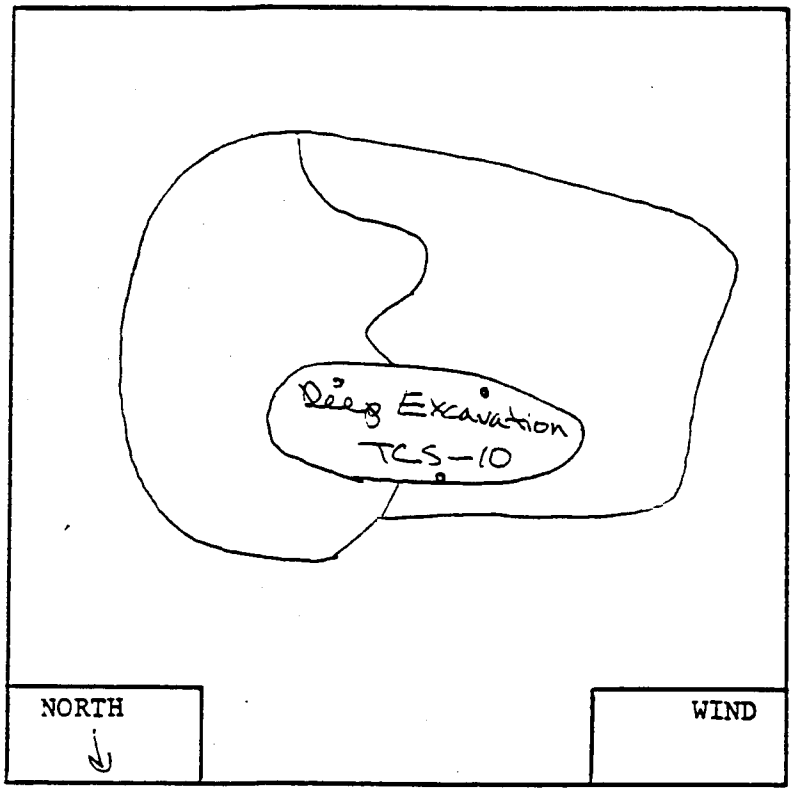
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-10 SAMPLE TIME 2:00 p.m.



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~; USE DIMENSIONS~~

PID METER USED OVM

AMBIENT 0.3 ppm

SAMPLE 0 ppm

HEADSPACE _____ ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

SAMPLE DESCRIPTION Damp to moist clay soil from three locations at base of deep excavation. No odor.

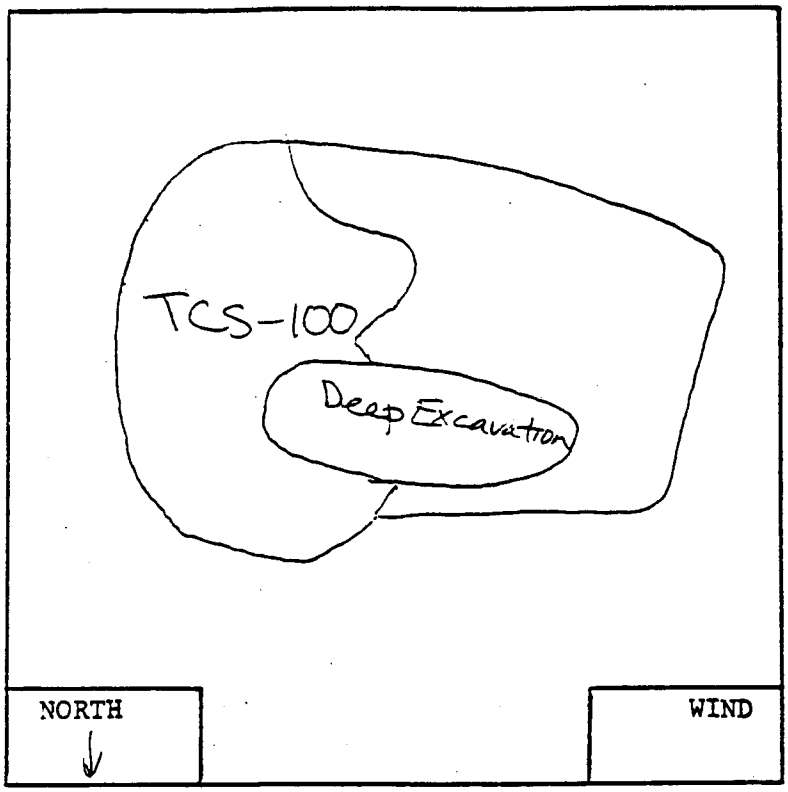
SAMPLED BY Steve Ranger

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-10 PROJECT NAME GM T&B PEA Waste Storage Area DATE 3/28/90

SAMPLE TYPE Soil Grab SAMPLE DESIGNATION TCS-100 (Duplicate of TCS-8) SAMPLE TIME 1:35 p.m.



LOCATION SKETCH

PID METER USED OVM

AMBIENT 1.2 ppm

SAMPLE 0 ppm

HEADSPACE — ppm

SAMPLING CREW Steve Ranger

EQUIPMENT USED Jar

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ~~- USE DIMENSIONS~~

SAMPLE DESCRIPTION Duplicate of TCS-8. No Odor.

SAMPLED BY Steve Ranger

APPENDIX F

ANALYTICAL REPORT DATED MAY 25, 1989

COMBUSTION ENGINEERING

89526.DOC
5395-00

May 25, 1989

Mr. Ken Gembel
Pontiac East Assembly - Truck & Bus Group
General Motors Corporation
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

Subject: Analytical Results of Soil Samples Collected at the Pontiac East Assembly Waste Storage Area

C-E Environmental, Inc. (C-EE) is presently assisting General Motors Corporation, Truck and Bus Group, Pontiac East Assembly (GMC-PEA) with the closure of its waste storage area. The location of this waste storage area in relation to the GMC-PEA plant is shown in Figure 1. As a part of this closure project, C-EE collected and analyzed samples of soil located beneath the concrete containment pad in the waste storage area. The samples were collected by Mr. Tim Palmer, Environmental Scientist at C-EE, on April 19, 1989. Samples were collected from nine different locations at depths ranging from 0" to 6" and 6" to 12". The approximate locations of these sampling points are shown in Figure 2.

The samples were analyzed for total lead (SW-846, Method 7420), total hexavalent chromium (SW-846, Method 7195), and volatile organic compounds (SW-846, Method 8010/8020). Analysis of the soil samples was conducted by Burmah Technical Services, Inc., in Pontiac, Michigan. The analytical results for the metals are presented in the attached Table 1. The analytical results for the volatile organic compounds are presented in Table 2.

As the results show, the soil sample collected at sampling point E-2 at a depth of 0" to 6" exhibited an elevated (above background) total lead level of 660 milligrams per kilogram (mg/kg). The lead level in the remaining eight soil samples submitted for lead analysis did not exceed background lead levels observed for the GMC-PEA site. No detectable levels of hexavalent chromium were found in any of the nine samples submitted for analysis. The level of detection for hexavalent chromium was 0.5 mg/kg.

C-E Environmental, Inc.
A subsidiary of
Combustion Engineering, Inc.

33493 Fourteen Mile Road
Suite 50
Farmington Hills, MI 48331

(313) 661-3100

COMBUSTION ENGINEERING

Elevated levels of volatile organics were observed in two of the soil samples submitted for analysis. Volatile organic compounds observed in the soil sample collected at sampling point E-1 at a depth of 6" to 12" included ethyl benzene (275 to 300 mg/kg), toluene (150 to 175 mg/kg), and xylene (1,000 to 1,100 mg/kg). Volatile organics observed in the soil sample collected at sampling point E-3 at a depth of 6" to 12" included ethyl benzene (20 to 25 mg/kg) and xylene (100 to 125 mg/kg). No other organic volatile compounds were observed in the soil samples submitted from sampling points E-1 and E-3. In addition, no detectable levels of volatile organic compounds were observed in the other seven soil samples submitted for analysis. The level of detection for the volatile organic compounds was 10 mg/kg.

Based on the analytical results, subsurface soil contamination in the waste storage area appears to be limited to the northeastern corner of the storage pad area. Additional sampling and analysis, however, is needed to fully define the lateral and vertical extent of contamination in this area and to determine the proper disposition of the contaminated materials.

In light of the proximity of the observed contaminated soils to the tank farm area located north of the waste storage pad (refer to Figure 1), and the known history of gasoline releases at and near the tank farm area, it is likely that the contaminated soils observed in the waste storage area are attributable to gasoline releases migrating from the tank farm area rather than releases occurring at the waste storage area.

If you have any questions regarding the analytical results, please call me at (313) 661-3100. It has been a pleasure working with you on this project.

Sincerely,

C-E ENVIRONMENTAL, INC.

Steven M. Ranger
Environmental Engineer

SMR/bw

Attachments

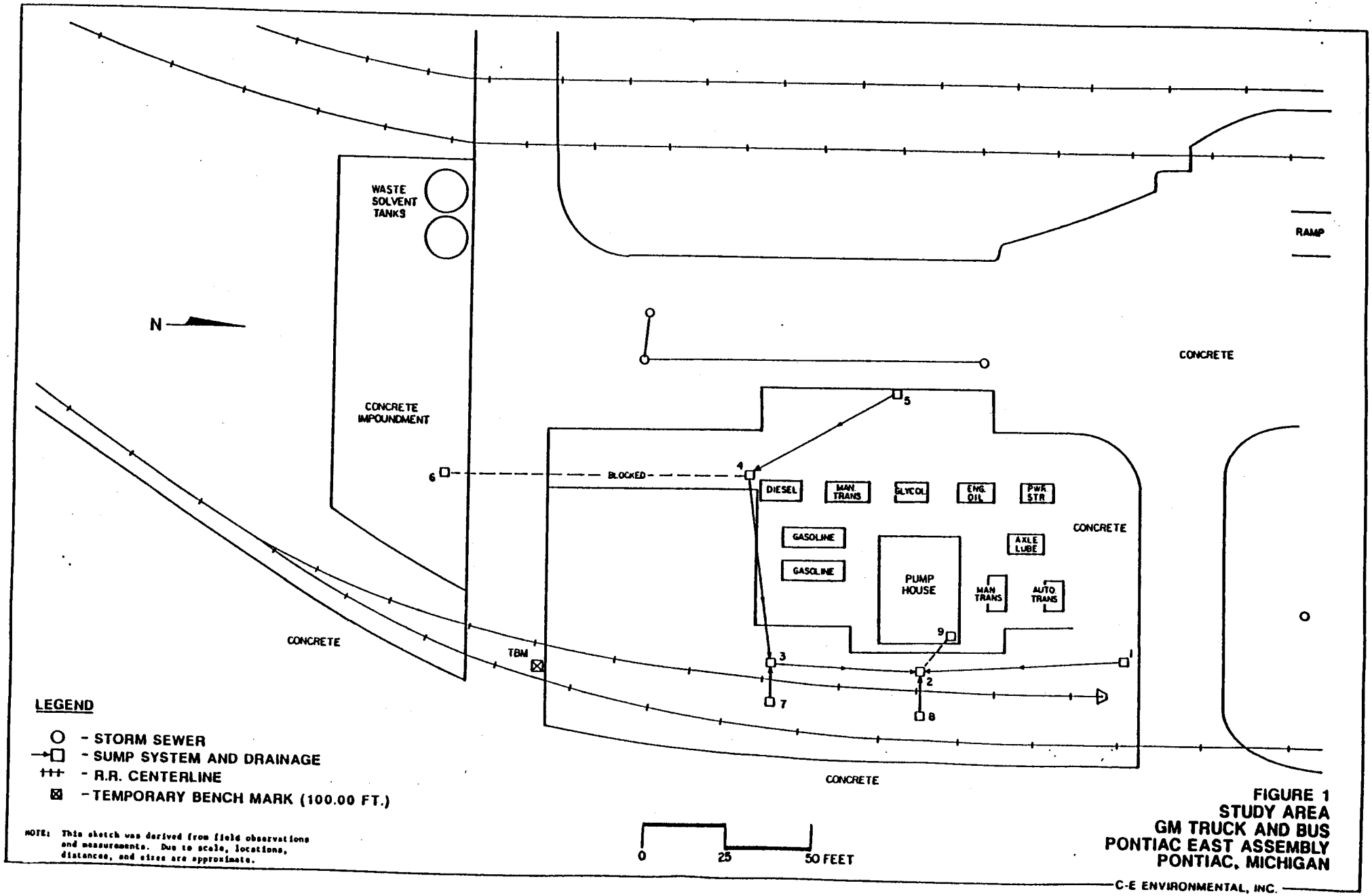
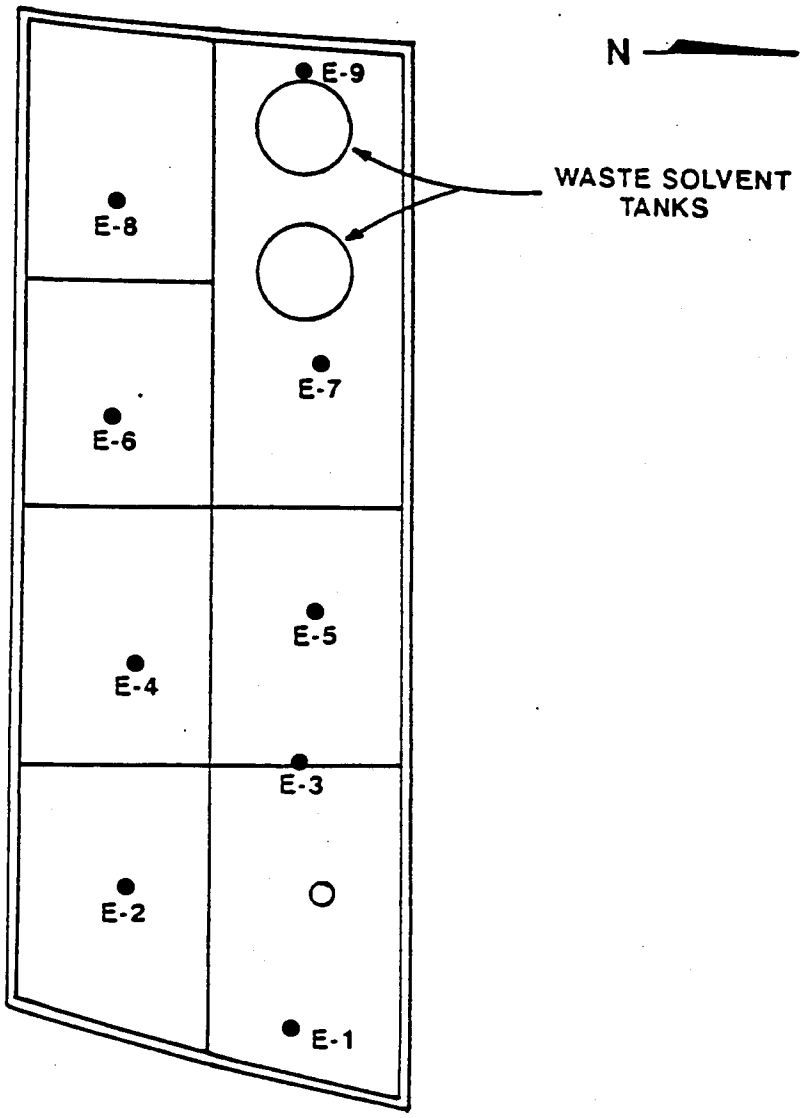


FIGURE 1
STUDY AREA
GM TRUCK AND BUS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

C-E ENVIRONMENTAL, INC.



LEGEND

● SOIL SAMPLE LOCATION

SCALE

0 10 20 40 FEET

FIGURE 2
SOIL SAMPLING LOCATIONS
GM TRUCK AND BUS
PONTIAC EAST ASSEMBLY
PONTIAC, MICHIGAN

TABLE 1

ANALYTICAL RESULTS FOR METALS
GM Truck & Bus East Assembly, Pontiac, Michigan

ANALYTE	E-1 0" to 6"	E-2 0" to 6"	E-3 0" to 6"	E-4 0" to 6"	E-5 0" to 6"	E-6 0" to 6"	E-7 0" to 6"	E-8 0" to 6"	E-9 0" to 6"
Total Hex Chromium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Lead	12	660	9.4	8.0	12	21	18	13	10

Notes:

All results in milligrams per kilogram (mg/kg).

GMTAB1.WK1

TABLE 2

ANALYTICAL RESULTS FOR ORGANIC VOLATILE COMPOUNDS
GM Truck & Bus East Assembly, Pontiac, Michigan

ANALYTE	E-1 6" to 12"	E-2 6" to 12"	E-3 6" to 12"	E-4 6" to 12"	E-5 6" to 12"	E-6 6" to 12"	E-7 6" to 12"	E-8 6" to 12"	E-9 6" to 12"
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Benzene	275 to 300	ND	20 to 25	ND	ND	ND	ND	ND	ND
Toluene	150 to 175	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (all isomers)	1000 to 1100	ND	100 to 125	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND
MEK	ND	ND	ND	ND	ND	ND	ND	ND	ND
MIBK									

Notes:

All results in milligrams per kilogram (mg/kg).
ND - Not detectable (detection limit of 10 mg/kg).

GMTAB2.W

GENERAL MOTORS CORPORATION

TRUCK & BUS GROUP

PONTIAC CENTRAL MANUFACTURING & ASSEMBLY

WASTE MANAGEMENT FACILITY

CLOSURE REPORT

Prepared by

McNamee Industrial Services, Inc.
Ann Arbor, Michigan

March 1991

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Owner/Operator Closure Certification

I, Craig B. Parr, Plant Manager, General Motors Corporation, Truck and Bus Group, Pontiac Central Assembly Plant, hereby state and certify that, to the best of my knowledge and belief, the Hazardous Waste Storage Area of the Pontiac Central Assembly Plant has been closed in accordance with the approved closure plan and its approved revisions/clarifications (presented and discussed in the attached report), and that closure was completed according to the attached chronology. Certification made on behalf of General Motors Corporation.

Craig B Parr
Signature

april 10, 1991
Date

Professional Engineer Closure Certification

I, Thomas M. Doran, a certified professional engineer (State of Michigan, license number 27143) with McNamee Industrial Services, Inc., (3135 S. State, Ann Arbor, Michigan) hereby certify that I have knowledge of the aforementioned hazardous waste storage area and that closure of this aforementioned area has been performed in accordance with the approved closure plan and its approved revisions/clarifications (presented and discussed in the attached report).

Signature

4-5-91
Date

CLOSURE CERTIFICATION CHRONOLOGY

PHASE I

1/17/90	-	Began water blasting accumulation pad west
1/18/90	-	Completed water blasting accumulation pad west
	-	Sampled accumulation pad west rinsate
	-	Cored and sampled C-1 and C-3
1/29/90	-	Began and completed water blasting accumulation pad east
	-	Sampled accumulation pad east rinsate
	-	Began water blasting bulking pad west
	-	Cored and sampled C-4
1/30/90	-	Completed water blasting bulking pad west
	-	Sampled bulking pad west rinsate
1/31/90	-	Cored and sampled C-2, C-5, C-6 and C-7
2/8/90	-	Began and completed water blasting bulking pad east
	-	Sampled bulking pad east rinsate
	-	Cored and sampled C-8 and C-9

PHASE II

6/25/90	-	Began and completed water blasting accumulation pad west
	-	Sampled accumulation pad west rinsate
	-	Collected ambient sample of accumulation pad west rinsate
	-	Cored and sampled C-10, C-11, C-12, and C-13
11/27/90	-	Excavated and sampled soil north of bulking pad retaining wall
12/5/90	-	Additional excavation and sampling of soil north of bulking pad retaining wall

INTRODUCTION

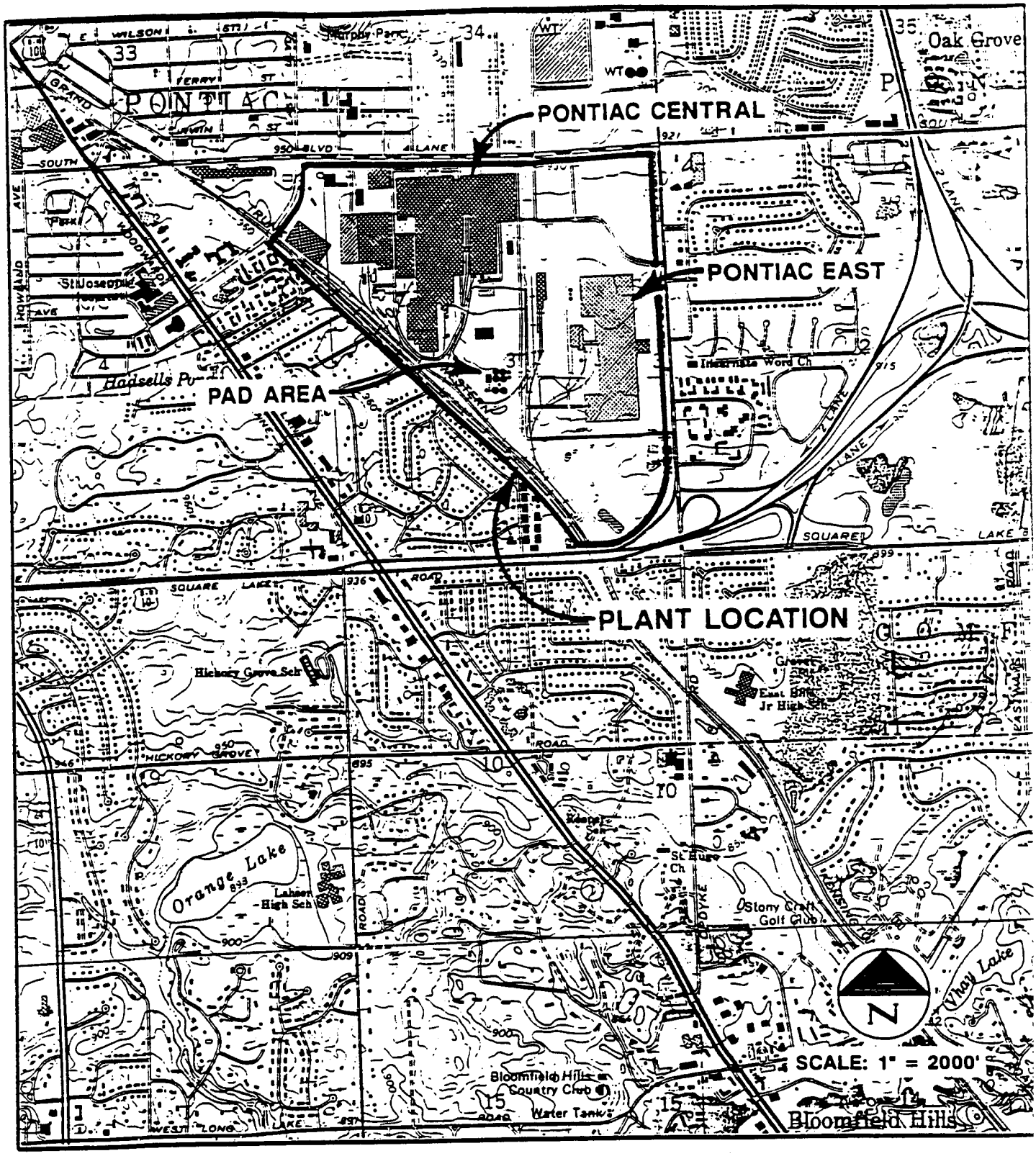
General Motors Corporation, Truck & Bus Group, has retained McNamee Industrial Services, Inc., to provide environmental services pertaining to closure and documentation of the Hazardous Waste Management Facility at the Pontiac, Michigan, Central Plant. The waste management activities at the facility are conducted in compliance with RCRA interim status standards (40 CPR 265) and Michigan Act 64 Rules. Original permit application was for on-site hazardous waste treatment, hazardous waste storage over 90 days and receipt of off-site hazardous wastes. However, since the facility performs no hazardous waste treatment, does not store hazardous waste over 90 days and handles only on-site generated hazardous wastes, a reduction in hazardous waste management status was requested. Although application was made for a permit to manage hazardous wastes at the entire waste management facility, hazardous waste was stored only on the drum accumulation area of the pad. The bulking area of the pad was not used for storage of hazardous waste. Upon completion of the Closure, Truck & Bus - Pontiac Central Plant will perform its hazardous waste management activities under 40 CFR 262 and Act 64, Part 3 (Generator) Rules.

FACILITY DESCRIPTION

Pontiac Central and East Plants occupy approximately 400 acres in the southeast corner of Pontiac, Michigan (Figure 1). The Central Plant waste management facility is adjacent to the wastewater treatment plant in the south-central area of the site as seen in Figure 2. It was constructed in 1980 and is comprised of a 12,543 square foot concrete pad divided into two operating halves, the west half of which is a covered waste accumulation facility and the east half an uncovered waste bulking facility. Both pads are constructed of 8-inch thick reinforced concrete with PVC waterstops at the joints. They are separated by a 4-foot high, 2-foot thick concrete wall. An epoxy topcoating covers the entire accumulation pad. A 2-foot high concrete "dike-style" wall encloses three sides of the bulking pad. The pads are drained by two gravity drains, one in the accumulation pad and one in the bulking pad, which carry liquids to the wastewater treatment plant for necessary treatment before discharge to the City of Pontiac POTW.

PURPOSE AND SCOPE

This report is intended to satisfy the documentation requirement of the waste management pad closure as specified in 40 CFR 265.111, the Closure Performance Standard. To this end, a written closure plan (Appendix A) was submitted by General Motors to the Michigan Department of Natural Resources (MDNR) for approval. The plan was subsequently approved by MDNR officials in March, 1988 (Appendix B).



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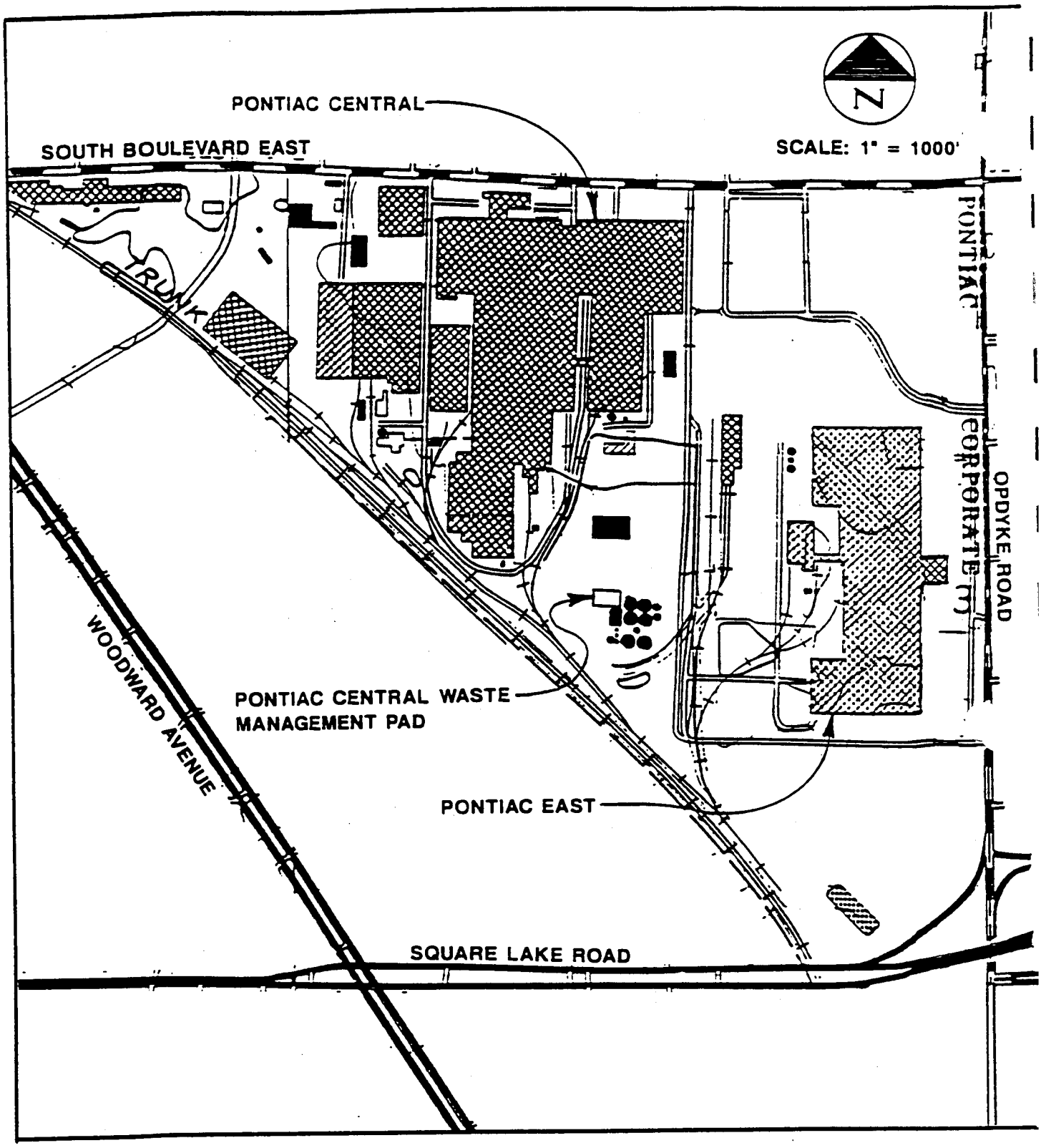
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BIRMINGHAM AND PONTIAC
SOUTH QUADRANGLES



QUADRANGLE LOCATION

FIGURE 1

SITE LOCATION MAP
GM TRUCK AND BUS
PONTIAC CENTRAL



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BIRMINGHAM AND PONTIAC
SOUTH QUADRANGLES



QUADRANGLE LOCATION

FIGURE 2

PLANT MAP
GM TRUCK AND BUS
PONTIAC CENTRAL

An initial closure certification report was completed by McNamee Industrial Services, Inc., and submitted to the MDNR in April 1990. Upon their review, a notice of deficiency letter (Appendix C) was submitted to General Motors Corporation, informing them of additional activities necessary to comply with certification requirements. For purposes of clarity within this report, initial closure activities are referred to as Phase I activities, and closure activities performed in response to the MDNR notice of deficiency letter are referred to as Phase II activities.

Closure Performance Standard

In compliance with 40 CFR 265, Subpart G, General Motors Corporation (as the Facility owner/operator) has retained McNamee Industrial Services, Inc., to undertake the necessary steps to perform the decontamination, environmental characterization and documentation of closure of the subject waste management pads. The Closure Performance Standard, in part, says:

> The owner or operator must close the facility in a manner that controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere...

BACKGROUND SOIL CONDITIONS

As part of the closure, it was necessary to determine background soil quality for site-specific constituents, including total hexavalent chromium and total lead. Sample locations (Figure 3) were selected by General Motors personnel in accordance with the MDNR guidance document "How Clean is Clean". The samples were collected from depths of approximately six inches at Pontiac Central and Pontiac East Plant sites considered to be "uncontaminated" and undisturbed. Sample collection logs are found within Appendix D. Samples from the background sites and waste management pad were collected from similar soil/sediment horizons.

The total lead and hexavalent chromium background concentrations (Table 1) revealed from chemical analyses were statistically compared to concentrations detected in the soil samples below the waste management pad to determine whether environmental impact has occurred as a result of hazardous waste management activities at the unit. These comparisons were made using the Gossett Student's T-test at the 95% confidence level, the results of which appear in the Analytical Results Section below.

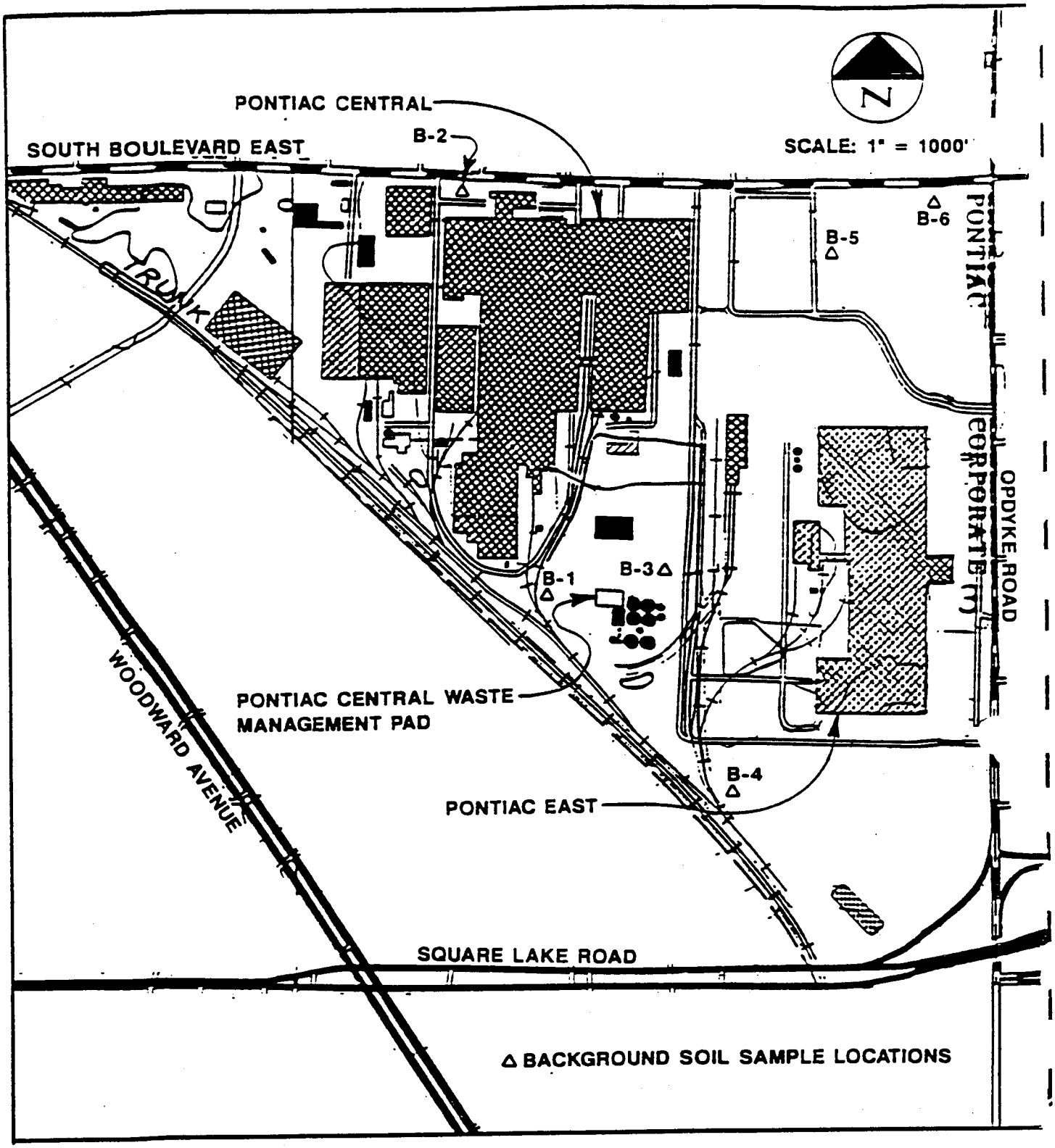
Table 1

Background Soil Samples

Analytical Results for Metals (in mg/kg)

Analyte	B-1	B-2*	B-3*	B-4	B-5	B-6	B-6 Duplicate
Total Hexavalent Chromium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total Lead	65	240	140	15	24	57	64

*Not used in calculation of background soil conditions due to apparent elevated concentrations of total lead.



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BIRMINGHAM AND PONTIAC
SOUTH QUADRANGLES



QUADRANGLE LOCATION

FIGURE 3

PLANT MAP SHOWING
BACKGROUND SOIL SAMPL
LOCATIONS, GM TRUCK &
BUS, PONTIAC CENTR

FIELD ACTIVITIES

As part of the closure requirements, the pad's working surfaces were decontaminated with ultra high-pressure water rinses followed by sampling and chemical analyses of site specific compounds. A series of soil borings were also conducted to enable the collection of soil samples for chemical analysis.

PAD DECONTAMINATION

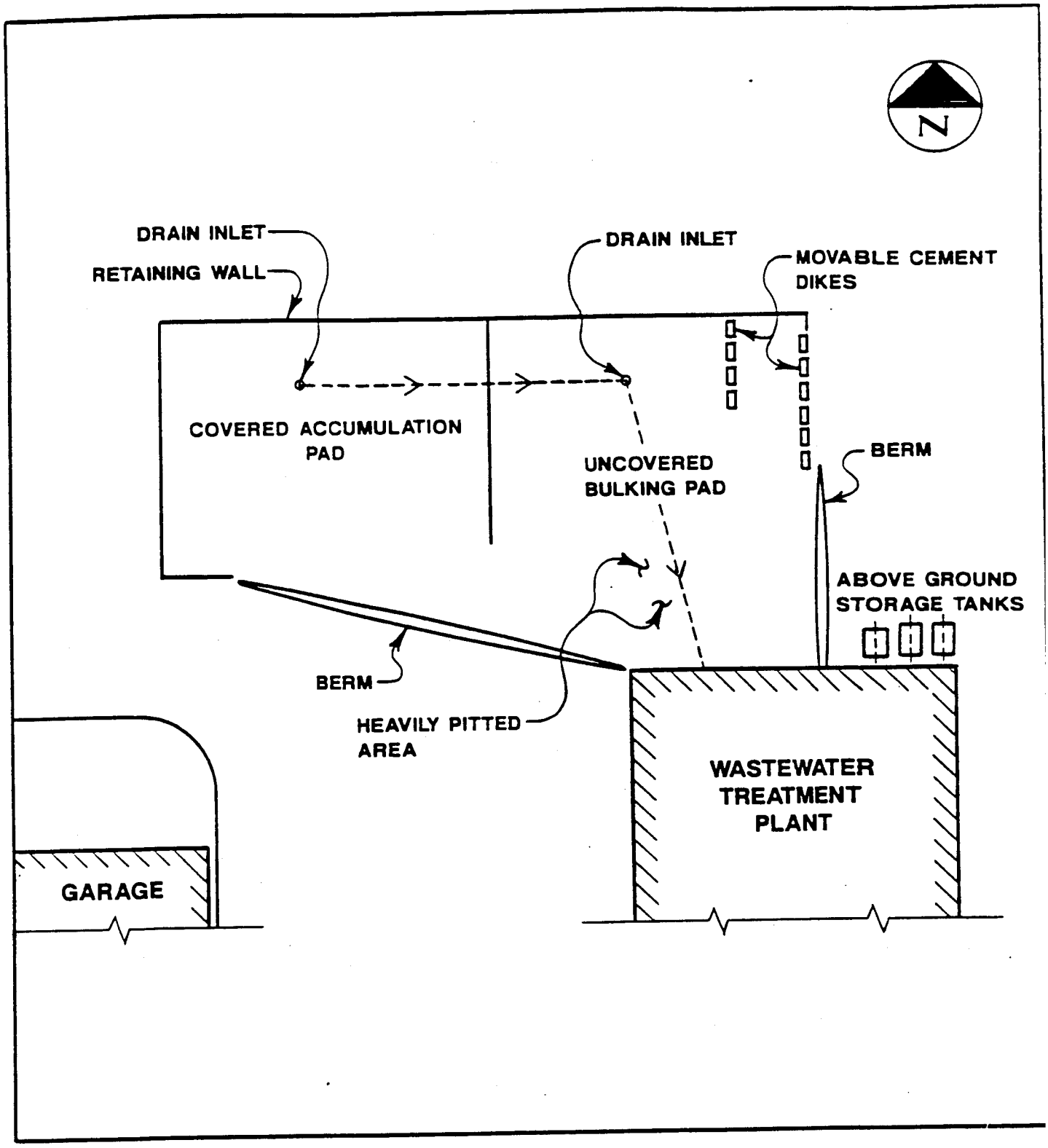
As described previously, the waste management pad (Figure 4) is divided into two operating sections, a waste accumulation pad (covered) on the west, and a waste bulking pad (uncovered) on the east. Since the waste management facility had to remain active while manufacturing operations were ongoing at the plant, it had to be at least partially functional during decontamination and investigation activities. To achieve this, both the accumulation and bulking pads were divided into an active half and a "decontamination/investigation" half. This enabled cleaning and sampling to occur concurrent with normal waste management activities. Decontamination and investigation began with the west half of the accumulation pad and continued eastward, ending with the east half of the bulking pad. Although sufficient notice was made to MDNR regulatory officials by General Motors Corporation staff, no on-site MDNR inspections were made of either Phase I or Phase II field activities.

Phase I

Decontamination of both the accumulation pad and the bulking pad was accomplished by manually scraping sludge, product, and residue off the pads followed by a pressurized water rinse. In this manner, most of the adhering material was removed, to be either bulked as additional nonhazardous waste or transported as a liquid to the treatment plant by one of two gravity drains. These operations are routinely performed two to four times per year as part of normal pad management. Following preliminary scraping and pressure washing, an ultra high-pressure water blaster was mobilized to complete the decontamination procedures. With the water blaster, any remaining sludge and paint residue was removed from the retaining walls, dikes, and floors and was diverted to the in-place drainage system.

Washing of the accumulation pad accomplished removal of nearly all visible solid material adhering to the concrete sealer, which was in very good condition. The bulking pad did not have a concrete sealer and contained an area where the floor was severely pitted. This area, in the south-central area of the pad, was not intensely blasted since the high pressure may have

caused further pitting. While the final washwater from the covered pad was free of visible solids, the uncovered pad final washwater was slightly clouded with what appeared to be fine concrete particulates in solution.



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LEGEND

SCALE: 1" = 40'±

FIGURE 4

WASTE MANAGEMENT PAD
SITE MAP, GM TRUCK AND
BUS, PONTIAC CENTRAL

The degraded condition of portions of the bulking pad can be attributed to the lack of a concrete sealer, sludge routinely being in contact with the pad, exposure to the elements, and the high volume of heavy traffic necessary for bulking operations. Pitting of the concrete in the southern area of the pad has advanced to the point of exposing the underlying steel reinforcing rods. The underlying soil, however, was not exposed. Also, in this area, the PVC waterstops at several of the joints is either in very poor condition or missing, reducing the integrity of the pad.

Another area of concern relevant to the bulking pad was the northern perimeter outside the retaining wall. Bulking operations, which include the addition of pebble lime to sludge by use of a front-end loader, has resulted in spillage of minor amounts of sludge over the wall and directly onto the soil. Furthermore, the southwest areas of the covered pad and the northwest areas of the uncovered pad are low and do not drain well, making it necessary for pooled liquids in these areas to be pumped by the on-site licensed liquid waste handler. These fluids are subsequently discharged to the treatment plant for routine wastewater treatment. All liquids are confined to the pads by either the concrete walls on the west and north sides, the wall dividing the pads, and by concrete berms on the south and east sides.

Phase II

Following MDNR's review of the initial closure report, a notice of deficiency was issued to General Motors officials. Within the notice were requests to perform a subsequent water blasting of the accumulation pad west and additional soils investigation. The decontamination and sampling procedures employed were identical to Phase I, as required in the Closure Plan. In addition to sampling of the rinsate, a blank sample of the rinsate was left open to the pad atmosphere during blasting to collect chemical data on ambient conditions.

SAMPLING OF RINSATE AND SOIL

Chemical analysis of site specific heavy metals (lead and hexavalent chromium) and volatile organic compounds (VOC's) was performed on the clean rinsate and on selected soil samples for purposes of defining the general environmental quality of the facility.

DECONTAMINATION RINSATE

Phase I

After high-pressure water blasting of the pads was completed, a series of rinsate samples were collected for laboratory analysis, including one sample from each pad quarter for a total of four sampling events. Samples were collected from low areas of the pad floors after blasting had removed adhering residue and the rinsate was as free of solids as possible. As was specified in the Closure Plan, decontamination was considered complete only after laboratory analysis confirmed that metals concentrations were statistically lower than background samples and VOC's were non-detectable. Upon collection, samples were retained in laboratory supplied, pre-preserved bottles and were chilled and transported to the laboratory under strict chain-of-custody (all chain of custody documentation appears in Appendix E) for analysis of lead and hexavalent chromium and parameters within the EPA Method 601 and 602 scans.

Although pad decontamination efforts were successful in removing sludge and paint solids from the walls, dikes and floors of the facility, low concentrations of ambient VOC's were always present at the facility during decontamination activities due to one-half of the pad actively being used for routine storage, bulking and solidifying of non-hazardous waste. VOC presence was monitored by periodic photoionization detector (PID) readings of the ambient air within the pad area. Readings fluctuated between 0.8 and 2.5 ppm. These ambient VOC's may have mixed with washwater mist and become incorporated into the rinsate that was subsequently collected for laboratory analysis. Therefore, sample characterization is probably not purely indicative of decontamination efforts, but is likely to contain "background" data in the form of ambient VOC's.

Phase II

As noted in the Decontamination section above, a subsequent water blasting event took place on the accumulation pad west. Protocol was consistent with the Closure Plan and identical to that of Phase I. Sample results from both phases are noted in the Analytical Results section.

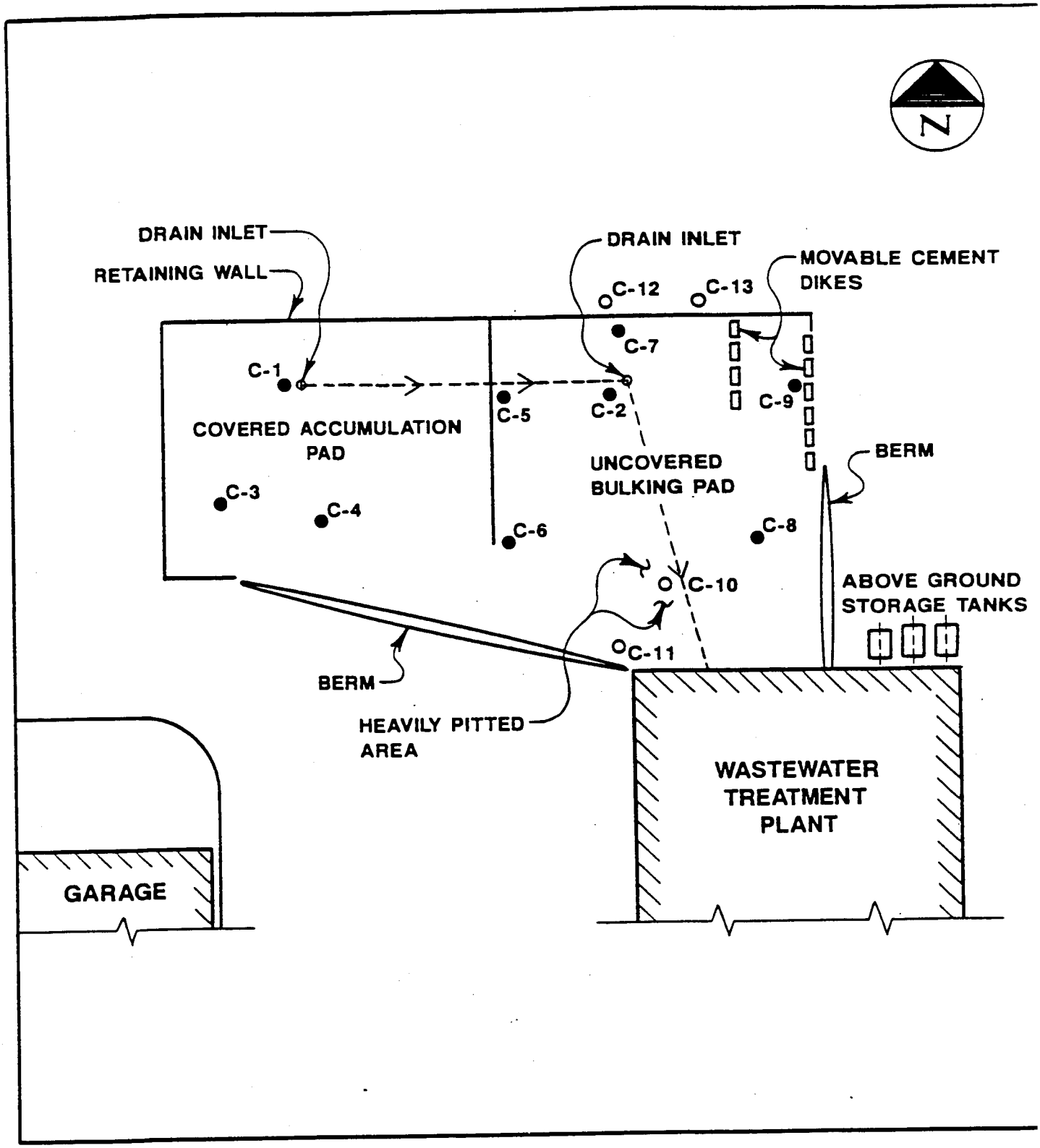
SOIL

Phase I

To provide chemical quality data on the soil underlying the waste management pads, a series of nine soil borings were performed through the pad and soil samples were collected for laboratory analysis. Analytes included site specific heavy metals, (total and EP TOX lead and hexavalent chromium) and VOC's within the EPA Methods 8010 and 8020. Figure 5 depicts soil sample locations for Phase I, labeled C-1 through C-9, and for Phase II, labeled C-10 through C-13.

Sampling locations were selected by General Motors personnel in accordance with the guidelines found in the MDNR "How Clean is Clean" document. In general, the locations were selected to provide representative soil types and soil quality data in consideration of pad dimensions and areas subject to potential environmental impact. Sampling depths were selected to correspond with background soil sample horizons, with the 0.5 and 1.0-foot intervals targeted to provide a degree of vertical control. Deeper sampling was not a part of this assignment.

Sampling was accomplished by coring through the concrete pad with a 10-inch diameter, water cooled rotary coring device, followed by hand augering through the soils to depths of 0.5 foot and 1.0 foot beneath the pad-soil interface. To prevent the possibility of contaminants invading the core void, coring and sampling was conducted directly following water blasting. After cores were removed, any cooling water standing in the hole was bailed out with a sterile jar to provide a dry sampling environment. A stainless steel, three inch diameter decontaminated hand auger was used to recover soil samples from the specified horizons. Upon extraction of the auger from the boring, the soil on top of the bucket was discarded and the soil from within the interior of the bucket was collected with a decontaminated hand shovel and retained in laboratory supplied bottles. For each horizon sampled, a 4-ounce laboratory jar was partially filled with soil and secured with a tightly fitting cap of aluminum foil. These samples were put aside for approximately 30 minutes each to allow build up of any volatiles in the headspace. Photoionization readings were then conducted by piercing the foil and inserting the probe of a calibrated PID (Photovac TIP II) within it. Subsequently, two 4-ounce laboratory supplied jars were packed with the subject soil for laboratory analysis by EPA Methods 8010 and 8020, and a 1-liter jar was filled for laboratory analysis of total and EP TOX lead and hexavalent chromium.



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LEGEND

● SOIL BORING LOCATIONS (PHASE 1)
O SOIL BORING LOCATIONS (PHASE 2)
SCALE: 1" = 40'±

FIGURE 5

**WASTE MANAGEMENT PA
SHOWING SOIL SAMPLE
LOCATIONS, GM TRUCK &
BUS, PONTIAC CENTRAL**

To assure the quality and representativeness of the samples, the auger was scraped free of adhering soil after each sampling event and washed in a trisodium phosphate and distilled water solution followed by a triple rinse with distilled water.

Phase II

As requested by MDNR, a series of four additional soil borings was performed to provide chemical data on areas of concern within and proximal to the bulking pad. Phase II borings are labeled C-10 (pitted area), C-11 (unsealed joint area), C-12 (north perimeter west-side) and C-13 (north perimeter east-side). Methodologies for procuring samples were identical to those within Phase I, with the exception that the samples collected from outside the north retaining wall were collected at depths 0.5 and 1.0 feet below grade surface since the area is not covered with concrete.

ANALYTICAL RESULTS

Chemical analysis of rinsate and soil samples was performed by NET Midwest, Inc., Laboratories of Pontiac, Michigan. Collection methods, parameters and test methods were in accordance with the Closure Plan.

Table 2 provides data concerning the parameters, test methods and detection limits used for soil and rinsate samples. A complete laboratory record of analysis is included in Appendix F.

Table 2

Analytical Test Methods and Detection

Limits for Soil and Rinsate Samples

Parameter	SW-846 Soil Test Method	Soil Detection Limit	SW-846 Rinsate Test Method	Rinsate Detection Limit
Total Lead	7420 or 7421	5 mg/kg	--	0.05 mg/kg
Total Hexavalent Chromium	7195, 7196 or 7197	5 mg/kg	--	0.05 mg/kg
Vinyl Chloride	8010	50 ug/kg	601	5 ug/kg
Bromomethane	8010	50 ug/kg	601	5 ug/kg
Chloroethane	8010	50 ug/kg	601	2 ug/kg
Trichlorofluoromethane	8010	50 ug/kg	601	2 ug/kg
cis-1, 2-Dichloroethene	8010	20 ug/kg	601	--------
trans-1, 3-Dichloropropene	8010	20 ug/kg	601	2 ug/kg
Bromodichloromethane	8010	20 ug/kg	601	2 ug/kg
Bromoform	8010	50 ug/kg	601	2 ug/kg
Carbon Tetrachloride	8010	20 ug/kg	601	10 ug/kg
Chlorobenzene	8010	90 ug/kg	601	2 ug/kg
Chloroform	8010	20 ug/kg	601	2 ug/kg
Dibromochloromethane	8010	20 ug/kg	601	2 ug/kg
1,1-Dichloroethane	8010	20 ug/kg	601	2 ug/kg
1,2-Dichloroethane	8010	20 ug/kg	601	2 ug/kg
1,1-Dichloroethene	8010	20 ug/kg	601	2 ug/kg
1,2-trans-Dichloroethene	8010	20 ug/kg	601	2 ug/kg
1,2-Dichloropropane	8010	20 ug/kg	601	2 ug/kg
1,3-cis-Dichloropropene	8010	20 ug/kg	601	2 ug/kg
Methylene Chloride	8010	90 ug/kg	601	2 ug/kg
1,1,2,2-Tetrachloroethane	8010	20 ug/kg	601	2 ug/kg
Tetrachloroethene	8010	20 ug/kg	601	2 ug/kg
1,1,1-Trichloroethane	8010	20 ug/kg	601	2 ug/kg
1,1,2-Trichloroethane	8010	20 ug/kg	601	2 ug/kg
Trichloroethene	8010	20 ug/kg	601	2 ug/kg
Benzene	8020	20 ug/kg	602	2 ug/kg
Ethylbenzene	8020	20 ug/kg	602	2 ug/kg
Toluene	8020	20 ug/kg	602	2 ug/kg
Xylene Isomers	8020	20 ug/kg	602	2 ug/kg

SOIL SAMPLES

Soil types beneath the waste management pads varied considerably, ranging from a dense, gray, indigenous lacustrine clay to a pebbly sand and silt fill material. In general, a silty sand fill approximately seven inches thick, underlain by a dense, native lacustrine clay dominates the pad area. The western and eastern edges of the facility tend to be higher in clay content while the northern and interior portions are higher in silt and sand content. Boring C-8 was comprised almost entirely of a crushed limestone aggregate, probably material from a former thoroughfare surface. A review of logs from soil borings completed earlier at the adjacent WWTP indicates a layer of fill consistently covering the general area, ranging in thickness between three and six feet. Underlying the fill is found a highly variable suite of sediments approximately 25 feet in thickness. These sediments appear to be interfingered clays, silts and sands, representative of a till sequence. Below this is consistently found an extensive layer of very stiff, moist, blue lacustrine clay. The deepest boring was terminated at 60 feet, the lower 30 feet of which was comprised of the dense blue clay. Soil boring logs completed as part of this project are found in Appendix G, while a complete set of soil boring logs completed prior to construction of the present WWTP are found in Appendix H.

Metals concentrations from soil samples were compared to background soil samples using the Gossett Student's T-test at the 95% confidence level to determine if a statistically significant difference exists, indicating potential environmental impact to soil beneath the waste management.

It was not possible to perform the Student's test on the hexavalent chromium due to insufficient data. All seven background samples were less than detection limit (<0.5 mg/kg) and all nine waste management pad soil samples were less than detection limit (<0.2 mg/kg), resulting in a lack of independently random, normally distributed populations necessary for statistical comparison.The absence of detectable concentration of hexavalent chromium, however, indicates that environmental impact from hexavalent chromium has not occurred.

Statistical comparison of lead is as follows:

Case	Group	Lead (mg/kg)
1	1	65.00
2	1	15.00
3	1	24.00
4	1	57.00
5	1	64.00
6	2	16.00
7	2	13.00
8	2	20.00
9	2	23.00
10	2	8.90
11	2	26.00
12	2	13.00
13	2	8.40
14	2	39.00

Group 1 = background samples
Group 2 = waste management pad samples

Independent samples: T-test on lead

Group	h	$\bar{X}_1$	S_1
1	5	45.00	23.696
2	9	18.584	9.746

Separate variances T = 2.383 DF = 4.8 prob. = .065

Pooled variances T = 2.992 DF = 12 prob. = .011

Note: h = number of samples

$\bar{X}_1$ = mean

S_1 = standard deviation

The objective of the statistical analysis was to test at a significance level of 0.01 whether or not the true average concentrations of lead differs between the two groups. Assumptions used for the statistical analysis are as follows:

1. Independent random samples from two normally distributed populations. The population variances are assumed to be normal.

2. $H_O = \mu 1 = \mu 2 = 2 \qquad HA = \mu 1 \neq \mu 2$

3. 95% confidence level

4. $$T = \frac{(\bar{X}_1 - \bar{X}_2) - 0}{S_p \quad 1/h_1, + 1/h_2} \qquad t_{12} \text{ under } H_O$$

5. Reject H_O if $| T | \geq t, 12, 0.95 = 1.7823$
   Do not reject otherwise.

Results of the analysis conclude:

$T = 2.992$

Because $T = 2.992$ exceeds $t_{12}, 0.95$ we reject H_O and conclude that the true average concentrations of lead are different in the two groups, with the concentrations of lead less in the soil underlying the pad. Neither halogenated nor aromatic VOC's (Methods 601 and 602) were detected by the analytical laboratory in any of the Phase I soil samples. Total VOC's were detected, however, in the field using a portable benzene equivalent calibrated PID (Photovac TIP-II) and head space methodology. Photoionization readings are found in Table 3. A summary of laboratory analyses of soil samples is found in Table 4.

Table 3

Photoionization Readings of Soil

(in ppm benzene equivalent)

	C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8	C-9	C-10	C-11	C-12	C-13
0.5 Feet	ND	18	ND	trace	10	2	60	ND	5	24	37	25	35
1.0 Feet	ND	25	ND	trace	4	2	65	ND	trace	15	17	19	20

Table 4

Soil Boring

Analytical Results

PHASE I

CORE C-1, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	16 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.09 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-2, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	13 mg/kg
EP Tox - Chromium	———
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.05 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

Table 4 (continued)

CORE C-3, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	20 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.09 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-4, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	23 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.18 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-5, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	8.9 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.05 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-6, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	26 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.12 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

Table 4 (continued)

CORE C-7, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	13 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.05 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-8, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	8.4 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.05 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

CORE C-9, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	39 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.06 mg/L
Methods 8010 & 8020	No compounds detected above detection limit

PHASE II

CORE C-10, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	17 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	<0.05 mg/L
Methods 8010 & 8020	0.095 mg/kg xylenes, total

Table 4 (continued)

CORE C-11, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	15 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.07 mg/L
Methods 8010 & 8020	0.025 mg/kg xylenes, total

CORE C-12, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	19 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.88 mg/L
Methods 8010 & 8020	0.020 benzene
	0.090 mg/kg ethylbenzene
	0.030 mg/kg toluene
	0.520 mg/kg xylenes, total

CORE C-13, 12"

ANALYTE	RESULT
Chromium, Hex.	<0.2 mg/kg
Lead	6.6 mg/kg
EP Tox - Chromium, Hex.	<0.05 mg/L
EP Tox - Lead	0.10 mg/L
Methods 8010 and 8020	No compounds detected above detection limit

RINSATE SAMPLES

Analytical results documenting waste management pad decontamination indicate that hexavalent chromium was not present at concentrations above detection limit while total lead varied in concentrations between 0.06 mg/L and 1.4 mg/L. Analysis of volatile organic compounds indicate that the west half of the accumulation pad rinsate contained a total of 1 mg/L purgeable halocarbons, with methylene chloride comprising 0.980 mg/L of the total. The accumulation pad east contained a total of 0.004 mg/L chloroform, while the bulking pad east contained concentrations of ethylbenzene and toluene at 0.035 and 0.045 mg/L, respectively. A total of 0.022 mg/L chloroform, 0.003 mg/L ethylbenzene and 0.002 mg/L toluene was present in the bulking pad rinsate. A summary of laboratory analyses of rinsate samples appears in Table 5.

Table 5

Rinsate Analytical Results

PHASE I

ACCUMULATION PAD - WEST

ANALYTE	RESULT
Chromium, Hex.	<0.05 mg/L
Lead	0.06 mg/L
Method 601 & 602	
- chloroform	15 ug/L
- methylene chloride	980 ug/L
- ethylbenzene	10 ug/L
- toluene	30 ug/L
- 1, 1, 1,- trichloroethane	5 ug/L

ACCUMULATION PAD - EAST

ANALYTE	RESULT
Chromium, Hex.	<0.05 mg/L
Lead	0.13 mg/L
Method 601 & 602	
- chloroform	4 ug/L

BULKING PAD - WEST

ANALYTE	RESULT
Chromium, Hex.	<0.05mg/L
Lead	0.11 mg/L
Method 601 & 602	
-chloroform	22 ug/L
-ethylbenzene	3 ug/L
-toluene	2 ug/L

BULKING PAD - EAST

ANALYTE	RESULT
Chromium, Hex.	<0.12 mg/L
Lead	1.4 mg/L
Method 601 & 602	
- ethylbenzene	35 ug/L
- toluene	45 ug/L

Table 5 (continued)

PHASE II

ACCUMULATION PAD - WEST

ANALYTE	
Chromium, Hex.	<0.05 mg/L
Lead	<0.05 mg/L
Method 601 & 602	No compounds detected above detection limit.

BACKGROUND BLANK

ANALYTE	
Chromium, Hex.	<0.05 mg/L
Lead	0.15 mg/L
Method 601 & 602	10 ug/L Chloroform
	10 ug/L ethyl benzene
	2700 ug/L methylene chloride
	11 ug/L toluene
	15 ug/L xylenes, total

SOIL REMEDIATION

In order to satisfy MDNR requirements for approval of the waste management pad certification, a limited soil remediation was requested for soils adjacent to the east end of the north retaining wall of the bulking pad. To achieve the remediation, a limited soil excavation was performed, followed by waste soil characterization and excavation sampling and analysis.

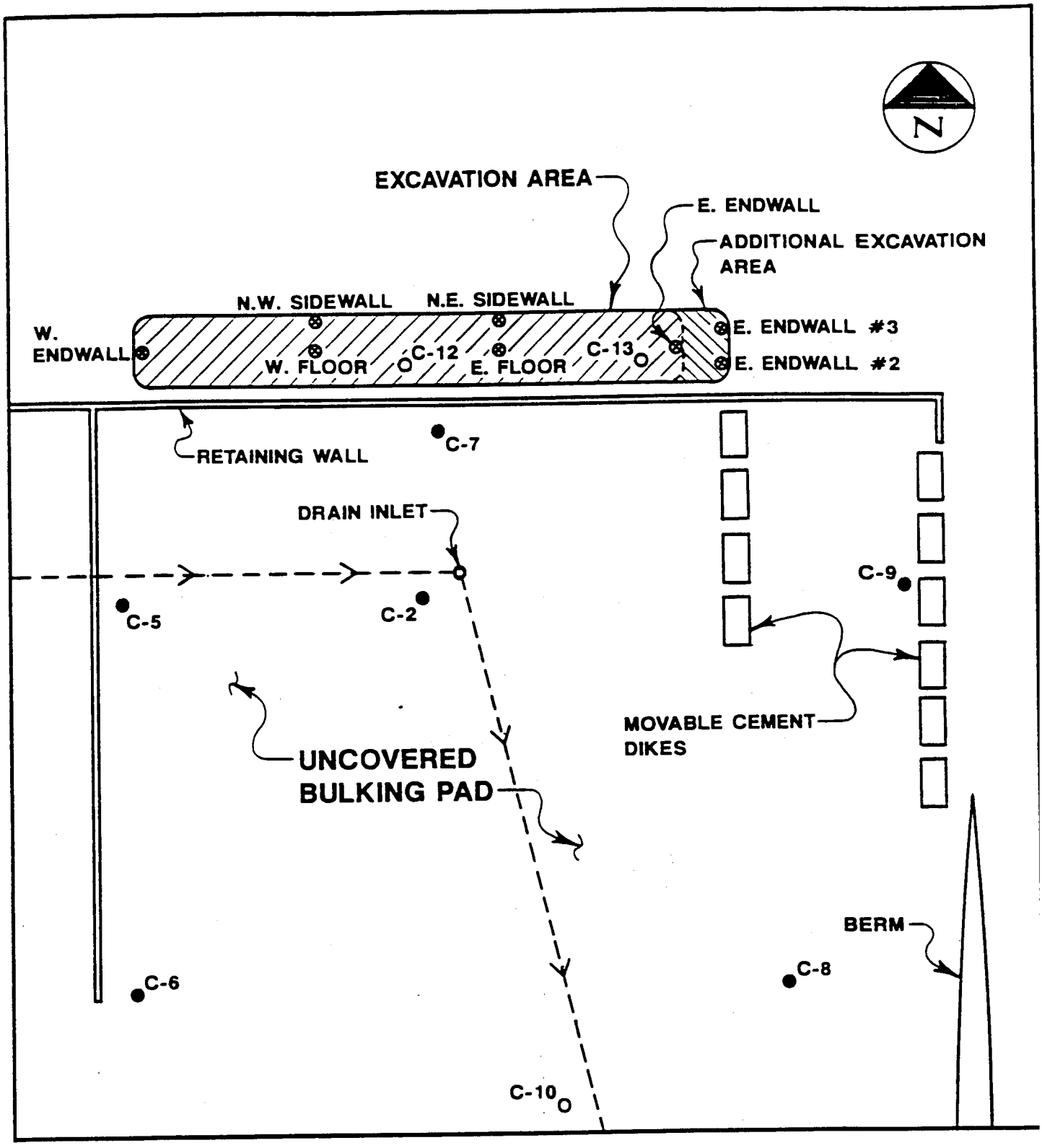
The first round of excavation resulted in an elongated trench approximately 60 feet long by four feet wide by four feet deep, for an equivalent of approximately 33 cubic yards of waste. All excavation activities were monitored by a McNamee Industrial Service representative who screened ambient conditions and spoils with a PID using the protocol set forth in the closure plan.

When non-detected PID readings were achieved on representative floor, endwall and sidewall samples, composite soil samples were collected for laboratory analysis of benzene, toluene, ethylbenzene and xylene.

The analyses revealed non-detectable concentrations for all samples except the east endwall composite, which contained 70 ug/kg xylene. In response to the detection, another round of excavation was conducted, resulting in another five cubic yards of material being excavated.

To provide an additional degree of chemical characterization of the expanded excavation, two additional composite samples were collected and analyzed (labeled as east endwall composite #2 and east endwall composite #3). Since xylene was the only compound detected in the east endwall sample from the initial excavation, it was the only compound analyzed for in the subsequent excavation.

Xylene was not detected in east endwall samples #2 and #3, thus providing sufficient data to document an adequate clean-up, has been achieved. Table 6 provides a summary of excavation analyses, while Figure 6 depicts the excavation location and attendant sampling.



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LEGEND

● SOIL BORING LOCATIONS (PHASE 1)
O SOIL BORING LOCATIONS (PHASE 2)
⊗ EXCAVATION COMPOSITE SOIL SAMPLE LOCATIONS
SCALE: 1" = 15'±

FIGURE 6

WASTE MANAGEMENT PAD SHOWING EXCAVATION AREA GM TRUCK & BUS, PONTIAC CENTRAL

Table 6

Excavation Analytical Results

Location	Analyte	Result
West Endwall	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	<20 ug/kg
East Endwall	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	70 ug/kg
Northwest Sidewall	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	<20 ug/kg
Northeast Sidewall	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	<20 ug/kg
West Floor	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	<20 ug/kg
East Floor	Benzene	<20 ug/kg
	Toluene	<20 ug/kg
	Ethylbenzene	<20 ug/kg
	Xylene	<20 ug/kg
East Endwall #2	Xylene	<20 ug/kg
East Endwall #3	Xylene	<20 ug/kg

SUMMARY AND CONCLUSIONS

As part of a reduction in operating latitude needed for waste management activities at General Motors Truck & Bus Group, Pontiac Central Manufacturing and Assembly Plant's waste management facility, a waste management pad closure has been conducted in compliance with 40 CFR 265.111, the Closure Performance Standard. Closure included decontamination of a 12,543-square-foot concrete pad by removal of sludge and residue with ultra high-pressure water blasting, followed by rinsate sampling and coring and sampling of soil beneath and adjacent to the pad to enable laboratory analysis of site-specific metals and volatile organic compounds (VOC's). In addition, a limited excavation of soils adjacent to the pad was performed. This report provides documentation of field activities, laboratory analyses, and interpretations necessary to provide environmental characterization of the site.

Because the waste management pad had to remain partially active during decontamination and sampling activities, it was necessary to divide the facility into quarters, allowing half of the accumulation pad and half of the bulking pad to remain operable at all times. In this manner, decontamination and sampling could proceed with minimal disturbance to normal waste management activities.

Pad closure was conducted in two phases, with Phase I being comprised of an initial round of decontamination, sampling and analysis, followed by a preliminary certification report documenting the activities and analysis. Based on a notice of deficiency letter to General Motors from MDNR, a second phase of additional decontamination, sampling and analyses were implemented. This phase, Phase II, was targeted at areas of the pad which either were not satisfactorily decontaminated or were in need of further chemical characterization. Analytical results from the Phase II soil samples prompted the need for the limited soil excavation.

Decontamination began with the removal of bulk sludge by scraping, followed with an initial pressurized water rinse and, finally, rinsing with an ultra high-pressure water blaster. The resultant rinsate was diverted to the on-site drainage system which flowed to the adjacent wastewater treatment plant for normal treatment. Pooled rinsate was sampled and subsequently vacuumed and hauled to the wastewater treatment plant by the on-site licensed hazardous waste hauler.

Soil characterization was accomplished by coring through the concrete pad at nine locations selected by GM personnel in accordance with the guidelines set forth in the MDNR document, "How Clean is Clean." Samples were procured at 0.5-foot and 1.0-foot below the pad and soil interface using a decontaminated stainless steel auger. Samples were stored in laboratory supplied bottles and transported to the laboratory under strict laboratory directed protocol and chain-of-custody. A separate sample of each soil horizon was collected for in-field photoionization analysis.

Although Phase I water blasting was successful in removing nearly all visible residue, as evidenced by the lack of solids in the rinsate, a notable concentration of volatile organic compounds was present in the west half covered waste accumulation pad rinsate, particularly methylene chloride at a concentration of 0.980 mg/L. The rinsate from the other half of the accumulation pad contained only a single volatile organic compound, chloroform, at a concentration of only 0.004 mg/L. The rinsate from the east half of the bulking pad contained 0.035 mg/L ethylbenzene and 0.045 mg/L toluene. VOC's detected in the west half of the bulking pad included 0.022 mg/L chloroform, 0.003 mg/L ethylbenzene and 0.002 mg/L toluene.

Overall, VOC concentrations in the Phase I rinsate appear anomalously high since water blasting was successful in removing nearly all visible sludge residue, resulting in a final rinsate that was free of solids. VOC concentrations in the accumulation pad west rinsate may be attributed to ambient VOC's liberated from the active portions of the facility.

Phase II water blasting of the accumulation pad west was successful in fully decontaminating the pad, as is evident by the lack of detectable VOC's.

Total hexavalent chromium was not found to be present above detection limits in any of the rinsate samples, Phase I or II, while total lead varied between 0.06 mg/L in the accumulation pad east sample to 1.4 mg/L in the bulking pad east sample.

Metals analysis of soil samples was performed by Student T-test statistical comparison to background soil samples. The comparison test demonstrated the lack of environmental impact from the unit by lead to soils beneath the pad due to metals. Hexavalent chromium was not detected in either the background or waste management pad soil samples, also indicating a lack of environmental impact.

No VOC's, using EPA methods 8010 and 8020, were detected by the laboratory in the soils underlying the pad investigated during Phase I sampling (C-1 through C-9). In-field photoionization readings of the soil samples, however, indicate the potential presence of an unknown volatile organic compound or compounds in several of the samples.

Four Phase II soil samples were collected in areas of this pad subject to potential invasion by contaminants, namely a pitted area of the pad and an area where the waterstop was missing from a joint, as well as soil due north of the north retaining wall of the east bulking pad. Analyses indicated minor impact to the soil, prompting the excavation of approximately 33 - 35 cubic yards of soil. That soil was properly transported, manifested and disposed of at a licensed Type II landfill. Waste disposal shipper/manifests are included as Appendix I.

The overall condition of the accumulation pad was excellent, with minimal concrete pitting, an effective concrete sealant and tight joints. The overall condition of the bulking pad was poor to good with areas of severe concrete pitting, a lack of concrete sealant and several areas where the waterstop at the joints was missing or disrupted.

RECOMMENDATIONS

Certify closure of the accumulation pad based on the chemical quality of rinsate and soil beneath the pad.

Certify closure of the bulking pad based on the chemical quality of rinsate and lack of EPA Method 601 and 602 volatile organic compounds and low metal concentrations in the soil beneath the pad.

Basic improvements to the facility should be provided to insure that liquids drain properly and waste is confined to the pad.

APPENDIX A

Closure Plan

Truck & Bus Gr
General Motors Corporat
31 Judson St
Pontiac, Michigan 48

December 2, 1987

Michigan Department of Natural Resources
Waste Management Division
P.O. Box 30028
Lansing, MI 48909

Attn: Andrea Schoenrock

Dear Ms. Schoenrock:

Enclosed is a revised closure plan for the waste management areas at our Pontiac Central and East plants.

Per your request, the DNR offices will be notified in advance of key events in the closure activities.

If you have any questions, please call me at (313) 456-7529.

Very truly yours,

D. S. Harrett

D. S. Harrett
Environmental Engineering
Pontiac Central Mfg. & Assy.

DSH/dg

Enclosure

CPE17.008

HAZARDOUS WASTE STORAGE FACILITY
CLOSURE PLAN

FOR

TRUCK & BUS GROUP
PONTIAC CENTRAL PLANT
PONTIAC EAST PLANT

EPA #MID005356902

SEPTEMBER, 1987

CPE15.036

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APPENDICES

Appendix A Pontiac Central and East Plants - Annual Waste Summaries

Appendix B Waste Characterizations

1.0 Introduction

This closure plan describes the methods and sequence of events necessary to close (2) hazardous waste management areas at Truck & Bus - Pontiac Central and East plants. The following plan was developed in accordance with 40CFR 265.111 - 265.115 and Michigan Act 64 Rule R299.9613.

1.1 Background

General Motors Truck & Bus - Pontiac Submitted a RCRA Part A application to the EPA on November 17, 1980 for treatment of hazardous wastes on site, storage of hazardous wastes on site over 90 days, and/or receipt of hazardous wastes from off site. In April, 1985, Truck & Bus - Pontiac Central and East submitted a part B application. On July 1, 1987, the plant requested withdrawal of the part B application after determining that the additional operating latitude afforded by permitted status was not needed: no hazardous wastes require treatment on site, storage over 90 days is not necessary for economical disposal, and all Pontiac Truck & Bus plants manage their hazardous wastes independently, so receipt from off site is not required. When final closure is accomplished Truck & Bus - Pontiac Central will continue its waste management activities under 40CFR262 and Act 64 Part 3 (Generator) rules.

1.2 Purpose and Scope

The purpose of this closure plan is to provide documentation of compliance with 40 CFR 265.111, closure performance standard, which states that an owner or operator of a hazardous waste management facility must close his facility in a manner which:

- Minimizes the need for further maintenance.
- Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the ground or surface waters or to the atmosphere.

The scope of this closure plan includes the following waste management units operated at the Truck & Bus - Pontiac Central and East plants:

- Central plant containerized and bulk waste management pad (storage of listed hazardous wastes).
- East plant container and tank waste management area (storage of listed hazardous waste).

This closure plan describes the steps necessary to remove waste and waste residue from regulated waste management units, decontaminate facility equipment, and document closure. Estimates are also included for the maximum hazardous waste inventory, closure schedule, and final closure date.

2.0 General Facility Information

2.1 Facility Name and Location

Name - General Motors Corporation
Truck & Bus Group
Pontiac Central Mfg. & Assy. / Pontiac East Assembly
Address - 660 S. Boulevard East / 820 S. Opdyke Rd.
Pontiac, Michigan 48053
Facility Contacts
Central - Mr. Dan Harrett
(313) 456-7529
East - Mr. Ken Gembel
(313) 452-2781
EPA ID# - MID005356902

2.2 Facility Description

The General Motors Truck & Bus Group - Pontiac Central and East plants are located in the southeast corner of Pontiac, on a property bounded by South Boulevard on the North, Opdyke Road on the East, East Boulevard on the West, and the Grand Trunk Western Railroad Tracks on the South. Geographical coordinates are the northeast, northwest and southeast 1/4 of section 03, tier 2 north, range 10 east. The facility occupies some 400 acres, of which less than one acre is dedicated to hazardous waste management. A map of the plant property is given as figure 2-1.

2.3 Waste Characteristics

2.3.1 Wastes Managed in Central Plants Waste Management Pad

The Central plants waste management pad receives non-hazardous paint sludges in bulk from all three Truck & bus - Pontiac plants, solidifies them with lime as needed, and loads them into 35 yard licensed hazardous waste hauling vehicles for shipment (by plant preference) to a licensed hazardous waste landfill. Laboratory analyses show this waste stream to be consistently non-hazardous. In addition, wastewater treatment sludges were managed in bulk here while they were under a temporary delisting, and are now managed in 15 yard licensed rolloff boxes as a F019 listed waste. (This waste stream was listed as F006/F019 until the F006 listing was revised to exclude phosphating in December, 1986.)Parked road tankers on this pad are used to store non-hazardous oils and glycol. Containers of waste paint and solvent (listed wastes F003, F005) chlorinated solvents (listed waste F001), and non-hazardous oils are brought to the pad from the plant to be emptied and consolidated in the appropriate bulk tank here or at the Pontiac East facility (described in the next section). Incompletely emptied containers of non-hazardous adhesives and sealers are brought to this pad to be emptied and the residue consolidated with the paint sludges. Pebble lime is stored in a pile on the pad and is used as required to solidify

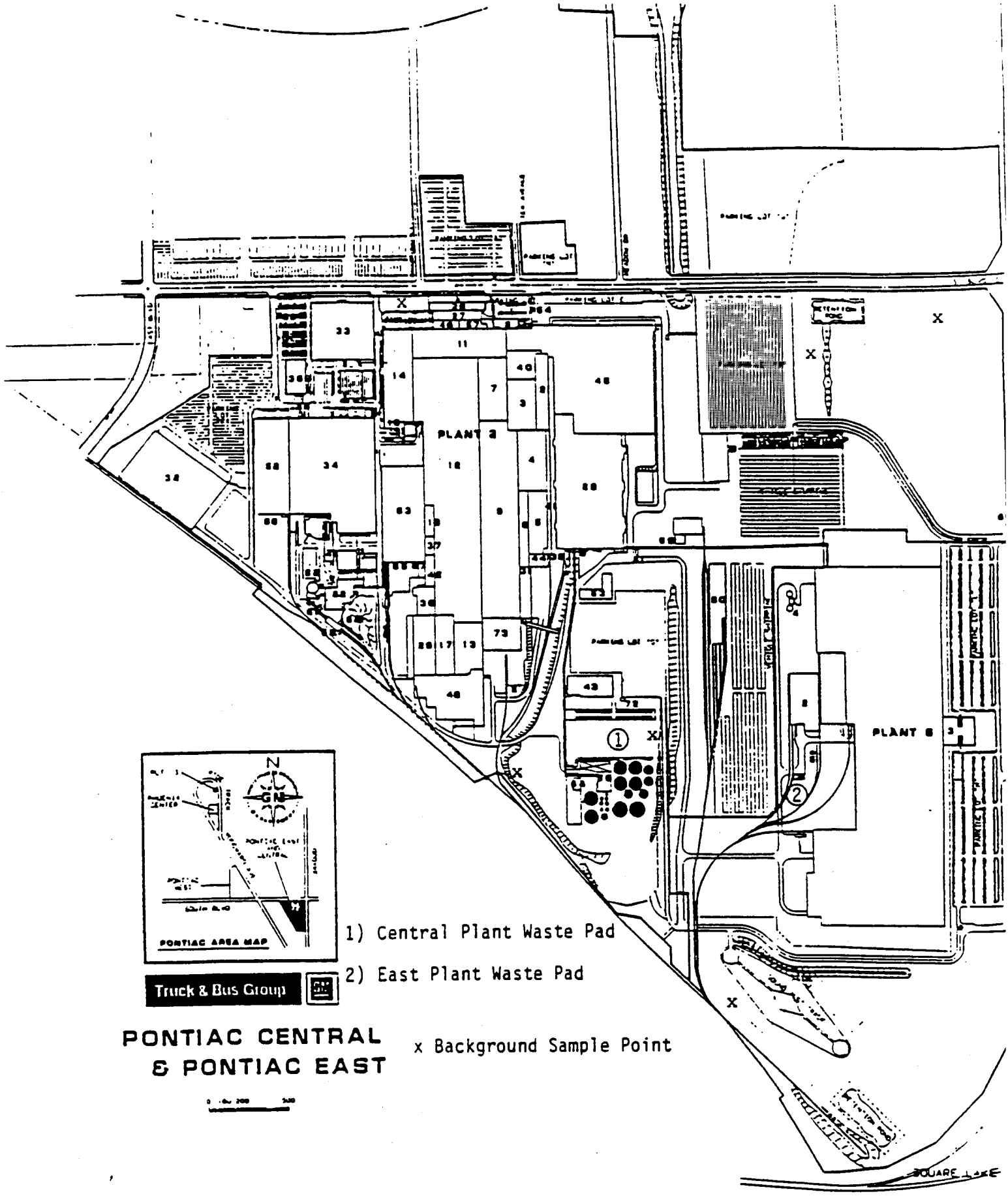


Fig. 2-1 Facility Map

the sludges to meet the acceptance criteria of the disposal facility. All transporting vehicles are owned by contract haulers, who decontaminate the vehicle prior to its return to this facility.

The Pontiac Central waste management pad consists of a 12,543 square foot, 8 inch thick concrete area constructed in 1980, reinforced with PVC waterstop in all joints. Two drains carry precipitation and free liquids into the adjoining wastewater treatment plant; this plant in turn discharges to the City of Pontiac POTW and is beholden to its discharge limitations. (No discharge excursions of any sort have occurred; therefore it may be concluded that runoff from hazardous waste operations may be properly handled in the wastewater treatment system.) Recent inspections of this facility indicate it to be in excellent condition with no apparent cracks or other evidences of failure.

2.3.2 Wastes Managed in the East Plant Waste Management Pad

The East Plant waste management pad received drummed waste paints, solvents, chlorinated solvents, non-hazardous sealers and adhesives, and empty drums generated in the East Plant until the end of 1984. At that time the plant shut down for retooling and the production operations were relocated to the Central plant. A new waste management pad was constructed at Pontiac East to be operated as an accumulation facility and the old waste management pad was converted to secondary containment for hazardous waste tanks being used by Pontiac Central plants. These tanks were relocated from another containment area (since closed and covered by a building expansion). These tanks are presently used for waste paint and waste solvent (listed wastes F003, F005). With the activation of a new tank group at Pontiac Central these tanks will be idled; neither Pontiac Central nor Pontiac East plants foresee reusing this installation.

The Pontiac East pad consists of a 4,500 square foot irregular concrete slab. During its use as a container management area it had 4 inch curbing all around; the diking was raised to 18" to provide tank secondary containment. The age and details of construction of this pad are not known but it serviced a plant constructed in 1972; visual inspection indicates it to be in excellent condition.

Previous hazardous wastes brought to this area in drums include:

1) Waste paints - F003, F005, D001
2) Waste solvents - F003, F005, D001
3) Chlorinated solvents - F001

Some containers of hazardous wastes may have remained in this area over 90 days. All containerized waste has long since been removed from this containment area; as noted previously its present use is solely as secondary containment for two hazardous waste storage tanks. These tanks have not leaked or overflowed since their installation in this area. The tanks are freestanding, with no associated pumps or piping.

2.4 Estimated Maximum Hazardous Waste Inventory

The following table lists the expected maxima of hazardous wastes to be found in either containment area. These maxima may not represent the current quantities stored as waste removal activities are ongoing.

Hazardous Waste	Tank/Container/Bulk	Central Pad	East Pad
CWT Sludge (F019)	Container	30 YD^3	-
Waste Paint (F003/ F005)	Tank	-	12,000 gal.
Waste Paint (F003/ F005)	Container	1,000 gal.	-
Waste Solvent (F003/ F005)	Tank	-	12,000 gal.
Waste Solvent (F003/ F005)	Container	1,000 gal.	-
Other Wastes			
Paint Sludges	Bulk	40 YD^3	-
Waste Oil	Tank	Gal.	-
Waste Glycol	Tank	Gal_3	-
Waste Sealers/Adhesives	Bulk	5 YD^3	-

3.0 Closure Methods

3.1 Central Plants Waste Management Pad

The Central plants waste management pad will continue in use as an accumulation facility; therefore, closure will entail removal of wastes and investigation only to the extent necessary to determine whether contamination has escaped the confines of the facility. If contamination is found outside the waste management area, closure will then encompass sampling, testing and removals as appropriate to define and abate the contaminated areas. As the production operations are dependent on this facility, half the area will be investigated, remediated and restored at a time. When closure is complete, the entire facility will be returned to operation.

3.2 East Plant Waste Management Pad

The East plants waste management pad will undergo decontamination sampling, testing and remediation as appropriate to render the area clean. Closure will be final; there are no plans to reactivate this facility in any capacity. The tanks will be decontaminated and stored for future reuse; the concrete will be cored and if contamination is found, excavated as necessary to define and abate any contamination. Restoration of any excavated areas following decontamination is at the option of Pontiac East Assembly and is not within the scope of this closure plan.

4.0 Decontamination Methods

4.1 Central Plants Waste Management Pad

The Pontiac Central waste management pad is to be divided into two sections by a concrete wall; this wall will serve as a barrier between the covered and open areas of the facility and will form the division between areas of investigation and closure activity: half the area will undergo closure while the other half remains active. Following is the decontamination method for either half.

All loose material will be removed by shoveling or scraping and disposed of in the same manner as paint sludge, i.e., secure landfill by preference. Following this, cleaning will proceed using high pressure or ultrahigh pressure water. The collected liquid will be disposed of to the wastewater treatment plant which routinely receives runoff from this area. Cleaning will be repeated until no solids appear in samples of the wash water. At this point the liquid from the cleaning activity will be sampled and analyzed for volatile organics, lead and chromium (VI) using the EPA methods described in Section 4.3. The pad will be considered clean when lead and chromium (VI) in the rinsate is not statistically above soil background, and volatile organic constituents are below detection limits. (Although cyanide is also a listed constituent of F019 sludges, no cyanide has been used in any process at Pontiac Central since 1967. The area being decontaminated dates from 1980; therefore, no cyanide was introduced to the pad.)

Soils underlying the waste management pad will be sampled by coring the concrete at the low points in each section of the pad. These low points will be adjacent to the drains in each section. Inspection of the pad for cracks or other evidence of loss of integrity will determine if other locations are to be sampled. The soil sampling procedure is described in section 5.1.2.

All sampling and handling procedures will be consistent with SW-846, Test Methods for Evaluating Solid Wastes (2nd edition).

4.2 East Plant Waste Management Area

The tanks at the Pontiac East facility will be emptied of all pumpable contents, then waterblasted to remove adhering residue using ultrahigh pressure equipment. Liquids generated by the cleaning process will be collected for disposal as an F003/F005 waste. The tank interior will be considered clean when volatile organic compounds in the rinsate are nondetectable. The tanks have no associated pumps or piping to be decontaminated. Following the cleaning of the tanks the concrete containment pad will be cleaned using high pressure water; the liquids collected will be disposed to the central wastewater system as was done for the Central plants waste management pad. Scrubbing will be repeated until no further residue can be collected. The liquid

collected will be analyzed for volatile organics, lead and chromium (VI) using EPA test methods described in section 4.3. The concrete will be considered clean when lead and chromium (VI) in the rinsate is not statistically above soil background at the 95% confidence level, and volatile organic compounds are below detection limits. All sampling and handling procedures will be in accordance with EPA SW-846, 'Test Methods for Evaluating Solid Waste' (second edition). Soils underlying the waste management pad will be sampled by coring the concrete at the indicated grid locations.

4.3 Test Methods

Analytical methods to be used to document decontamination are as follows:

Parameter	Test Method
Lead	SW-846 Method 7420 or 7421
Chromium (VI)	SW-846 Method 7195, 7196 or 7197
Volatile Organic Compounds	SW-846 - 8010, EPA Method 601 SW-846 - 8020, EPA Method 602

5.0 Closure Documentation

5.1 Central Plants Waste Management Pad

Documentation of closure of the central plants waste pad will consist of the following:

- Documentation of pad decontamination.
- Documentation of removal of underlying soils shown to contain hazardous wastes or hazardous constituents.

Documentation of closure in these areas is designed to be consistent with MDNR's draft guidance document 'how clean is clean'.

5.1.2. Sampling of Underlying Soils

The sampling points are shown in figure 5-1. Owing to the small area involved, a maximum of nine samples will be collected. At a minimum, the samples will be drawn at the lowest point in each area, with additional samples taken at cracks if any are found to be present following cleaning. Soil samples will be taken initially at the 0-.5 foot and .5-1.0 foot level. Samples will be taken with a hand auger through the concrete coring. Between samples the sampling auger will be decontaminated by scraping off adhering soils, washing with detergent and rinsing with distilled or deionized water. The following procedure will be used to analyze and interpret the soils samples obtained.

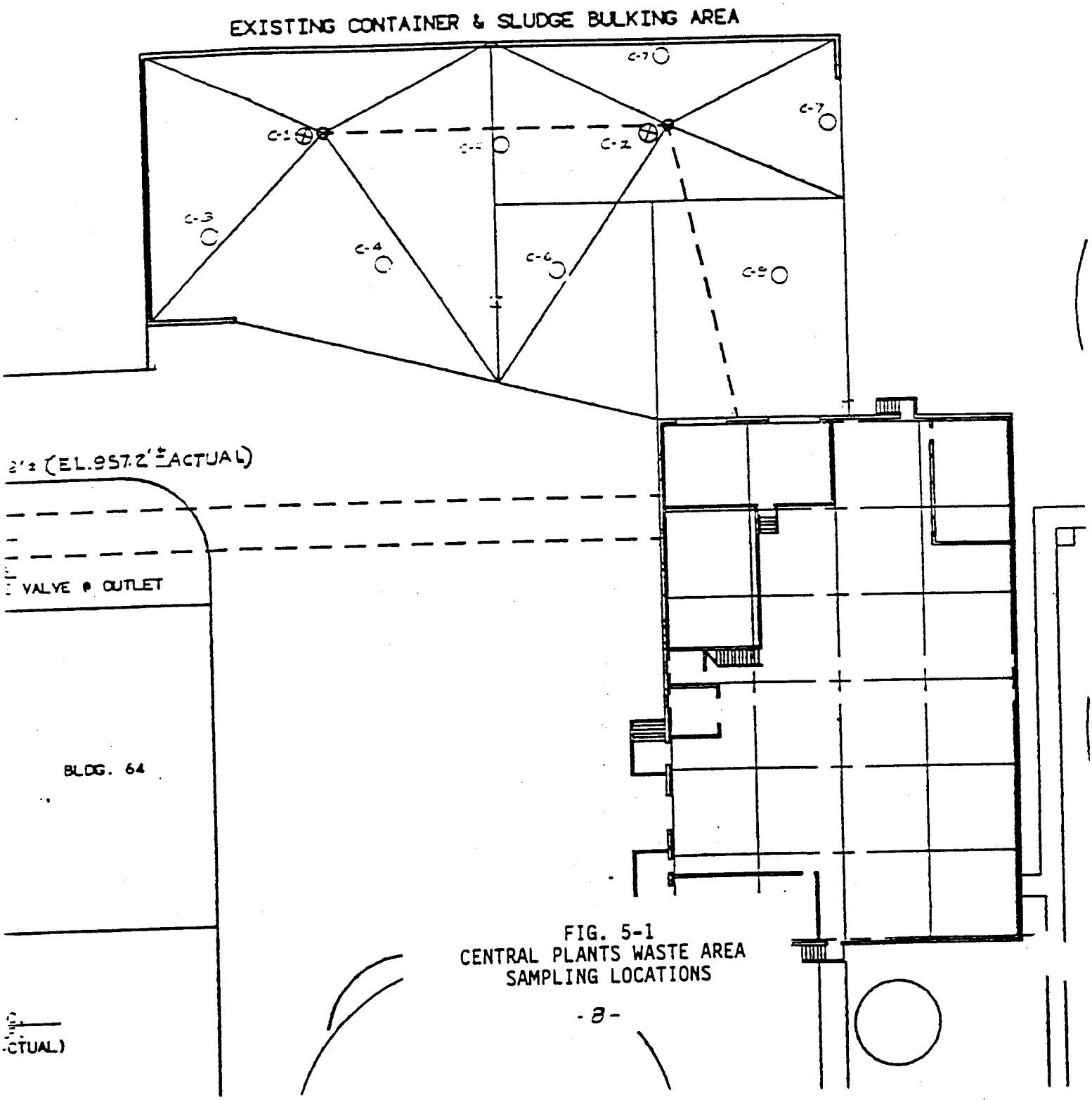


FIG. 5-1
CENTRAL PLANTS WASTE AREA
SAMPLING LOCATIONS

5.1.2 a Establishing Soil Background

Background soil parameters will be determined by samples taken at six background locations as indicated on Figure 2-1. The samples will be collected from approximately the same soil types and elevations as the soils underlying the pad. The background soil samples will be analyzed for total metals.

5.1.2 b Soils Analyses

These analyses may be performed on samples taken at the site:

- Total metals analyses for lead and chrome (VI)
- EP toxicity for lead and chrome (VI)
- Photoionization detection readings
- Volatile organics (methods 601 and 602)

Total metal concentrations of the underlying soils will be compared with the levels in the background samples to determine if contaminants have penetrated the concrete pad and impacted the underlying soils. Comparison will be by the Gossett Student's T-test at the 95% confidence level. This method is used to determine if a statistically significant difference exists between background soils and soils in areas at risk of contamination. If a statistically significant difference is found, soils impaction by contaminants will be presumed to have occurred. EP toxicity analyses of soils samples showing statistically elevated levels of metals will determine the disposition of impacted soils requiring removal. If the EP toxicity threshold levels are exceeded the soils will be removed and disposed as a hazardous waste. If the EP toxicity thresholds are not exceeded the soils will be removed and disposed as an Act 641 waste.

Photoionization detection (PID) readings will be taken at the site with a PID meter at the sampling location identified. The meter will be calibrated according to the manufacturer's recommendations. Readings will be taken on all samples from various depths at each location. Samples will be placed in sample jars and covered with foil. After 30 minutes the instrument probe will be inserted through the foil into the sample jar headspace and a reading taken.

If the samples taken at the shallowest depth indicate that volatile organics are present, samples will be taken from the next lowest level and tested in a like manner. The process will be repeated until a sample is obtained which yields a negative result with the PID meter. This sampling level will then be sampled using appropriate containers for volatile organics analysis (40 ml vials).

Laboratory VOA will be made using EPA method 601 for purgeable halocarbons hand method 602 for aromatic hydrocarbons. Samples taken will observe appropriate sample preservation and chain of custody practices.

The sample screening technique described above is designed to expedite the portion of the closure process devoted to definition of the scope of remediation, while still meeting the intent of MDNR's closure guidelines. This procedure will ensure that at least one sample from each sampling location undergoes analysis for volatile organics using EPA methods 601 and 602.

5.1.2 c Criteria for Determination of Scope of Removal

If the following criteria are all met the soil will be left in place:

- Volatile organic compounds using EPA methods 601 and 602 are nondetectable.

- Total lead and chrome (VI) are not statistically above background according to the Gossett Student's T-test.

If soils at any sampling plant fail either criteria they will be removed. Removal of soil around a contaminated point will be within a radius equal to the distance between adjacent boring locations. Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an act 641 waste. Soils contaminated with metals above EP toxicity limits or with volatile organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminants found in the previous level. If contaminants are found, additional soil removal will be performed. If no contaminants are found, cleanup is complete.

5.1.2 d Restoration of Concrete Containment

Since the Central plants waste management pad is to continue in service after decontamination, the facility will be restored following soils sampling and any soils removal. After all contamination has been removed, the underlying voids will be backfilled and compacted to original grade. Reinforcing mesh will be placed and the original concrete edges will be treated with an epoxy bonding agent, per the manufacturer's instructions, to ensure a seal between the new and existing concrete. Corings where no contamination was found will be repaired in a similar manner with the exception of reinforcing steel.

5.2 Pontiac East Waste Management Area

5.2.1 Decontamination of Tanks

The tanks at Pontiac East managed listed hazardous wastes (paint and solvents, EPA codes F003, F005). All pumpable waste will be removed and disposed of in the normal manner. Following this the

tanks will be cleaned three times using high pressure or ultrahigh pressure water. Liquids generated from the first cleaning at a minimum will be disposed of as a listed hazardous waste; waste from subsequent cleanings will be tested to determine its acceptability in the central wastewater treatment system. The tanks will be considered clean when the rinsate contains nondetectable levels of volatile organics as determined by EPA methods 601 and 602.

5.2.2 Cleaning of Containment Area

Following the tank cleaning the concrete containment area will be cleaned by high pressure water. The rinsate will be collected and analyzed for volatile organics using EPA methods 601 and 602. The concrete will be considered clean when volatile organics in the rinsewater are nondetectable by the above methods.

5.2.3 Sampling of Underlying Soils

The sampling locations are shown in figure 5-2. Owing to the small area involved a maximum of nine samples will be collected. At a minimum, samples will be collected in low areas and cracked or otherwise unsound locations of the containment area. Soils samples will be taken at 0-.5 feet and .5-1.0 feet below the bottom of the concrete slab. Samples will be taken with a hand auger through the concrete coring. Between samples the sampling auger will be decontaminated by scraping off adhering soils, followed by washing with detergent and rinsing with distilled or deionized water.

The following procedure will be used to analyze and interpret the soil samples obtained.

5.2.3 a Establishing Soil Background

Background soil parameters will be as determined from soil samples taken at six background locations as shown on Figure 2-1. The samples will be taken from approximately the same soil types and elevations as the soils underlying the pad. The background samples will be analyzed for total metals.

5.2.3 b Soils Analyses

These analyses may be performed on samples taken at the site.

- Total metals analyses for lead and chrome (VI).
- EP toxicity for lead and chrome (VI).
- Photoionization detection readings.
- Volatile organics (EPA methods 601 and 602)

Total metals concentrations of the underlying soils will be compared with the levels in the background samples to determine if contaminants have penetrated the concrete pad and impacted the

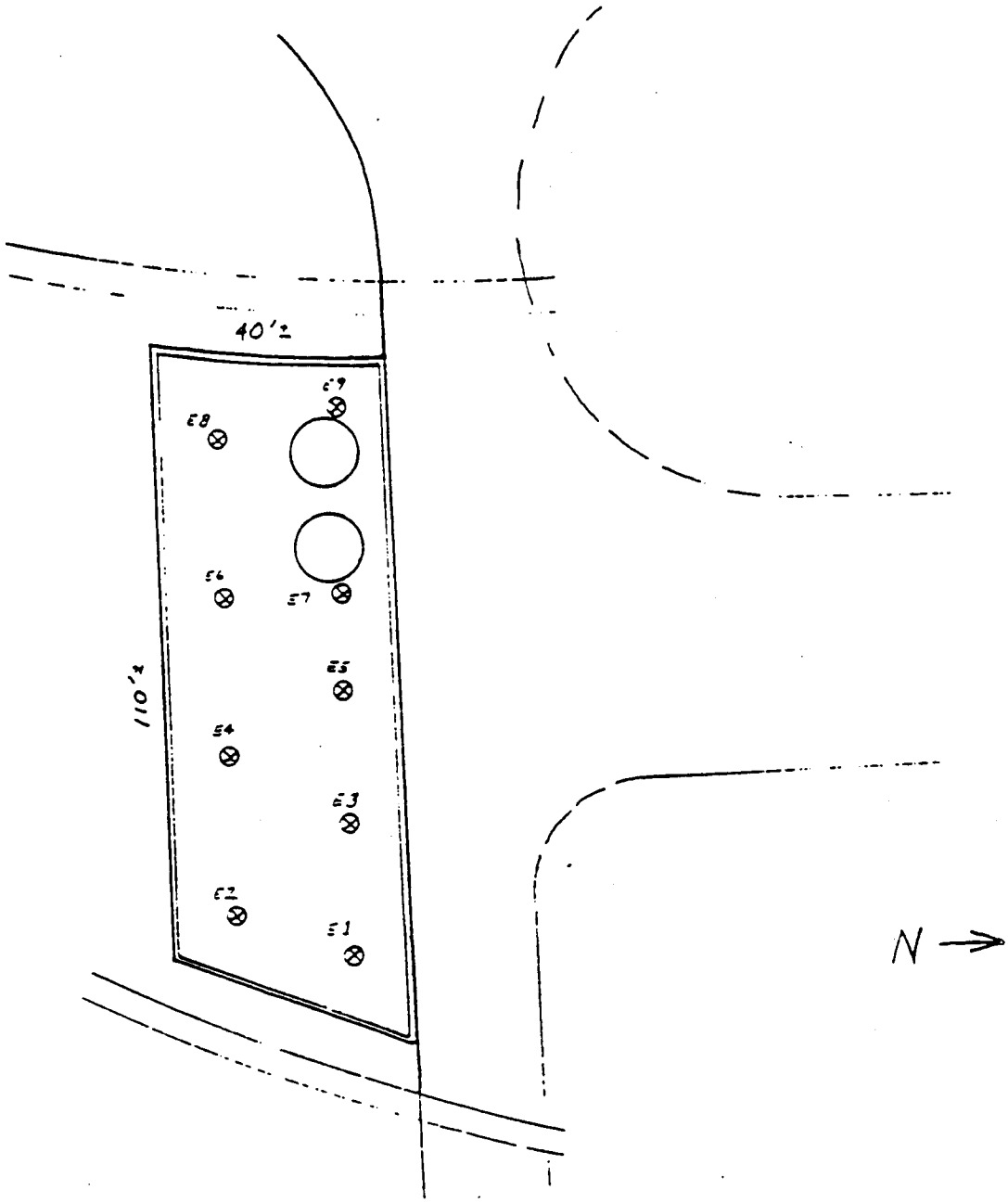


FIG. 5-2
EAST PLANT WASTE AREA
SAMPLING LOCATIONS

underlying soils. Comparison will be by the Gossett Student's T-test. This method is used to determine if a statistically significant difference exists between the background soils and soils in areas at risk of contamination. If a statistically significant difference is found, soils impaction by contaminants will be presumed to have occurred. EP toxicity analyses of soils showing statistically elevated levels of metals will determine the disposition of impacted soils requiring removal. If the EP toxicity thresholds are exceeded the soils will be removed and disposed of as a hazardous waste. If the EP toxicity thresholds are not exceeded the soils will be removed and disposed of as an Act 641 waste.

Photoionization detection (PID) readings will be taken at the site with a PID meter at each identified sampling location. The meter will be calibrated according to the manufacturer's recommendations. Readings will be taken on all samples from various depths at each location. Samples will be placed in glass sample jars and covered with foil. After 30 minutes the meter probe will be inserted through the foil into the sample jar headspeace and a reading taken.

If readings taken on samples from the shallowest depth indicate volatile organics are present, samples will be taken from the next lowest level and tested in a similar manner. The process will be repeated until a sample is obtained which yields a negative result with a PID meter. This sampling level will then be sampled will then be sampled using appropriate methods and containers for volatile organics analysis (40 ml glass vials).

Laboratory VOA will be made using EPA method 601 for purgeable halocarbons and EPA method 602 for aromatic hydrocarbons. Samples taken will observe appropriate sample preservation and chain of custody practices.

The sample screening technique described above is designed to expedite the portion of the closure process devoted to definition of the scope of remediation, while still meeting the intent of EPA's closure guidelines. The procedure will ensure that at least one sample from each sampling location undergoes analysis for volatile organics using EPA methods 601 and 602.

5.2.3 C Criteria for Determination of Scope of Removal

If the following criteria are all met the soils will be left in place:

- Volatile organics using EPA methods 601 and 602 are nondetectable.
- Total lead and chrome (VI) are not statistically above background according to the Gossett Student's T-test.

If soils and any sampling location fail either criteria they will be removed. Removal of soil around a contaminated area will be within a radius equal to the distance between adjacent boring locations.

Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an Act 641 waste. Soils contaminated with metals above EP toxicity limits or with organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminents found in the previous level. If contaminants are found, additional soil removals will be performed. If no contaminants are found, cleanup is complete.

As no reuse of this area is contemplated once closure is completed, restoration of the area is not within the scope of closure.

6.0 Decontamination of Equipment

Heavy equipment used in soils excavation will be cleaned with high pressure water in a contained area. The collected rinsate will be tested to determine its acceptability in the central wastewater treatment system. The equipment shall be considered clean when the rinsate contains nondetectable concentrations of volatile organics using EPA methods 601 and 602.

7.0 Closure Documentation Report

Upon completion of onsite closure activities GM Truck & Bus Pontiac will submit to MDNR a report documenting that closure activities were conducted according to the approved closure plan. The items addressed in the report will include all the applicable items in MDNR's 'draft certification closure checklist'. The documentation report will be signed and sealed by a registered professional engineer. Truck & Bus - Pontiac will also submit a letter to MDNR certifying that closure was completed according to the approved closure plan.

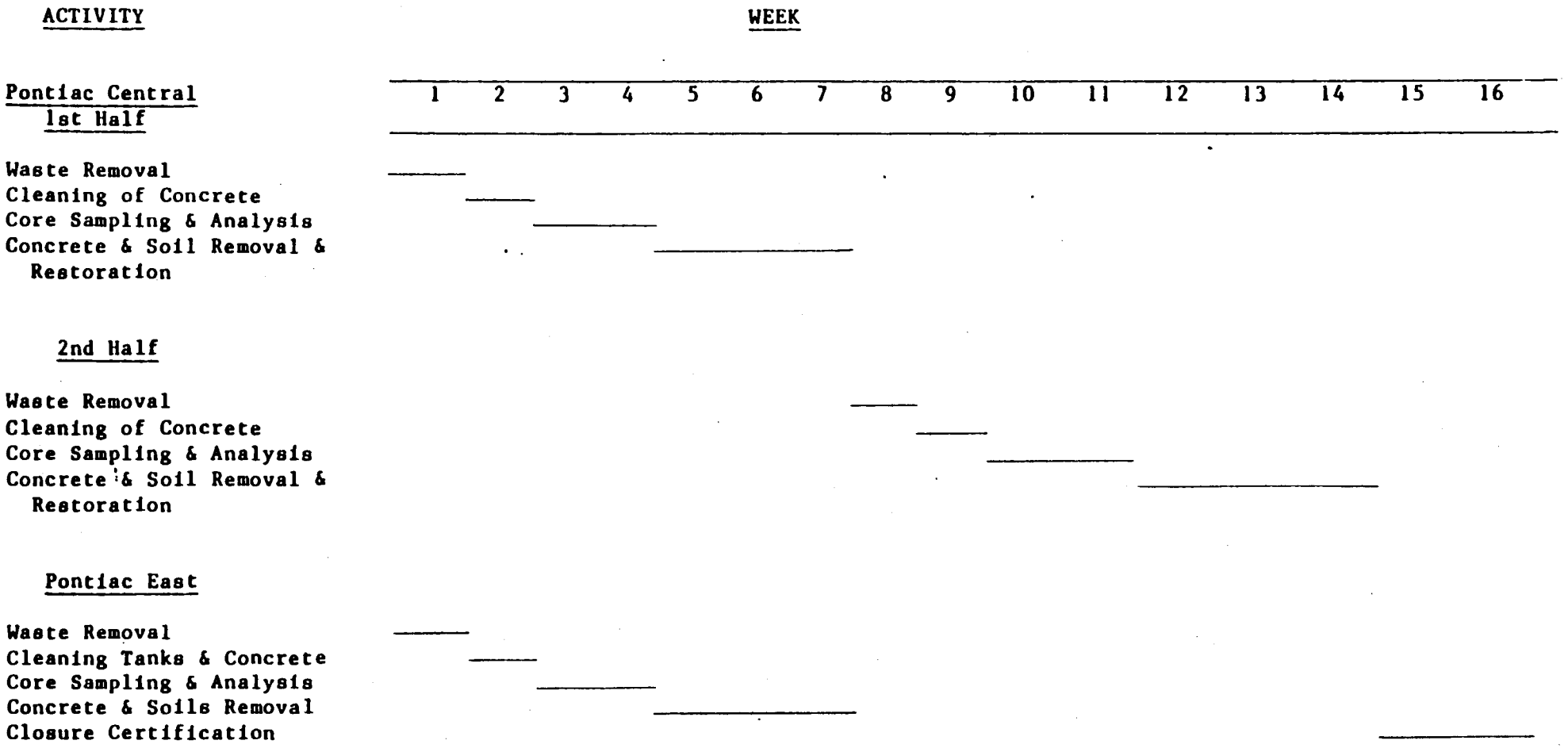
8.0 Estimated Closure Schedule

Truck & Bus - Pontiac will begin closure activity within 30 days of receipt of approval of the closure plan. The closure schedule detailed in figure 6-1 is predicated upon receipt of approval during a season when frost is not or will not become an impediment to closure sampling and remediation activities.

9.0 Closure Cost Estimate

The estimated cost to close the hazardous waste storage areas at Truck & Bus - Pontiac is estimated at $45,000 to $50,000. Table 6-2 details the costs associated with closure.

FIG. 6-1
CLOSURE SCHEDULE



cpel6.014

Table 6-2
Closure Cost Estimate

Item	Quantity	Per Unit	Total
Hazardous Waste Inventory Removal	-	-	(Included in Operating Costs)
Concrete Coring	18	50	900
Soil Sampling	(Lot)	1,200	1,200
Analyses			
VOA	25 Samples	200	5,000
Total Metals	18 Samples	150	2,700
EP Tox (Metals)	18 Samples	250	4,500
Tank Cleaning	(Lot)	3,000	3,000
Concrete Cleaning	(Lot)	2,500	2,500
Concrete Demolition	40 YD^3	80	3,200
Concrete Replacement	40 YD^3	250	10,000
Soil Removal / Disposal			
Nonhazardous	30 YD^3	40	800
Hazardous	10 YD^3	80	800
Closure Certification Report	(Lot)	4,500	4,500
Administrative Costs	5%		1,950
Contingency Costs	20%		7,800
			48,850

PONTIAC CENTRAL AND EAST PLANTS
ANNUAL WASTE SUMMARIES

1981-1986

CPE16.004

HAZARDOUS & LI D WASTE DISPOSAL:

WASTE - 1981 TONS/MONTH	JAN.	FEB.	MAR. 3 MO. AVE	APR.	MAY	JUNE 6 MO. AVE	JULY	AUG.	SEPT. 9 MO. AVE	OCT.	NOV.	DEC. AVE.	YR.	PRE YRS
SLUDGE-WASTE TREAT (LANDFILL)	534.4	390.9	457.4 / 384.9	380.5	324.5	499.2 / 964.4	1067.3	843.3	609.6 / 773.4	648.7	1135.7	662.2 / 676.5		
SLUDGE-PAINT, GRIND ETC. (LANDFILL)	238.6	170.1	214.2 / 233.9	180.7	95.8	168.3 / 90.5	51.8	-----	118.0	-----	-----	88.4		
PAINT & SOLVENT (SOLIDIFIED)	105.4	59.0	81.1 / 78.9	46.1	55.8	71.3 / 82.7	57.1	-----	53.9	-----	-----	40.2		
PAINT & SOLVENT (INCINERATED)			-0-			-0-			8.7 / 78.5	120.6	22.6	26.6 / 94.7		
SOLVENT - PUTTY (SOLD FOR RECLAIM)	-----	-----	-----	-----	-----	-----	19.0	-----	2.1	24.7	-----	3.6		
SOLVENT-METH. CHLOR (SOLD FOR RECLAIM)			-0-			-0-			-0-	5.1	-----	.42		
VENT-1,1,1 TRICHLOR (SOLD FOR RECLAIM)														
YCOL & BRAKE FLUID (SOLD FOR RECLAIM)														
YCOL & BRAKE FLUID (INCINERATED)	-----	-----	-0-	-----	-----	-0-	-----	-----	-0-	95.3	-----	7.9		
OIL (SOLD FOR RECLAIM)	29.8	91.4	70.4 / 90.0	29.6	87.4	59.4 / 28.3	60.6	55.2	60.3 / 70.5	30.4	51.7	54.4 / 26.5		
OIL - (DRIED & FILTERED FOR REUSE)														
P.C.B. CAP & TRANS. (SECURE LANDFILL)	-----	1.0	0.3 / -----	-----	.2	0.14 / -----	-----	.08	0.1 / -----	4.7	-----	0.66		
ASBESTOS (LANDFILL)	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----		
CRUSHED PAILS & DRUMS (SOLD)	-----	-----	-0- / -----	14.0	-----	2.3 / -----	-----	-----	1.6 / -----	-----	-----	1.1		
OTHERS - (SEE REVERSE FOR DETAILS)			-0-			-0-	-----	185.2	62.8 / 317.6	45.0		50.5		
TOTAL	908.2	714.4	803.4 / 787.7	652.9	563.7	798.8 / 1165.9	1255.8	1083.8	917.0 / 1122.0	980.4	1210.0	936.9 / 799.2		
MANIFESTS & number/ CONTAINERS month														
MANIFESTS ISSUED	shipment/ total						45/54	31/43	45/48	33/55	38/52	28 / 18		
CONTAINERS PAILS	pails/	-----	-----	(274) 838	1942	1084	1735 (933-1)	1751	5075 (4431) 4405	505	2286	(1367) 673		
CRUSHED DRUMS	drums			(27) 812	415	309	(378) 134	122	447 (380) 67	85	480	(267) 331		
CONTAINERS PAILS	pails/	-----									140	1002		
FLUSHED DRUMS	drums		91	(215) 554	811	783	1652	518	847 (779) 168	413	445	(10) 1078		
DEPOSIT DRUMS											217	(11.0) 71.3		

CURRENT YEAR 1982

HAZARDOUS & LIQUID WASTE DISPOSAL

PREV YEAR

WASTE NAME (Given in Tons Per Month)	JAN	FEB	MAR 3-MO-AVG	APR	MAY	JUN 6-MO-AVG	JUL	AUG	SEP 9-MO-AVG	OCT	NOV	DEC YEARS-AVG	MONTHL AVERAG
SLUDGE-Waste Treatment (Landfilled)	612.5	539.1	(643.7) 779.6	483.8	543.9	(599.2) 636.6	632.7	545.1	(576.1) 430.2	382.1	172.0	(550.6) 550.6	75
SLUDGE-Paint-Grindings-Etc. (Landfilled)													
PAINT & SOLVENT (Incinerated)	22.6	22.1	(16.5)	24.5		(19.3) 17.7	72.6		(23.9) 26.8	26.7	-0-	(21.1) 16.8	2
SOLVENT-PURGE (Sold for Reclamation)	47.8		(24.0) 23.9	65.1		(37.0) 34.9	42.9		(32.4) 22.7	20.2	27.8	(29.0) 24.0	
SOLVENT-METHYLENE CHLORIDE (Sold for Reclamation)				9.4		(0.4.2)			(0.3?)			(0.3?)	
SOLVENT-1,1,1,TRICHLOROETHANE (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)						(2.6) 15.8			(1.7)	27.4	-0-	(3.6)	
GLYCOL & BRAKE FLUID (Incinerated)	106.1	20.6	(42.2)	26.5	25.2	(29.7)		23.1	(22.3)		32.4	(19.4)	
OIL (Sold for Reclamation)		50.5	(35.6) 34.7	60.4	52.5	(41.9) 33.3	28.3	64.8	(41.9) 33.2	28.9	-0-	(38.0) 49.9	4
OIL (Dried & Filtered for Reuse)			(7.2) (3)** 21.6		+ (4) 2.3	(3.9)			(7.6)			(1.9)	
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES (See Below) (Indicate - 1, 2, 3, 4, 5,										++ (5) 16.0		(1.3)	*
TOTALS (Including Aggregated Quarterly Averages)	790.3	632.3	(768.2) 882.1	660.7	623.9	(734.4) 817.1	780.7	633.0	(703.6) 512.9	501 3	527.2	(666.4) 636.3	9
MANIFESTS Shipments	31	22	29	24	21	27	26	20	17	19	18	22	276
ISSUED Total	44	93	46	35	36	59	49	30	31	28	28	31	444
CONTAINERS PAILS	1440	1774	1844	1552	2254	1473	1826	2411	-0-	2078	687	342	17,692
CRUSHED DRUMS	115	303	593	273	357	100	639	224	-0-	582	447	39	3,672
CONTAINERS PAILS	759	210	224	-0-	330	-0-	-0-	-0-	80	-0-	283	-0-	1,886
FLUSHED DRUMS	512	856	1685	1726	929	1186	1434	1669	919	1056	659	1131	12,992
DEPOSIT-DRUMS (Flushed)	373	605	1272	392	731	917	902	771	733	698	469	870	8,733

OTHER WASTES: 1. PCB CAPACITORS & TRANSFORMERS
2. ASBESTOS
3. DIESEL FUEL** (Reclaimed)
4. PHOSPHATE ESTER +
5. BUTYL ACETATE++ (Reclaimed)

*Includes (40.4) Paint & Solvent Solidified

cc: E.G. Beck
A.L. Di Vito
R.F. Keller

CURRENT YEAR 1983 EAST-CENTRAL COMPLEX

HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL EPA I.D. MID 005356902

PREVIOU YEAR 19

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE*
SLUDGE-Waste Treatment (Landfilled)	198.6	441.0	404.3 573.3	320.7	492.8	415.1 464.4	462.7	782.5	483.8 618.7	294.8	515.0	455.8 305.8	550.6
SLUDGE-Paint-Grindings-Etc. (Landfilled)													
PAINT & SOLVENT (Incinerated)	20.8	-0-	6.9 -0-	19.4	22.3	14.9 26.9		28.9	13.1	27.1	27.2	16.3 23.5	21.1
SOLVENT-Purge (Sold for Reclamation)	19.6	-0-	6.5 -0-		23.2	10.7 21.9		23.5	18.8 21.9	23.0	22.0	13.1	89.9
SOLVENT-Methylene Chloride (Sold for Reclamation)													0.88
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)													3.6
GLYCOL & BRAKE FLUID (Incinerated)				24.5		4.0	23.0	21.8	7.7 6.3			8.2 23.8	19.4
OIL (Sold for Reclamation)	14.3	49.5	48.4 81.6	31.6	24.8	42.3 52.5	18.7	52.7	41.8 50.2	22.2	27.2	48.1 53.6	38.0
OIL (Dried & Filtered for Reuse)													1.9
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)	(5) 19.7		6.5			3.2			2.1		(1) 0.8	1.7	1.3
TOTALS (Including Aggregated Quarterly Averages)	273.0	490.5	472.8 654.9	396.2	563.1	490.5 565.7	504.4	909.4	562.1 702.3	367.1	592.2	535.4 406.7	666.4
TOTAL MANIFESTS ISSUED	19	23	28	17	23	23	20	40	28	18	27	22	288(2
TOTAL SHIPMENTS FOR DISPOSAL	19	21	28	17	22	23	20	38	26	18	27	22	281(2
MANIFESTS ISSUED INTERNALLY	0	2	0	0	1	0	0	2	2	0	0	0	7(0
MANIFESTS RECEIVED INTERNALLY	18	17	22	15	15	15	11	1	14	17	18	21	184(1
TOTAL MANIFESTS RECEIVED	18	18	25	18	18	18	13	4	16	21	19	25	213(1
PAILS CRUSHED	680	494	406	510	252	814	797	839	1,325	354	585	486	7,542(6
DRUMS CRUSHED	237	255	119	61	78	179	134	47	298	206	246	146	2,006(1
PAILS FLUSHED	167	331	71	214	272	510	412	1598	677	356	380	782	5,770(4
DRUMS FLUSHED	394	539	633	719	753	1022	767	712	868	879	786	631	8,703(7
DEPOSIT DRUMS FLUSHED	282	384	528	638	649	844	628	624	675	696	611	426	6,985(5

OTHER WASTES
1. B CAPACITORS & TRANSFORMERS
2. CB CONTAMINATED DEBRIS
3. ASBESTOS
4. BATTERIES
5. WASTE OIL RE UES
6.

cc: R.E.WARD P.S. AM
R.J. WYATT R.J. RY
E DEC

CURRENT YEAR 1984 — PONTIAC CENTRAL & EAST — HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL — PREVIOUS YEAR 198

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	MONTHLY AVERAGE
SLUDGE-Waste Treatment (Landfilled)(NON-HAZARDOUS)	292.9	486.2	434.1 523.4	371.0	303.5	364.3 209.0	362.8	308.1	349.0 284.8	252.9	407.0	356.2 473.9	4,275.5 455.8
SLUDGE-Paint-Grindings-Etc. (Landfilled)	151.2	225.4	182.5 170.9	202.5	298.5	219.7 270.2	209.3	437.0	243.8 229.3	258.8	460.0	254.4 140.0	3,053.1
PAINT & SOLVENT (Incinerated)			14.3 43.1		24.2	14.9 22.6		71.9	17.9			13.4	161.8 16.7
SOLVENT-Paint (Sold for Reclamation)	84.8		14.8	84.8	89.0	83.7	89.3	48.8	83.4 16.8	23.8		82.1 22.1	1,005 19.9
SOLVENT-Methylene Chloride (Sold for Reclamation)								9.6	1.9			0.8	
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)		8.2	2.7			1.3			0.9			1.2 6.3	4.9
GLYCOL & BRAKE FLUID (Incinerated)				18.5		7.4 25.9			7.6 24.4			5.7	128 8.2
OIL (Sold for Reclamation)	42.9	24.7	31.4 26.7	27.5	66.6	42.6 67.4	24.3	25.0	39.6 51.7	31.4	42.5	40.4 54.5	485.2 48.1
OIL (Dried & Filtered for Reuse)													
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)		(5) 14.8				2.4 (1)0.035			1.6	(1) 0.23		1.5 (3)3.5	1.7
TOTALS (Including Aggregated Quarterly Averages)	218.3	248.4	244.0 265.3	272.7	414.3	304.8 409.8	256.9	592.3	333.3 322.2	314.3	502.5	336.9 226.4	535.4
TOTAL MANIFESTS ISSUED	18	17	14	12	19	19	12	25	13	18	23	14	24.0
TOTAL SHIPMENTS FOR DISPOSAL	18	17	14	12	19	19	12	25	13	18	23	14	23.4
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0.5
MANIFESTS RECEIVED INTERNALLY	1	23	18	12	19	16	23	27	13	32	26	19	15.3
TOTAL MANIFESTS RECEIVED	5	25	20	15	21	19	23	28	13	32	26	19	17.7
PAILS CRUSHED	219	843	704	761	532	2,206	998	2,285	751	516	751	1,462	628.5
DRUMS CRUSHED	92	284	410	203	178	346	155	552	214	387	212	119	167.1
PAILS FLUSHED	629	484	1,331	1,046	499	2,041	1,138	1,825	1,216	524	1,064	3,049	480.8
DRUMS FLUSHED	568	864	1,126	902	841	791	461	1,617	780	982	952	1,133	752.2
DEPOSIT DRUMS FLUSHED	435	729	765	620	641	626	520	1,110	562	707	779	927	582.0

OTHER WASTES
1. PCB CAPACITORS & TRANSFORMERS
2. PCB CONTAMINATED DEBRIS
3. ASBESTOS
4. BATTERIES
5. WASTE OIL RESIDUES
6.

CURRENT YEAR 1985 PONTIAC CENTRAL & EAST PLANTS HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	PREVIOUS YEAR 198 MONTHLY AVERAGE
SLUDGE-Waste Treatment (CWT) (Landfilled)(NON-HAZARDOUS)	567.5	576.6	547.2 497.7	549.9	382.5	471.0 252.0	314.9	250.9	389.0 109.1	172.2	290.3	347.1 201.9	356.2
SLUDGE-Paint-Grindings-Etc. (Landfilled)	90.0	125.3	192.7 363.0	235.6	238.7	244.3 413.5	298.3	346.9	321.0 779.1	608.9	356.2	332.4 134.0	254.4
PAINT & SOLVENT (Incinerated)		20.1	12.8 16.5	42.8	48.4	33.3 70.4	61.5	73.7	42.1 43.9	54.9	43.6	39.8	13.4
SOLVENT-Purge (Sold for Reclamation)	23.6	47.3	23.6	21.6	23.3	23.9 27.7	27.0	43.3	23.7			17.8	21.3
SOLVENT-Methylene Chloride (Sold for Reclamation)												0.0	0.8
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)													
GLYCOL & BRAKE FLUID (Sold for Reclamation)												0.0	1.3
GLYCOL & BRAKE FLUID (Incinerated)		20.1	6.7			6.9 21.4			7.2			5.4	5.1
OIL (Sold for Reclamation)	21.4	47.7	40.2 31.5		137.8	46.4 20.3	46.2	105.6	47.8	23.8	46.7	41.7	40.1
OIL (Dried & Filtered for Reuse)													
DRUMS & PAILS (Crushed and Sold)													
OTHER WASTES-Indicate 1-2-3-4 (See List Below)	(3) 1.8	(3) 3.6	33.8 (6)84.5	(6) 38.6	(3) .375	23.3			15.5		(3) 6.4	12.2	1.
			(3)11.5										
TOTALS (Including Aggregated Quarterly Averages)	136.8	264.1	309.9 528.8	300.0	448.5	368.5 533.0	433.0	569.2	463.2 955.6	687.6	452.9	453.6 134.0	336.
TOTAL MANIFESTS ISSUED	8	15	23	16	20	21	19	24	27	24	17	7	17
TOTAL SHIPMENTS FOR DISPOSAL	8	15	23	16	20	21	19	24	27	24	17	7	17
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0
MANIFESTS RECEIVED INTERNALLY	14	17	28	27	43	32	44	40	26	29	27	23	19
TOTAL MANIFESTS RECEIVED	14	17	31	29	46	34	46	42	27	32	30	25	21
PAILS CRUSHED	743	585	627	1,963	1,680	1,674	3,661	3,327	2,336	1,191	757	1,424	1,002
DRUMS CRUSHED	468	197	442	527	402	547	508	830	512	483	224	238	263
PAILS FLUSHED	906	894	559	2,248	1,715	1,773	3,661	3,327	2,336	1,011	747	1,424	1,237
DRUMS FLUSHED	973	779	707	940	859	858	740	1,425	1,045	682	341	365	933
DEPOSIT DRUMS FLUSHED	600	612	461	695	505	462	394	899	684	311	103	67	702

OTHER WASTES 1. PCB CAPACITORS & TRANSFORMERS 2. PCB CONTAMINATED DEBRIS 4. BATTERIES 5. WASTE OIL RESIDUES

CURRENT YEAR 1986 — PONTIAC CENTRAL PLANT — HAZARDOUS LIQUID AND SOLID WASTE DISPOSAL

WASTE NAME (Given in Tons Per Month)	JAN	FEB	3-MO-AVG MAR	APR	MAY	6-MO-AVG JUN	JUL	AUG	9-MO-AVG SEP	OCT	NOV	YEAR-AVG DEC	PREVIOUS YEAR 198 MONTHLY AVERAGE
SLUDGE-Waste Treatment (Landfilled)	N/H 571.3	N/H 721.3	H 499.0 204.6	H 629.0	H 476.1	H 518.5 509.0	H 403.0	H 453.1	N 473.9 H 297.7	N/H 436.8	N/H 262.9	N 440.5 H 322.2	347.1
SLUDGE-Paint-Grindings-Etc. (Landfilled)	328.7	158.6	284.1 365.2	230.0	181.2	256.2 273.6	82.6	15.0	243.0 582.1	278.5	78.5	225.3 130.7	332.4
PAINT & SOLVENT (Incinerated)	46.2	43.2	—	41.2	14.9	37.4 42.8	39.9	44.0	41.4 18.3	20.0	41.7	34.3 24.3	39.8
SOLVENT-Purge (Sold for Reclamation)			—			—			—			—	17.1
SOLVENT-Methylene Chloride (Sold for Reclamation)			—			—			—			—	0.(
SOLVENT-1,1,1, Trichloroethane (Sold for Reclamation)			—			—			—			—	
GLYCOL & BRAKE FLUID (Sold for Reclamation)			—			—			—			—	0.(
GLYCOL & BRAKE FLUID (Incinerated)			—			—		22.6	4.9 22.1			3.7	5.
OIL (Sold for Reclamation)	23.9	43.0	22.3	72.5	19.1	29.4 18.4	48.8		30.9 52.5	25.5	21.3	28.7 19.4	41.
OIL (Dried & Filtered for Reuse)			—			—			—			—	
DRUMS & PAILS (Crushed and Sold)			—			—			—			—	
OTHER WASTES-Indicate 1-2-3-4 (See List Below)		(1) 2.0	.66		(3) 8.9	2.3 (3) 2.6			1.6 (1) .98	(3) 6.9		1.7	12.
			—			—			—			—	
TOTALS (Including Aggregated Quarterly Averages)	398.8	246.8	417.2 606.0	972.7	700.2	620.9 864.4	574.3	534.7	617.3 675.9	330.9	141.5	516.8 174.4	453.
TOTAL MANIFESTS ISSUED	17	17	31	66	49	56	42	35	33	14	9	9	18.
TOTAL SHIPMENTS FOR DISPOSAL	18	18	31	66	49	56	42	35	33	14	9	9	18.
MANIFESTS ISSUED INTERNALLY	0	0	0	0	0	0	0	0	0	0	0	0	0
MANIFESTS RECEIVED INTERNALLY	154	39	31	28	18	11	8	20	5	0	0	0	29.
TOTAL MANIFESTS RECEIVED	157	42	32	31	20	15	11	23	8	2	0	0	31.
PAILS CRUSHED	1,037	1,138	1,432	1,258	811	879	1606	1,348	406	1,596	725	551	1,664.
DRUMS CRUSHED	249	270	475	338	317	243	357	267	287	449	402	271	448.
PAILS FLUSHED	1,039	1,170	1,434	1,427	811	879	1606	1,526	798	1,651	725	649	1,716.
DRUMS FLUSHED	515	349	556	671	447	360	571	425	437	632	533	385	809.
DEPOSIT DRUMS FLUSHED	134	96	128	263	138	125	204	335	152	193	167	116	490.

OTHER WASTES
1. PCB CAPACITORS & TRANSFORMERS
2. PCB CONTAMINATED DEBRIS
3. ASBESTOS
4. BATTERIES
5. WASTE OIL RESIDUES
6. WASTE ELPO

WASTE CHARACTERIZATIONS

WATER TREATMENT SLUDGE
PAINT SLUDGE
WASTE PAINT
WASTE SOLVENT

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04-01-87

SAMPLE NO: 5216

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 9 - 00226

TAKEN

RECEIVED
03-16-87

FILTER CAKE SLUDGE (CENTRAL WATER TREATMENT)

Lead	1,084	ppm
Chlorine Residual	<0.003	percent
Oil & Grease	2.20	percent
Solids	50.81	percent
VOLATILES		
Acrolein		
Acrylonitrile		
Benzene		
Bis (Chloromethyl) Ether		
Bromoform		
Carbon Tetrachloride		
Chlorobenzene		
Clorodibromomethane		
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform		
Dichlorobromomethane		
Dichlorodiflouromethane		

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Director of Laboratories
FBM/sjk
Preliminary Report

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1,1-Dichloroethane		
1,2-Dichloroethane		
1,1-Dichloroethylene		
1,2-Dichloropropane		
1,2-Dichloropylene		
Ethylbenzene		
Methyl Bromide		
Methylene Chloride		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene		
Toluene	0.156	ppm
1,2-Trans-dichloroethylene		
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene		
Trichlorofluoromethane		
Vinyl Chloride		
EP TOXICITY STUDY	.	

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SAMPLE DESCRIPTION: 9

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EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm

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2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	non-corrosive pH=8.63	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	<100	BTU/lb.

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04-03-87

SAMPLE NO: 5216

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

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03-16-87

Toxicity Characteristic Leaching Procedure (TCLP) METHOD: Federal Register/ Vol. 51, NO. 216/Friday, November 7, 1986 Rules & Regulations		
Volatile Organic Compounds		
Acetone	<0.1	ppm
n-Butyl Alcohol	<0.1	ppm
Carbon disulfide	<0.1	ppm
Carbon tetrachloride	<0.1	ppm
Chlorobenzene	<0.1	ppm
Cresols (cresylic acid)	<0.1	ppm
Cyclohaxanone	<0.1	ppm
1,2 - Dichlorobenzene	<0.1	ppm
Ethyl acetate	<0.1	ppm

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04-03-87

SAMPLE NO: 5216
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PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

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03-16-87

Ethylbenzene	<0.1	ppm
Ethyl ether	<0.1	ppm
Isobutanol	<0.1	ppm
Methanol	<0.1	ppm
Methylene chloride	<0.1	ppm
Methyl ethyl ketone	<0.1	ppm
Methyl isobutyl ketone	<0.1	ppm
Nitrobenzene	<0.1	ppm
Pyridine	<0.1	ppm
Tetrachloroethylene	<0.1	ppm
Toluene	<0.1	ppm
1,1,1 - Trichloroethane	<0.1	ppm
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.1	ppm
Trichloroethylene	<0.1	ppm
Trichlorofluoromethane	<0.1	ppm
Xylene	<0.1	ppm
Lead	1,084	ppm

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04-03-87

SAMPLE NO: 5216

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN RECEIVED
03-16-87

Chlorine Residual	<0.003	percent
Oil & Grease	2.20	percent
Solids	50.81	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm

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04-03-87

SAMPLE NO: 5216
Page 28

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PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00226 Filter Cake Sludge

TAKEN

RECEIVED
03-16-87

Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	non-corrosive pH=8.63	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	<100	BTU/lb.

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04-01-87

SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4 - 00221

TAKEN

RECEIVED
03-16-87

PAINT SLUDGE - COMPOSITE ALL STREAMS (CONTAINMENT PAD)

Chlorine Residual	1.348	percent
Oil & Grease	11.14	percent
Solids	71.78	percent
VOLATILES		
Acrolein		
Acrylonitrile		
Benzene		
Bis (Chloromethyl) Ether		
Bromoform		
Carbon Tetrachloride		
Chlorobenzene		
Clorodibromomethane		
Chloroethane		
2-Chloroethylvinyl Ether		
Chloroform		
Dichlorobromomethane		
Dichlorodiflouromethane		
1,1-Dichloroethane		

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4

TAKEN

RECEIVED
03-16-87

1,2-Dichloroethane		
1,1-Dichloroethylene		
1,2-Dichloropropane		
1,2-Dichloropylene		
Ethylbenzene		
Methyl Bromide		
Methylene Chloride		
1,1,2,2-Tetrachloroethane		
Tetrachloroethene		
Toluene	0.989	ppm
1,2-Trans-dichloroethylene		
1,1,1-Trichloroethane		
1,1,2-Trichloroethane		
Trichloroethene		
Trichlorofluoromethane		
Vinyl Chloride		
EP TOXICITY STUDY	:	
EP TOXICITY METALS	:	

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PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4

TAKEN

RECEIVED
03-16-87

Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm

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SAMPLE NO: 5211
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GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 4

TAKEN

RECEIVED
03-16-87

Corrosivity - pH	corrosive pH=12.57	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	4,069	BTU/lb.

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04-03-87

SAMPLE NO: 5211

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

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03-16-87

Toxicity Characteristic Leaching Procedure (TCLP) METHOD: Federal Register/ Vol. 51, NO. 216/Friday, November 7, 1986 Rules & Regulations		
Volatile Organic Compounds		
Acetone	<0.1	ppm
n-Butyl Alcohol	<0.1	ppm
Carbon disulfide	<0.1	ppm
Carbon tetrachloride	<0.1	ppm
Chlorobenzene	<0.1	ppm
Cresols (cresylic acid)	<0.1	ppm
Cyclohaxanone	<0.1	ppm
1,2 - Dichlorobenzene	<0.1	ppm
Ethyl acetate	<0.1	ppm

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

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03-16-87

Ethylbenzene	<0.1	ppm
Ethyl ether	<0.1	ppm
Isobutanol	<0.1	ppm
Methanol	<0.1	ppm
Methylene chloride	<0.1	ppm
Methyl ethyl ketone	<0.1	ppm
Methyl isobutyl ketone	<0.1	ppm
Nitrobenzene	<0.1	ppm
Pyridine	<0.1	ppm
Tetrachloroethylene	<0.1	ppm
Toluene	<0.1	ppm
1,1,1 - Trichloroethane	<0.1	ppm
1,1,2-Trichloro-1,2,2-trifluoroethane	<0.1	ppm
Trichloroethylene	<0.1	ppm
Trichlorofluoromethane	<0.1	ppm
Xylene	<0.1	ppm
Chlorine Residual	1.348	percent

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

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03-16-87

Oil & Grease	11.14	percent
Solids	71.78	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm
Lindane	<0.10	ppm

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04-03-87

SAMPLE NO: 5211

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 00221 Paint Sludge (Composite)

TAKEN

RECEIVED
03-16-87

Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	corrosive pH=12.57 *	units
Ignitability	no flash up to 200	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	4,069	BTU/lb.

* FROM LIME ADDITION FOR SOLIDIFICATION

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04-01-87

SAMPLE NO: 5212

GMC TRUCK
PONTIAC CENTRAL PLANT
660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 5 - 00222

TAKEN

RECEIVED
03-16-87

WASTE PAINT & SOLVENT (TANK 61)

Lead	3,759	ppm
Chlorine Residual	0.243	percent
Solids	27.70	percent
EP TOXICITY STUDY	.	
EP TOXICITY METALS	.	
Arsenic	<5.0	ppm
Barium	<1.0	ppm
Cadmium	<1.0	ppm
Copper	<1.0	ppm
Chromium	<5.0	ppm
Cyanide	<0.20	ppm
Lead	<5.0	ppm
Mercury	<0.2	ppm
Selenium	<1.0	ppm
Silver	<5.0	ppm
Zinc	<1.0	ppm
EP TOXICITY HERB. & PEST.	.	
Endrin	<0.02	ppm

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04-01-87

SAMPLE NO: 5212

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660 S. BOULEVARD EAST
PONTIAC, MI 48053
BILL MILLWARD

SAMPLE DESCRIPTION: 5

TAKEN

RECEIVED
03-16-87

Lindane	<0.10	ppm
Methoxychlor	<0.10	ppm
Toxaphene	<0.10	ppm
2,4,D	<0.10	ppm
2,4,5-TP(Silvex)	<0.10	ppm
Corrosivity - pH	non-corrosive pH=6.26	units
Ignitability	flash at 70	deg F
Acid Extraction 24 Hr.	.	
Reactivity	no	
Cyanide	<2.0	ppm
Sulfide	<10	ppm
BTU	12,293	BTU/lb.

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APPENDIX B

MDNR Closure Plan

Approval Letter

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
MARLENE J FLUHARTY
KERRY KAMMER
O. STEWART MYERS
DAVID D OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

GORDON E. GUYER, Director

March 7, 1988

Mr. D. S. Harrett
Environmental Engineering
GMC - Truck & Bus Group
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Harrett:

SUBJECT: Revised Closure Plan
Truck & Bus Central and East Plants
MID 005 356 902

The Michigan Department of Natural Resources (MDNR) has completed a review of your revised closure plan dated December 2, 1987, pursuant to the requirements of 40 CFR, Part 265, which are adopted by reference in MAC R 299.11003 of the Act 64 administrative rules. Based on this review, and the fact that no significant comments were received during the 30-day public comment period, the MDNR hereby approves your closure plan subject to the conditions enclosed with this letter.

Closure of RCRA interim status units does not release the facility from its responsibilities under the Hazardous and Solid Waste Amendments of 1984 (HSWA). All interim status facilities are subject to the corrective action requirements of these amendments.

If you have any questions, please contact Ms. Andrea Schoenrock, of my staff, at 517-373-3988.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-2730

cc: Ms. Becky Kocsis, MDNR
Ms. Andrea Schoenrock, MDNR
Mr. Ken Burda/C&E File
Ms. Lynne King, MDNR
Ms. Carol Witt, U.S. EPA
Ms. Marilyn Sabadaszka, U.S. EPA

R1028
1/88

APPENDIX B1

AMENDMENT TO CLOSURE PLAN REQUEST

Truck & Bus Group
General Motors Corporation
31 Judson Street
Pontiac, Michigan 48058

Truck & Bus Group

November 13, 1990

Liane Shekter Smith
Michigan DNR
Waste Management Division
S. Ottawa Building
P.O. Box 30241
Lansing, MI 48909

SUBJECT: Closure of Truck & Bus Pontiac Central Assembly
Hazardous Waste Storage Area (MID 005356902)

Dear Ms. Smith,

On November 8, 1990, at a meeting between Michigan Department of Natural Resources (MDNR) and General Motors (GM) representatives, the MDNR suggested that an amendment to the closure plan, for the subject facility, be made. Specifically, this amendment would clarify that constituents, detected during the implementation of the closure plan, that did not originate from hazardous waste activities at the unit, need not be addressed during closure. This letter is a request for an amendment to the closure plan for the subject facility.

The unit at the subject facility consists of a drum storage pad and a waste pile. During implementation of the closure plan, Phase II sampling indicated the presence of very low levels of xylene at two locations under the unit. In a letter, dated September 12, 1990, the presence of the xylene was demonstrated not to have originated from hazardous waste activities at the unit. The MDNR concurred with this position in a letter dated October 16, 1990 from Alan J. Howard to GM. GM Truck & Bus will further investigate the extent and significance of the presence of xylene after closure of this unit.

The requested amendment can be accomplished by adding language to Section 5.1.2 c of the closure plan. The attached pages show the current and suggested revised wording for the applicable section of the closure plan. With this change the closure plan will distinguish between detected constituents that originated from hazardous waste activities at the unit and those originating from other sources.

As requested in the above referenced October 16, 1990 letter, a revised schedule is attached. This revised schedule represents the work that will be performed during the remainder of the closure period. Although some activities are concurrent and are not reliant upon other activities, the dates shown on the schedule are subject to change. The actual dates depend upon several factors including but not limited to lab turn-around time and results of verification sampling. Currently it is not expected that any additional time will be required, beyond April 16, 1991, to complete closure of the unit. If, however, problems arise that would necessitate more time, a request will be made within 30 days of the unexpected event and at least 30 days prior to the end of the closure period.

If you have any questions or concerns, please call me at (313) 456-2289.

Sincerely,

Steven R. Thurman
GM Truck & Bus Group
Central Office Plant Engineering,
Environmental and Appropriations

Attachments

cc. Steve Buda, MDNR - Lansing
Ken Gembel, GM T&B - Pontiac East
Lynne King, MDNR - Livonia
Jim Nachtman, GM T&B - Central Office
Steve Song, GM EAS
Chuck Wyrick, GM T&B - Pontiac Central

5.1.2 c Criteria for Determination of Scope of Removal

If the following criteria are all met, the soil will be left in place:

- Volatile organic compounds using EPA methods 601 and 602 are non-detectable
- Total lead and chromium (VI) are not statistically above background according to the Gossett Student's T-test.

If soils at any sampling point fail either criteria they will be removed. Removal of soil around a contaminated point will be within a radius equal to the distance between adjacent boring locations. Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an Act 641 waste. Soils contaminated with metals above toxicity limits or with volatile organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminants found in the previous level. If contaminants are found, additional soil removal will be performed. If no contaminants are found, cleanup is complete.

5.1.2 c Criteria for Determination of Scope of Removal

If the following criteria are all met, the soil will be left in place:

- Volatile organic compounds using EPA methods 601 and 602 are non-detectable
- Total lead and chromium (VI) are not statistically above background according to the Gossett Student's T-test.

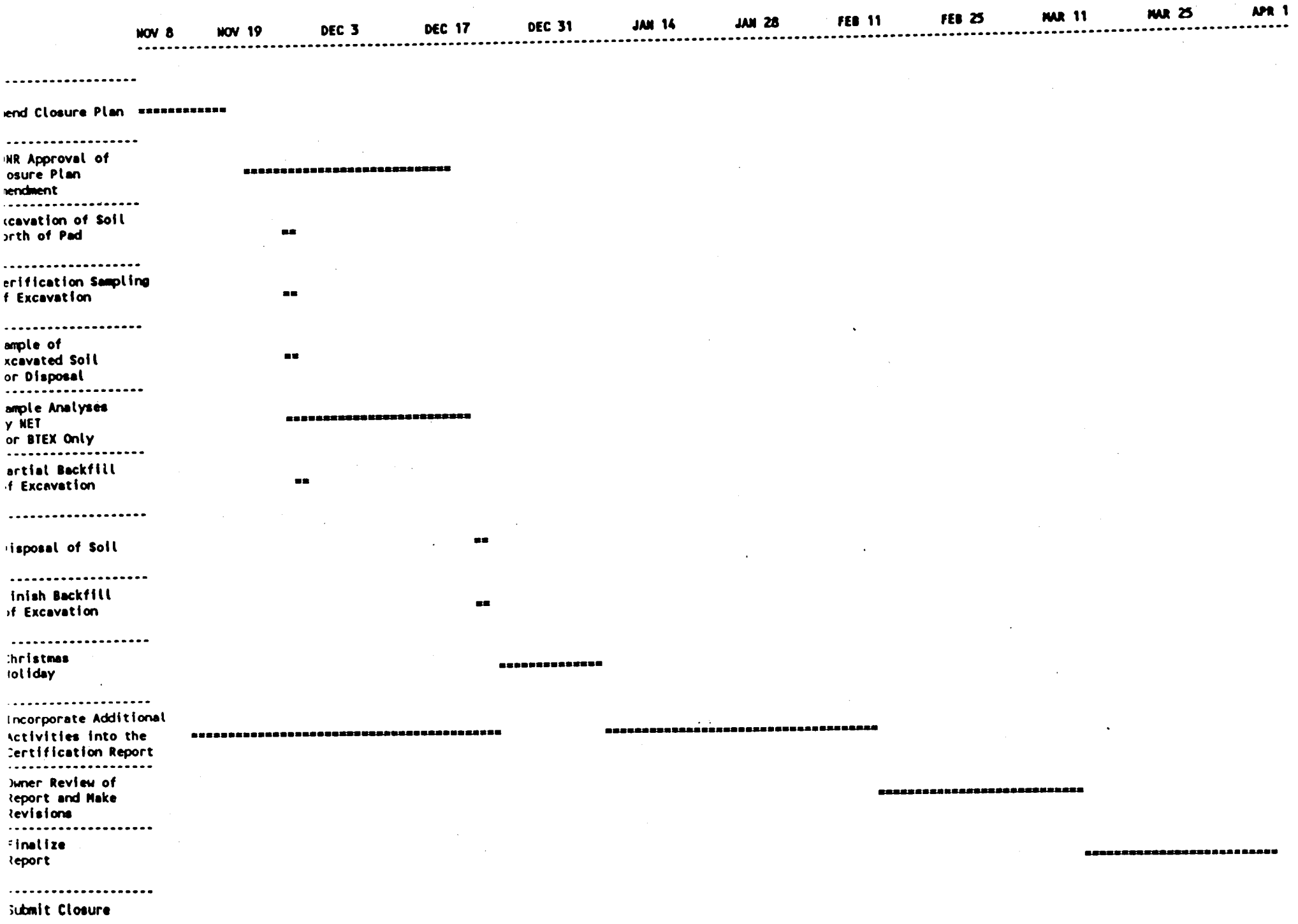
If soils at any sampling point fail either criteria they will be removed.

If it is demonstrated that the reason for failure of either of the above criteria is due to sources other than hazardous waste activity at the unit, this fact will be documented and the soils will be left in place. In addition, detection of constituents that originate from other sources does not warrant expanding the investigation for purposes of obtaining a determination of clean closure. Although not addressed during closure, these constituents that are demonstrated to have originated from other sources, may be subject to corrective action requirements under the federal Hazardous and Solid Waste Amendments of 1984 (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA).

Removal of soil around a contaminated point will be within a radius equal to the distance between adjacent boring locations. Soils determined to be contaminated with metals statistically above background, but below EP toxicity limits, will be disposed of as an Act 641 waste. Soils contaminated with metals above toxicity limits or with volatile organics will be disposed of as an Act 64 waste.

Following removal of the lowest confirmed contaminated level, additional samples will be taken of the next level and analyzed for the contaminants found in the previous level. If contaminants are found, additional soil removal will be performed. If no contaminants are found, cleanup is complete.

PONTIAC CENTRAL ENV . NTAL CLOSURE
REVISED S.. OULE
NOV 1990 - APRIL 1991



APPENDIX B2

AMENDED CLOSURE PLAN APPROVAL

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
ELLWOOD A. MATTSON
O. STEWART MYERS
RAYMOND POUPORE

STATE OF MICHIGAN

John Engler
~~JAMES J. BLANCHARD~~, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

February 1, 1991

'91 FEB -6 A11:48

CENTRAL PLAN

Mr. Steven R. Thurman
General Motors Corporation
Truck & Bus Group
Central Office Plant Engineering
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Thurman:

SUBJECT: Closure Plan Amendment Approval
Hazardous Waste Storage Area
Pontiac Central Assembly
MID 005 356 902

The Michigan Department of Natural Resources (Department), Waste Management Division, has completed its review of the closure plan amendment request, submitted November 15, 1990. Based on this review, and the fact that no significant comments were received during the public comment period, the Department hereby approves the closure plan amendment for the hazardous waste management area at its facility located at 660 South Boulevard East in Pontiac, Michigan. In accordance with R 299.9601(3) and 40 CFR 265.112(d)(4), which is adopted by reference in R 299.11003, the modified closure plan is the approved closure plan.

The approved closure plan amendment modifies the criteria specified in the closure plan governing the scope of required remediation. The approved closure plan amendment specifies that organic contamination, which originated from sources other than hazardous waste activities at the unit, will be addressed as part of the corrective action requirements under the federal Hazardous and Solid Waste Amendments of 1984 (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA). As a reminder, closure of interim status units does not release General Motors Corporation from any plant-wide corrective action responsibilities it may have under HSWA and RCRA.

If you have any questions or comments, please contact Ms. Liane Shekter Smith of the Hazardous Waste Permits Section at 517-335-4790.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-9523

cc: Ms. Lorraine Kosik, U.S. EPA
Mr. Richard Traub, U.S. EPA
Ms. Lynne King, DNR - Livonia
Mr. Steve Buda, DNR
Ms. Liane Shekter Smith, DNR
HWP/C&E File

APPENDIX C

MDNR Notice of Deficiency Letter

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
ELLWOOD A. MATTSON
O. STEWART MYERS
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

May 10, 1990

'90 MAY 16 A7:30

CENTRAL

Mr. Steven R. Thurman
Central Office Plant Engineering
Truck & Bus Group
General Motors Corporation
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Thurman:

SUBJECT: Closure Certification Documentation Package
Hazardous Waste Storage Area
Pontiac Central Assembly
MID 005 356 902

The Michigan Department of Natural Resources (MDNR), Waste Management Division (WMD), has reviewed the closure certification for the hazardous waste storage area located at Pontiac Central Assembly pursuant to the Michigan Hazardous Waste Management Act, 1979 P.A. 64, as amended. Your submittal, received on April 18, 1990, is not complete. WMD is therefore unable to release General Motors Corporation from the financial capability requirements for closure and liability coverage under Part 7 of the Act 64 Rules. As we discussed at our meeting May 2, 1990, additional soil sampling must be performed and documentation submitted to WMD for your closure certification to be considered complete.

Additional Soil Sampling

The approved closure plan required that "inspection of the pad for cracks or other evidence of loss of integrity will determine if other locations are to be sampled." The closure certification document states that sludge has spilled outside the dikes of the bulking area onto the soil, that the concrete pad shows evidence of pitting to the point of exposing the steel reinforcing rods, and that at several of the joints the waterstops are in poor condition or missing. These conditions all describe severe loss of integrity of the uncovered pad. Therefore, additional soil sampling is required in order to fulfill the requirements of the approved closure plan and determine whether contamination has escaped the confines of the hazardous waste management area.

Consistent with the approved closure plan, the following soil sampling plan must be implemented by General Motors Corporation at the hazardous

waste management area of the Pontiac Central assembly facility. These activities are still part of Pontiac Central's closure process and must be conducted according to the approved closure plan and the additional requirements included in this letter. Any concrete coring, soil sampling, sample management, decontamination, rinsate management or other closure activities must be performed in a similar manner so that the data collected as part of this additional sampling event will be comparable to the existing sampling results, and to ensure protection of the environment in accordance with 40 CFR 265.111 the closure performance standard.

Soil samples, at a minimum, must be obtained from the locations shown on the figure enclosed. These locations represent areas of concern which were not previously sampled. Samples must be obtained from the same depths and intervals as the previous samples, and placed in appropriate containers and stored in the same manner as the previous samples. Analytical testing on these soil samples must consist of the same analytical parameters as required in the approved closure plan using the appropriate analytical methods. The approved closure plan did not specify required detection limits for these analyses, therefore, the detection limits in the attached table must be incorporated into any additional analytical work done at the site. These detection limits are consistent with the detection limits achieved by the MDNR Environmental Laboratory.

Conditions for determining if soils are contaminated, for removal of contaminated soils and disposal requirements are presented in the approved closure plan, and must be followed. However, the statistical comparison of inorganic analytical data to the background results should be done utilizing the four lowest values of the six background samples which were analyzed, B-1, B-4, B-5 and B-6. Samples B-2 and B-3 had elevated lead levels inconsistent with the other background lead values, with the samples obtained so far at the hazardous waste management area at Pontiac Central and with typical lead values from the samples obtained as part of the closure activities for the hazardous waste management area at Pontiac East. Therefore, samples B-2 and B-3 are not believed to represent background conditions for lead in the on-site soils.

Since these elevated lead levels are not suspected as having resulted from hazardous waste management activities at the interim status unit, further delineation of potential soil contamination at these locations (B-2 and B-3) will <u>not</u> be required as part of closure of the unit. However, closure of the interim status unit does not release General Motors Corporation from any plant-wide corrective action responsibilities under the federal Hazardous and Solid Waste Amendments of 1984 (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA).

Closure activities must be performed within the allotted time for the closure period. Since closure at this facility began on January 16, 1990, closure activities are required to be completed by July 16, 1990. In accordance with 40 CFR §265.113(b), General Motors Corporation must adhere to the schedule of actions specified by the plan. Failure to

comply with the approved plan makes the facility liable for formal enforcement action.

Additional Documentation

The following additional documentation is required as part of your closure certification documentation package:

-- Certification statements must be provided by General Motors Corporation and by an independent, registered engineer. These statements must be supplemented by the language provided in 40 CFR §270.11(d). In addition, the closure certification must include documentation that the official signing the closure certification statement for General Motors Corporation is authorized to do so as specified in 40 CFR §270.11.

-- A copy of the approved closure plan and letter of closure plan approval must be included in the closure certification documentation package.

-- Copies of the soil boring logs or equivalent field information for the six background samples must be included. The soil boring logs should identify when and where the samples were obtained, the depth and interval of each sample, and the type of soil material that was sampled (i.e., silty sand, clayey silt, etc.). In addition, a labelled location plan must also be included.

-- The closure certification must include the dates on which various closure activities were performed.

-- Supporting documentation must be provided in order to substantiate the theory that volatile organic contamination in the washwater may be the result of ambient conditions.

Approved Closure Plan Amendment Process

Please note that the requirements in this letter do not reflect an amendment to your closure plan, but rather clarification of the requirements of your approved closure plan. If you wish to deviate from the approved closure plan in any way, you must first obtain written approval from the Department pursuant to the formal procedures and substantive criteria established in 40 CFR §265.112(c) for amending approved closure plans, adopted by reference in Michigan's Administrative Rules 299.9601(1) and (3), and 299.11003. These rules require that a facility with an approved closure plan may submit a written request to authorize a change to the approved closure plan according to the following schedule:

a) 60 days prior to a proposed change in facility design or operation;

b) within 60 days after an unexpected event which has affected the closure plan;

c) within 30 days after an unexpected event which occurs during the closure period.

A requested closure plan amendment must be approved by the Department prior to implementation by the facility. As a reminder, any request to extend the closure period must be submitted to WMD at least 30 days prior to the expiration of the 180-day closure period, as required by 40 CFR §265.113(c). In addition, a closure certification documentation package must be submitted to WMD within 60 days of completion of closure activities as required by 40 CFR §265.115.

If you have any questions, please contact me.

Sincerely,

Liane J. Shekter Smith

Liane J. Shekter Smith
Environmental Engineer
Hazardous Waste Permits Section
Waste Management Division
517-335-4790

cc: Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Steve Chester, AAG
Mr. Steve Buda, DNR
Ms. Lynne King, DNR - Northville
C&E File

APPENDIX D

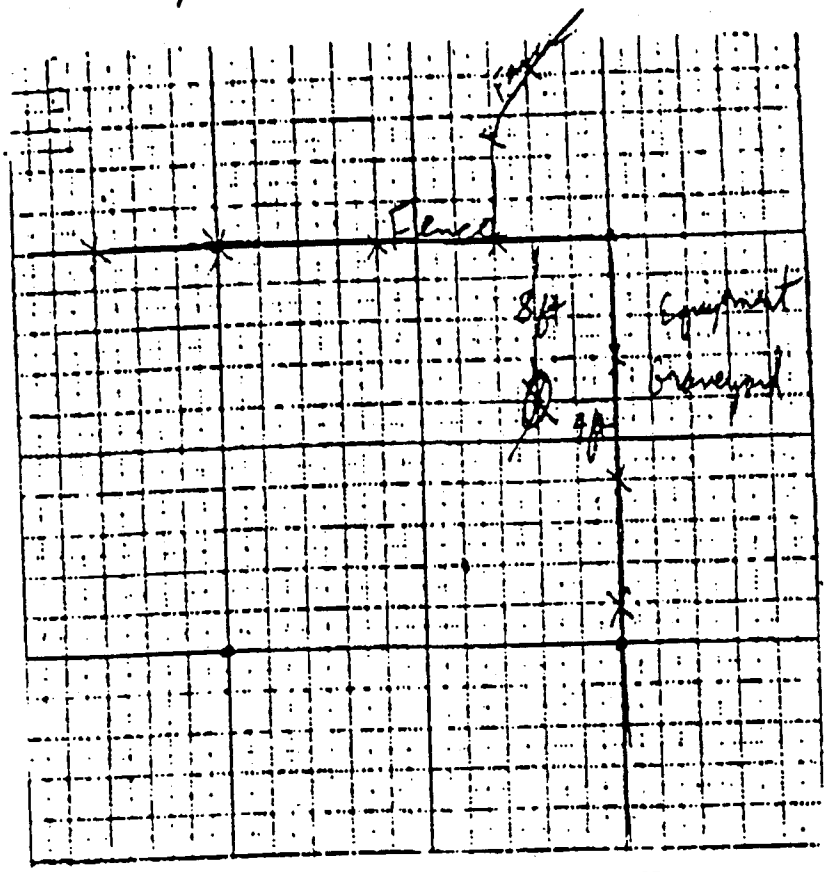
Background Soil Sampling Logs

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. B-1

Date 19 Apr 89 Time Start 906 Time Finish 910



SKETCH MAP OF SAMPLE SITE

North

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	0.8 ppm	0.9 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 (11.7)

Protection Level: B C D

Sampling Crew

1. C. Skelly
2. TJ Palmer
3.

Sample Designations(s)

B-1 Background

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: 0.8 cm Sand Ground moist and covered with grass and weeds small shrub bush

Timothy J Palmer
(Signed)

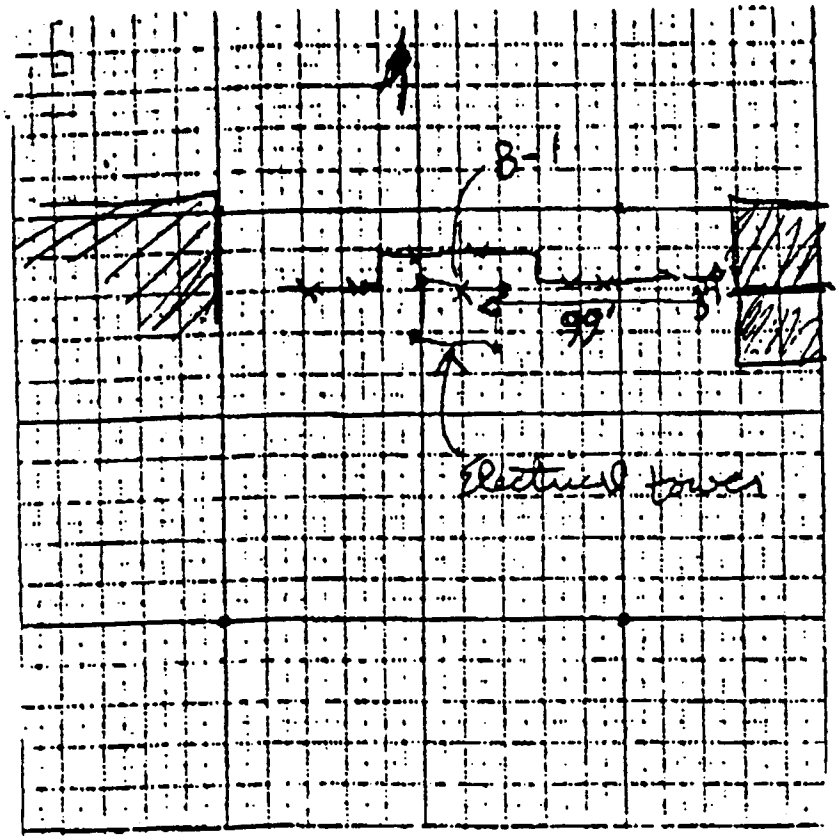
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. B-2

Date 19 April 89 Time Start 0930 Time Finish 0938



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations (X) Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	2.0 ppm	2.1 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C D

Sampling Crew

1. T. Palmer
2. C. Kielty
3.

Sample Designations(s)

B-2 Background

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Ground moist ; 3" of wood chips and peat (removed) Sample taken from native soil.

Chris J. Kielty
(signed)

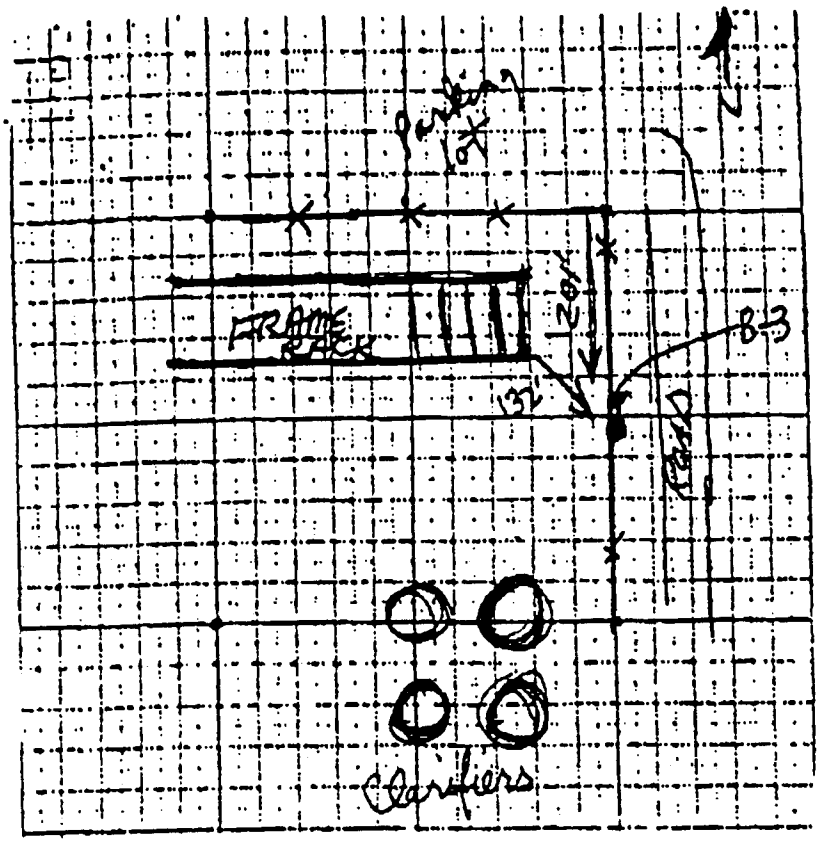
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. B-3

Date 19 April 87 Time Start 1000 Time Finish 1005



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations ⊗ Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	1.4 ppm	2.0 ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 (1.7)

Protection Level: B C (D)

Sampling Crew

1. C. Kuhn
2. T. Palmer
3.

Sample Designations(s)

B-3 Background

FIELD PARAMETERS

pH _____ cond _____ temp _____

Notes: Moist to wet Dark Brown Sand + Gravel (Fill)

(signed)

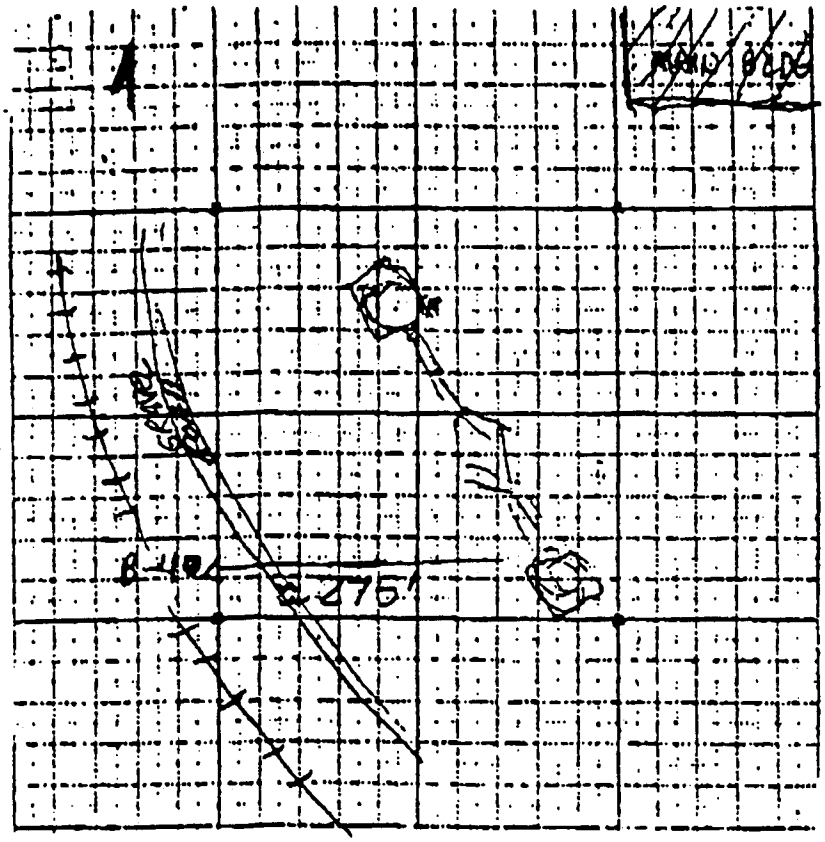
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. Gm PEA

Date 4/20/89 Time Start _____ Time Finish 1020



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations ⊗ Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	— ppm	— ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C (D)

Sampling Crew

1. C. Kelly
2. T. Palmer
3.

Sample Designations(s)

B-4

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Brown sand w/some gravel; very moist

Sandy clay @ 6" — no odor

(signed)

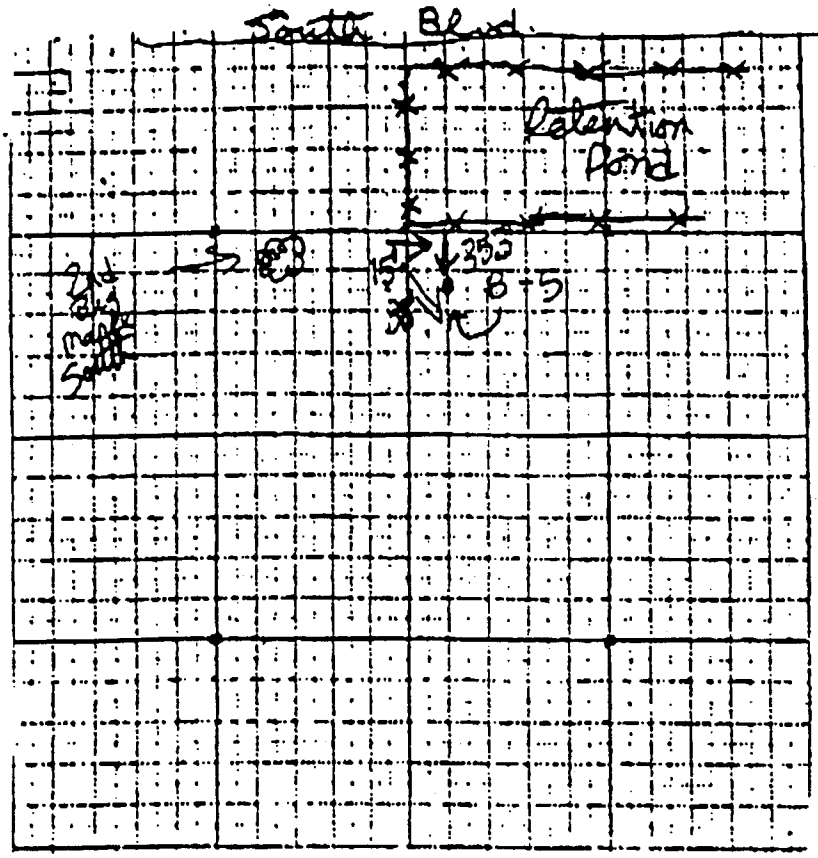
Reference:

E.C. JORDAN CO.

SOIL SAMPLING DATA

Project No. 5935-00 Site No. GM PEA

Date 4/20/89 Time Start _____ Time Finish 1040



SKETCH MAP OF SAMPLE SITE

Indicate grid point designations @ X: Indicate sample component locations ⊗ Sketch pertinent features

Sample Component Monitoring

	Surface	Hole
1.	ppm	ppm
2.	ppm	ppm
3.	ppm	ppm
4.	ppm	ppm
5.	ppm	ppm
6.	ppm	ppm

HNU Bulb: 10.2 11.7

Protection Level: B C D

Sampling Crew

1. C. Kielty
2. T. Palmer
3.

Sample Designations(s)

B-5

FIELD PARAMETERS

pH_____ cond_____ temp_____

Notes: Brown Sand, some clay, trace fine gravel - no odor

(signed) Cary Kielty

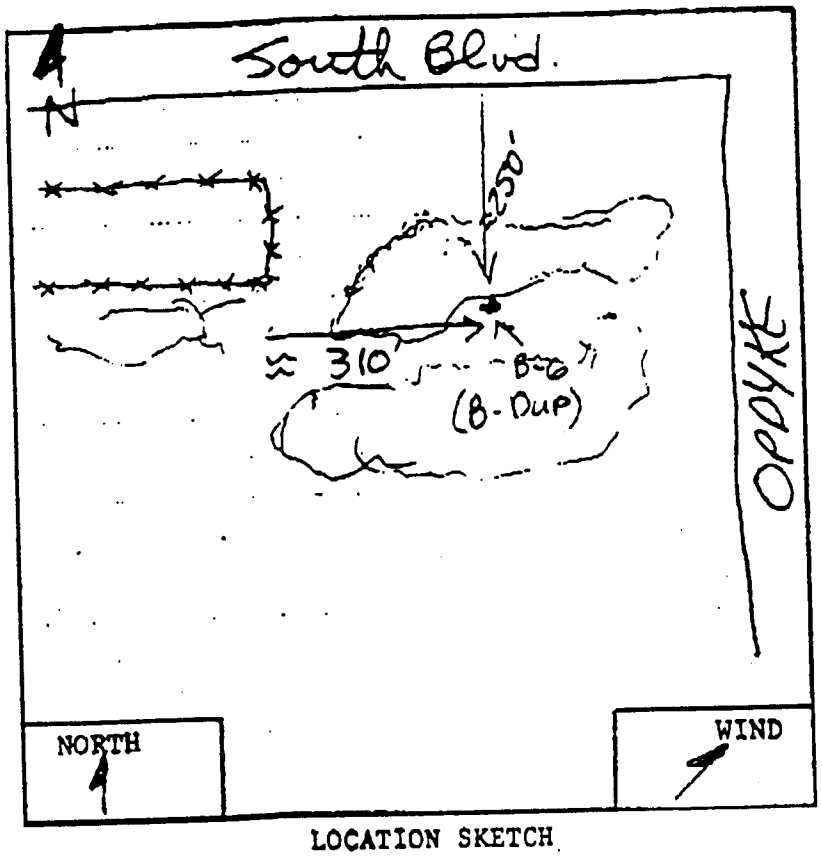
Reference:

E.C. JORDAN CO.

GRAB SAMPLE DATA SHEET

PROJECT NO. 5935-00 PROJECT NAME GM PEA DATE 4/20/89

SAMPLE TYPE Soil SAMPLE DESIGNATION B-6 / B-DUP SAMPLE TIME 1055



LOCATION SKETCH

☐ SKETCH TO SCALE @ 1"= _____

☒ NO SCALE ; USE DIMENSIONS

PID METER USED —

AMBIENT _____ ppm

SAMPLE _____ ppm

HEADSPACE _____ ppm

SAMPLING CREW C. Fiedler
T. Palmer

EQUIPMENT USED _____

SAMPLE DESCRIPTION Brown Sand ; natural organic material ; Some clay
- no odor -
Duplicate sample taken (B-Dup)

SAMPLED BY Ciaran Fiedler / Thomas Palmer

TOTAL P.08

APPENDIX E

Chain-of-Custody Forms

GM-Pontiac Truck & Bus

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client: GM - PONTIAC CENTRAL
Address: STEVE THURMAN
313-456-2289

Contact person: JOHN RODIAN
Phone # 313-665-3999 ext. 414
PO #
Project: GM-PONTIAC CENTRAL PAD DECON.

Special Handling Request
☐ Rush SURCHARGE MAY APPLY
☐ Verbal
☐ Other

Sample ID	Date	Time	Grab	Comp	No. of Containers	Waste Type	Preservation	Analysis request
RINSE WATER DECONTAMINATED PAD W.	1/13/90	4:30	✓	—	3	WATER	ON ICE	TCLP, CHROMIUM 601, 602
C-1, 12"	1/18/90		✓	—	3	SOIL	—	TOTAL LEAD, CHROMIUM EP TOX LEAD, CHROMIUM, 601, 602
C-3, 12"	1/18/90		✓	—	3	SOIL	—	TOTAL LEAD, CHROMIUM EP TOX LEAD, CHROMIUM, 601, 602

Collected by: John C Rodian 1/18/90 1:30p

Received by: Date Time

Received by: Date Time

Received for laboratory by: Date Time
Rosemary A. Valentine 1-18-90

Final disposition:

Delivery by: Date Time

Relinquished by: Date Time

Relinquished by: Date Time

Comments (Precautions/hazards)

AL-6

GM-Pontiac Truck & Bus

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client: GM-TRUCK & BUS
Address: PONTIAC CENTRAL
STEVE THURMAN
456-2284

Contact person: JOHN RODWAN
Phone # 313-665-3999 ext 414
PO #
Project: WASTE MGT PAD DECON.

Special Handling Request
☐ Rush SURCHARGE MAY APPLY
☐ Verbal
☐ Other

Sample ID	Date	Time	Grab	Comp	No. of Containers	Waste Type	Preservation	Analysis request
COUGHED PAD EAST RINSATE	1/29/90	2:30	✓	—	3	WATER	HNO_3	601, 602 Lead & chromium
C-4, 12"	1/29/90	3:30	✓	—	3	SOIL	—	601, 602 Lead & chromium (TOTAL + EP TOX)

Collected by: John C Rodwan 1/29/90 3:45

Received by: Date Time

Received by: Date Time

Received for laboratory by: Rosemary A. Valentine Date 1-29-90 Time

Final disposition:

Delivery by: Date Time

Relinquished by: Date Time

Relinquished by: Date Time

Comments (Precautions/hazards)

GM-Pontiac Truck & Bus

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client: GM-Truck & Bus
Address: Pontiac Central
Steve Thurman
313-456-2289

Contact person: John Rodwan
Phone # 313-665-3999 ext. 414
PO #
Project: G-M - Pontiac Central / Wast Mgt. Pad decon

Special Handling Request
☐ Rush SURCHARGE MAY A
☐ Verbal
☐ Other

Sample ID	Date	Time	Grab	Comp	No. of Containers	Waste Type	Preservation	Analysis request
open pad-west rinsate	1/30/90	1:00	✓	-	3	water	on label	Chromium + lead 601 + 602

Collected by: John C Rodwan 1/30/90 1:20
Received by: Carolyn Parlean 1/31/90 1:35 PM
Received by:
Received for laboratory by:
Final disposition:

Delivery by:
Relinquished by:
Relinquished by:
Comments (Precautions/hazards)

AL-6

GM-Pontiac Truck & Bus

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client: GM-Truck + Bus
Address: Pontiac Central
Steve Thurman
456-2289

Contact person: JOHN ROONAN
Phone # 313-665-3999 ext 414
PO #
Project: GM-Truck + Bus, Pontiac Central / Waste Mgt. Pad decon

Special Handling Request
☐ Rush SURCHARGE MAY AP
☐ Verbal
☐ Other

Sample ID	Date	Time	Grab	Comp	No. of Containers	Waste Type	Preservation	Analysis request
C-6, 12"	1/31/90	12:15	✓	–	3	soil	–	TOTAL + EP TOX Lead + chromium 601 + 602
C-5, 12"	1/31/90	12:30	✓	–	3	soil	–	TOTAL + EP TOX Lead + chromium 601 + 602
C-7, 12"	1/31/90	12:45	✓	–	3	soil	–	TOTAL + EP TOX Lead + chromi 601 + 602
C-2, 12"	1/31/90	1:00	✓	–	3	soil	–	TOTAL + EP TOX Lead + chrom 601 + 602

Collected by: John C Rodman 1/31/90 2:16
Received by: Date Time
Carolyn Paslean 1/31/90
Received by: Date Time
Received for laboratory by: Date Time
Final disposition:

Delivery by: Date Time
Relinquished by: Date Time
Relinquished by: Date Time
Comments (Precautions/hazards)

AL-6

GM-Pontiac Truck & Bus

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client: GM-TRUCK + BUS
Address: PONTIAC CENTRAL
STEVE THURMAN
451-2289

Contact person: John Rodwan
Phone # (313) 665-3999 ext - 414
PO #
Project: Waste bilge - Pad Decon -

Special Handling Request
[ ] Rush SURCHARGE MAY APPLY
[ ] Verbal
[ ] Other

Sample ID	Date	Time	Grab	Comp	No. of Containers	Waste Type	Preservation	Analysis request
RINSE WATER OPEN PAD - EAST	2/8/90	12:00	✓	-	3	water	labeled	Lead + Chromium VI 601 + 602
C-8, 12" *	2/8/90	3:15	✓	-	3	soil	—	Total Lead + Chromium VI EP TOX Lead + Chromium VI 601, 602
C-9, 12" **	2/8/90	3:00	✓	-	3	soil	—	Total Lead + Chromium VI EP TOX Lead + Chromium VI 601 + 602

Collected by: John C Rodwan 2/8/90 3:30

Received by: Date Time

Received by: Date Time

Received for laboratory by: Date Time

Final disposition:

* note - C-8 SAMPLES VERY GRAVELLY

Delivery by: Date Time

Relinquished by: Date Time

Relinquished by: Date Time

Comments (Precautions/hazards)

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

CHAIN OF CUSTODY

Client GM-PONTIAC, T+B	Project Name Pontiac Central Waste Pad Closure Phase II
Send Report to: STEVE THURMAN, GM STEVE BIER, GM JOHN RODWAN, MIS	
Address STEVE THURMAN CENTRAL OFC PLANT ENG. TRUCK + BUS GROUP GM CORP, 71 JUDSON ST. Telephone # PONTIAC, MI 48058 456-2289	Collected by: John Rodwan, MIS

PO. NO. REL. NO.

Collection Information								Parameters														
Sample ID	Sampling Location	Date	Time	GRAB	COMP	Sample Type	No. of Container	TOTAL LEAD + CHROME (VI)	EP TOX Lead + chrome VI	601 + 602	Lead	Chrome VI										
S-1 1ft	BULKING PAD	6/25/90	2:15	✓		SOIL	2	✓	✓	✓												
S-2 1ft	BULKING PAD	6/25/90	3:30	✓		SOIL	2	✓	✓	✓												
S-3 1ft	BULKING PAD N-PERIMETER	6/25/90	10:00	✓		SOIL	2	✓	✓	✓												
S-4 1ft	BULKING PAD N-PERIMETER	6/25/90	10:45	✓		SOIL	2	✓	✓	✓												
RINSATE	W. DRUM PAD	6/25/90	11:15		✓	WTR	4			✓	✓	✓										
RINSATE BLANK	W. DRUM PAD	6/25/90	11:30		✓	WTR	4			✓	✓	✓										

Remarks:

Relinquished by:	Date	Time	Received by:	Date T
John C Rodwan	6/25/90			

Shipping Notes/Lab Comments

Received for NET Midwest by: Carolyn Paslean 6/25/90 4:

Samples Field Filtered: ___ Yes ___ No

Seals Intact Upon Receipt: ___ Yes ___ No ___ N/A

3135 SOUTH STATE ST.
SUITE 202
ANN ARBOR, MI. 48108

CHAIN OF CUSTODY

Client:
Name General Motors
Address Pontiac Central
Truck + Bus
Phone ATTN: STEVE THURMAN

Project Description:
Site: Pontiac Central
Waste Mgt. Bldg

Sample I.D./Description	Date	Time	Number of Containers	Preservation	Requested Analysis
E. ENDWALL COMPOSITE	11/27/90	1130	2	—	
W. ENDWALL COMPOSITE	11/27/90	1145	2	—	
E. FLOOR COMPOSITE	11/27/90	2210	2	—	
W. FLOOR COMPOSITE	11/27/90	2220	2	—	
E. SIDEWALL COMPOSITE	11/27/90	2230	2	—	
W. SIDEWALL COMPOSITE	11/27/90	2240	2	—	
WASTE SAMPLE.	11/27/90	2235	2	—	

Collected by: Peter Christensen 11/27/90

Delivered by: date time

Received by: date time

Relinquished by: date time

Received by: date time

Relinquished by: date time

Received for laboratory by: Carolyn Patten date 11/29/90 time 2:30 pm

Comments:

Final Disposition:

3155 SOUTH STATE ST.
SUITE 202
ANN ARBOR, MI. 48108

CHAIN OF CUSTODY

Client:
Name GM - PONTIAC CENTRAL
Address T+B GROUP
STEVE THURMAN cc: STEVE BAIER
JOHN ROUMAN (MUNITECH)
Phone 456-2239

Project Description:
Site: [illegible]

Sample I.D./Description	Date	Time	Number of Containers	Preservation	Requested Analysis
E. SINGWALL COMPOSITE #1	2/17/89	1120	2	—	[illegible]

Collected by: Glenn E Rathman 2/17/89 1120			Delivered by:	date	time
Received by:	date	time	Relinquished by:	date	time
Received by:	date	time	Relinquished by:	date	time
Received for laboratory by: Carolyn Faulkner	date 2/17/89	time 1435 relinq	Comments:		
Final Disposition:					

3135 SOUTH STATE ST.
SUITE 202
ANN ARBOR, MI. 48108

CHAIN OF CUSTODY

Client:
Name KMI-CONTINENTAL

Address TRB GROUP

STEVE THURMAN

Phone 665-2284

Project Description:
Site: NORTH MAIN ROAD

Sample I.D./Description	Date	Time	Number of Containers	Preservation	Requested Analysis
E. SEWERAGE COMPOSITE #3	10/5/94	1015	2	—	Volatiles

Collected by: John C Kaufman 10/5/94 1015			Delivered by:	date	time
Received by:	date	time	Relinquished by:	date	time
Received by:	date	time	Relinquished by:	date	time
Received for laboratory by: Laurie Parker	date 10/5/94	1030 time	Comments:		
Final Disposition:					

APPENDIX F

Laboratory Analysis Records

Phase I

Soil Boring Sample Analysis

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
16 Judson St
Mail Code 1206-08
Pontiac MI 48058

02-01-90

Sample No.: 68144

Sample Description: C-1, 12''

Project: Pontiac Central
cc: Steve Baier - GM; John Rodwan - McNamee

Date Taken: 01-18-90

Date Received: 01-18-90

Chromium, Total	13	mg/Kg
Lead	16	mg/Kg
Solids, Total	88	%
EP Tox - Chromium	0.06	mg/L
EP Tox - Lead	0.09	mg/L
METHOD 601/8010		
METHOD 602		
Benzene	<2	mg/Kg
Bromodichloromethane	<10	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<10	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<2	mg/Kg
Dibromochloromethane	<2	mg/Kg
Dichlorodifluoromethane	<2	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
16 Judson St
Mail Code 1206-08
Pontiac MI 48058

02-01-90

Sample No.: 68144

Sample Description: C-1, 12''

Project: Pontiac Central
cc: Steve Baier - GM; John Rodwan - McNamee

Date Taken: 01-18-90

Date Received: 01-18-90

cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg
1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68695

Sample Description: C-2 12''

Program: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	13	mg/Kg
Solids, Total	96	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.05	mg/L

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Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68695

Sample Description: C-2 12''

Program: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68695

Sample Description: C-2 12''

Program: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Cook
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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Pontiac Division
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Pontiac, MI 48058
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Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-22-90

Sample No: 08345

RECEIVED
FEB 26 1990
McNAMEE, PORTER & SEELEY
BY

Sample Description: C-3, 12''

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-18-90

Date Received: 01-18-90

Chromium, Hexavalent	<0.2	mg/Kg
Chromium, Total	16	mg/Kg
Lead	20	mg/Kg
Solids, Total	86	%
EP Tox - Chromium	0.05	mg/L
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.09	mg/L
METHOD 601/8010		
METHOD 602		
Benzene	<2	mg/Kg
Bromodichloromethane	<10	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<10	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<2	mg/Kg
Dibromochloromethane	<2	mg/Kg
Dichlorodifluoromethane	<2	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-22-90

Sample No.: 68145

Sample Description: C-3, 12''

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-18-90

Date Received: 01-18-90

trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg
1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

02-13-90

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

Sample No.: 68536

Sample Description: C-4, 12''

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Taken: 01-29-90

Date Received: 01-29-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	mg/Kg
Bromodichloromethane	<5	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<2	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-13-90

Sample No.: 68536

Sample Description: C-4, 12''

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Taken: 01-29-90

Date Received: 01-29-90

1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-13-90

Sample No.: 68536

Sample Description: C-4, 12''

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Taken: 01-29-90

Date Received: 01-29-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	23	mg/Kg
Solids, Total	91	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.18	mg/L

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

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Pontiac Division
398 Auburn Avenue
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Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68693

Sample Description: C-5 12''

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	8.9	mg/Kg
Solids, Total	85	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	<0.05	mg/L

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68693

Sample Description: C-5 12''

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg

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Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68693

Sample Description: C-5 12''

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-31-90

Date Received: 01-31-90

1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68692

Sample Description: C-6 12''

Project: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	26	mg/Kg
Solids, Total	91	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.12	mg/L

RECEIVED
FEB 22 1990
MCNAMEE, PORTER & SEELEY
BY

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Pontiac Division
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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68692

Sample Description: C-6 12''

Project: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg.
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg

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ANALYTICAL REPORT

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GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68692

Sample Description: C-6 12''

Project: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Manager

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Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68694

Sample Description: C-7 12''

Program: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg
Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg

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Pontiac Division
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Fax: (313) 334-8486

Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68694

Sample Description: C-7 12''

Program: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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Fax: (313) 334-8486

Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-20-90

Sample No.: 68694

Sample Description: C-7 12''

Program: Pontiac Central
cc: John Rodwan-McNamee Industrial

Date Taken: 01-31-90

Date Received: 01-31-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	13	mg/Kg
Solids, Total	97	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	<0.05	mg/L

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ANALYTICAL REPORT

Formerly: Burman Technical Services, Inc.

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69057

Sample Description: C-8 12''

Program: Pontiac Central

Date Taken: 02-08-90 1515

Date Received: 02-08-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	8.4	mg/Kg
Solids, Total	97	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	<0.05	mg/L
METHOD 601/602		
Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg

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Formerly: Burmah Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69057

Sample Description: C-8 12''

Program: Pontiac Central

Date Taken: 02-08-90 1515

Date Received: 02-08-90

Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg
1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69058

Sample Description: C-9 12''

Program: Pontiac Central

Date Taken: 02-08-90 1500

Date Received: 02-08-90

Chromium, Hexavalent	<0.2	mg/Kg
Lead	39	mg/Kg
Solids, Total	84	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.06	mg/L
METHOD 601/602		
Benzene	<2	mg/Kg
Bromodichloromethane	<2	mg/Kg
Bromoform	<10	mg/Kg
Bromomethane	<5	mg/Kg
Carbon tetrachloride	<2	mg/Kg
Chlorobenzene	<2	mg/Kg
Chloroethane	<2	mg/Kg
2-Chloroethyl vinyl ether	<5	mg/Kg
Chloroform	<2	mg/Kg
Chloromethane	<5	mg/Kg
Dibromochloromethane	<5	mg/Kg
Dichlorodifluoromethane	<5	mg/Kg
1,2-Dichlorobenzene	<10	mg/Kg
1,3-Dichlorobenzene	<10	mg/Kg
1,4-Dichlorobenzene	<10	mg/Kg
1,1-Dichloroethane	<2	mg/Kg
1,2-Dichloroethane	<2	mg/Kg
1,1-Dichloroethene	<2	mg/Kg
trans-1,2-Dichloroethene	<2	mg/Kg
1,2-Dichloropropane	<2	mg/Kg
cis-1,3-Dichloropropene	<2	mg/Kg
trans-1,3-Dichloropropene	<2	mg/Kg

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69058

Sample Description: C-9 12''

Program: Pontiac Central

Date Taken: 02-08-90 1500

Date Received: 02-08-90

Ethyl benzene	<2	mg/Kg
Methylene chloride	<2	mg/Kg
1,1,2,2-Tetrachloroethane	<2	mg/Kg
Tetrachloroethene	<2	mg/Kg
Toluene	<2	mg/Kg
1,1,1-Trichloroethane	<2	mg/Kg
1,1,2-Trichloroethane	<2	mg/Kg
Trichloroethene	<2	mg/Kg
Trichlorofluoromethane	<2	mg/Kg
Vinyl chloride	<5	mg/Kg

GM-Pontiac Truck & Bus

Christopher P. Jock

Phase I
Rinsate Sample Analysis

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ANALYTICAL REPORT

Formerly: Burman Technical Services, Inc.

02-13-90

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

Sample No.: 68535

Sample Description: Covered Pad - East Rinsate

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Received: 01-29-90

Date Taken: 01-29-90

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2	ug/L
Bromodichloromethane	<2	ug/L
Bromoform	<10	ug/L
Bromomethane	<5	ug/L
Carbon tetrachloride	<2	ug/L
Chlorobenzene	<2	ug/L
Chloroethane	<2	ug/L
2-Chloroethyl vinyl ether	<5	ug/L
Chloroform	4	ug/L
Chloromethane	<5	ug/L
Dibromochloromethane	<5	ug/L
Dichlorodifluoromethane	<5	ug/L
1,2-Dichlorobenzene	<10	ug/L
1,3-Dichlorobenzene	<10	ug/L
1,4-Dichlorobenzene	<10	ug/L
1,1-Dichloroethane	<2	ug/L
1,2-Dichloroethane	<2	ug/L
1,1-Dichloroethene	<2	ug/L
trans-1,2-Dichloroethene	<2	ug/L
1,2-Dichloropropane	<2	ug/L
cis-1,3-Dichloropropene	<2	ug/L
trans-1,3-Dichloropropene	<2	ug/L
Ethyl benzene	<2	ug/L
Methylene chloride	<2	ug/L
1,1,2,2-Tetrachloroethane	<2	ug/L
Tetrachloroethene	<2	ug/L
Toluene		

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ANALYTICAL REPORT

Formerly: Burman Technical Services, Inc.

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-13-90

Sample No.: 68535

Sample Description: Covered Pad - East Rinsate

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Taken: 01-29-90

Date Received: 01-29-90

1,1,1-Trichloroethane	<2	ug/L
1,1,2-Trichloroethane	<2	ug/L
Trichloroethene	<2	ug/L
Trichlorofluoromethane	<2	ug/L
Vinyl chloride	<5	ug/L

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ANALYTICAL REPORT

Formerly: Burman Technical Services, Inc.

02-13-90

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

Sample No.: 68535

Sample Description: Covered Pad - East Rinsate

Program: Pontiac Central
Waste Mgt. Pad Decon.

Date Received: 01-29-90

Date Taken: 01-29-90

Chromium, Hexavalent	<0.05	mg/L
Lead	0.13	mg/L

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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Pontiac Division
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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-13-90

Sample No.: 68564

Sample Description: Open Pad - West Rinsate

Program: Pontiac Central Waste Mgt
Pad Decontamination

Date Taken: 01-30-90

Date Received: 01-30-90

Chromium, Hexavalent	<0.05	mg/L
Chromium, Total	0.04	mg/L
Lead	0.11	mg/L
METHOD 601/602		
Benzene	<2	ug/L
Bromodichloromethane	<10	ug/L
Bromoform	<5	ug/L
Bromomethane	<2	ug/L
Carbon tetrachloride	<2	ug/L
Chlorobenzene	<2	ug/L
Chloroethane	<2	ug/L
2-Chloroethyl vinyl ether	<5	ug/L
Chloroform	22	ug/L
Chloromethane	<5	ug/L
Dibromochloromethane	<5	ug/L
Dichlorodifluoromethane	<5	ug/L
1,2-Dichlorobenzene	<10	ug/L
1,3-Dichlorobenzene	<10	ug/L
1,4-Dichlorobenzene	<10	ug/L
1,1-Dichloroethane	<2	ug/L
1,2-Dichloroethane	<2	ug/L
1,1-Dichloroethene	<2	ug/L
trans-1,2-Dichloroethene	<2	ug/L
1,2-Dichloropropane	<2	ug/L
cis-1,3-Dichloropropene	<2	ug/L
trans-1,3-Dichloropropene	<2	ug/L
Ethyl benzene	3	ug/L
Methylene chloride	<3	ug/L

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-13-90

Sample No.: 68564

Sample Description: Open Pad - West Rinsate

Program: Pontiac Central Waste Mgt
Pad Decontamination

Date Taken: 01-30-90

Date Received: 01-30-90

1,1,2,2-Tetrachloroethane	<2	ug/L
Tetrachloroethene	<2	ug/L
Toluene	2	ug/L
1,1,1-Trichloroethane	<2	ug/L
1,1,2-Trichloroethane	<2	ug/L
Trichloroethene	<2	ug/L
Trichlorofluoromethane	<2	ug/L
Vinyl chloride	<5	ug/L

Christopher P. Jock
Divisional Manager

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-22-90

Sample No.: 68146

Sample Description: Rinse Water Covered Pad West

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-13-90

Date Received: 01-18-90

Chromium, Hexavalent	<0.05	mg/L
Chromium, Total	0.03	mg/L
Lead	0.06	mg/L
METHOD 601/8010		
METHOD 602		
Benzene	<2	ug/L
Bromodichloromethane	<5	ug/L
Bromoform	<10	ug/L
Bromomethane	<5	ug/L
Carbon tetrachloride	<2	ug/L
Chlorobenzene	<2	ug/L
Chloroethane	<2	ug/L
2-Chloroethyl vinyl ether	<5	ug/L
Chloroform	15	ug/L
Chloromethane	<5	ug/L
Dibromochloromethane	<2	ug/L
Dichlorodifluoromethane	<2	ug/L
1,2-Dichlorobenzene	<10	ug/L
1,3-Dichlorobenzene	<10	ug/L
1,4-Dichlorobenzene	<10	ug/L
1,1-Dichloroethane	<2	ug/L
1,2-Dichloroethane	<2	ug/L
1,1-Dichloroethene	<2	ug/L
trans-1,2-Dichloroethene	<2	ug/L
1,2-Dichloropropane	<2	ug/L
cis-1,3-Dichloropropene	<2	ug/L
trans-1,3-Dichloropropene	<2	ug/L

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-22-90

Sample No.: 68146

Sample Description: Rinse Water Covered Pad West

Project: Pontiac Central
cc: John Rodwan - McNamee

Date Taken: 01-13-90

Date Received: 01-18-90

Ethyl benzene	10	ug/L
Methylene chloride	980	ug/L
1,1,2,2-Tetrachloroethane	<2	ug/L
Tetrachloroethene	<2	ug/L
Toluene	30	ug/L
1,1,1-Trichloroethane	5	ug/L
1,1,2-Trichloroethane	<2	ug/L
Trichloroethene	<2	ug/L
Trichlorofluoromethane	<2	ug/L
Vinyl chloride	<5	ug/L

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

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Formerly: Burman Technical Services, Inc.

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69056

Sample Description: Rinsewater Open Pad - East

Program: Pontiac Central

Date Taken: 02-08-90 1200

Date Received: 02-08-90

Chromium, Hexavalent	<0.12	mg/L
Lead	1.4	mg/L
METHOD 601/602		
Benzene	<2	ug/L
Bromodichloromethane	<2	ug/L
Bromoform	<10	ug/L
Bromomethane	<5	ug/L
Carbon tetrachloride	<2	ug/L
Chlorobenzene	<2	ug/L
Chloroethane	<2	ug/L
2-Chloroethyl vinyl ether	<5	ug/L
Chloroform	<2	ug/L
Chloromethane	<5	ug/L
Dibromochloromethane	<5	ug/L
Dichlorodifluoromethane	<5	ug/L
1,2-Dichlorobenzene	<10	ug/L
1,3-Dichlorobenzene	<10	ug/L
1,4-Dichlorobenzene	<10	ug/L
1,1-Dichloroethane	<2	ug/L
1,2-Dichloroethane	<2	ug/L
1,1-Dichloroethene	<2	ug/L
trans-1,2-Dichloroethene	<2	ug/L
1,2-Dichloropropane	<2	ug/L
cis-1,3-Dichloropropene	<2	ug/L
trans-1,3-Dichloropropene	<2	ug/L
Ethyl benzene	35	ug/L
Methylene chloride	<2	ug/L
1,1,2,2-Tetrachloroethane	<2	ug/L

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ANALYTICAL REPORT

Formerly: Burman Technical Services, Inc.

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac MI 48053

02-28-90

Sample No.: 69056

Sample Description: Rinsewater Open Pad - East

Program: Pontiac Central

Date Taken: 02-08-90 1200

Date Received: 02-08-90

Tetrachloroethene	<2	ug/L
Toluene	45	ug/L
1,1,1-Trichloroethane	<2	ug/L
1,1,2-Trichloroethane	<2	ug/L
Trichloroethene	<2	ug/L
Trichlorofluoromethane	<2	ug/L
Vinyl chloride	<2	ug/L

GM-Pontiac Truck & Bus

Christopher P. Jock
Divisional Manager

Phase II

Soil Boring Sample Analysis

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75354

Page 1

Sample Description: S-1 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier ✓John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1415

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.2	mg/Kg
Lead	17.	mg/Kg
Solids, Total	90.	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	<0.05	mg/L

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75354

Sample Description: S-1 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1415

Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/8010

METHOD 8020

Benzene	<20.	ug/Kg
Bromodichloromethane	<20.	ug/Kg
Bromoform	<50.	ug/Kg
Bromomethane	<50.	ug/Kg
Carbon tetrachloride	<20.	ug/Kg
Chlorobenzene	<90.	ug/Kg
Chloroethane	<50.	ug/Kg
2-Chloroethyl vinyl ether	<20.	ug/Kg
Chloroform	<20.	ug/Kg
Chloromethane	<20.	ug/Kg
Dibromochloromethane	<20.	ug/Kg
Dichlorodifluoromethane	<20.	ug/Kg
1,2-Dichlorobenzene	<20.	ug/Kg
1,3-Dichlorobenzene	<20.	ug/Kg
1,4-Dichlorobenzene	<20.	ug/Kg
1,1-Dichloroethane	<20.	ug/Kg
1,2-Dichloroethane	<20.	ug/Kg
1,1-Dichloroethene	<20.	ug/Kg
trans-1,2-Dichloroethene	<20.	ug/Kg
1,2-Dichloropropane	<20.	ug/Kg
cis-1,3-Dichloropropene	<20.	ug/Kg
trans-1,3-Dichloropropene	<20.	ug/Kg
Ethyl benzene	<20.	ug/Kg
Methylene chloride	<90.	ug/Kg
1,1,2,2-Tetrachloroethane	<20.	ug/Kg

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75354

Sample Description: S-1 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1415

Date Received: 06-25-90 1610

Tetrachloroethene	<20.	ug/Kg
Toluene	<20.	ug/Kg
1,1,1-Trichloroethane	<20.	ug/Kg
1,1,2-Trichloroethane	<20.	ug/Kg
Trichloroethene	<20.	ug/Kg
Trichlorofluoromethane	<50.	ug/Kg
Vinyl chloride	<50.	ug/Kg
Xylenes, Total	95.	ug/Kg

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48058
Tel: (313) 253-0440
Fax: (313) 334-8486

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75355

Sample Description: S-2 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1530

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.2	mg/Kg
Lead	15.	mg/Kg
Solids, Total	89.	%
EP Tox - Chromium, Hex.	<0.05	mg/L
EP Tox - Lead	0.07	mg/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75355

Sample Description: S-2 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1530

Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/8010

METHOD 8020

Benzene	<20.	ug/Kg
Bromodichloromethane	<20.	ug/Kg
Bromoform	<50.	ug/Kg
Bromomethane	<50.	ug/Kg
Carbon tetrachloride	<20.	ug/Kg
Chlorobenzene	<90.	ug/Kg
Chloroethane	<20.	ug/Kg
2-Chloroethyl vinyl ether	<20.	ug/Kg
Chloroform	<50.	ug/Kg
Chloromethane	<20.	ug/Kg
Dibromochloromethane	<20.	ug/Kg
Dichlorodifluoromethane	<20.	ug/Kg
1,2-Dichlorobenzene	<20.	ug/Kg
1,3-Dichlorobenzene	<20.	ug/Kg
1,4-Dichlorobenzene	<20.	ug/Kg
1,1-Dichloroethane	<20.	ug/Kg
1,2-Dichloroethane	<20.	ug/Kg
1,1-Dichloroethene	<20.	ug/Kg
trans-1,2-Dichloroethene	<20.	ug/Kg
1,2-Dichloropropane	<20.	ug/Kg
cis-1,3-Dichloropropene	<20.	ug/Kg
trans-1,3-Dichloropropene	<20.	ug/Kg
Ethyl benzene	<20.	ug/Kg
Methylene chloride	<90.	ug/Kg
1,1,2,2-Tetrachloroethane	<20.	ug/Kg

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75355

Sample Description: S-2 1' Bulking Pad

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1530

Date Received: 06-25-90 1610

Tetrachloroethene	<20.	ug/Kg
Toluene	<20.	ug/Kg
1,1,1-Trichloroethane	<20.	ug/Kg
1,1,2-Trichloroethane	<20.	ug/Kg
Trichloroethene	<20.	ug/Kg
Trichlorofluoromethane	<50.	ug/Kg
Vinyl chloride	<50.	ug/Kg
Xylenes, Total	25.	ug/Kg

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75356

Sample Description: S-3 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1000

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.2 (AA)	mg/Kg
Lead	19.	mg/Kg
Solids, Total	89.	%
EP Tox - Chromium, Hex.	<0.05 (color)	mg/L
EP Tox - Lead	0.88	mg/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75356

Sample Description: S-3 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1000 Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/8010

METHOD 8020

Benzene	20.	ug/Kg
Bromodichloromethane	<20.	ug/Kg
Bromoform	<50.	ug/Kg
Bromomethane	<50.	ug/Kg
Carbon tetrachloride	<20.	ug/Kg
Chlorobenzene	<90.	ug/Kg
Chloroethane	<50.	ug/Kg
2-Chloroethyl vinyl ether	<20.	ug/Kg
Chloroform	<20.	ug/Kg
Chloromethane	<20.	ug/Kg
Dibromochloromethane	<20.	ug/Kg
Dichlorodifluoromethane	<20.	ug/Kg
1,2-Dichlorobenzene	<20.	ug/Kg
1,3-Dichlorobenzene	<20.	ug/Kg
1,4-Dichlorobenzene	<20.	ug/Kg
1,1-Dichloroethane	<20.	ug/Kg
1,2-Dichloroethane	<20.	ug/Kg
1,1-Dichloroethene	<20.	ug/Kg
trans-1,2-Dichloroethene	<20.	ug/Kg
1,2-Dichloropropane	<20.	ug/Kg
cis-1,3-Dichloropropene	<20.	ug/Kg
trans-1,3-Dichloropropene	<20.	ug/Kg
Ethyl benzene	90.	ug/Kg
Methylene chloride	<90.	ug/Kg
1,1,2,2-Tetrachloroethane	<20.	ug/Kg

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75356

Sample Description: S-3 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1000

Date Received: 06-25-90 1610

Tetrachloroethene	<20.	ug/Kg
Toluene	30.	ug/Kg
1,1,1-Trichloroethane	<20.	ug/Kg
1,1,2-Trichloroethane	<20.	ug/Kg
Trichloroethene	<20.	ug/Kg
Trichlorofluoromethane	<50.	ug/Kg
Vinyl chloride	<50.	ug/Kg
Xylenes, Total	520.	ug/Kg

Bruce E. Brown
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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75357

Sample Description: S-4 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1045

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.2 (AA)	mg/Kg
Lead	6.6	mg/Kg
Solids, Total	91.	%
EP Tox - Chromium, Hex.	<0.05 (color)	mg/L
EP Tox - Lead	0.10	mg/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75357

Sample Description: S-4 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1045 Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/8010

METHOD 8020

Benzene	<20.	ug/Kg
Bromodichloromethane	<20.	ug/Kg
Bromoform	<50.	ug/Kg
Bromomethane	<50.	ug/Kg
Carbon tetrachloride	<20.	ug/Kg
Chlorobenzene	<90.	ug/Kg
Chloroethane	<50.	ug/Kg
2-Chloroethyl vinyl ether	<20.	ug/Kg
Chloroform	<20.	ug/Kg
Chloromethane	<20.	ug/Kg
Dibromochloromethane	<20.	ug/Kg
Dichlorodifluoromethane	<20.	ug/Kg
1,2-Dichlorobenzene	<20.	ug/Kg
1,3-Dichlorobenzene	<20.	ug/Kg
1,4-Dichlorobenzene	<20.	ug/Kg
1,1-Dichloroethane	<20.	ug/Kg
1,2-Dichloroethane	<20.	ug/Kg
1,1-Dichloroethene	<20.	ug/Kg
trans-1,2-Dichloroethene	<20.	ug/Kg
1,2-Dichloropropane	<20.	ug/Kg
cis-1,3-Dichloropropene	<20.	ug/Kg
trans-1,3-Dichloropropene	<20.	ug/Kg
Ethyl benzene	<20.	ug/Kg
Methylene chloride	<90.	ug/Kg
1,1,2,2-Tetrachloroethane	<20.	ug/Kg

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
31 Judson, Mail 1206-08
Pontiac MI 48058

07-24-90

Sample No.: 75357

Sample Description: S-4 1' Bulking Pad N. Perimeter

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1045

Date Received: 06-25-90 1610

Tetrachloroethene	<20.	ug/Kg
Toluene	<20.	ug/Kg
1,1,1-Trichloroethane	<20.	ug/Kg
1,1,2-Trichloroethane	<20.	ug/Kg
Trichloroethene	<20.	ug/Kg
Trichlorofluoromethane	<50.	ug/Kg
Vinyl chloride	<50.	ug/Kg
Xylenes, Total	<20.	ug/Kg

Bruce E. Brown
Project Manager

Phase II

Rinsate and Ambient Sample Analysis

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

BULKING PAD EAST SECOND RINS

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75358

Sample Description: Rinsate

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1115

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.05	mg/L
Lead	<0.05	mg/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75358

Sample Description: Rinsate

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1115

Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<2.	ug/L
Bromodichloromethane	<5.	ug/L
Bromoform	<10.	ug/L
Bromomethane	<5.	ug/L
Carbon tetrachloride	<2.	ug/L
Chlorobenzene	<2.	ug/L
Chloroethane	<2.	ug/L
2-Chloroethyl vinyl ether	<5.	ug/L
Chloroform	15.	ug/L
Chloromethane	<5.	ug/L
Dibromochloromethane	<5.	ug/L
Dichlorodifluoromethane	<2.	ug/L
1,2-Dichlorobenzene	<10.	ug/L
1,3-Dichlorobenzene	<10.	ug/L
1,4-Dichlorobenzene	<10.	ug/L
1,1-Dichloroethane	<2.	ug/L
1,2-Dichloroethane	<2.	ug/L
1,1-Dichloroethene	<2.	ug/L
trans-1,2-Dichloroethene	<2.	ug/L
1,2-Dichloropropane	<2.	ug/L
cis-1,3-Dichloropropene	<2.	ug/L
trans-1,3-Dichloropropene	<2.	ug/L
Ethyl benzene	<2.	ug/L
Methylene chloride	<2.	ug/L
1,1,2,2-Tetrachloroethane	<2.	ug/L
Tetrachloroethene	<2.	ug/L
Toluene	<2.	ug/L

Bruce E. Brown
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75358

Sample Description: Rinsate

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1115

Date Received: 06-25-90 1610

1,1,1-Trichloroethane	<2.	ug/L
1,1,2-Trichloroethane	<2.	ug/L
Trichloroethene	<2.	ug/L
Trichlorofluoromethane	<2.	ug/L
Vinyl chloride	<5.	ug/L
Xylenes, Total	<2.	ug/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75359

Sample Description: Rinsate-Blank

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1130

Date Received: 06-25-90 1610

Chromium, Hexavalent	<0.05	mg/L
Lead	0.15	mg/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75359

Sample Description: Rinsate-Blank

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1130

Date Received: 06-25-90 1610

VOLATILE COMPOUNDS

METHOD 601/602

Benzene	<8.	ug/L
Bromodichloromethane	<20.	ug/L
Bromoform	<40.	ug/L
Bromomethane	<20.	ug/L
Carbon tetrachloride	<8.	ug/L
Chlorobenzene	<8.	ug/L
Chloroethane	<8.	ug/L
2-Chloroethyl vinyl ether	<20.	ug/L
Chloroform	10.	ug/L
Chloromethane	<20.	ug/L
Dibromochloromethane	<20.	ug/L
Dichlorodifluoromethane	<8.	ug/L
1,2-Dichlorobenzene	<40.	ug/L
1,3-Dichlorobenzene	<40.	ug/L
1,4-Dichlorobenzene	<40.	ug/L
1,1-Dichloroethane	<8.	ug/L
1,2-Dichloroethane	<8.	ug/L
1,1-Dichloroethene	<8.	ug/L
trans-1,2-Dichloroethene	<8.	ug/L
1,2-Dichloropropane	<8.	ug/L
cis-1,3-Dichloropropene	<8.	ug/L
trans-1,3-Dichloropropene	<8.	ug/L
Ethyl benzene	10.	ug/L
Methylene chloride	2700.	ug/L
1,1,2,2-Tetrachloroethane	<8.	ug/L
Tetrachloroethene	<8.	ug/L
Toluene	11.	ug/L

Bruce E. Brown
Project Manager

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ANALYTICAL REPORT

Steve Thurmon
GMC TRUCK & BUS DIV-BAIER
31 Judson, 1206-08 Mail Co
Pontiac MI 48058

07-24-90

Sample No.: 75359

Sample Description: Rinsate-Blank

Program: Pontiac Central Waste Pad Closure Phase 2
cc: Steve Baier John Rodwan (McNamee Porter Seeley)

Date Taken: 06-25-90 1130

Date Received: 06-25-90 1610

1,1,1-Trichloroethane	<8.	ug/L
1,1,2-Trichloroethane	<8.	ug/L
Trichloroethene	<8.	ug/L
Trichlorofluoromethane	<8.	ug/L
Vinyl chloride	<20.	ug/L
Xylenes, Total	15.	ug/L

Bruce E. Brown
Project Manager

North-Wall Excavation
Soil Sample Analysis

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

RECEIVED
DEC 05 1990
McNAMEE, PORTER & SEELEY
BY

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82945

Pontiac Central-Waste Mgt.
Sample Description: E. Endwall Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990 Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	70.	ug/Kg

Bruce E. Brown
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82946

Pontiac Central-Waste Mgt.
Sample Description: W. Endwall Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990 Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82947

Pontiac Central-Waste Mgt.
Sample Description: E. Floor Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990
Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82948

Pontiac Central-Waste Mgt.
Sample Description: W. Floor Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990
Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82949

Pontiac Central-Waste Mgt.
Sample Description: E. Sidewall Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990
Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

11/30/1990

Job No.: 90.0879
Sample No.: 82950

Pontiac Central-Waste Mgt.
Sample Description: W. Sidewall Composite

cc: Steve Baier, John Rodman (McNamee,Porter,Seeley)

Date Taken: 11/27/1990
Date Received: 11/27/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Benzene	<20.	ug/Kg
Toluene	<20.	ug/Kg
Ethyl Benzene	<20.	ug/Kg
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Divis on
398 Auburn Avenue
Pontiac, MI 48342
Tel: (313) 253-0440
Fax: (313) 334-8486

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

12/11/1990

Job No.: 90.1047
Sample No.: 83309

Waste Mgt Pad
Sample Description: E. Sidewall Comp. #2

Date Taken: 12/05/1990

Date Received: 12/05/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Xylene	<20.	ug/Kg

'90 DEC 14 P2:50

CERTIFIED

Bruce E. Brown
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Pontiac Division
398 Auburn Avenue
Pontiac, MI 48342
Tel: (313) 253-0440
Fax: (313) 334-8486

ANALYTICAL REPORT

Steve Thurman
GMC TRUCK & BUS DIV-BAIER
660 South Blvd East
Pontiac, MI 48053

01/28/1991

Job No.: 90.1047
Sample No.: 83310

'91 FEB -6 A8:28

CENTRAL PLANT

Waste Mgt Pad
Sample Description: E. Sidewall Comp. #3

Date Taken: 12/05/1990
Date Received: 12/05/1990

Parameter	Result	Unit
UST VOLATILES 8020 - SOIL		
Xylene	<20.	ug/Kg

Bruce E. Brown
Project Manager

TOTAL P.03

APPENDIX G

Waste Management Pad Soil Boring Logs

C-1

0-8"	Reinforced concrete
8-12"	Gray medium-grained wet silty clay
12-20"	Gray/brown sandy pebbly silt

C-2

0-8"	Reinforced concrete
8-20"	Medium-grained wet silty gravelly sand

C-3

0-8"	Reinforced concrete
8-16"	Gravy brown mottled pebbly clay
16-20"	Gray/Brown mottled moist silty pebbly clay

C-4

0-8"	Reinforced concrete
8-14"	Gray medium-grained moist silty sand
14-20	Brown/gray dry sandy silt

C-5

0-8"	Reinforced concrete
8-20"	Medium-grained wet silty sand with occasional pebble

C-6

0-8"	Reinforced concrete
8-10"	Brick in medium-grained wet silty pebbly silt
10-20"	Gray clayey pebbly silt

C-7

0-8"	Concrete
8-20"	Medium-grained wet silty sand with occasional pebble

C-8

0-8"	Concrete
8-20"	Crushed limestone aggregate

C-9

0-8"	Reinforced concrete
8-15"	Brown coarse-grained silty sand with strong VOC odor

C-10

0-8"	Reinforced Concrete
8-18"	Crushed limestone aggregate
18-20"	Brown/gray mottled clayey silt

C-11

0-8"	Reinforced Concrete
8-12"	Sand - medium-grained, well sorted
12-20"	Silty mottled gray brown clayey sand

C-12

0-8"	Sand, medium, brown/gray mottled, silty with pebbles
8-12"	Clay, brown, silty, moist with pebbles

C-13

0-8"	Sand, medium, brown/gray mottled, wilty with pebbles
8-12"	Clay, brown, silty, moist with pebbles

APPENDIX H

WWTP Soil Boring Logs

JOB NO. 71-333 LOG OF SOIL BORING NO.

PROJECT PROPOSED WASTE TREATMENT FACILITIES

LOCATION OPDYKE & SOUTH BLVD.

DATE 4-22-71 SURFACE ELEV. 88.73 (95T.84) PONTIAC, MICHIGAN

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows/Ft. &	Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF	Si. %
1A UL	2		VERY STIFF MOIST SLIGHTLY ORGANIC BLUE CLAY, SAND & STONES, FILL	9 12 13	7.7	105.4		
1B UL	4		3'6" STIFF-MOIST SANDY BROWN CLAY	3 5 9	12.0	128.4	2490	
1C UL	8		7'0" COMPACT MOIST MEDIUM BROWN SAND	2 5 9	19.8	119.2		
1D UL	10			5 4 4	7.8	122.0		
	12							
1E UL	14		14'0" STIFF MOIST BLUE CLAY, SAND AND PEBBLES	4 8 10	4.0	128.0		
	16		15'3"					
	18		EXTREMELY COMPACT MOIST COARSE BROWN SAND					
1F UL	20			24 22 20	3.5	125.0		
	22							
	24		23'0"					
1G UL	26		EXTREMELY COMPACT WET COARSE BROWN SAND	7 14 20	16.3	131.9		
	28		26'0"					
1H UL	30		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	7 10 15	12.9	137.2		
	32							
1I UL	34			7 9 13	11.4	140.9		
	36							
	38		37'6"					
1J UL	40		EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	9 14 19	11.8	140.0	2849	
	42							
1K UL	44		44'6" EXTREMELY STIFF MOIST SANDY	14 23 31	33.4	146.0	4692	
	46		46'0" BLUE CLAY					
	48		EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES					
1L UL	50			29 41 72	33.4	145.0		
	52							
1M UL	54			37 60	5.9	145.0		
	56							
	58							
1N UL	60		60'0"	19 40 59	8.9		9258	

TYPE OF SAMPLE
D.—DISTURBED
U.L.—UNDIST. LINER
S.T.—SHELBY TUBE

REMARKS:

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	23	FT.	0	INS.
G.W. ENCOUNTERED AT		FT.		INS.
G.W. AFTER COMPLETION	25	FT.	0	INS.
G.W. AFTER		HRS.	FT.	INS.

PROJECT PROPOSED WASTE TREATMENT FACILITIES

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-23-71 SURFACE ELEV. 90.00 (959.1) PONTIAC, MICHIGAN

Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural W.P.C.F.	Unc. Comp. Strength #/PSF
2A UL	2		VERY STIFF MOIST CLAY, SAND, STONES, FILL	5 9 10	11.3	138.5	
2B UL	4						
2C UL	6		5'0" EXTREMELY STIFF MOIST VARIEGATED CLAY, LENSES OF	5 8 15	10.8		
2D UE	8		8'8" SILT, SAND AND PEBBLES	10 15 20	12.0	139.9	15126
	10		← EXTREMELY STIFF MOIST OXIDIZED BROWN CLAY, SAND AND PEBBLES	10 20 24	14.4	133.8	13837
	12		13'0" ← EXTREMELY COMPACT MOIST MEDIUM BROWN SAND				
2E UL	14						
	16		15'6" ← EXTREMELY COMPACT MOIST FINE BROWN SAND AND SILT	15 19 23	4.5	129.2	
	18		18'6" ← VERY COMPACT WET FINE GREY				
2F UL	20		19'6" SAND	5 8 11	11.7	143.5	4431
	22		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES				
2G UL	24			8 9 12	11.3	139.9	6257
	25		25'6" EXTREMELY COMPACT MOIST COARSE BROWN SAND				
	26						
	28		28'6"				
2H UL	30		COMPACT WET COARSE BROWN	5 9 7	24.0	139.0	
	32		31'0" SAND				
	34		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES				
2I UL	36			9 10 14	10.4	142.5	6225
	38		38'0" EXTREMELY STIFF MOIST BLUE				
2J UL	40		CLAY, SAND AND PEBBLES	12 19 29	8.6	147.8	8300
	42		41'8" EXTREMELY STIFF MOIST SANDY				
2K UL	44		BLUE CLAY				
	46		46'0"	30 62	7.7	145.8	
	48						
	50						
	52						
	54						
	56						
	58						
	60						

TYPE OF SAMPLE
D. -DISTURBED
U.L.-UNDIST. LINER
S.T.-SHELBY TUBE
S.S.-SPLIT SPOON
R.C.-ROCK CORE

REMARKS:

Standard Penetration Test - Driving 2" OD Sampler 1' With

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	18	FT.	6	INS.
G.W. ENCOUNTERED AT	28	FT.	6	INS.
G.W. AFTER COMPLETION	26	FT.	0	INS.
G.W. AFTER HRS.		FT.		INS.
G.W. VOLUMES	LIGHT TO HEAVY			

JOB NO. 71-333 LOG OF SOIL BORING NO. 3

PROJECT PROPOSED WASTE TREATMENT FACILITI

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-21-71 SURFACE ELEV. 89.28 (958.38) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"			Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF	Str. T
	1		VERY STIFF MOIST CLAY, SAND, STONES, FILL							
3A UL	2									
	3			9	11	11	12.5	137.2		
	4									
3B UL	5		4'6" EXTREMELY STIFF MOIST BROWN CLAY, SAND AND PEBBLES, LENSES OF SILT	5	12	17	15.2	129.9	12310	
	6		6'6"							
3C UL	7		FIRM MOIST BROWN CLAY, LAYERS OF SAND	2	4	3	9.6	107.8		
	8									
	9		9'6"							
3D UL	10		COMPACT MOIST MEDIUM BROWN SAND	4	5	6	8.1	112.0		
	11									
	12									
	13									
	14		14'0"							
3E UL	15		STIFF MOIST SANDY BLUE CLAY	5	7	8	9.4	141.5	2460	
	16									
	17									
	18									
	19									
3F UL	20		20'0"	6	21	32	15.0	137.0	11040	
	21		EXTREMELY COMPACT MOIST COARSE BROWN SAND							
	22									
	23		23'0"							
	24		VERY COMPACT WET COARSE BROWN SAND							
3G UL	25			7	12	9	14.9	132.5		
	26									
	27									
	28		28'0"							
	29		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES							
3H UL	30		30'0"	7	12	15	12.4	141.0	5760	

TYPE OF SAMPLE:
D. - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE

REMARKS:

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	23	FT.	0	INS.
G.W. ENCOUNTERED AT		FT.		INS.
G.W. AFTER COMPLETION	24	FT.	0	INS.

JOB NO. 11-333 LOG OF SOIL BORING NO. 4

PROJECT PROPOSED WASTE TREATMENT FACILITIES

LOCATION BOYNE ROAD & SOUTH BLVD.

DATE 4-23-71 SURFACE ELEV. 88.45 (952.55) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF
			1'6" VERY STIFF MOIST CLAY, SAND, STONES, FILL				
4A UL	2		← STIFF MOIST SLIGHTLY ORGANIC	7 10	6	11.7	134.0
4B UL	4		4'0" CLAY, FILL				
4C UL	6		6'3" ← VERY STIFF MOIST VARIEGATED CLAY, SAND AND PEBBLES	4 8	10	12.2	135.8 4120
4D UL	8		9'0" ← COMPACT MOIST MEDIUM BROWN SAND AND STONES	5 6	7	12.1	
	10		← COMPACT MOIST MEDIUM BROWN SAND, CLAY CONTENT	4 5	6	14.8	
4E UL	12		14'6"				
	14		VERY STIFF MOIST SANDY BLUE CLAY	6 8	11	16.0	131.2
	16						
4F UL	18		19'7" EXTREMELY STIFF MOIST BROWN				
	20		21'0" CLAY, SAND AND PEBBLES	5 9	19	12.4	144.5 6970
	22		22'6" ← EXTREMELY COMPACT MOIST				
4G UL	24		← COARSE BROWN SAND				
	26		24'3" ← VERY COMPACT WET COARSE BROWN SAND	9 12	16	9.5	147.5 3030
	28		27'0" ← EXTREMELY STIFF MOIST SANDY BLUE CLAY				
4H UL	30						
	32		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	5 9	18	12.2	142.8 5490
4I UL	34						
	36			6 10	14	12.8	136.2 2670
	38		38'0"				
4J UL	40		EXTREMELY STIFF MOIST BLUE				
	42		41'0" CLAY, SAND AND PEBBLES	7 15	19	12.7	142.8 5040
4K UL	44		EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES				
	46		46'0"	12 25	46	8.8	146.0
	48						
	50						
	52						
	54						
	56						
	58						
	60						

TYPE OF SAMPLE
U. - UNDISTURBED
U.L. - UNDIST. LINER
T.T. - THELEY TUBE
S.S. - SPLIT SPOON
R.C. - ROCK CORE

REMARKS:

Standard Penetration Test - Driving 2" OD Sampler 1" ID

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 22 FT. 6 INS.
G.W. ENCOUNTERED AT FT. INS.
G.W. AFTER COMPLETION 27 FT. 0 INS.
G.W. AFTER HRS. FT. INS.

JOB NO. 71-333 LOG OF SOIL BORING NO. 2

PROJECT PROPOSED WASTE TREATMENT FACILITY

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-21-71 SURFACE ELEV. 89.44 (958.54) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"	Moisture %	Natural Dry Wt. P.C.F.	Unc. Comp. Strength PSF.	Sieve %
			VERY STIFF MOIST SLIGHTLY ORGANIC CLAY, SAND, STONES, FILL					
5A UL	2			7	11	11.1	136.0	
	4		3'6" ← STIFF MOIST VARIEGATED CLAY, SAND CONTENT, SLIGHT ORGANIC					
5B UL	6		6'0" CONTENT, FILL	2	4	8	13.7	127.0	2520
5C UL	8		← VERY STIFF MOIST, OXIDIZED BROWN CLAY, SAND AND PEBBLES	5	8	10	18.0	128.4	5340
5D UL	10		10'0" ← COMPACT MOIST MEDIUM BROWN SAND	6	4	6	18.8	130.0	
	12		13'0" ← COMPACT WET BROWN SILTY AND						
	14		14'0" SAND, HIGH CLAY CONTENT						
5E UL	16		16'0" ← COMPACT WET GREY SILTY AND SAND	9	5	6	13.1	145.0	
	18		← VERY STIFF MOIST BLUE CLAY,						
5F UL	20		20'0" SAND AND PEBBLES						
	22		20'2" ← EXTREMELY STIFF MOIST OXIDIZED BROWN CLAY, SAND	6	15	31	9.6	143.0	4300
	24		23'6" AND PEBBLES						
5G UL	26		24'0" ← EXTREMELY COMPACT MOIST COARSE BROWN SAND	19	8	9	14.0	140.0	
	28		← VERY COMPACT WET COARSE BROWN SAND						
5H UL	30		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	5	10	13	13.8	140.6	2730
	32								
5I UL	34			6	10	15	13.2	142.0	
	36								
	38								
5J 5E	40		39'0" EXTREMELY STIFF MOIST SANDY BLUE CLAY	11	16	21	11.5	136.5	12550
	42		41'6"						
5K UL	44		EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	22	35	42	6.2	144.9	12810
	46								
	48								
5L UL	50			29	35	50	6.7	137.5	
	52								
5M UL	54			22	30	47	7.0	147.2	11130
	56								
	58								
5N UL	60		60'0"	31	55		8.4	145.9	11280

TYPE OF SAMPLE
O. -DISTURBED
U.L. -UNDIST. LINER
S.T. -SHELBY TUBE
S.S. -SPLIT SPOON

REMARKS:

GROUND WATER OBSERVATIONS
G.W. ENCOUNTERED AT 13 FT. 0 INS.
G.W. ENCOUNTERED AT 24 FT. 6 INS.
G.W. AFTER COMPLETION NONE FT. INS.
G.W. AFTER HRS. FT. INS.

PROJECT PROPOSED WASTE TREATMENT FACIL

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-22-71 SURFACE ELEV. 87.04 (956.74) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"			Moisture %	Natural Wt. P.C.F.	U Strength
	1	Fill	VERY STIFF MOIST SANDY CLAY, FILL						
6A UL	2	Fill	2'0" STIFF MOIST VARIEGATED CLAY, FILL	2	4	5	27.9	131.9	
	3	Fill	3'0" STIFF MOIST BROWN CLAY, SAND AND PEBBLES						
	4	O	4'2" MEDIUM COMPACT MOIST MEDIUM BROWN SAND						
6B UL	5			4	4	3	10.9	118.9	
	6		6'0" MEDIUM COMPACT MOIST MEDIUM BROWN SAND, CLAY CONTENT						
6C UL	7			2	2	3	18.7	120.5	
	8		8'6" MEDIUM COMPACT MOIST COARSE BROWN SAND						
	9								
6D UL	10		10'0" COMPACT MOIST FINE BROWN SAND	3	4	7	17.8	119.0	
	11								
	12								
	13								
	14								
6E UL	15	O	14'0" VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	5	7	11	31.0	141.9	
	16	O							
	17	O							
	18		17'6" EXTREMELY COMPACT MOIST COARSE BROWN SAND						
	19								
6F UL	20			15	20	17	4.7	133.0	
	21								
	22								
	23		23'0" VERY COMPACT WET COARSE BROWN SAND						
6G UL	24								
	25	O	25'0" VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	5	9	12	12.1	143.5	
	26	O							
	27	O							
	28	O							
	29	O							
6H UL	30	O	30'0"	5	7	11	12.8	140.9	19

TYPE OF SAMPLE
D. -DISTURBED
U.L.-UNDIST. LINER
S.T.-SHELBY TUBE
S.S.-SPLIT SPOON
R.C.-ROCK CORE
OTHER-

REMARKS:

Standard Penetration Test - Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	23	FT. 0	IN
G.W. ENCOUNTERED AT		FT.	IN
G.W. AFTER COMPLETION	25	FT. 6	IN
G.W. AFTER HRS.		FT.	IN
G.W. VOLUMES			

HEAVY

PROJECT PROPOSED WASTE TREATMENT FACILI

LOCATION ORCHARD ROAD & SOUTH BLVD.

DATE 4-19-71 SURFACE ELEV. 86.10 (955.2) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows For 6"			Moisture %	Natural Wt P.C.F.	Unc. Comp Strength PSF
			FIRM MOIST VARIEGATED CLAY, SAND, FILL						
7A UL	1 2 3	FILL	3'0"	3	2	3	21.4	122.7	
			MEDIUM COMPACT WET MEDIUM BROWN SAND						
7B UL	4 5 6			5	4	3	15.4	129.9	
			6'0" VERY COMPACT WET COARSE BROWN SAND, LIGHT CLAY CONTENT						
7C UL	7 8			8	7	11	14.8	136.8	
			8'6" VERY COMPACT WET COARSE BROWN SAND						
7D UL	9 10 11 12 13 14			6	10	11	12.7	138.9	
7E UL	15 16 17			10	11	14	12.7	139.2	
			17'4" EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES						
7F UL	18 19 20 21 22 23 24			7	12	15	10.6	147.5	2649
7G UL	25 26 27 28 29			9	13	15	13.5	147.0	5491
7H UL	30		30'0"	6	13	16	11.9	137.7	10120

TYPE OF SAMPLE
D.. -DISTURBED
U.L.-UNDIST. LINER
S.T.-SHELBY TUBE
S.S.-SPLIT SPOON
R.C.-ROCK CORE
OTHER-

REMARKS:

Standard Penetration Test – Driving 2" OD Sampler 1' With 140# Hammer Falling 30"; Count Made At 6" Intervals

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 3 FT. 0
G.W. ENCOUNTERED AT 8 FT. 6
G.W. AFTER COMPLETION 17 FT. 0
G.W. AFTER HRS. FT.
G.W. VOLUMES LIGHT TO HEA

JOB NO. 71-330 LOG OF SOIL BORING NO.

PROJECT WASTE TREATMENT FACILITIES

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-19-71 SURFACE ELEV. 88.86 (957.96) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF
	1	Fill	VERY COMPACT MOIST SANDY CLAY, STONES, FILL				
8A UL	2		1'6" VERY STIFF MOIST VARIEGATED CLAY, SAND AND PEBBLES, FILL	6 T0 T1	12.4	135.0	
	3	Fill					
	4		4'0"				
8B UL	5	Fill	VERY STIFF MOIST VARIEGATED CLAY, SAND, FILL	7 9 T2	13.4		
	6		5'6"				
	7		COMPACT MOIST MEDIUM BROWN SAND, CLAY, BRICKS	5 5 6	15.0		
8C UL	8						
	9		9'0"	3 4 4	18.8	127.2	8555
8D UL	10		COMPACT MOIST MEDIUM BROWN SAND, CLAY				
	11		11'3"				
	12		STIFF MOIST OXIDIZED BROWN CLAY, SAND AND PEBBLES				
	13						
	14			6 8 14	12.0	142.0	
8E UL	15		15'0"				
	16		VERY COMPACT MOIST COARSE BROWN SAND				
	17						
	18						
	19		18'5"				
8F UL	20		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	4 8 11	9.5	143.2	6225
	21		21'0"				
	22		COMPACT WET MEDIUM BROWN SAND				
	23						
	24		24'0"				
8G UL	25		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES, LAYERS OF SILT	6 12 13	9.4	140.2	11492
	26		26'6"				
	27						
	28		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES				
	29						
8H UL	30		30'0"	7 T0 11	9.8	140.2	48

TYPE OF SAMPLE
D. -DISTURBED
U.L. -UNDIST. LINER
S.T. -SHELBY TUBE

REMARKS:

GROUND WATER OBSERVATIONS
G.W. ENCOUNTERED AT 21 FT. 0
G.W. ENCOUNTERED AT FT.
G.W. AFTER COMPLETION 24 FT. 0

LOG OF SOIL BORING NO.

BORING NO.

PROJECT WASTE TREATMENT FACILITIES

LOCATION DIXIE ROAD & SOUTH BLVD.

PONTIAC, MICHIGAN

DATE 4-13-71 SURFACE ELEV. 89.98 (95.08)

Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows per 6"			Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF	Sic. %
	1		VERY COMPACT MOIST SAND, CINDERS, CLAY & STONES, SILT	8	10	12	7.8	139.0		
SA	2									
UL	3									
	4			4	5	4	13.8	128.5	5480	
SB			4'8" STIFF MOIST OXIDIZED BROWN CLAY							
UL	5									
	6		6'3" VERY STIFF MOIST OXIDIZED BROWN CLAY, SAND & PEBBLES	6	8	11	12.9	137.2	9960	
SC	7									
UL	8									
	9		9'0"	7	14	26	14.3	138.2	13200	
SD	10									
UL	11		EXTREMELY STIFF MOIST BROWN CLAY, SAND & PEBBLES, STREAKS OF SILT							
	12									
	13		13'0"							
	14		VERY COMPACT MOIST MEDIUM BROWN SAND, LAYERS OF BROWN SILT	7	11	13	11.3	129.0		
E	15									
UL	16		16'0"							
	17		VERY STIFF MOIST BLUE CLAY, SAND & PEBBLES							
	18									
	19		19'0" VERY STIFF MOIST OXIDIZED	11	26	22	3.5	131.0		
SE			19'6" BROWN CLAY, SAND & PEBBLES							
UL	20		EXTREMELY COMPACT MOIST COARSE BROWN SAND							
	21									
	22		22'6"							
	23									
	24			6	14	17	9.3	140.1	7406	
SG			EXTREMELY STIFF MOIST BLUE							
UL	25		CLAY, SAND & PEBBLES							
	26									
	27									
	28									
	29			11	14	22	10.5	140.8	5526	
SH										
UL	30		30'0"							

TYPE OF SAMPLE

C - DISTURB...

U.L. - MOIST. LINER

S.T. - SHELBY TUBE

S.S. - SPLIT SPOON

R.C. - ROCK CORE

REMARKS:

Standard Penetration Test - Driving 2" OD Sampler 12" with

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT 13 FT. 0 INS.

G.W. ENCOUNTERED AT FT. INS.

G.W. AFTER COMPLETION NONE FT. INS.

G.W. AFTER HRS. FT. INS.

G.W. VOLUMES LIGHT

JOB NO. ____ LOG OF SOIL BORING NO. ____

PROJECT WASTE TREATMENT FACILITIES

LOCATION OPDYKE ROAD & SOUTH BLVD.

PONTIAC, MICHIGAN

DATE 4-20-71 SURFACE ELEV. 87.50 (956.6)

Sample Type	No.	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"	Moisture %	Natural Wt. P.C.F.	Unc. Comp. Strength PSF	S
	1	(?) FILL	0'8" STONES, FILL					
10-S UL	2	SSSSS		7	19	14.8	109.0	
	3	FILL	EXTREMELY STIFF MOIST CLAY, STREAKS OF CINDERS, FILL					
	4			20	30	38	7.2	
10B UL	5	SSSSS						
	6		6'0"					
10C UL	7		STIFF MOIST BROWN CLAY, SAND	3	6	8	12.1	138.0	2107
	8							
	9		8'7"					
10D UL	10			4	12	16	9.1	143.0	7023
	11		VERY STIFF MOIST SANDY BROWN CLAY, STREAKS OF SILT					
	12							
	13							
	14		13'6"					
10E UL	15			10	13	16	11.8	121.1	
	16							
	17		EXTREMELY COMPACT WET MEDIUM BROWN SAND					
	18							
	19							
10F D	20			7	13	12	13.7	127.0	
	21							
	22							
	23		22'3"					
	24		EXTREMELY STIFF MOIST BLUE CLAY, SAND & PEBBLES	7	14	20	11.4	142.2	9258
10G UL	25							
	26							
	27		27'0"					
	28		VERY STIFF MOIST BLUE CLAY, SAND & PEBBLES					
	29			6	10	14	9.8	142.9	9960
TOH UL	30		30'0"					

TYPE OF SAMPLE
D. -DISTURBED
U.L.-UNDIST. LINER
S.T.-SHELBY TUBE
S.S.-SPLIT SPOON
R.C.-ROCK CORE

REMARKS:

Standard Penetration Test — Driving 2" OD Sampler 1" With

GROUND WATER OBSERVATIONS

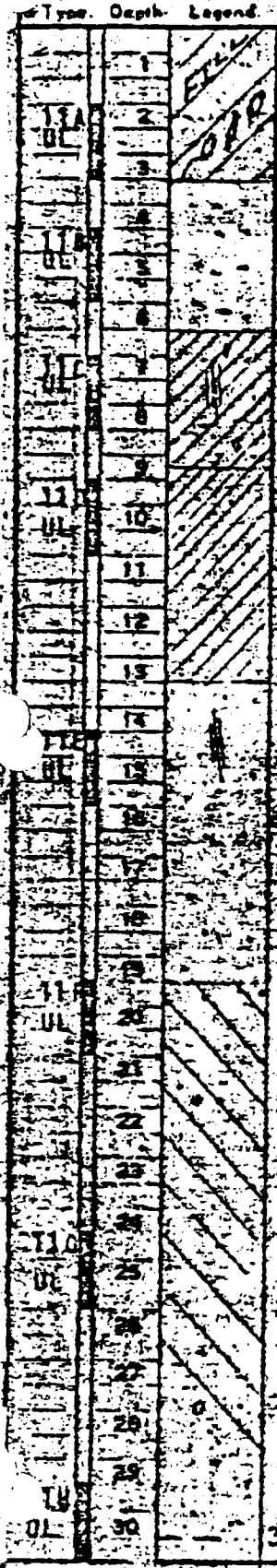
G.W. ENCOUNTERED AT	13	FT.	6	INS.
G.W. ENCOUNTERED AT		FT.		INS.
G.W. AFTER COMPLETION	14	FT.	0	INS.
G.W. AFTER ____ HRS.		FT.		INS.
G.W. VOLUMES	HEAVY			

JOB NO. 71-333 LOG OF SOIL BORING NO. 17

PROJECT WASTE TREATMENT FACILITIES

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-20-71 SURFACE ELEV. 872 (956.3) PONTIAC, MICHIGAN



Sample Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"			Moisture %	Natural W. P.C.F.	Unc. Comp. Strength PSF	Str.
			VERY STIFF MOIST CLAY, SAND, BRICK, STONES, FILL							
SS	1			7	10	14	5.5	127.0		
UL	2									
	3									
			3'0"							
	4		VERY COMPACT MOIST MEDIUM BROWN SAND							
SS	5			8	11	10	5.1	113.0		
	6		6'0"							
UL	7		EXTREMELY STIFF MOIST WEATHERED BROWN CLAY, SAND AND PEBBLES, STREAKS OF SILT							
	8		8'8"							
SS	9		EXTREMELY STIFF MOIST SANDY BROWN CLAY	9	11	15	11.2	141.2	3064	
	10									
	11									
	12									
	13									
			13'0"							
SS	14		VERY COMPACT WET MEDIUM BROWN SAND, LAYERS OF SILT	5	10	14	4.1	110.9		
	15									
	16									
	17									
	18									
	19		19'0"							
SS	20		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	6	9	13	9.2	144.3	7246	
UL	21									
	22									
	23									
	24									
SS	25			7	10	15	10.5	141.5	8938	
UL	26									
	27									
	28									
	29									
SS	30			7	9	14	10.3	142.0		
			30'0"							

TYPES OF SAMPLE
D. - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON

REMARKS

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	13	FT.	0	INS.
G.W. ENCOUNTERED AT		FT.		INS.
G.W. AFTER COMPLETION	28	FT.	6	INS.

JOB NO. 71-333 LOG OF SOIL BORING NO. 12

PROJECT PROPOSED WASTE TREATMENT FACILITY

LOCATION OPDYKE ROAD & SOUTH BLVD.

DATE 4-16-71 SURFACE ELEV. 89.8 (95B.9) PONTIAC, MICHIGAN

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per 6"			Moisture %	Natural Wt. P.C.F.	Unc. Compr. Strength PSF	Sp. G.
			0'3" STONES							
12A UL	1-4		FIRM MOIST MIXED CLAY, SAND, STONES, SLIGHT ORGANIC CONTENT, FILL	2	3	4	13.7	137.0	4060	
12B UL	5-6		4'6" STIFF MOIST SANDY GRAVELLY BROWN CLAY	2	4	5	14.0	136.0	5395	
12C UL	7-8		5'0" STIFF MOIST BROWN CLAY, SAND AND PEBBLES, LENSES OF SILT	2	4	5	21.9	125.9	3799	
12D UL	9-13		9'0" VERY STIFF MOIST BROWN CLAY, SAND AND PEBBLES, LENSES OF SILT	7	10	13	12.4	142.9	1660	
			13'0" COMPACT MOIST MEDIUM BROWN							
			13'6" SAND							
12E UL	14-15		STIFF MOIST SANDY BROWN CLAY							
			15'0"							
	16-18		STIFF MOIST SANDY BLUE CLAY	6	7	11	12.7	143.8	2617	
			19'0"							
12F UL	20-23		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	4	7	11	11.7	145.5	7661	
			24'0"							
12G UL	24-25		COMPACT WET MEDIUM GREY SAND							
			25'0"							
	26-29		VERY STIFF MOIST BLUE CLAY, SAND AND PEBBLES	9	9	8	12.3	139.5		
12H UL	30		30'0"	7	8	11	13.6	144.0	2043	

TYPE OF SAMPLE
D. - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON

REMARKS:

GROUND WATER OBSERVATIONS
G.W. ENCOUNTERED AT 24 FT. 0 HRS.
G.W. ENCOUNTERED AT FT. HRS.
G.W. AFTER COMPLETION 24 FT. 0 HRS.

LOG OF SOIL BORING NO

PROJECT WASTE TREATMENT FACILITIES

LOCATION OPDYKE ROAD & SOUTH BLVD.

PONTIAC, MICHIGAN

DATE 4-20-71 SURFACE ELEV. 851 (959.2)

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per Ft.		Moisture %	Natural W.L.P.C.F.	Unc. C Strength
	1		0'0" STONES, FINES					
T3A UL	2		VERY STIFF MOIST VARIEGATED CLAY, STONES, FINE SAND	3		33	13.2	124.0
	3		3'3"					
T3B UL	4		COMPACT MOIST COARSE BROWN SAND	6	5	8	9.5	109.0
	5							
	6		6'0"					
T3C UL	7		VERY COMPACT MOIST COARSE BROWN SAND	6	8	14	4.5	127.0
	8							
T3D UL	9			9	14	18	12.4	133.2
	10		10'0"					
	11		EXTREMELY COMPACT MOIST FINE BROWN SILT					
	12							
	13							
	14		14'0"					
T3E III	15		STIFF MOIST BLUE CLAY, LAYERS OF WET MEDIUM GREY SAND	4	8	8	10.2	143.3
	16		16'0"					
	17		STIFF MOIST BLUE CLAY, SAND AND PEBBLES					
	18							
	19							
T3F UL	20			6	6	9	11.8	142.0
	21							
	22		22'0"					
	23							
	24		VERY STIFF MOIST BLUE CLAY, SAND & PEBBLES					
T3G UL	25			6	9	11	11.4	141.5
	26							
	27							
	28							
	29							
T3H UL	30		30'0"				10.2	145.3

TYPE OF SAMPLE
D - DISTURBED
U.L. - UNDIST. LINER
S.T. - SHELBY TUBE
S.S. - SPLIT SPOON

REMARKS:

GROUND WATER OBSERVATIONS
G.W. ENCOUNTERED AT 14 FT.
G.W. ENCOUNTERED AT FT.
G.W. AFTER COMPLETION NONE FT.
G.W. AFTER HRS. FT.

PROJECT PROPOSED WASTE TREATMENT FACILITY

LOCATION DEQUINDRE ROAD & SOUTH BLVD. PONTIAC, MICHIGAN

DATE 4-15-71 SURFACE ELEV. 88.82 (959.92)

Sample & Type	Depth	Legend	SOIL DESCRIPTION	Penetration Blows Per Ft.			Moisture %	Natural W. P.C.F.	Unc. Comp. Strength PSF
			COMPACT MOIST DISCOLORED SAND AND STONES, FILL						
14A UL	1'0"		FIRM MOIST ORIGINAL SANDY BROWN CLAY, LENSES OF SILT	2	3	4	17.8	130.1	3479
14B UL	4'0"		EXTREMELY STIFF MOIST SANDY BROWN CLAY, LENSES OF SILT	5	11	17	13.2	141.3	9290
14C UL	6'3"		VERY STIFF MOIST BROWN CLAY, SAND AND PEBBLES	6	12	23	11.3	145.1	3862
14D UL				6	9	18	11.8	146.3	5107
14E UL	14'0"		VERY STIFF MOIST SANDY BLUE CLAY	9	11	11	12.7	143.5	6193
14F UL				8	9	9	15.9	138.9	7661
	21'6"		VERY COMPACT WET MEDIUM GREY SAND						
	23'0"								
14G UL			VERY STIFF MOIST SANDY BLUE CLAY	7	11	14	10.3	147.3	6640
	27'0"		EXTREMELY STIFF MOIST BLUE CLAY, SAND AND PEBBLES						
14H UL	30'0"			7	14	20	11.6	144.0	8396

TYPE OF SAMPLE
D. -DISTURBED
U.L. -UNDIST. LINER
S.T. -SHELBY TUBE
S.S. -SPLIT SPOON
R.C. -ROCK CORE

REMARKS:

Standard Penetration Test – Driving 2" OD Sampler 1' With

GROUND WATER OBSERVATIONS

G.W. ENCOUNTERED AT	21	FT.	6	INS.
G.W. ENCOUNTERED AT		FT.		INS.
G.W. AFTER COMPLETION	27	FT.	0	INS.
G.W. AFTER		HRS.	FT.	INS.

APPENDIX I

WASTE SOIL MANIFESTS

NON HAZARDOUS OR SOLID WASTE DISPOSAL DELIVERY AUTHORIZATION SHIPPER

T & B 802 Rev (5-90)

INSTRUCTIONS

- USE A NO. 2 PENCIL ONLY
- FILL SQUARES COMPLETELY

RIGHT	WRONG
■	☒

(1)FULL LOAD (2)75% LOAD (3) 50% LOAD (4)25% LOAD.

WASTE SOURCE

#	DESC	#	DESC	#	DESC	#	DESC
001	CENTRAL	150	SPO FLINT	450	STD DISP.	750	CAD HAM
002	EAST	200	FLINT MFP	460	CENT FOUND	777	AMER WASTE
003	WEST	222	SPO 75	500	DET ASSEMB.	850	BOCF BODY
004	ENG	250	NAVE	550	BOCF REAT	888	LUIS KAY
005	PHOENIX	300	SLVR DOME	555	GM BLDG.	900	GM PG
050	BFI	333	SPO 78	600	HYD 3R	950	MID EAST
100	BUICK CTY	350	WSTE MGT.	650	GMTB FLINT	999	OTHER
110	HYD YPSI	400	CAD CLRK	666	GM TC		
111	PONT MTR	444	LAKE ORION	700	LAID LAW		

WASTE TYPE

- COMPACTED REFUSE (Explain under remarks if sent anywhere other than GM T & B Facility) .....
- UNCOMPACTED REFUSE .....
- REFUSE PLANT HEAVIES .....
- CAFETERIA GARBAGE .....
- SCRAP DOCK REFUSE .....
- SLUDGE (NON HAZARDOUS) .....
- CONSTRUCTION DEBRIS .....
- ASH .....
- PAPER .....
- TIRES .....
- OTHER .....

DISPOSAL FACILITY

1. GM T&B REFUSE BUILDING 2. STORAGE 3. PONTIAC CITY LANDFILL
4. TIRE SHREDDERS INC. 5. WAYNE DISPOSAL, OAKLAND 6. WAYNE DISPOSAL
7. EAGLE VALLEY 8. OTHER (Specify under remarks, requires authorization below)

HAULER

NAME Laidlaw

REMARKS: Recycling

Waste Treatment

E.V.

NOT VALID UNLESS STAMPED AT OUTBOUND GATE. NOT FOR SHIPMENT OF HAZARDOUS WASTE UNLESS ACCOMPANIED BY A STATE OF MICHIGAN WASTE DISPOSAL MANIFEST

DISPOSAL AUTHORIZATION

Wm Bolton

(SIGNATURE)

■ ASH ☐ REFUSE ■ OTHER(SPECIFY IN REMARKS)

DO NOT SIGN BEYOND THIS LINE

Special hauling or disposal approvals must be signed by a responsible Chief Engineer or Maintenance Supervisor who has checked and secured copies of the required licenses.

COPY DISTRIBUTION: WHITE COPY to be returned to the generator indicating receipt by the disposal facility, BLUE COPY to be retained by Originator, GREEN COPY for Disposal Facility, YELLOW COPY to be retained by the hauler, PINK COPY to be retained by Plant Security.

DATE: MM DD YY

E. Sayre 2-26-91

DRIVER'S NAME (Printed) DRIVER'S SIGNATURE DATE

DISPOSAL FACILITY SIGNATURE DATE

B02300

NON HAZARDOUS OR SOLID WASTE DISPOSAL DELIVERY AUTHORIZATION SHIPPER

T & B 802 Rev (5-90)

- USE A NO. 2 PENCIL ONLY
- FILL SQUARES COMPLETELY

INSTRUCTIONS

RIGHT	WRONG
■	☒

0 1 2 3 4 5 6 7 8 9

(1)FULL LOAD (2)75% LOAD (3) 50% LOAD (4)25% LOAD.

WASTE SOURCE

#	DESC	#	DESC	#	DESC	#	DESC
001	CENTRAL	150	SPO FLINT	450	STD DISP.	750	CAD HAM
002	EAST	200	FLINT MFP	460	CENT FOUND	777	AMER WASTE
003	WEST	222	SPO 75	500	DET ASSEMB.	850	BOCF BODY
004	ENG	250	NAVE	550	BOCF REAT	888	LUIS KAY
005	PHOENIX	300	SLVR DOME	555	GM BLDG.	900	GM PG
050	BFI	333	SPO 78	600	HYD 3R	950	MID EAST
100	BUICK CTY	350	WSTE MGT.	650	GMTB FLINT	999	OTHER
110	HYD YPSI	400	CAD CLRK	666	GM TC		
111	PONT MTR	444	LAKE ORION	700	LAID LAW		

0 1 2 3 4 5 6 7 8 9

WASTE TYPE

- COMPACTED REFUSE (Explain under remarks if sent anywhere other than GM T & B Facility) .....
- UNCOMPACTED REFUSE .....
- REFUSE PLANT HEAVIES .....
- CAFETERIA GARBAGE .....
- SCRAP DOCK REFUSE .....
- SLUDGE (NON HAZARDOUS) .....

CONSTRUCTION DEBRIS .....

ASH .....

PAPER .....

TIRES .....

OTHER .....

DISPOSAL FACILITY

1. GM T&B REFUSE BUILDING 2. STORAGE 3. PONTIAC CITY LANDFILL
4. TIRE SHREDDERS INC. 5. WAYNE DISPOSAL, OAKLAND 6. WAYNE DISPOSAL
7. EAGLE VALLEY 8. OTHER (Specify under remarks, requires authorozation below)

0 1 2 3 4 5 6 7 8 9

HAULER

NAME.. Lonkhorn

REMARKS: Lonkhorn

E.V. Scott Lakeman

NOT VALID UNLESS STAMPED AT OUTBOUND GATE. NOT FOR SHIPMENT OF HAZARDOUS WASTE UNLESS ACCOMPANIED BY A STATE OF MICHIGAN WASTE DISPOSAL MANIFEST

DISPOSAL AUTHORIZATION

Wm Bolton

(SIGNATURE)

ASH ☐ REFUSE ☐ OTHER(SPECIFY IN REMARKS) ■

DO NOT SIGN BEYOND THIS LINE

Special hauling or disposal approvals must be signed by a responsible Chief Engineer or Maintenance Supervisor who has checked and secured copies of the required licenses.

COPY DISTRIBUTION: WHITE COPY to be returned to the generator indicating receipt by the disposal facility, BLUE COPY to be retained by Originator, GREEN COPY for Disposal Facility, YELLOW COPY to be retained by the hauler, PINK COPY to be retained by Plant Security.

DATE: 0 1 2 3 4 5 6 7 8 9

M M D D Y Y

Bill Wells 2-26-91

DRIVER'S NAME (Printed) DRIVER'S SIGNATURE DATE

DISPOSAL FACILITY SIGNATURE DATE

APPENDIX B.5

MDNR CLOSURE LETTERS

JRAL RESOURCES COMMISSION
OMA ANDERSON
RI FLUHARTY
RR MER
STE MYERS
VID SON
YMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

GORDON E. GUYER, Director

March 7, 1988

Mr. D. S. Harrett
Environmental Engineering
GMC - Truck & Bus Group
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Harrett:

SUBJECT: Revised Closure Plan
Truck & Bus Central and East Plants
MID 005 356 902

The Michigan Department of Natural Resources (MDNR) has completed a review of your revised closure plan dated December 2, 1987, pursuant to the requirements of 40 CFR, Part 265, which are adopted by reference in MAC R 299.11003 of the Act 64 administrative rules. Based on this review, and the fact that no significant comments were received during the 30-day public comment period, the MDNR hereby approves your closure plan subject to the conditions enclosed with this letter.

Closure of RCRA interim status units does not release the facility from its responsibilities under the Hazardous and Solid Waste Amendments of 1984 (HSWA). All interim status facilities are subject to the corrective ıction requirements of these amendments.

f you have any questions, please contact Ms. Andrea Schoenrock, of my taff, at 517-373-3988.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-2730

Ms. Becky Kocsis, MDNR
Ms. Andrea Schoenrock, MDNR
Mr. Ken Burda/C&E File
Ms. Lynne King, MDNR
Ms. Carol Witt, U.S. EPA
Ms. Marilyn Sabadaszka, U.S. EPA

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
GORDON E. GUYER
KERRY KAMMER
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

October 5, 1989

Mr. Ken Gembel
GMC-Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

SUBJECT: Closure Activities-Additional Work Plan
Hazardous Waste Management Area
Pontiac East Assembly
MID 005 356 902

The Michigan Department of Natural Resources, Waste Management Division (WMD), has completed its review of GMC Truck & Bus Group-Pontiac East Assembly's (GMC-PEA) work plan for the above referenced hazardous waste management area, submitted on September 21, 1989.

The work plan was prepared by GMC-PEA following initial closure activities for the hazardous waste management area pursuant to the closure plan submitted on December 4, 1987, and approved by WMD on March 7, 1988. The work plan, as modified by the attached "Conditions for Approval," is hereby approved.

If you have any questions regarding this approval, please contact Ms. Liane Shekter Smith of my staff at 517-335-4790.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-9523

Attachment
cc: Mr. Steve Ranger, C-E Environmental
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Richard Traub, U.S. EPA
Mr. Steve Buda, DNR/C&E File
Ms. Lynne King, DNR-Northville
Ms. Liane Shekter Smith, DNR

October 5, 1989

Conditions for Approval

General Motors Corporation
Truck & Bus Group
Pontiac East Assembly
820 S. Opdyke Road
Pontiac, Michigan 48053

MID 005 356 902

1. The statistical comparison of inorganic analytical data to the background results shall be done utilizing the four lowest values of the six background samples which were analyzed.

2. The limit of detection for soil samples analyzed for lead using SW-846 method 7420 shall be 10 mg/kg. The limit of detection for soil samples analyzed for MDNR Scan II compounds using SW-846 Method 8020 shall be 20 ug/kg. These levels shall be confirmed with the analytical laboratory prior to sampling.

3. Excavated materials shall be placed in roll off boxes and covered as described in the work plan. These contaminated materials shall then be sampled and tested as necessary to determine if the contaminated materials are hazardous waste. A minimum of four (4) samples shall be required to characterize the waste for disposal.

4. All hazardous wastes shall be disposed in accordance with the land disposal restrictions specified in 40 CFR Part 268.

5. If unexpected conditions develop or an unexpected event occurs during these activities which necessitates an amended closure plan or work plan, then an amended closure plan or work plan shall be submitted within 30 days after the unexpected event to WMD for approval.

6. After the concrete has been removed from the hazardous waste management area, steps shall be taken to ensure that contaminated soils are not exposed. The area shall be tarped or soil materials shall be excavated and placed in covered containers while awaiting necessary analytical results.

7. In addition to the sampling strategy described in the work plan, two confirmatory samples shall be obtained and analyzed for total lead (SW-846 Method 7420) and MDNR Scan II (SW-846 Method 8020) from the western area of the hazardous waste management area. The samples shall be taken at an approximate depth of six (6) inches at locations determined by GMC-PEA and approved by WMD.

8. Soil sampling at locations E-10 and E-11 shall be conducted in the same manner as described for E-1 through E-3 in the work plan. All samples taken at these locations (E-1 through E-3, E-10 and E-11)

shall be analyzed for total lead and MDNR Scan II as described in the work plan and subject to the conditions specified herein.

9. The third paragraph on page 4 shall be modified to reflect that contaminated soils will be landfilled at the Wayne Disposal facility consistent with paragraph four on the same page.

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
MARLENE J FLUHARTY
GORDON E GUYER
KERRY KAMMER
ELLWOOD A MATTSON
O STEWART MYERS
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P O BOX 30028
LANSING, MI 48909

DAVID F HALES, Director

October 30, 1990

Mr. Ken Gembel
General Motors Corporation
Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

SUBJECT: Release from Financial Capability Requirements for Closure
Hazardous Waste Storage Area
Pontiac East Assembly, MID 005 356 902

The Michigan Department of Natural Resources has completed a review of the closure certification for the facility referenced above pursuant to the Michigan Hazardous Waste Management Act, 1979 P.A. 64, as amended (Act 64). Based upon your closure certification submitted September 7, 1990, General Motors Corporation, Pontiac East Assembly, is hereby released from the financial capability requirements for closure of the hazardous waste storage area at the Pontiac East Assembly facility under Part 7 of the Act 64 Rules. General Motors Corporation is therefore no longer required to use the corporate guarantee to demonstrate financial capability for closure of the hazardous waste storage area, at the Pontiac East Assembly facility. Please note that closure of the entire facility (Pontiac East Assembly and Pontiac Central Assembly) will not be completed until a complete closure certification is received for the hazardous waste management area at the Pontiac Central Assembly facility, as these plants are identified under one U.S. EPA identification number.

This release of the financial capability requirement for the closure of the hazardous waste storage area at Pontiac East Assembly does not release your company from any corrective action responsibilities under the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984.

Please contact Ms. Liane Shekter Smith of the Waste Management Division at 517-335-4790, if you have any questions regarding this matter.

Sincerely,

David F. Hales
ACTING Director
517-373-2329

cc: Mr. Richard Traub, U.S. EPA
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Alan Howard, DNR
Mr. Steve Buda, DNR
Ms. Lynne King, DNR
Ms. Liane Shekter Smith, DNR
HWP/C&E File

RAL RESOURCES COMMISSION
OMAS J. ANDERSON
ILENE J. FLUHARTY
ADON E. GUYER
KERRY KAMMER
ELLWOOD A. MATTSON
O STEWART MYERS
RAYMOND POUPORE

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John Engler
~~JAMES J. BLANCHARD~~, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

February 1, 1991

'91 FEB -6 A11:46

CENTRAL [illegible]

Mr. Steven R. Thurman
General Motors Corporation
Truck & Bus Group
Central Office Plant Engineering
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Thurman:

SUBJECT: Closure Plan Amendment Approval
Hazardous Waste Storage Area
Pontiac Central Assembly
MID 005 356 902

The Michigan Department of Natural Resources (Department), Waste Management Division, has completed its review of the closure plan amendment request, submitted November 15, 1990. Based on this review, and the fact that no significant comments were received during the public comment period, the Department hereby approves the closure plan amendment for the hazardous waste management area at its facility located at 660 South Boulevard East in Pontiac, Michigan. In accordance with R 299.9601(3) and 40 CFR 265.112(d)(4), which is adopted by reference in R 299.11003, the modified closure plan is the approved closure plan.

The approved closure plan amendment modifies the criteria specified in the closure plan governing the scope of required remediation. The approved closure plan amendment specifies that organic contamination, which originated from sources other than hazardous waste activities at the unit, will be addressed as part of the corrective action requirements under the federal Hazardous and Solid Waste Amendments of 1984 (HSWA) to the Resource Conservation and Recovery Act of 1976 (RCRA). As a reminder, closure of interim status units does not release General Motors Corporation from any plant-wide corrective action responsibilities it may have under HSWA and RCRA.

If you have any questions or comments, please contact Ms. Liane Shekter Smith of the Hazardous Waste Permits Section at 517-335-4790.

Sincerely,

Alan J. Howard, Chief
Waste Management Division
517-373-9523

cc: Ms. Lorraine Kosik, U.S. EPA
Mr. Richard Traub, U.S. EPA
Ms. Lynne King, DNR - Livonia
Mr. Steve Buda, DNR
Ms. Liane Shekter Smith, DNR
HWP/C&E File

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
MARLENE J FLUHARTY
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DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

DAVID F. HALES, Director

October 30, 1990

Mr. Ken Gembel
General Motors Corporation
Truck & Bus Group
Pontiac East Assembly
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Gembel:

SUBJECT: Release from Financial Capability Requirements for Closure
Hazardous Waste Storage Area
Pontiac East Assembly, MID 005 356 902

The Michigan Department of Natural Resources has completed a review of the closure certification for the facility referenced above pursuant to the Michigan Hazardous Waste Management Act, 1979 P.A. 64, as amended (Act 64). Based upon your closure certification submitted September 7, 1990, General Motors Corporation, Pontiac East Assembly, is hereby released from the financial capability requirements for closure of the hazardous waste storage area at the Pontiac East Assembly facility under Part 7 of the Act 64 Rules. General Motors Corporation is therefore no longer required to use the corporate guarantee to demonstrate financial capability for closure of the hazardous waste storage area, at the Pontiac East Assembly facility. Please note that closure of the entire facility (Pontiac East Assembly and Pontiac Central Assembly) will not be completed until a complete closure certification is received for the hazardous waste management area at the Pontiac Central Assembly facility, as these plants are identified under one U.S. EPA identification number.

This release of the financial capability requirement for the closure of the hazardous waste storage area at Pontiac East Assembly does not release your company from any corrective action responsibilities under the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984.

Please contact Ms. Liane Shekter Smith of the Waste Management Division at 517-335-4790, if you have any questions regarding this matter.

Sincerely,

David F. Hales
ACTING Director
517-373-2329

cc: Mr. Richard Traub, U.S. EPA
Ms. Marilyn Sabadaszka, U.S. EPA
Mr. Alan Howard, DNR
Mr. Steve Buda, DNR
Ms. Lynne King, DNR
Ms. Liane Shekter Smith, DNR
HWP/C&E File

STATE OF MICHIGAN

URAL RESOURCES COMMISSION
ALENE J. FLUHARTY
ADON E. BUYER
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JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
P.O. BOX 30028
LANSING, MI 48909

Delbert Rector, Director

June 27, 1991

Mr. Steven Thurman
General Motors Corporation
Truck & Bus Group
Central Office Plant Engineering
31 Judson Street
Pontiac, Michigan 48058

Dear Mr. Thurman:

SUBJECT: Release from Financial Capability Requirements for Closure
Hazardous Waste Storage Area
Pontiac Central Assembly, MID 005 356 902

The Michigan Department of Natural Resources has completed a review of the closure certification for the facility referenced above pursuant to the Michigan Hazardous Waste Management Act, 1979 P.A. 64, as amended (Act 64). Based upon your April 12, 1991, and May 28, 1991, closure certification, General Motors Corporation, Pontiac Central Assembly, is hereby released from the financial capability requirements for closure and liability coverage under Part 7 of the Act 64 Rules. General Motors Corporation is therefore no longer required to use the financial test to demonstrate financial capability for closure of this facility.

This release of financial capability requirements for the closure of the hazardous waste storage area does not release your company from any corrective action responsibilities under the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984.

Please contact Ms. Liane Shekter Smith, Environmental Engineer, Waste Management Division, at 517-335-4790, if you have any questions regarding this matter.

Sincerely,

Delbert Rector
Director
517-373-2329

cc: Mr. Richard Traub, U.S. EPA
Ms. Lorraine Kosik, U.S. EPA
Ms. Mindy Koch, DNR
Mr. Steve Buda, DNR
Ms. Lynne King, DNR
Ms. Liane Shekter Smith, DNR
HWP/C&E File

REVIEW OF EXISTING CONDITIONS REPORT

GM TRUCK GROUP
PONTIAC EAST ASSEMBLY/FORMER PONTIAC CENTRAL MANUFACTURING AND ASSEMBLY PLANTS

MID 005356902

A "Brownfield" Redevelopment Project

Pontiac, Michigan

VOLUME II OF IV - APPENDICES C TO F

OCTOBER 1995
REF. NO. 7097 (1)
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CONESTOGA-ROVERS & ASSOCIATES

APPENDIX C

SITE WIDE WORK PLANS

APPENDIX C.1

SITE WIDE QUALITY ASSURANCE PROJECT PLAN

QUALITY ASSURANCE PROJECT PLAN

Pontiac Central Manufacturing Facility
Pontiac, Michigan

OCTOBER 1994
REF. NO. 5770 (13)
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CONESTOGA-ROVERS & ASSOCIATES

LIST OF ACRONYMS AND SHORT FORMS

GM	-	General Motors Corporation
CLP	-	Contract Laboratory Program
CRA	-	Conestoga-Rovers & Associates
DQO	-	Data Quality Objective
EPA-WW	-	"Methods for the Chemical Analysis of Water and Wastes", EPA-600/4-79-020, revised March 1983
GC	-	Gas Chromatography
GC/MS	-	Gas Chromatography/Mass Spectrometry
MDNR	-	Michigan Department of Natural Resources
MS/MSD	-	Matrix Spike/Matrix Spike Duplicate
°C	-	Degree Centigrade
OMMP	-	Operation, Maintenance and Monitoring Plan
PE	-	Performance Evaluation
QA	-	Quality Assurance
QA/QC	-	Quality Assurance/Quality Control
QAO	-	Quality Assurance Officer
QAPP	-	Quality Assurance Project Plan
QC	-	Quality Control
%R	-	Percent Recovery
RA	-	Remedial Action
RAS	-	Routine Analytical Services
RPD	-	Relative Percent Difference
RSD	-	Relative Standard Deviation
Site	-	Pontiac Central Manufacturing Facility
SOPs	-	Standard Operating Procedures
SW-846	-	"Test Methods for Evaluating Solid Waste Physical/Chemical Methods", EPA SW-846, 3rd Edition, November 1986
TCL	-	Target Compound List
USEPA	-	United States Environmental Protection Agency
VOCs	-	Volatile Organic Compounds

QUALITY ASSURANCE PROJECT PLAN (QAPP)

PROJECT TITLE: Pontiac Central Manufacturing Facility

PREPARED BY: CONESTOGA-ROVERS & ASSOCIATES (CRA)

Approved By: _____ Date:_____
Project Manager - GM
Keith West

Approved By: _____ Date:_____
Project Manager - CRA
Glenn Turchan

Approved By: _____ Date:_____
QA/QC Officer - CRA
Analytical Activities
Lou Almeida

Approved By: _____ Date:_____
QA/QC Officer - CRA
Field Activities
Frank Ring

Approved By: _____ Date:_____
Project Manger - (Project Laboratory)
(to be determined)

Approved By: _____ Date:_____
QA Officer - (Project Laboratory)
Laboratory Activities
(to be determined)

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1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) presents the organization, objectives, functional activities, and specific quality assurance (QA) and quality control (QC) activities associated with the Site Assessment sampling of soil and groundwater at the Pontiac Central Manufacturing Facility (Site) in Pontiac, Michigan. This QAPP also describes the specific protocols which will be followed for sampling, sample handling and storage, chain-of-custody, laboratory and field analysis.

All QA/QC procedures will be in accordance with applicable professional technical standards, USEPA requirements, government regulations and guidelines, and specific project goals and requirements. This QAPP has been prepared by Conestoga-Rovers & Associates (CRA) in accordance with all USEPA QAPP guidance documents, in particular, "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (QAMS-005/80).

2.0 PROJECT DESCRIPTION

This QAPP has been developed for the Site Assessment sampling of soil and groundwater at the Pontiac Central Manufacturing Facility Site in Pontiac, Michigan. The plan has been prepared to establish the QA/QC procedures particular to the groundwater remediation at this Site.

2.1 PROJECT OBJECTIVES AND SCOPE

The evaluation of the data collected will determine the type and extent of contamination, if any, located on Site.

2.2 PARAMETERS TO BE TESTED AND FREQUENCY

Sample matrices, analytical parameters and frequencies of sample collection are presented in Table 2.1.

2.3 DATA QUALITY OBJECTIVE

Data quality objectives (DQOs) are qualitative and quantitative statements which specify the quality of the data required to support decisions made during Site Assessment activities and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality.

DQOs have been established in accordance with the USEPA guidance document entitled "Data Quality Objectives for Remedial Response Activities - Development Process", dated March 1987, in conjunction with the document, "Data Quality Objectives for Remedial

TABLE 2.1

SUMMARY OF SAMPLING AND ANALYSIS PROGRAM
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Matrix	*Field Parameters*	*Laboratory Parameters*	*Investigative (1) Samples*	*Field Blanks*	*Field Duplicates*	*Matrix Spike (2) MS/MSD*	*Total*
Groundwater/ Sewer Water	Groundwater Elevations pH Specific Conductance Temperature	TAL metals TCL VOCs TCL SVOCs TCL Pesticides/PCBs TRPH Chloride					
Soil	Soil Elevations	BTEX PNAs Formaldehyde					

Notes:

(1) One trip blank sample, which consists of two filled 40 mL preserved glass vials for VOC aqueous samples shall be shipped with each cooler of aqueous VOC samples.

(2) Matrix spike/matrix spike duplicate (MS/MSD) analyses are required for organic analyses. Samples designated for MS/MSD analyses will be collected, with extra sample volumes for water samples, at a frequency of one per group of twenty (20) or fewer investigative samples. Triple the normal sample volumes will be collected for extractable orgnanics. Inorganic analyses require one matrix spike/laboratory duplicate (MS/DUP) to be analyzed at a frequency of one per group of twenty (20) or fewer investigative samples.

Response Activities - Example Scenario RI/FS Activities at a Site with Contaminated Soils and Groundwater", dated March 1987. Reference to these documents ensures that the database developed during the Site activities meets the objective and quality necessary for its intended use.

DQOs can be classified for the measurement data by defining the level of analytical support assigned to each type of data measurement.

The following defines the different levels of analytical support:

i) Level I - Field screening or analysis using portable instruments;
ii) Level II - Field analyses using more sophisticated portable analytical instruments;
iii) Level III - All analyses performed in off-Site analytical laboratories using USEPA procedures other than the Contract Laboratory Program (CLP) Routine Analytical Services (RAS);
iv) Level IV - CLP-RAS performed in a CLP analytical laboratory using CLP procedures; and
v) Level V - Non-standard analytical methods performed in an off-Site laboratory.

Table 2.2 presents the level of analytical support for each group of parameters.

TABLE 2.2

LEVELS OF DATA QUALITY OBJECTIVES (DQO) ANALYTICAL REPORT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Matrix	*Analysis*	*Analytical Support*
Groundwater	pH	Level I
	Specific Conductivity	Level I
	Water Level	Level I
	Temperature	Level I
Groundwater/ Soil	TAL Metals	Level III
	TCL VOC	Level III
	TCL SVOC	Level III
	TCL Pesticides, PCBs	Level III
	BTEX	Level III
	PNAs	Level III
	Chloride	Level III
	Formaldehyde	Level III
	TRPH	Level III

3.0 PROJECT ORGANIZATION AND RESPONSIBILITY

A summary of the key personnel with QA responsibilities follows:

General Motors Corporation (GM)

- general overview of the project to ensure that GM's objectives for the project are met;
- participation in key negotiations with MDNR; and
- management guidance to CRA's Project Manager.

Glenn Turchan - Project Manager

- general overview of the project to ensure that GM's objectives are met;
- participation in key negotiations with MDNR;
- preparation and review of Site Assessment reports; and
- liaison with MDNR.

Lou Almeida - QA/QC Officer - Analytical Activities - CRA

- system audits - laboratory activities;
- overview and review field QA/QC;
- coordinate supply of performance evaluation samples;
- review laboratory QA/QC;
- data validation and assessment;
- advise on data corrective action procedures; and
- QA/QC representation of project activities.

Frank Ring - QA/QC Officer - Field Activities - CRA

- management of field activities and field QA/QC;
- data assessment;
- technical representation of field activities; and
- preparation of standard operating procedures (SOPs) for field activities.

Project Laboratory - Earth Tech

- will perform all chemical analyses of groundwater, treatment system effluent and air samples collected during the monitoring activities.

Project Manager - Project Laboratory - To be determined

- coordinate laboratory analyses;
- supervise in-house chain-of-custody;
- schedule sample analyses;
- overview data review;
- overview preparation of analytical reports; and
- approval of the QAPP.

Operations Manager - Project Laboratory - To be determined

- coordinate laboratory analysis;
- supervise in-house chain-of-custody;
- schedule sample analyses;
- oversee data review;
- oversee preparation of analytical reports; and
- approve final analytical reports prior to submission to CRA.

QA Officer - Project Laboratory - To be determined

- overview laboratory quality assurance;
- overview QA/QC documentation;
- conduct detailed data review;
- decide laboratory actions, if required;
- technical representation of laboratory QA procedures;
- preparation of laboratory SOPs; and
- approval of the QAPP.

Sample Custodian - Project Laboratory - To be determined

- receive samples and sign accompanying documents (chain-of-custody);
- notify technical staff of samples that require immediate attention; and
- control and regulate access to samples and log all sample movements.

Primary responsibility for project quality rests with CRA's QA/QC Officers - Analytical and Field Activities. Ultimate responsibility for project quality rests with the CRA Project Manager. Independent quality assurance will be provided by the Project Laboratory's Project Manager and QA Officer prior to release of all data to CRA.

4.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective is to develop and implement procedures for field sampling, chain-of-custody, laboratory analyses and reporting that will provide results which are legally defensible in a court of law. Specific procedures for sampling, chain-of-custody, laboratory instrument calibration, laboratory analysis, reporting of data, internal quality control, audits, preventive maintenance of laboratory and field equipment and corrective action are described in other sections of this QAPP. The purpose of this section is to address the specific objectives for accuracy, precision, completeness, representativeness and comparability.

4.1 LEVEL OF QA EFFORT

Field blank, trip blank, duplicate and matrix spike samples will be analyzed to assess the quality of the data resulting from the field sampling program. Field and trip blanks consist of analyte-free water and will be submitted to the analytical laboratory to provide the means to assess the quality of the data resulting from the field sampling program. Field blank samples are analyzed to check for procedural contamination at the Site which may cause sample contamination. Trip blanks are used to assess the potential for contamination of samples due to contaminant migration during sample shipment and storage. Field duplicate samples are analyzed to check for sampling and analytical reproducibility. Matrix spikes provide information about the effect of the sample matrix on the preparation and measurement methodology. All matrix spikes are performed in duplicate.

The general level of the QA effort will be one field duplicate and one field blank per ten groundwater monitoring samples or a minimum of one per groundwater sampling event. One volatile organic compound (VOC) trip blank sample consisting of deionized ultra pure water will be included along with each shipment of multiple aqueous VOC, groundwater monitoring samples.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples are prepared from the monitoring samples. MS/MSD water samples typically must be collected at triple the volume for VOC analysis and double the volume for extractable organics. One MS/MSD sample will be collected/designated for every 20 groundwater monitoring samples or a minimum of one per groundwater sampling event.

The number of MS/MSD, duplicate and field blank samples to be collected are specified in Section 5.0.

The level of QA effort provided for groundwater and treated water samples will be equivalent to the level of QC effort specified in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846 3rd edition, November 1986 (SW-846) and "Methods for the Chemical Analysis of Water and Wastes", EPA-600/4-70-020, revised March 1983 (EPA-WW). The level of QA effort for air samples will be equivalent to the level of QA effort specified in "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air", EPA-600/4-84-041, 1984 and the "NIOSH Manual of Analytical Methods", 3rd Edition, Volume 2, February 1984.

The level of QA effort for the field measurements of pH and specific conductance will consist of collecting duplicate samples and verifying instrument calibration. Temperature readings will be obtained with the pH or conductivity measurements. Water level measurements will be to the nearest 0.01 ft. using an electric sounding water level meter.

4.2 ACCURACY, PRECISION AND SENSITIVITY OF ANALYSES

The fundamental QA objective with respect to accuracy and precision of laboratory analytical data is to achieve the QC acceptance criteria of the analytical protocols referenced in Section 8.0.

The sensitivity of the analyses are provided in Table 4.1.

4.3 COMPLETENESS, REPRESENTATIVENESS AND COMPARABILITY

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. It is expected that the Project Laboratory will provide data meeting QC acceptance criteria for 80 percent or more for all samples tested using the referenced methods. Following completion of the analytical testing, the percent completeness will be calculated by the following equation:

$$\text{Completeness} = \frac{\text{Valid Data Obtained}}{\text{Total Data Planned}} \times 100$$

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition. Representativeness is a qualitative parameter which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling network was designed to provide data representative of Site conditions. During development of this network, consideration was given to the historical Site operations, existing analytical data and physical setting and processes. Representativeness will be satisfied by insuring that the long-term monitoring plan is followed, proper sampling techniques are used, proper analytical procedures are followed and holding times of the samples are not exceeded in the laboratory.

Comparability expresses the confidence with which one data set can be compared with another. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the planned

TABLE 4.1

TARGETED QUANTITATION LIMITS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Compound	*Targeted Quantitation Limits*	
	Water (µg/L)	*Soil (1)* (µg/kg)
TCL Volatile Organic Compounds		
acetone	50	100
benzene	1	10
bromodichloromethane	1	10
bromoform	1	10
bromomethane	1	10
butanone	50	100
carbon disulfide	50	100
carbon tetrachloride	1	10
chlorobenzene	1	10
chloroethane	1	10
chloroform	1	10
chloromethane	1	10
cis-1,3-dichloropropene	1	10
dibromochloromethane	1	10
1,1-dichloroethane	1	10
1,2-dichloroethane	1	10
1,1-dichloroethene	1	10
1,2-dichloroethene (total)	1	10
1,2-dichloropropane	1	10
ethylbenzene	1	10
2-hexanone	50	100
methylene chloride	1	10
4-methyl-2-pentanone	500	100
styrene	1	10
1,1,2,2-tetrachloroethane	1	10
tetrachloroethene	1	10
toluene	1	10
trans-1,3-dichloropropene	1	10
1,1,1-trichloroethane	1	10
1,1,2-trichloroethane	1	10
trichloroethene	1	10
vinyl chloride	1	10
xylenes (total)	1	10
TCL Semivolatile Organic Compounds		
acenaphthene	5	330
acenaphthylene	5	330
anthracene	5	330

TABLE 4.1

TARGETED QUANTITATION LIMITS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Compound	*Targeted Quantitation Limits* Water (µg/L)	Soil (1) (µg/kg)
3-nitroaniline	20	1,700
4-nitroaniline	20	1,700
nitrobenzene	5	330
N-nitroso-di-n-propylamine	5	330
N-nitrosodiphenylamine (diphenylamine)	5	330
phenanthrene	5	330
pyrene	5	330
1,2,4-trichlorobenzene	5	330
4-chloro-3-methylphenol	5	330
2-chlorophenol	5	330
2,4-dichorophenol	5	330
2,4-dimethylphenol	5	330
2,4-dinitrophenol	50	1,700
4,6-dinitro-2-methylphenol	20	1,700
2-methylphenol	5	330
4-methylphenol	5	330
2-nitrophenol	5	330
4-nitrophenol	20	1,700
pentachlorophenol	1	1,700
phenol	5	330
2,4,5-trichlorophenol	50	1,700
2,4,6-trichlorophenol	5	330
TCL Pesticides/PCB		
alpha-BHC	0.01	1.7
beta-BHC	0.01	1.7
delta-BHC	0.01	1.7
gamma-BHC	0.01	1.7
heptachlor	0.01	1.7
aldrin	0.01	1.7
heptachlor expoxide	0.01	1.7
endosulfan I	0.01	3.3
dieldrin	0.02	3.3
4,4'-DDE	0.02	3.3
endrin	0.02	3.3
endosulfan II	0.02	3.3
4,4'-DDD	0.02	3.3
endosulfan sulfate	0.02	3.3
4,4'-DDT	0.02	3.3

TABLE 4.1

TARGETED QUANTITATION LIMITS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Compound	*Targeted Quantitation Limits*	
	Water (µg/L)	*Soil (1)* (µg/kg)
methoxychlor	0.5	50
endrin ketone	0.02	1.7
endrin aldehyde	0.02	3.3
alpha-chlordane	0.01	1.7
gamma-chlordane	0.01	1.7
toxaphene	1.0	170
PCB-1016	0.2	330
PCB-1221	0.2	330
PCB-1232	0.4	330
PCB-1242	0.2	330
PCB-1248	0.2	330
PCB-1254	0.2	330
PCB-1260	0.2	330
TAL Inorganics (2)		
aluminum	20	500
antimony	5	500
arsenic	1	100
barium	200	1,000
beryllium	5	1,000
cadmium	0.2	50
calcium	5,000	1,000,000
chromium	50	2,500
cobalt	50	10,000
copper	25	1,000
iron	100	2,000
lead	3	1,000
magnesium	5,000	1,000,000
manganese	20	2,000
mercury	0.2	100
nickel	50	1,000
potassium	5,000	1,000
selenium	5	500
silver	0.5	500
sodium	5,000	1,000,000
thallium	2	500
vanadium	20	1,000
zinc	20	1,000

TABLE 4.1

TARGETED QUANTITATION LIMITS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Compound	*Targeted Quantitation Limits*	
	Water (µg/L)	*Soil (1)* (µg/kg)
Polynuclear Aromatic Hydrocarbons		
Acenaphthene	5	330
Acenaphthylene	5	330
Anthracene	5	330
Benzo(a)anthracene	5	330
Benzo(b)fluoranthene	5	330
Benzo(k)fluroanthene	5	330
Benzo(g,h,i)penylene	5	330
Chrysene	5	330
Debenzo(a,h)anthracene	5	330
Fluoranthene	5	330
Fluorene	5	330
Indero(h2,3-cd)pyrene	5	330
2-Methylnaphthalene	5	330
Naphfralene	5	330
Phenanthrene	5	330
Pyrene	5	330
BTEX		
Benzene	1	10
Toluene	1	10
Ethylbenzene	1	10
Xylenes	1	10
Other Parameters		
TRPH	200	1,000
Chloride	10 mg/L	200 mg/kg
Formaldehyde	100	500

Notes:

(1) The targeted quantitiation limits for soil are based on dry weight. Actual sample quantitation limits are highly matrix dependent. Target quantitation limits presented are for guidance only. Targeted quantitation limits may be affected by mositure content, matrix interferences, QA/QC problems and high concentrations of target and non-target analytes.

(2) When a MDNR quantitation limit for metals has not been established, a limit has been provided from the referenced methods.

analytical data, as documented in the QAPP, are expected to provide comparable data. These new analytical data, however, may not be directly comparable to existing data because of difference in procedures and QA objectives.

4.4 FIELD MEASUREMENTS

Measurement data will be generated in many field activities. These activities include, but are not limited to, the following:

i) documenting time and weather conditions;
ii) collecting water level data;
iii) determining pH, specific conductivity, and temperature of groundwater samples; and
iv) verifying well development and pre-sampling purge volumes.

The general QA objective for such measurement data is to obtain reproducible and comparable measurements to a degree of accuracy consistent with the use of standardized procedures.

5.0 SAMPLING PROCEDURES

The following subsections presents the procedures for sampling the various media at the Site.

5.1 EQUIPMENT CLEANING

All sampling equipment which may come in contact with potentially contaminated materials shall be decontaminated prior to field use and after each sample is collected to prevent cross-contamination of the samples. Duplicate samples shall be collected concurrently with original samples, therefore, sampling equipment will not be decontaminated before collection of the duplicate. Decontamination of equipment will be performed as follows:

i) clean water and non-phosphate detergent wash using a brush, if necessary, to remove all visible foreign matter;
ii) rinse thoroughly with potable water;
iii) rinse with pesticide-grade isopropyl alcohol;
iv) rinse thoroughly with deionized water;
v) allow the equipment to air dry on a clean plastic sheet as long as possible; and
vi) wrap in aluminum foil until use.

Following final rinse, openings will be visually inspected to verify they are free of particulates and other material which may contribute to possible sample cross-contamination.

Fluids used for cleaning will not be recycled. All wash water, rinse water and decontamination fluids will be transferred to the groundwater treatment system where it will be treated.

5.2 FIELD SAMPLING

5.2.1 Sample Labeling

Each sample will be labeled with a unique sample number that will facilitate tracking and cross-referencing of sample information. The sample numbering system to be used is described as follows:

Example: GW-090192-WP-001

GW	- designates types of sample (GW-groundwater, TW-treated water, G-air emissions)
090192	- designates date of collection presented as month/day/year
WP	- sampler's initials
001	- sequential number starting with 001 at the start of the project

Field QC samples also will be numbered with a unique sample site number, consistent with the numbering system described above to prevent laboratory bias of field QC samples.

5.2.2 Field Log

The field logbook will be a bound document with consecutively numbered pages. The entries for each day will commence on a new page which will be dated. All entries will be made only in waterproof black ink. Corrections will be made by marking through the error with a single line, so as to remain legible, and initialing this action followed by writing the correction.

The following information will be recorded in the field logbook for each sample collected:

i) site location identification;
ii) unique sample identification number;
iii) date and time (in military time format) of sample collection;
iv) weather conditions;
v) designation as to the sample matrix;
vi) designation as to the means of collection (grab, bailer, etc.);
vii) brief description of the sample;
viii) name of sampler;
ix) analyses to be performed on sample; and
x) any other relevant comments such as odor, staining, texture, filtering, preservation, etc.

5.2.3 Chain-Of-Custody Forms

CRA chain-of-custody records will be used to track all samples from time of sampling to the arrival of samples at the laboratory.

Each sample container being shipped to the laboratory will contain a chain-of-custody form. The chain-of-custody form consists of four copies which are distributed to the sampler, to the shipper, to the laboratory and to the office file of CRA. The sampler and shipper will maintain their copies while the other two copies are enclosed in a waterproof enclosure within the shipping container. The laboratory, upon receiving the samples, will complete the remaining copies. The laboratory will maintain one copy for its records. The executed original will be returned to CRA with the data deliverables package. A typical chain-of-custody form is presented on Figure 5.1.

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA–ROVERS & ASSOCIATES
651 Colby Drive
Waterloo, Ont. N2V 1C2 (519)884–0510

SHIPPED TO (Laboratory Name):

REFERENCE NUMBER:

SAMPLER'S SIGNATURE: _____ PRINTED NAME: _____

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS	REMARKS

5.2.4 Sample Containers and Handling

Required sample containers, sample preservation methods, maximum holding times and filling instructions are provided in Table 5.1.

All samples will be placed in appropriate sample containers, labeled and properly sealed. The sample labels will include sample number, place of collection, date and time of collection and analyses to be performed. Samples will be cushioned within the shipping coolers by the use of vermiculite, foam chips and/or bubble wrap. Samples will be kept cool by the use of sealed plastic bags of ice or cooler packs. A trip blank will accompany each shipment of groundwater samples submitted for VOC analysis.

Samples will be shipped by commercial courier on a daily basis to the Project Laboratory. The exception to this will be samples which are collected on a Sunday or holiday. For samples collected on a Sunday or holiday, additional ice will be placed in the coolers, the coolers will be sealed and kept in a designated secure area where it will be picked up by the courier on the next business day.

Two seals comprised of CRA chain-of-custody tape will be placed over the lid on the front and back of each shipping cooler prior to shipment to secure the lid and provide evidence that the samples have not been tampered with en route to the laboratory. Clear tape will be placed over the seals to ensure that they are not accidentally broken during shipment.

Upon receipt of the cooler at the laboratory, the cooler will be inspected by the Sample Custodian. The condition of the cooler and seal will be noted on the chain-of-custody form by the Sample Custodian.

The Sample Custodian then will check the contents of the cooler with those samples listed on the chain-of-custody form. Any damage

TABLE 5.1

CONTAINER, PRESERVATION, SHIPPING AND PACKAGING REQUIREMENTS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analyses	*Sample Containers*	*Preservation*	*Maximum Holding Time from Sample Collection (1)*	*Volume of Sample*	*Shipping*	*Normal Packaging*
Groundwater/Sewer Water						
TCL VOC, BTEX	Three 40 mL teflon-lined septum vials per analysis	HCl to pH < 2 Iced, 4° C	14 days for analysis	Fill completely, no air bubbles	Overnight or Hand Deliver	Foam Liner
TRPH	One 500 mL glass bottle with teflon-lined lid	Iced, 4° C	28 days for analysis	Fill to neck of bottle	Overnight or Hand Deliver	Bubble Pack or Foam Chips
TCL SVOC, PAH, TCL Pesticides/ PCB	Two 1 litre amber glass bottles per analysis	Iced, 4° C	7 days for extraction 40 days after extraction for analysis	Fill to neck of bottle	Overnight or Hand Deliver	Bubble Pack or Foam Chips
TAL Metals	One 1 litre plastic bottle	HNO3 to pH < 2 Iced, 4° C	6 months (mercury-28 days) for analysis	Fill to neck of bottle	Overnight or Hand Deliver	Bubble Pack or Foam Chips
Chloride	One 1 litre plastic bottle	Iced, 4° C	28 days for analysis	Fill to neck of bottle	Overnight or Hand Deliver	Bubble Pack or Foam Chips
Formaldehyde	One 1 litre amber glass bottle	Iced, 4° C	28 days for analysis	Fill to neck of bottle	Overnight or Hand Deliver	Bubble Pack or Foam Chips

TABLE 5.1

CONTAINER, PRESERVATION, SHIPPING AND PACKAGING REQUIREMENTS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analyses	*Sample Containers*	*Preservation*	*Maximum Holding Time from Sample Collection (1)*	*Volume of Sample*	*Shipping*	*Normal Packaging*
SOIL						
TCL VOC, BTEX	One 4-ounce glass jar per analysis	Iced, 4° C	14 days for analysis	Fill completely	Overnight or Hand Deliver	Bubble Pack or Foam Chips
TCL SVOC, PAH, TCL pesticides/PCB	One 4-ounce glass jar per analysis	Iced, 4° C	14 days for extraction 40 days after extraction for analysis	Fill to shoulder of jar	Overnight or Hand Deliver	Bubble Pack or Foam Chips
TRPH	One 4-ounce glass jar per analysis	Iced, 4° C	28 days for analysis	Fill to shoulder of jar	Overnight or Hand Deliver	Bubble Pack or Foam Chips
TAL Metals	One 16-ounce glass jar	Iced, 4° C	6 months (mercury-28 days) for analysis	Fill to shoulder of jar	Overnight or Hand Deliver	Bubble Pack or Foam Chips
Chloride	No additional jar necessary	Iced, 4° C	28 days for analysis	Fill to shoulder of jar	Overnight or Hand Deliver	Bubble Pack or Foam Chips
Formaldehyde	500 mL glass jar	Iced, 4° C	30 days for analysis	Fill to shoulder of jar	Overnight or Hand Deliver	Bubble Pack or Foam Chips

Note:

(1) These are technical holding times, i.e., are based on time elapsed from time of sample collection.

to the samples or discrepancies in the accompanying documentation will be recorded in the remarks column of the chain-of-custody form, dated and signed. Any damage or discrepancies will be reported to the Project Manager who will contact CRA for resolution.

5.3 SAMPLING PROTOCOLS

5.3.1 Groundwater Monitoring Well Sampling Protocols

Groundwater samples will be obtained using the sampling protocol which follows:

i) The depth of water in each well will be measured to the nearest 0.01 foot using an electric tape. The measuring device will be precleaned prior to use in each well using the cleaning sequence provided in Section 5.1.

ii) Prior to sampling, each well will be purged using a pre-cleaned stainless steel bottom-filling bailer, or a disposable teflon or PVC bailer. The monitoring wells will be purged by removing a minimum of three standing well volumes of groundwater where the volume of standing water is calculated as follows:

$$V = 0.041 \ d^2 \ h$$

where:

V = volume of standing water in gallons
d = diameter of the well in inches
h = depth of water in feet

Field measurements of pH, conductivity and temperature of the evacuated water will be obtained and recorded following removal of

each standing well volume and prior to sample collection. Well purging will continue until three consecutive and consistent readings (± 0.2 units for pH, ± five percent for conductivity and ± two degrees for temperature) of pH, conductivity and temperature are obtained or a maximum of five standing well volumes have been removed. In the event that a well is bailed dry prior to achieving three well volumes, groundwater will be permitted to recover to a level sufficient for sample collection. The time that the well was bailed dry will be recorded and the well will be monitored for recovery. Upon recovery, the sample will be collected. All waste groundwater not collected for analysis will be contained and transferred to the treatment system where it will be treated.

iii) After purging the required volume of well water or immediately after well development, water samples will be collected using a pre-cleaned stainless-steel bailer or a disposable teflon or PVC bailer attached to polypropylene rope. The bailer will be emptied directly into the appropriate sample containers. Containers will be filled in order of decreasing analyte volatility, using techniques which will minimize sample agitation. New polypropylene rope will be used for each monitoring well.

iv) The protocols for placing samples in appropriate containers, preservation and shipping are included in Table 5.1.

v) Field duplicate samples will be collected;

vi) Samples for matrix spike analysis will be collected from a well representative of the condition of the majority of the monitoring wells, turbid or non turbid. Samples will be collected from the representative monitoring wells using the same protocol as for the field duplicate with increased sample volume being collected. The chain-of-custody forms sent to the project laboratory will indicate the samples collected for matrix spike analysis.

vii) If disposable bailers are not used, rinsate blank sample will be collected. These samples will consist of distilled or deionized water poured into, and then sampled out of, a precleaned bailer. This will provide a quality assurance check on the decontamination procedures employed for the bailers and sample containers.

5.3.2 Soil Sampling Protocols

5.3.2.1 Soil Borings

For soil samples designated to be collected from exploratory boreholes for chemical analysis, a split barrel sampler shall be used to retrieve soil, as outlined below:

1. A new pair of disposable latex gloves will be used at each sampling location and for the preparation of samples from different vertical zones at each individual location.

2. Prior to use at each sampling location, all sampling equipment not previously decontaminated will be cleaned in accordance with Section 5.1.

3. A split spoon sampler will be driven through the designated sampling interval.

4. The split spoon sampler will be retrieved and opened upon a sheet of aluminum foil.

5. Using a clean cutting tool, the entire core surface will be trimmed and disposed and the core will be cut longitudinally. A continuous sample will be removed from the sampler. The sample will be removed using

clean stainless steel spatulas, spoons or other appropriate sampling equipment. The sample shall be placed in the appropriate sample container and sealed with a teflon lined cap. The protocols for containerizing, preserving and shipping the soil samples are included in Table 5.1.

6. All equipment used during the sampling procedures which may have come in contact with contaminated soils, shall be decontaminated in accordance with Section 5.1.

7. A field duplicate sample will be collected for each set of ten soil samples collected.

8. A field (rinsate) blank sample will be collected for each set of ten soil samples collected. The field blank will consist of deionized water poured over the sampling tools after they have been cleaned using the field decontamination procedures.

9. A matrix spike (MS) and matrix spike duplicate (MSD) will be collected for each set of 20 soil samples collected.

10. A new pair of disposable gloves and clean sampling tools shall be used to prepare the sample from the underlying sample interval in accordance with the procedures described for preparation of the surface sample.

5.3.2.2 Surface Soil/Sediment Samples

For samples designated to be collected from surface soil/sediment or solid waste chemical analysis, a sample will be collected using the same general sampling protocol as described for soil borings with the following exceptions.

1. The soil sample will be retrieved with a stainless steel cup or spoon.
2. The soil sample will be placed in the sample jars using clean stainless steel spatulas or other appropriate sampling equipment.

6.0 SAMPLE CUSTODY AND DOCUMENT CONTROL

It is USEPA Policy to follow the chain-of-custody protocols as described in "NEIC Policies and Procedures", EPA-330/9-78-001-R, revised August 1991. This custody is in three parts: sample collection, laboratory analysis and final evidence files. Final evidence files, including all originals of laboratory reports and purge files, are maintained under document control in a secure area.

A sample or evidence file is under your custody if it:

i) is in your possession;
ii) is in your view, after being in your possession;
iii) is in your possession and you place it in a secured location; or
iv) is in a designated secure area.

6.1 FIELD CHAIN-OF-CUSTODY PROCEDURES

The sample packaging and shipment procedures summarized below will insure that the samples will arrive at the laboratory with the chain-of-custody intact. The protocol for specific sample numbering using case numbers and traffic report numbers, if applicable, and other sample designations are included in Section 5.0.

6.1.1 Field Procedures

The following chain-of-custody procedures will be used in the field:

i) The field sampler is personally responsible for the care and custody of the samples until they are transferred or properly dispatched. As few people as possible should handle the samples.

ii) All bottles will be labeled with unique sample numbers.

iii) Sample labels are to be completed for each sample using waterproof ink unless prohibited by weather conditions.

6.1.2 Field Logbooks/Documentation

Field logbook will provide the means of recording data collecting activities performed. As such, entries will be described in as much detail as possible so that persons going to the Site could reconstruct a particular situation without reliance on memory.

The title page of each logbook will contain the following:

i) person to whom the logbook is assigned
ii) logbook number;
iii) project name
iv) project start date; and
v) end date.

Entries into the logbook will contain a variety of information. At the beginning of each entry, the date, start time, weather, names of all sampling team members present, level of personal protection being used, and the signature of the person making the entry will be entered. The names of visitors to the Site, field sampling or investigation team personnel and the purpose of their visit will also be recorded in the field logbook.

Measurements made and samples collected will be recorded. All entries will be made in ink and no erasures will be made. If an incorrect entry is made, the information will be crossed out with a single strike mark. Whenever a sample is collected, or a measurement is made, a

detailed description of the location of the station, which includes compass direction and distance taken of the station, if any, will also be noted. All equipment used to make measurements will be identified, along with the data of calibration.

Samples will be collected following the sampling procedures presented in Section 5.0. The equipment used to collect samples will be noted, along with the time of sampling, sample description, depth at which the sample was collected, volume and number of containers. Sample identification number will be assigned during sample collection. Field QC samples, which will receive an entirely separate sample identification number, will be submitted blind to avoid laboratory bias of field QC samples.

6.1.3 Transfer of Custody and Shipment Procedures

The following custody and shipping procedures will be followed:

i) Samples are accompanied by a properly completed chain-of-custody form. The sample numbers and locations will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to the laboratory, or to/from a secure storage area.

ii) Samples will be properly packaged for shipment and dispatched to the appropriate laboratory for analysis, with a separate signed custody record enclosed in each sample box or cooler. Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. The preferred procedure includes use of a custody seal attached to the front right and back left of the cooler. The custody seals

are covered with clear plastic tape. The cooler is strapped shut with strapping tape in at least two locations.

iii) Whenever samples are split with a source or government agency, a separate chain-of-custody record is prepared for those samples and marked to indicate with whom the samples are being split. The person relinquishing the samples to the facility or agency should request the representative's signature acknowledging sample receipt. If the representative is unavailable or refuses to sign, this is noted in the "Received By" space.

iv) All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment, and the pink and goldenrod copies will be retained by the sampler for returning to the sampling office.

v) If the samples are sent by common carrier, a bill of lading should be used. Receipts of bills of lading will be retained as part of the permanent documentation. Commercial carriers are not required to sign off on the custody form as long as the custody forms are sealed inside the sample cooler and the custody seals remain intact.

6.2 LABORATORY CHAIN-OF-CUSTODY PROCEDURES

The sample custodian will assign a unique number to each incoming sample for use in the laboratory. The unique number and customer number will then be entered into the sample receiving log. The laboratory date of receipt will also be noted.

Laboratory custody procedures and document control for those samples analyzed by the Project Laboratory will be consistent with their standard laboratory protocols.

6.3 STORAGE OF SAMPLES

After the sample custodian has prepared the sample receiving log, the chain-of-custody will be checked to ensure that all samples are stored in the appropriate locations. All samples will be stored within an access controlled location and will be maintained under the preservation requirements specified in Table 5.1 until completion of all analytical work or, as a minimum, for 30 days after receipt of the final report by CRA.

6.4 FINAL EVIDENCE FILES CUSTODY PROCEDURES

Evidential files for the entire project will be maintained by CRA and will consist of the following:

i) project plan;
ii) project log books;
iii) field data records;
iv) sample identification documents;
v) chain-of-custody records;
vi) correspondence;
vii) references, literature;
viii) final data packages;
ix) miscellaneous - photos, maps, drawings, etc.; and
x) final report.

The evidentiary file materials will be the responsibility of the evidentiary file custodian with respect to maintenance and document removal.

The Project Laboratory will be responsible for maintaining analytical log books and laboratory data. Raw laboratory data files will be inventoried and maintained by the Project Laboratory for a period of five

years, at which time CRA will advise the Project Laboratory regarding the need for additional storage.

7.0 CALIBRATION PROCEDURES AND FREQUENCY

This section describes procedures for maintaining the accuracy for all the instruments and measuring equipment which are used for conducting field tests and laboratory analyses. These instruments and equipment should be calibrated prior to each use or on a scheduled periodic basis.

7.1 FIELD INSTRUMENTS/EQUIPMENT

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specification.

Equipment to be used during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual for each instrument to ensure that all maintenance requirements are being observed. Field notes from previous sampling trips will be reviewed so that the notation on any prior equipment problem are not overlooked, and all necessary repairs to equipment have been carried out.

7.1.1 Field Instrument Calibration

Calibration of the field instruments used during water sampling will be done prior to the collection of each water sample if data indicate a change (>±10 percent) in pH and/or conductivity from the last location sampled. Calibration of field instruments will be conducted at least daily during water sampling. The field equipment will be maintained, calibrated and operated in a manner consistent with the manufacturer's guidelines and USEPA standard methods. However, since the majority of

field measurements will be limited to pH, conductivity and temperature the following procedures will be conducted, at a minimum:

A) Calibration of pH Meter

The pH meter will be calibrated with commercially obtained pH 7, 4 and 10 buffer solutions. The pH calibration will be temperature compensated, and will be performed immediately before initiating a sampling event. Calibration checks will be performed with every sample collected. In the event that the result fails to be within 0.1 pH units, the meter must be recalibrated and all samples after the last calibration must be remeasured.

Calibration will be performed in accordance with the following procedure:

1) rinse the probe in deionized water;
2) insert probe in a fresh pH 7 buffer solution;
3) slide battery compartment cover back to the first stop exposing the adjustment potentiometers;
4) adjust the "CAL" potentiometer such that the display reads 7.00;
5) remove the probe; rinse in deionized water;
6) insert probe in a fresh pH 4 or pH 10 buffer solution;
7) adjust the slope potentiometer until the correct pH is displayed; and
8) remove probe; rinse in deionized water.

B) Calibration of the Specific Conductivity Meter

The specific conductivity meter is factory calibrated, but the calibration should be checked periodically and the probe thoroughly rinsed between samples. Calibration of the specific conductivity meter will be performed as follows:

1) rinse probe in deionized water;
2) wipe probe and allow to dry;

3) the conductivity displayed should be zero in air;
4) adjust the zero potentiometer if necessary;
5) immerse the probe in a solution of known conductivity;
6) adjust the "SPAN" potentiometer such that the correct conductivity is displayed; and
7) rinse probe thoroughly with deionized water and allow to dry.

C) Calibration of Temperature

Temperature measurements are performed in conjunction with specific conductance measurements and the meter is factory calibrated.

D) Calibration of Water Level

Water level measurements are obtained to the nearest 0.01 foot using an electronic sounding water level meter. No field calibration is possible.

7.2 LABORATORY INSTRUMENTS

Calibration of laboratory equipment will be based on approved written procedures. Records of calibration, repairs, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities. These records will be filed at the location where the work is performed and will be subject to QA audit. For all instruments, the laboratory will maintain a properly trained repair staff with in-house spare parts or will maintain service contracts with vendors.

The records of calibration will be kept as follows:

i) If possible, each instrument will have record of calibration permanently affixed with an assigned record number.

ii) A label will be affixed to each instrument showing description, manufacturer, model numbers, date of last calibration and by whom

calibrated (signature), due date of next calibration and compensation or correction figures, as appropriate.

iii) A written stepwise calibration procedure will be available for each piece of test and measurement equipment.

iv) Any instrument that is not calibrated to within the manufacturer's original specification will display an appropriate warning tag.

8.0 ANALYTICAL PROCEDURES

The samples collected for chemical analyses will be analyzed using the methods listed in Table 8.1.

TABLE 8.1

SUMMARY OF ANALYTICAL METHODS
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Matrix	*Parameter*	*Method of Analysis*[1]	
Groundwater/ Sewer Water	BTEX	SW-846	8020
	TCL VOC	SW-846	8260
	PNAs	SW-846	8270
	TCL SVOC	SW-846	8270
	TCL Pesticides/PCB	SW-846	8080
	TAL Metals	SW-846	6010/7000
	Chloride	EPA-WW	325.3
	Formaldehyde	SW-846	8411
	TRPH	EPA-WW	418.1
Soil/Sediment	BTEX	SW-846	8020
	TCL VOC	SW-846	8240
	PNAs	SW-846	8270
	TCL SVOC	SW-846	8270
	TCL Pesticides/PCB	SW-846	8080
	TAL Metals	SW-846	6010/7000
	Chloride	EPA-WW	325.3
	Formaldehyde	SW-846	8411
	TRPH	EPA-WW	418.1

Note:

1 SW-846 - "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", USEPA SW-846, 3rd edition, November 1986.

EPA-WW - "Methods for the Chemical Analysis of Water and Wastes", EPA 600/4-79-020, revised March 1983.

9.0 INTERNAL QUALITY CONTROL CHECKS AND FREQUENCY

This section presents the internal quality control checks and frequency procedures which will be employed for field and laboratory measurements.

9.1 FIELD QC

Quality control procedures for field measurements will be limited to checking the reproducibility of the measurement in the field by obtaining multiple readings and by calibrating the instruments (where appropriate).

Quality control of field sampling will involve collecting field duplicates and field blanks in accordance with the applicable procedures and frequencies described in Sections 4.1 and 5.0, and the level of effort indicated in Table 2.1.

9.2 LABORATORY QC

Specific procedures related to internal laboratory QC samples (namely, matrix spikes, surrogate spikes, blanks, QC check samples and matrix spike duplicates) are detailed in the following subsections.

The internal QC checks for the methods of analyses will follow the appropriate methods specified in Table 8.1 and criteria outlined in the applicable SOPs which are presented in Attachment I.

9.2.1 Initial and Continuing Calibration Checks

The compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing acceptable quantitative data. The initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an analysis run, while the continuing calibration checks document that the initial calibration is still valid, and that satisfactory maintenance and adjustment of the instrument on a day-to-day basis is achieved. The specific control criteria and action requirements for these calibrations will be as specified in the SOPs which are presented in Attachment I.

9.2.2 Method Blank Samples

A method blank sample will be analyzed by the laboratory at a frequency of one blank per twenty analyses or, in the event that an analytical round consists of less than twenty samples, one method blank sample will be analyzed. The method blank sample, an aliquot of analyte-free water, will be carried through the entire analytical procedure.

9.2.3 Matrix Spike/Matrix Spike Duplicates

A matrix spike and matrix spike duplicate (MS/MSD) sample set will be analyzed at a minimum frequency of one per twenty investigative samples. Acceptance criteria and compounds that will be used for matrix spikes are identified in Table 9.1. Percent spike recoveries will be used to evaluate analytical accuracy while percent difference between the matrix spike and matrix spike duplicate will be used to assess analytical precision.

TABLE 9.1

MS/MSD ACCEPTANCE CRITERIA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Compound*	*Control Limits (1)* *Recovery (%) Water Matrix*		*Recovery (%) Solid Matrix*	
TCL VOCs	1,1-Dichloroethene	0-234	(14)	0-231	(22)
	Benzene	37-151	(11)	44-150	(21)
	Trichloroethene	71-157	(14)	74-143	(24)
	Toluene	47-150	(13)	56-148	(21)
	Chlorobenzene	37-160	(13)	47-158	(21)
TCL SVOCs	1,2,4-Trichlorobenzene	44-142	(25)	43-142	(25)
	Acenaphthene	47-145	(25)	50-142	(25)
	2,4-Dinitrotoluene	39-139	(25)	33-132	(25)
	Pyrene	52-115	(25)	52-116	(25)
	N-Nitroso-di-n Proylamine	0-230	(25)	0-209	(25)
	1,4-Dichlorobenzene	20-124	(25)	19-121	(25)
	Pentachlorophenol	14-176	(25)	15-172	(25)
	Phenol	5-112	(25)	5-83	(25)
	2-Chlorophenol	23-134	(25)	22-134	(25)
	4-Chloro-3-Methylphenol	22-147	(25)	21-147	(25)
	4-Nitrophenol	0-132	(25)	0-132	(25)
PNAs	Naphthalene	21-133	(25)	25-134	(25)
	Acenaphthylene	33-145	(25)	36-145	(25)
	Acenaphthene	47-145	(25)	50-142	(25)
	Fluorene	59-121	(25)	58-122	(25)
	Phenanthrene	54-120	(25)	54-120	(25)
	Anthracene	27-133	(25)	31-132	(25)
	Fluoranthene	26-137	(25)	29-137	(25)
	Pyrene	52-115	(25)	52-116	(25)
	Benzo(a)anthracene	33-143	(25)	33-141	(25)
	Chrysene	17-168	(25)	18-164	(25)
	Benzo(b)fluoranthene	24-159	(25)	21-157	(25)
	Benzo(k)fluoranthene	11-162	(25)	10-157	(25)
	Benzo(a)pyrene	17-163	(25)	13-166	(25)
	Indeno(1,2,3,cd)pyrene	0-171	(25)	0-157	(25)
	Dibenzo(a,h)anthracene	0-227	(25)	0-239	(25)
	Benzo(g,h,i)perylene	0-219	(25)	0-214	(25)

TABLE 9.1

MS/MSD ACCEPTANCE CRITERIA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Compound*	*Control Limits (1)* *Recovery (%) Water Matrix*		*Recovery (%) Solid Matrix*	
BTEX	Benzene	39-150	(20)	(NE)	(NE)
	Chlorobenzene	55-135	(20)	(NE)	(NE)
	1,2-Dichlorobenzene	37-154	(20)	(NE)	(NE)
	1,3-Dichlorobenzene	50-141	(20)	(NE)	(NE)
	1,4-Dichlorobenzene	42-143	(20)	(NE)	(NE)
	Ethylbenzene	32-160	(20)	(NE)	(NE)
	Toluene	46-148	(20)	(NE)	(NE)
Pesticides/PCBs	Aldrin	42-122	(20)	(NE)	(NE)
	alpha-BHC	37-134	(20)	(NE)	(NE)
	beta-BHC	17-147	(20)	(NE)	(NE)
	gamma-BHC	19-140	(20)	(NE)	(NE)
	delta-BHC	32-127	(20)	(NE)	(NE)
	Chlordane	45-119	(20)	(NE)	(NE)
	4,4'-DDD	31-141	(20)	(NE)	(NE)
	4,4'-DDE	30-145	(20)	(NE)	(NE)
	4,4'-DDT	25-160	(20)	(NE)	(NE)
	Dieldrin	36-146	(20)	(NE)	(NE)
	Endosulfan I	45-153	(20)	(NE)	(NE)
	Endosulfan II	0-202	(20)	(NE)	(NE)
	Endosulfan Sulfate	26-144	(20)	(NE)	(NE)
	Endrin	30-147	(20)	(NE)	(NE)
	Heptachlor	34-111	(20)	(NE)	(NE)
	Heptachlor epoxide	37-152	(20)	(NE)	(NE)
	Toxaphene	41-126	(20)	(NE)	(NE)
	Aroclor 1016	50-114	(20)	(NE)	(NE)
	Aroclor 1221	15-178	(20)	(NE)	(NE)
	Aroclor 1232	10-215	(20)	(NE)	(NE)
	Aroclor 1242	39-150	(20)	(NE)	(NE)
	Aroclor 1248	38-158	(20)	(NE)	(NE)
	Aroclor 1254	29-131	(20)	(NE)	(NE)
	Aroclor 1260	8-127	(20)	(NE)	(NE)

TABLE 9.1

MS/MSD ACCEPTANCE CRITERIA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Compound*	*Control Limits (1)* *Recovery (%) Water Matrix*		*Recovery (%) Solid Matrix*	
TAL Metals	Arsenic	80-120	(20)	(NE)	(NE)
	Barium	80-120	(20)	(NE)	(NE)
	Cadmium	80-120	(20)	(NE)	(NE)
	Chromium	80-120	(20)	(NE)	(NE)
	Copper	80-120	(20)	(NE)	(NE)
	Lead	80-120	(20)	(NE)	(NE)
	Nickel	80-120	(20)	(NE)	(NE)
	Selenium	80-120	(20)	(NE)	(NE)
	Silver	80-120	(20)	(NE)	(NE)
	Thallium	80-120	(20)	(NE)	(NE)
	Zinc	80-120	(20)	(NE)	(NE)

Notes:

(1) Values in parentheses are relative percent difference control limits. The values presented are the current control limits in effect which are recalculated on a periodic basis. The control limits used to evaluate the data will be the values in effect when the samples are analyzed.

NE Limits are not established, when sufficient laboratory data are available, standard limits will be calculated.

9.2.4 Surrogates

Surrogates are used in all GC and GC/MS analyses. Every blank, standard, and environmental sample including MS/MSD samples will be spiked with surrogate compounds prior to purging volatiles or extracting semi-volatiles.

Surrogates will be spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries will fall within the control limits set by procedures specified in the SOP. The control limits are presented in Table 9.2 for analytes falling within the quantitation limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantitation limit; assessment of analytical quality in these cases will be based in the quality control embodied in the check, matrix spike and matrix spike duplicate samples.

9.2.5 Blind Check Samples

As supplied by the USEPA, an analytical batch may contain a blind check sample. In general, the blind check sample may be obtained from USEPA and supplied to CRA. The analytes employed in this check sample will be a representative subset of the analytes of interest.

The percent recovery of analytes from the check samples will be calculated as defined in Section 13.2.

9.2.6 Trip Blank Samples

Trip blank samples will be submitted with monitoring well VOC samples only, and will be used to determine if cross-contamination occurs during the shipment and storage of investigative samples. Trip blank

TABLE 9.2

SURROGATE COMPOUNDS ACCEPTANCE CRITERIA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Compound*	*Control Limits (1)* *Recovery (%) Water Matrix*	*Recovery (%) Solid Matrix*
TCL VOCs/ BTEX	4-Bromofluorobenzene	57-107	66-117
	Toluene-d8	86-110	81-113
	Dibromofluoromethane	87-118	80-127
TCL SVOCs	2,4,6-Tribromophenol	34-116	24-100
	2-Fluorobiphenyl	40-106	35-101
	2-Fluorophenol	17-72	28-87
	Nitrobenzene-d5	36-102	26-96
	Phenol-d6	10-48	26-92
	Terphenyl	39-120	31-115
TCL Pesticides/PCBs	Decachlorobiphenyl	60-150	60-150
	Tetrachloro-m-xylene	60-150	60-150
PNAs	2-Fluorophenol	40-106	35-101
	Nitrobenzene-d5	36-102	26-96
	Terphenyl	39-120	31-115

Notes:

(1) Values in parentheses are relative percent difference control limits. The values presented are the current control limits in effect which are recalculated on a periodic basis. The control limits used to evaluate the data will be the values in effect when the samples are analyzed.

* Specified in applicable laboratory SOP.

samples are prepared in the laboratory, prior to the sampling event, by filling two 40-mL vials with organic-free deionized water. The trip blank samples are kept with the investigative samples throughout the duration of the sampling event, and upon return to the laboratory, are analyzed for VOCs to determine the presence of organic compounds introduced during storage at the Site and during shipment to the laboratory.

10.0 DATA REDUCTION, VALIDATION AND REPORTING

The Project Laboratory will perform analytical data reduction and review in-house under the direction of the Project Laboratory QA Officer. The Project Laboratory QA Officer will be responsible for assessing data quality and advising of any data which were rated "preliminary" or "unacceptable" or other qualifications based on the established QC criteria. The Project Laboratory will provide Level III (or equivalent) deliverables. Data reduction, review and reporting by the Project Laboratory conducted as detailed in the following procedure:

i) Raw data produced and checked by the responsible analyst is turned over for independent review by another analyst.

ii) The area supervisor or senior analyst reviews the data for attainment of quality control criteria established by the QAPP.

iii) The area supervisor or senior analyst will decide whether any sample reanalysis is required. It should be noted that reanalyses required during corrective action procedures may be initiated by the responsible analyst as described in Section 14.0.

iv) Upon completion of all reviews and acceptance of the raw data by the supervisor, a report will be generated and sent to the Project Manager.

v) The Project Manager will complete a thorough inspection of all reports.

vi) Upon acceptance of the preliminary reports by the Project Manager, final reports will be generated and signed by the Operations Manager or his designee.

vii) A thorough review of a percentage of all data packages is performed by the Project Laboratory Quality Assurance Officer or his designee.

Field data from direct-reading instruments (pH, conductance, temperature) will not require reduction. Laboratory data reduction will be performed using the equations in the analytical methods referenced in Table 8.1.

The QA/QC Officer - Analytical Activities will conduct an evaluation of data reduction and reporting by the laboratory. These evaluations will consider the finished data sheets, field blank data and recovery data for surrogate and matrix spikes. The material will be checked for legibility, completeness, correctness and the presence of requisite dates, initials, and signatures. The results of these checks will be assessed and reported to the CRA's Project Manager noting any discrepancies and their effect upon the acceptability of the data. All information garnered for QA/QC checks will be discussed in a QA/QC Validation report.

Validation of the analytical data will be performed by the QA/QC Officer - Analytical Activities based on the applicable evaluation criteria outlined in "National Functional Guidelines for Organic Data Review", Draft December 1990, revised June 1991 and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganics Analysis", Draft October 1989. The assessment of analytical and field data will include checks for adherence to laboratory QA procedures and accuracy and precision criteria; and the presence of transmittal errors and anomalously high or low parameter values. The results of these data validations will be reported to the Project Manager, noting any problems and their effect upon the acceptability of the data.

Data produced from field measurements and sample collection activities that are used in the project reports will be appropriately identified and appended to the report. Where data have been reduced or summarized, the method of reduction will be documented in the report. In addition, field data will be audited by the QA/QC Officer Field Activities for anomalously high or low values that may appear to be inconsistent with other data.

Laboratory data packages will consist of the following deliverables:

i) a case narrative that includes a summary of analytical methods used and a description of any unusual action or conditions;
ii) dates of sample receipt, extraction/digestion and analysis;
iii) laboratory and field sample identification numbers;
iv) samples results in tabular format;
v) method blank sample summaries;
vi) surrogate compound recovery data and matrix spike/matrix spike duplicate recovery data and control limits;
vii) check sample data; and
viii) executed chain-of-custody forms.

11.0 PERFORMANCE AND SYSTEM AUDITS

Performance and system audits of both field and laboratory activities may be conducted to verify that sampling and analysis are performed in accordance with the procedures established in the QAPP. The audits of field and laboratory activities include two separate independent parts; internal and external audits.

11.1 FIELD AUDITS

Internal audits of field activities (sampling and measurements) will be conducted by the CRA QA/QC Officer - Field Activities. The audits will include examination of field sampling records, field instrument operating records, sample collection, handling and packaging in compliance with the established procedures, maintenance of QA procedures, chain-of-custody, etc. These audits will be conducted to correct deficiencies, and to verify that QA procedures are maintained throughout the remediation. The audits will involve review of field measurement records, instrumentation calibration records and sample documentation.

Any external audits will be conducted by MDNR.

11.2 LABORATORY AUDITS

The internal performance and system audits of the laboratory may be conducted by the CRA QA/QC Officer-Analytical Activities. The system audits, which will be conducted as deemed necessary by the CRA project manager or the CRA QA/QC Officer - Analytical Activities and will include examination laboratory documentation of sample receiving, sample log-in, sample storage, chain-of-custody procedure, sample preparation and analysis, instrument operating records, etc. The performance audits may be conducted on a quarterly basis. Blind QC samples will be prepared and

submitted along with project samples to the laboratory for analysis throughout the project. The QA officer will evaluate the analytical results of these blind performance samples to ensure the laboratory maintains acceptable performance.

Any external audits of the laboratories will be conducted by MDNR.

12.0 PREVENTIVE MAINTENANCE

All analytical instruments to be used in this project will be serviced by the laboratory personnel at regularly scheduled intervals in accordance with the manufacturers recommendations. Instruments may also be serviced at other times due to failure. Requisite servicing beyond the abilities of the laboratory personnel will be performed by the equipment manufacturer or its designated representative.

Daily checks of each instrument will be by the analyst who has been assigned responsibility for that instrument. This will include changing gas chromatography instrumentation inlet liners, tuning gas chromatography/mass spectrometry instrumentation, checking operation of data systems, checking for leaks, etc. Manufacturer's recommended procedures will be followed in every case.

Table 12.1 presents routine preventive maintenance for laboratory field instruments.

The pH and conductivity meters will be calibrated in the field as described in Section 7.1. In addition, the following preventative maintenance measures will be taken in the field:

Water Level Tape - Clean probe and lower three feet of tape with detergent wash and distilled water rinse to prevent hard water and iron buildup.

TABLE 12.1

ROUTINE PREVENTIVE MAINTENANCE
PROCEDURES AND SCHEDULES
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Instrument	*Maintenance Procedures/Schedule*	*Spare Parts in Stock*
Gas Chromatograph/Mass Spectrometer (GC/MS)	1. Replace pump oil as needed. 2. Change septa weekly or as often as needed. 3. Change gas line dryers as needed. 4. Replace electron multiplier as often as needed. 5. Replace gas jet splitter as needed. 6. Replace GC injector glass liner weekly or as often as needed. 7. Replace GC column as needed. 8. Check to ensure that gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP. 9. Check to ensure the pressure on the primary regulator never run below 100 psi.	1. Syringes 2. Septa 3. Various electronic components 4. Glass jet splitter 5. GC column 6. Glass liner
Gas Chromatograph	1. Change septa weekly or as often as needed. 2. Change gas line dryers as needed. 3. Replace GC injector glass liner weekly or as often as needed. 4. Replace GC column as needed. 5. Clean/replace GC detector as needed. 6. Check to ensure that gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP. 7. Check to ensure the pressure on the primary regulator never run below 100 psi.	1. Syringes 2. Septa 3. Detectors 4. Glass liner 5. GC column

TABLE 12.1

ROUTINE PREVENTIVE MAINTENANCE
PROCEDURES AND SCHEDULES
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Instrument	*Maintenance Procedures/Schedule*	*Spare Parts in Stock*
Purge and Trap Sample Concentrator	1. Replace trap as needed. 2. Decontaminate the system after running high concentration samples or as required by blank analysis. 3. Leak check system daily and as often as needed. 4. Check to ensure the gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP. 5. Check to ensure the pressure on the primary regulator never runs below 100 psi.	1. Spare traps 2. Spare sparger 3. Various electronic components/ circuits 4. Plumbing supplies - tubing fitting
Graphite Furnace Atomic Spectrophotomer (GFAA)	1. Change graphite tube contact rings as needed. 2. Change D2 background correction lamp as needed. 3. Clean quartz window as necessary. 4. Check daily to ensure the gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP. 5. Check graphite tubes daily and replace as necessary.	1. Contact rings 2. D2 are lamp

TABLE 12.1

ROUTINE PREVENTIVE MAINTENANCE
PROCEDURES AND SCHEDULES
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Instrument	*Maintenance Procedures/Schedule*	*Spare Parts in Stock*
Mercury Analyzer	1. Clean tubing and quartz cell weekly or as often as needed. 2. Clean aspirator after each batch samples or as necessary. 3. Check daily to ensure the gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP.	1. Quartz cells 2. Aspirator
Inductively Coupled Plasma Spectrometer (ICP)	1. Clean torch assembly and mixing chamber when discolored or after eight hours of running high dissolved solid samples. 2. Clean nebulizer as needed. 3. Check daily to ensure the gas supply is sufficient for the day's activity pressures are set as described in the SOP.	1. Spare torch and mixing chambers 2. Spare nebulizer 3. Spare capillary tubing.
Technicon TRAACS-800 Autoanalyzer	1. Inspect pump tubes after each 8-hour run; replace if discolored or distorted. 2. Check daily to ensure the gas supply is sufficient for the day's activity, and the delivery pressures are set as described in the SOP.	1. Pump tubes 2. Colorimeter lamps

TABLE 12.1

ROUTINE PREVENTIVE MAINTENANCE
PROCEDURES AND SCHEDULES
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Instrument	*Spare Parts in Stock*	*Maintenance Procedures/Schedule*
pH Meter	1. Check battery (if used in field); and replace if discharged. 2. After use in samples containing free oil, wash the electrode in soap and rinse thoroughly with water. Immerse the lower third of the electrode in diluted HCl (1:9) solution for 10 minutes to remove any film formed. Rinse thoroughly with water. 3. Keep electrode properly filled with appropriate filling electrolyte solution.	1. Standard buffers 2. Electrolyte filling solution 3. Spare electrode
Specific Conductivity Meter	1. Check battery (if used in field); and replace if discharged. 2. After use in samples containing free oil, wash the electrode in soap and rinse thoroughly with water.	1. Standard solution 2. Spare electrodes

13.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY AND COMPLETENESS

The following sections include the procedures and formulae utilized to assess the levels of precision, accuracy and completeness achieved during the associated sample analyses.

13.1 FIELD MEASUREMENTS

Field data will be assessed by the CRA QA/QC Officer - Field Activities who will review the field results for compliance with the established QC criteria that are specified in the QAPP and the Plan. Accuracy of the field measurements will be assessed using daily instrument calibration, calibration check, and analysis of blanks. Precision will be assessed on the basis of reproducibility by multiple readings of a single sample. Data completeness will be calculated using the following equation:

$$\text{Completeness} = \frac{\text{Valid (Usable) Data Obtained}}{\text{Total Data Planned}} \times 100$$

The required level of completeness will be 80 percent.

13.2 LABORATORY DATA

Laboratory results will be assessed for compliance with required precision, accuracy, completeness and sensitivity as follows:

13.2.1 Precision

Precision of laboratory analysis will be assessed by comparing the analytical results between MS/MSD samples. The relative

percent difference (%RPD) will be calculated from the results of MS/MSD samples.

13.2.2 Accuracy

Accuracy of laboratory results will be assessed for compliance with the established QC criteria that are described in Sections 4.0 and 9.0 of the QAPP using the analytical results of method blanks, reagent/preparation blank, MS/MSD samples, field blank and trip blanks. The percent recovery (%R) of matrix spike samples will be calculated.

13.2.3 Completeness

Completeness will be assessed by comparing the number of valid results (as determined by CRA QA/QC Officer - Analytical Activities) to the total possible number of results using the formula presented in Section 13.1. The required level of completeness for laboratory analyses will be 80 percent.

13.2.4 Sensitivity

The achievement of method detection limits depend on instrumental sensitivity and matrix effects. Therefore, it is important to monitor the instrumental sensitivity to ensure the data quality through constant instrument performance. The instrumental sensitivity will be monitored through the analysis of method blank, calibration check sample and laboratory control sample.

13.3 STATISTICAL EVALUATIONS

In examination of data and determination of its precision and accuracy, standard statistical formulae will be used.

13.3.1 Arithmetic Mean

The arithmetic mean is the average obtained by dividing a sum by the number of its addends. A number of recovery results are averaged together to improve the accuracy of the measurement. Figure 13.1, equation 1 summarizes the formula to be used to determine the arithmetic mean.

13.3.2 Standard Deviation

The standard deviation is the square root of the average squared difference between the individual values and the average value. A number of recovery results are evaluated to find the numerical variation in the data which is then used in the determination of the percent relative standard deviation. Figure 13.1 equation 2 summarizes the formula to be used to determine the standard deviation.

13.3.3 Percent Relative Standard Deviation (%RSD)

The percent relative standard deviation is the percentage obtained by dividing the standard deviation of the values by the arithmetic mean of the values and multiplying by 100. The %RSD is calculated on a series of measurements to evaluate an instruments analytical precision (e.g., initial calibration). Figure 13.1, equation 3 summarizes the formula to be used to determine %RSD.

Equation 1 Determination of Arithmetic Mean ($\bar{X}$)

$$\bar{X} = \frac{\sum_{i=1}^{n} X_i}{n}$$

where n = number of measurements

X_i = value of measurements

Equation 2 Determination of Standard Deviation (σ_{n-1})

$$\sigma_{n-1} = \sqrt{\frac{\sum_{i=1}^{n} (X_i - \bar{X})^2}{n-1}}$$

where n = number of measurements

X_i = value of measurements

$\bar{X}$ = arithmetic mean

Equation 3 Determination of Percent Relative Standard Deviation (% RSD)

$$\% \text{ RSD} = \frac{\sigma_{n-1}}{\bar{X}} \times 100$$

where σ_{n-1} = standard deviation

$\bar{X}$ = arithmetic mean

Equation 4 Determination of Percent Recovery (% R)

$$\% \text{ R} = \frac{\text{SSR} - \text{SR}}{\text{SA}} \times 100$$

where SSR = Spiked Sample Result

SR = Sample Result or Background

SA = Spike Added

Equation 5 Determination of Relative Percent Difference (RPD)

$$\text{RPD} = \left(\frac{|R_1 - R_2|}{\left[\frac{R_1 + R_2}{2} \right]} \right) \times 100$$

where R_1 = value of first result

R_2 = value of second result

figure 13.1

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Pontiac, Michigan

CRA

13.3.4 Percent Recovery (%R)

The percent recovery of a parameter is the percentage obtained by dividing the amount recovered by the true amount added and multiplying by 100. The percent recoveries of spiked samples are evaluated to establish the analytical accuracy of a measurement. Figure 13.1, equation 4 summarizes the formula to be used to determine the percent recovery.

13.3.5 Relative Percent Difference (RPD)

The relative percent difference is the percentage obtained by dividing the difference between two numbers by their arithmetic mean and multiplying by 100. The RPD is used to evaluate the analytical precision of two replicate measurements (e.g., matrix spike/matrix spike duplicate). Figure 13.1, equation 5 summarizes the formula to be used to determine RPD.

14.0 CORRECTIVE ACTION

The need for corrective action may be identified by system or performance audits or by standard QC procedures. The essential steps in the corrective action system will be:

i) checking the predetermined limits for data acceptability beyond which corrective action is required;
ii) identifying and defining problems;
iii) assigning responsibility for investigating the problem;
iv) investigating and determining the cause of the problem;
v) determination of a corrective action to eliminate the problem (this may include reanalyses or resampling and analyses);
vi) assigning and accepting responsibility for implementing the corrective action;
vii) implementing the corrective action and evaluating the effectiveness;
viii) verifying that the corrective action has eliminated the problem; and
ix) documenting the corrective action taken.

For each measurement system, the QA/QC Officer - Laboratory Activities or the analyst will be responsible for initiating the corrective action and the laboratory supervisor will be responsible for implementing the corrective action. The corrective action taken will depend upon the QA/QC criteria that did not meet the necessary criteria, and may range from qualifying the data to resampling at the Site. All problems requiring corrective action and the corrective action employed to resolve the problem will be reported. Field corrective action will consist of instrument recalibration, replacement of probes, or the instrument itself, and will be recorded in the field logbook.

15.0 QUALITY ASSURANCE REPORT TO MANAGEMENT

Management will receive reports on the performance of the measurement system and data quality following each sampling round and at the conclusion of the project.

Minimally, these reports will include:

i) assessment of measurement quality indicators, i.e., data accuracy, precision and completeness;
ii) results of system audits; and
iii) QA problems, action taken and resolutions.

The CRA QA/QC Officer - Analytical Activities will be responsible within the organizational structure for preparing these reports. The final report for the project will also include a separate QA section which will summarize data quality information contained in the periodic QA/QC reports to management, and details an overall data assessment and validation in accordance with the data quality objectives outlined in this QAPP.

ATTACHMENT A

PONTIAC CENTRAL MANUFACTURING FACILITY
SITE-SPECIFIC
QUALITY ASSURANCE PROJECT PLAN

ATTACHMENT B

ELECTRONIC DATA
DELIVERABLE REQUIREMENTS

ELECTRONIC DATABASE STANDARD
FIELD NAMES AND DESCRIPTION

Field Name		*Description*
LAB	C5-	Lab Name (First 3 letters are the lab name, last 2 are the city)
WORKNO	C8-	Work Order Number (issued by Lab)
LABID	C13-	Issued by Lab. I.D. for the work being done. Must have suffix designation of blank, B(blank), C (check), S (spike), D (duplicate), P (spike duplicate)
CRAID	C50-	CRA sample I.D. Usually a concatenation of fields starting with SRTP and ending with an incremented number representing the order in which the sample was taken. On sample label.
SDAT	D8-	Date sample collected
RDAT	D8-	Date sample received by Lab
EDAT	D8-	Extraction Date. Should be 14 days from SDAT for semi-volatiles.
LDATE	D8-	Leach date. Leachate analysis of soil by Reg. 347 to determine if sample is waste. (For disposal of soil samples)
ADAT	D8-	Date of analysis. Should be 14 days from EDAT for semi-volatiles.
MTHPRE	C10-	Designated reference (i.e. SW846, ASTM, EPA)
METHOD	C17-	Method of analysis of sample. The method will dictate the analytes to be found in sample (i.e. Method 602).
MTHDSC	C50-	Description of method
CL	C2-	Class of analand A - Acid Extractable B - Base Neutral Extractable I - Inorganics M - Metals V - Volatile Organics NR - Non Routine/Esoteric/Special Biologicals/Miscellaneous
ANALAND	C50-	The name of whatever was measured.
CASRN	C15-	Registry number of ANALAND. CASRN may have synonym parameters.
SRTP	C10-	MATRIX (SOURCE TYPE) GW - Groundwater AR - Air SW - Surface Water WS - Waste QC - All quantity control samples like rinses and blanks NR - Non routine (leachate wells and sewage etc.)
MEAST	C10-	Measurement Result
C1	C5-	Flags/Qualifiers, provided by Lab
UNITS	C10-	Unit of measure for MEAST and DETLIM
DETLIM	C10-	Detection limit
DRYWT	C1-	D or W - if result is not a dry weight conversion, the concentration is an as received result (meaning was not multiplied by total solids)
SURFLG	C1-	Y to designate the ANALAND as a surrogate
TIC	C1-	Y to designate the ANALAND as tentatively identified
UCL	C10-	Upper control limit
LCL	C10-	Lower control limit UCL and LCL range for result from surrogate, matrix spike and check
BATCH	C12-	Lab QC Batch Number (run number)
SIGDIG	C2-	Significant Digits
DILFAC	C10-	The factor that the sample was diluted by
RPD	C10-	Relative Percent Difference Results
URPDLMT	C10-	Upper RPD Limit
LRPDLMT	C10-	Lower RPD Limit

CRA
ELECTRONIC DATABASE STANDARD
FOR SAMPLE CHEMISTRY DATA

Preferred Disc. Size - 3 1/2"

Acceptable Data Formats

(1) dBASE/IV DBF format
(2) EXCEL spreadsheet format
(3) delimited ASCII format that can be imported directly into dBASE or EXCEL

Sample Chemistry Database Format

Field Description	*CRA Field Name*	*Field Format*	*Valid Entries*	
LAB NAME	LAB	C5		
WORK ORDER #	WRKNO	C8		
LAB I.D.	LABID	C13		
			[9] LABID	
			[3] LOT SAMP#	
			[1] SFX	<blank> = sample B = BLANK C = CHECK S = SPIKE D = DUPLICATE P = SPIKE DUPLICATE
CRA SAMPLE ID	CRAID	C50		
DATE COLLECTED	SDAT	D8	MM/DD/YY	
DATE RECEIVED	RDAT	D8	MM/DD/YY	
DATE EXTRACTED	EDAT	D8	MM/DD/YY	
LEACH DATE	LDAT	D8	MM/DD/YY (TCLP)	
DATE ANALYZED	ADAT	D8	MM/DD/YY	
METHOD PREFIX	MTHPRE	C10		
ANALYTICAL METHOD	METHOD	C17		
METHOD DESCRIPTION	MTHDSC	C50		
CLASS	CL	C2	SEE ANALYTE CLASS TABLE	
COMPOUND	ANALANT	C50		
CASNO	CASRN	C15		
MATRIX	SRTP	C10		
RESULT	MEAST	C10		
FLAGS/QUALIFIERS	C1	C5	PROVIDE FLAG/QUALIFIER LEGEND	
UNITS	UNITS	C10	UNIT MASTER FILE	
DETECTION LIMIT	DETLIM	C10		
DRY WT FLAG	DRYWT	C1	(D)RY (W)ET	
SURROGATE FLAG	SURFLG	C1	Y	
TC FLAG	TIC	C1	Y	
UPPER CONTROL LIMIT	UCL	C10	%	
LOWER CONTROL LIMIT	LCL	C10	%	
QC BATCH NUMBER	BATCH	C12		
SIGNIFICANT DIGITS	SIGDIG	C2		
DILUTION FACTOR	DILFAC	C10		
RPD RESULTS	RPD	C10		
UPPER RPD LIMITS	URPDLMT	C10		
LOWER RPD LIMITS	LRPDLMT	C10		

ANALYTE CLASS TABLE

A	=	ACID EXTRACTABLE
B	=	BASE/NEUTRAL EXTRACTABLE
D	=	DIOXINS
H	=	HERBICIDES
I	=	INORGANICS
M	=	METALS
O	=	OTHERS
P	=	PESTICIDES AND PCBs
V	=	VOLATILE ORGANICS
NR	=	NON-ROUTINE/ESOTERIC/SPECIAL/BIOLOGICALS/MISCELLANEOUS

ADDITIONAL DATABASES

1	CASE NARRATIVE	- ASCII TEXT FILE - INCLUDE LAB ID AND PROJECT MANAGER AND LAB MANAGER - ALSO INCLUDES MISC. NOTES
2	FLAG QUALIFIER LEGEND	C3 - CODE C50 - DESCRIPTION

NON DETECTS SHOULD BE REPORTED IN THE FOLLOWING FORMAT:

RESULT	DET LIM	UNITS	C1
<blank>	10	µg/L	ND

LIVONIA LABORATORY ACCEPTANCE CRITERIA

RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Guyer Date: 3/23/94
Area Supervisor: R D Brooks Date: 3/23/94
QA Supervisor: Kay E. Greaves Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 2 Pages Revised: —

METHOD DETECTION LIMIT
US EPA 8270/625

COMPOUND	MDL	UNITS
Acenaphthene	0.93	ug/L
Acenaphthylene	0.97	ug/L
Aniline	0.71	ug/L
Anthracene	0.88	ug/L
Benzidine	3.5	ug/L
Benzoic acid	5.3	ug/L
Benzo(a)anthracene	0.74	ug/L
Benzo(a)pyrene	1.2	ug/L
Benzo(b)fluoranthene	0.91	ug/L
Benzo(g,h,i)perylene	1.6	ug/L
Benzo(k)fluoranthene	1.4	ug/L
Benzyl alcohol	0.88	ug/L
Butylbenzylphthalate	2.3	ug/L
4-Chloro-3-methylphenol	0.74	ug/L
4-Chloroaniline	0.93	ug/L
bis(2-Chloroethoxy)methane	1.0	ug/L
bis(2-Chloroethyl)ether	0.95	ug/L
bis(2-chloroisopropyl)ether	3.0	ug/L
2-Chlorophenol	0.87	ug/L
4-Chlorophenyl-phenylether	0.81	ug/L
Chrysene	0.96	ug/L
Dibenzofuran	1.1	ug/L
Dibenz(a,h)anthracene	1.5	ug/L
1,2-Dichlorobenzene	1.0	ug/L
1,3-Dichlorobenzene	1.0	ug/L
1-4-Dichlorobenzene	0.96	ug/L
3,3'-Dichlorobenzidine	1.2	ug/L
2,4-Dichlorophenol	0.94	ug/L
Diethylphthalate	1.8	ug/L
2,4-dimethylphenol	0.82	ug/L
Dimethylphthalate	3.1	ug/L
Di-n-butylphthalate	5.9	ug/L
4,6-Dinitro-2-methylphenol	1.1	ug/L
2,4-Dinitrophenol	1.5	ug/L

2,4-Dinitrotoluene	0.98	ug/L
2,6-Dinitrotoluene	0.93	ug/L
Di-n-octylphthalate	1.1	ug/L
bis (2-Ethylhexyl)phthalate	5.0	ug/L
Fluorathene	0.94	ug/L
Fluorene	0.98	ug/L
Hexachlorobenzene	1.0	ug/L
Hexchlorobutadiene	1.4	ug/L
Hexachlorocyclopentadiene	1.8	ug/L
Hexachloroethane	1.0	ug/L
Indeno (1,2,3-cd)pyrene	1.5	ug/L
Isophorone	0.92	ug/L
2-Methylnaphthalene	1.1	ug/L
2-Methylphenol	0.98	ug/L
3-Methylphenol	0.92	ug/L
4-Methylphenol	0.92	ug/L
Naphthalene	1.1	ug/L
2-Nitroaniline	0.96	ug/L
3-Nitroaniline	0.73	ug/L
4-Nitroaniline	1.0	ug/L
Nitrobenzene	1.0	ug/L
2-Nitrophenol	0.69	ug/L
4-Nitrophenol	2.2	ug/L
N-Nitroso-di-n-propylamine	0.93	ug/L
N-Nitrosodiphenylamine	0.93	ug/L
N-Nitrosodimethylamine	0.76	ug/L
Pentachlorophenol	2.7	ug/L
Phenanthrene	1.0	ug/L
Phenol	0.73	ug/L
Pyrene	0.80	ug/L
1,2,4-Trichlorobenzene	1.1	ug/L
2,4,5-Trichlorophenol	1.1	ug/L
2,4,6-Trichlorophenol	0.69	ug/L

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Gugler Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Mary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 2 Pages Revised: —

METHOD DETECTION LIMIT
8260/MOD. 624

COMPOUND	MDL	UNITS
Benzene	0.19	ug/L
Bromobenzene	0.33	ug/L
Bromochloromethane	0.32	ug/L
Bromodichloromethane	0.28	ug/L
Bromoform	0.26	ug/L
Bromomethane	0.87	ug/L
n-butylbenzene	0.30	ug/L
sec-Butylbenzene	0.21	ug/L
tert-Butylbenzene	0.29	ug/L
Carbon Tetrachloride	0.48	ug/L
Chlorobenzene	0.27	ug/L
Chlorethane	0.36	ug/L
Chloroform	0.23	ug/L
Chloromethane	0.59	ug/L
2-chlorotoluene	0.35	ug/L
4-chlorotoluene	0.41	ug/L
Dibromochloromethane	0.13	ug/L
1,2-Dibromo-3-chloropropane	1.8	ug/L
Dibromomethane	0.55	ug/L
1,2-dichlorobenzene	0.43	ug/L
1,3-dichlorobenzene	0.30	ug/L
1,4-Dichlorobenzene	0.32	ug/L
Dichlorodifluoromethane	0.09	ug/L
1,1-dichloroethane	0.31	ug/L
1,2-Dichloroethane	0.22	ug/L
1,1-Dichloroethene	2.6	ug/L
cis-1,2-Dichloroethene	0.65	ug/L
trans-1,2-Dichloroethene	1.5	ug/L
1,2-Dichloropropane	0.41	ug/L
1,3-Dichloropropane	0.33	ug/L

2,2-Dichloropropane	1.1	ug/L
1,1-Dichloropropene	0.39	ug/L
Ethylbenzene	0.29	ug/L
Hexachlorobutadiene	0.61	ug/L
Isopropylbenzene	0.25	ug/L
p-Isopropyltoluene	0.20	ug/L
Methylene Chloride	0.57	ug/L
Naphthalene	1.1	ug/L
n-Propylbenzene	0.34	ug/L
Styrene	0.23	ug/L
1,1,1,2-Tetrachloroethane	0.22	ug/L
1,1,2,2,-Tetrachloroethane	0.48	ug/L
Tetrachloroethene	0.29	ug/L
Toluene	0.20	ug/L
1,2,3-Trichlorobenzene	0.51	ug/L
1,2,4-Trichlorobenzene	0.86	ug/L
1,1,1-Trichloroethane	0.26	ug/L
1,1,2-Trichloroethane	0.30	ug/L
Trichloroethene	0.36	ug/L
Trichlorofluoromethane	0.20	ug/L
1,2,3-Trichloropopane	0.93	ug/L
1,2,4-Trimethylbenzene	0.38	ug/L
1,3,5-Trimethylbenzene	0.23	ug/L
Vinyl chloride	0.45	ug/L
O-Xylene	0.31	ug/L
M-xylene	0.71	ug/L
P-xylene	0.71	ug/L

DO NOT COPY

RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: R Eggleston Date: 3/23/94
QA Supervisor: Gary E. Spencer Date: 3/23/94

Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 1 Pages Revised: —

METHOD DETECTION LIMIT
US EPA 601/602 - 8010/8020

COMPOUND	MDL	UNITS
Benzene	0.31	ug/L
Bromodichloromethane	0.25	ug/L
Bromoform	017	ug/L
Bromomethane	0.29	ug/L
Carbon Tetrachloride	0.51	ug/L
Chlorobenzene	0.26	ug/L
2 Chloroethylvinyl ether	0.24	ug/L
Chloroform	0.26	ug/L
Chloromethane	0.24	ug/L
Chloroethane	0.21	ug/L
Dibromochloromethane	0.17	ug/L
1,2-Dichlorobenzene	0.24	ug/L
1,3-Dichlorobenzene	0.29	ug/L
1,4-Dichlorobenzene	0.23	ug/L
Dichlorodifluoromethane	0.33	ug/L
1,1-Dichloroethane	0.23	ug/L
1,2-Dichloroethane	0.28	ug/L
1,1-Dichloroethane	0.25	ug/L
t-1,2-Dichloroethane	0.31	ug/L
1,2-Dichloropropane	0.27	ug/L
c-1,3-Dichloropropene	0.26	ug/L
t-1,3-Dichloropropene	0.25	ug/L
Ethyl benzene	0.15	ug/L
Methylene chloride	0.44	ug/L
1,1,2,2-Tetrachloroeh\thane	0.31	ug/L
Tetrachloroethene	0.18	ug/L
Toluene	0.30	ug/L
1,1,1-Trichloroethane	0.15	ug/L
1,1,2-Trichloroethane	0.22	ug/L
Trichloroethene	0.32	ug/L
Trichlorofluoromethane	0.25	ug/L
Total Xylenes	0.48	ug/L
Vinyl chloride	0.22	ug/L
MTBE	0.18	ug/L

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Gyles Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: [signature] Date: 3/23/94
Revision Number: 1 By: TSS Effective Date: 3/23/94
Total Number of Pages: 1 Pages Revised: —

METHOD DETECTION LIMIT
US EPA 8080/608 MODIFIED

COMPOUND	MDL GC SEMI #1(ug/L)	GC SEMI #2 (ug/L)
Aroclor 1016	19	12
1221	100	54
1242	14	27
1248	28	34
1254	11	10
1260	7.3	19
1232	28	14

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Dwyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Gary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJD Effective Date: 3/23/94
Total Number of Pages: 1 Pages Revised: —

METALS MDL INFORMATION

	ICP		FLAME AA		GF
	Water		Water		Water
Metal	MDL		MDL		MDL
	(mg/L)		(mg/L)		(ug/L)
Arsenic	0.04				1.0
Barium	0.01				
Cadmium	0.004		0.01		0.20
Chromium	0.02		0.05		5.0
Copper	0.009		0.01		2.5
Lead	0.01		0.05		1
Selenium	0.17				1.0
Zinc	0.01		0.01		
Silver	0.02		0.01		0.5
Mercury					
Thallium	0.05				
Iron	0.01		0.01		
Vanadium	0.007				
Alumium	0.18				
Manganese	0.05				
Beryllium	0.006				
Antimony			0.05		1.0
Nickel	0.01		0.02		
Cobalt			0.02		
Sodium					
Potassium	0.14				

RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Beyer Date: 3/23/94
Area Supervisor: B B Baird Date: 3/23/94
QA Supervisor: Barry E. Spencer Date: 3/23/94
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Total Number of Pages: 15 / Pages Revised: ———

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8260

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

	Water Matrix % Recovery	Soil Matrix % Recovery
1,1-Dichloroethene	D - 234	D - 231
Benzene	37 - 151	44 - 150
Trichloroethene	71 - 157	74 - 143
Toluene	47 - 150	56 - 148
Chlorobenzene	37 - 160	47 - 158

(D = detected result greater than 0)

	Daily Standard % Diff.	RF
Chloromethane *	25	0.30
Vinyl Chloride	25	
1,1-Dichloroethene	25	
1,1-Dichloroethane *	25	0.30
Chloroform	25	
1,2-Dichloropropane	25	
Toluene	25	
Chlorobenzene *	25	0.30
Ethylbenzene	25	
Bromoform *	25	0.30
1,1,2,2-Tetrachloroethane*	25	0.30

% Diff: The maximum the % difference of the daily standard can be from original 5 point curve.

RF: The minimum the response factor can be for the system performance check compounds*.

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Dyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Gary E. Spencer Date: 3/23/94
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Total Number of Pages: 1 Pages Revised: —

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8260 - TCLP Volatiles

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Parameter	Filtrate Matrix % Recovery	Leachate Matrix % Recovery
Vinyl Chloride	D - 251	68 - 132
1,1-Dichloroethene	D - 234	D - 231
Chloroform	51 - 138	52 - 136
1,2-Dichloroethane	49 - 155	52 - 154
2-Butanone (MEK) **	50 - 200	50 - 200
Carbon Tetrachloride	70 - 140	94 - 119
Benzene	37 - 151	44 - 150
Trichloroethene	71 - 157	74 - 143
Tetrachloroethene	64 - 148	91 - 123
Chlorobenzene	37 - 160	47 - 158

D = detected result greater than 0

	Daily Standard % Diff	RF
Chloromethane *	25	0.30
Vinyl Chloride	25	
1,1-Dichloroethene	25	
1,1-Dichloroethane *	25	0.30
Chloroform	25	
1,2-Dichloropropane	25	
Toluene	25	
Chlorobenzene *	25	0.30
Ethylbenzene	25	
Bromoform *	25	0.30
1,1,2,2-Tetrachloroethane*	25	0.30

% Diff: The maximum the % difference of the daily standard can be from original 5 point curve.

RF: The minimum the response factor can be for the system performance check compounds*.

REFERENCE: No established limits in SW 846 specifically for TCLP compounds. These are in-house limits based on limits for EPA 8260 in SW 846. **MEK limits are default limits - no criteria listed in SW 846.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Beyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Mary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJB Effective Date: 3/23/94
Total Number of Pages: 2 Pages Revised: —

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270

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MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Parameter	Water Matrix % Recovery	Soil Matrix % Recovery
1,2,4-Trichlorobenzene	44 - 142	43 - 142
Acenaphthene	47 - 145	50 - 142
2,4-Dinitrotoluene	39 - 139	33 - 132
Pyrene	52 - 115	52 - 116
N-Nitroso-di-n-Propylamine	D - 230	D - 209
1,4-Dichlorobenzene	20 - 124	19 - 121
Pentachlorophenol	14 - 176	15 - 175
Phenol	5 - 112	5 - 83
2-Chlorophenol	23 - 134	22 - 134
4-Chloro-3-Methylphenol	22 - 147	21 - 147
4-Nitrophenol	D - 132	D - 132

D = detected result greater than 0

Daily Standard

	% Diff	RF
Phenol	25	
1,4-Dichlorobenzene	25	
N-Nitroso-di-n-propylamine*	25	0.05
2-Nitrophenol	25	
2,4-Dichlorophenol	25	
Hexachlorobutadiene	25	
4-Chloro-3-methylphenol	25	
Hexachlorocyclopentadiene*	25	0.05
2,4,6-Trichlorophenol	25	

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270

	Daily Standard % Diff	con't RF
Acenaphthene	25	
2,4-Dinitrophenol *	25	0.05
4-Nitrophenol *	25	0.05
Pentachlorophenol	25	
Fluoanthene	25	
Di-n-octylphthalate	25	
Benzo(a)pyrene	25	

% Diff: The maximum the % difference of the daily standard can be from original 5 point curve.

RF: The minimum the response factor can be for the system performance check compounds*.

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Glynn Date: 3/23/94
Area Supervisor: R Stevens Date: 3/23/94
QA Supervisor: Gary C. Pierce Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 2 Pages Revised: —

CONTROLLED DOCUMENT - NON-COPY

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270 - TCLP Base/Neutral/Acids

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

TCLP Parameters	Filtrate Matrix % Recovery	Leachate Matrix % Recovery
Pyridine **	50 - 200	50 - 200
1,4-Dichlorobenzene	20 - 124	19 -121
2-Methylphenol **	50 - 200	50 - 200
Hexachloroethane	40 - 113	38 - 105
3&4-Methylphenol **	50 - 200	50 - 200
Nitrobenzene	35 - 180	34 - 172
Hexachlorobutadiene	24 - 116	23 - 115
2,4,6-Trichlorophenol	37 - 144	38 - 144
2,4,5-Trichlorophenol**	50 - 200	50 - 200
2,4-Dinitrotoluene	39 - 139	33 - 132
Hexachlorobenzene	D - 152	D - 152
Pentachlorophenol	14 - 176	15 - 175

D = detected result greater than 0

	Daily Standard % Diff	RF
Phenol	25	
1,4-Dichlorobenzene	25	
N-Nitroso-di-n-propylamine*	25	0.05
2-Nitrophenol	25	
2,4-Dichlorophenol	25	
Hexachlorobutadiene	25	
4-Chloro-3-methylphenol	25	
Hexachlorocyclopentadiene*	25	0.05

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270

Daily Standard con't

TCLP Parameters	%Diff	RF
2,4,6-Trichlorophenol	25	
Acenaphthene	25	
2,4-Dinitrophenol *	25	0.05
4-Nitrophenol *	25	0.05
Pentachlorophenol	25	
Fluoanthene	25	
Di-n-octylphthalate	25	
Benzo(a)pyrene	25	

% Diff: The maximum the % difference of the daily standard can be from original 5 point curve.

RF: The minimum the response factor can be for the system performance check compounds*.

REFERENCE: No established limits in SW 846 specifically for TCLP compounds. These are in-house limits based on limits for EPA 8270 (in SW 846). ** No criteria is listed in SW 846 for these compounds - these values are default limits.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Dyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Barry E. Jenson Date: 3/23/94
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QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270 - PNA's

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

Parameter	Water Matrix % Recovery	Soil Matrix % Recovery
Naphthalene	21 - 133	25 - 134
Acenaphthylene	33 - 145	36 - 145
Acenaphthene	47 - 145	50 - 142
Fluorene	59 - 121	58 - 122
Phenanthrene	54 - 120	54 - 120
Anthracene	27 - 133	31 - 132
Fluoranthene	26 - 137	29 - 137
Pyrene	52 - 115	52 - 116
Benzo(a)anthracene	33 - 143	33 - 141
Chrysene	17 - 168	18 - 164
Benzo(b)fluoranthene	24 - 159	21 - 157
Benzo(k)fluoranthene	11 - 162	10 - 157
Benzo(a)pyrene	17 - 163	13 - 166
Indeno(1,2,3,cd)pyrene	D - 171	D - 157
Dibenzo(a,h)anthracene	D - 227	D - 239
Benzo(g,h,i)perylene	D - 219	D - 214

D = detected result greater than 0

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QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8270 - PNA's

	Daily Standard % Diff	RF
Phenol	25	
1,4-Dichlorobenzene	25	
N-Nitroso-di-n-propylamine*	25	0.05
2-Nitrophenol*	25	
2,4-Dichlorophenol	25	
Hexachlorobutadiene	25	
4-Chloro-3-methylphenol	25	
Hexachlorocyclopentadiene*	25	0.05
2,4,6-Trichlorophenol	25	
Acenaphthene	25	
2,4-Dinitrophenol *	25	0.05
4-Nitrophenol *	25	0.05
Pentachlorophenol	25	
Fluoanthene	25	
Di-n-octylphthalate	25	
Benzo(a)pyrene	25	

% Diff: The maximum the % difference of the daily standard can be from original 5 point curve.

RF: The minimum the response factor can be for the system performance check compounds*.

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Beyer Date: 3/23/94
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QA Supervisor: Barry E. Spencer Date: 3/23/94
Revision Number: 1 By: TJB Effective Date: 3/23/94
Total Number of Pages: 1 Pages Revised: —

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8020

Parameter	CCV % Recovery	MS/MSD % Recovery	Duplicate RPD
Benzene	85 - 115	39 - 150	20
Chlorobenzene	85 - 115	55 - 135	20
1,2-Dichlorobenzene	85 - 115	37 - 154	20
1,3-Dichlorobenzene	85 - 115	50 - 141	20
1,4-Dichlorobenzene	85 - 115	42 - 143	20
Ethylbenzene	85 - 115	32 - 160	20
Toluene	85 - 115	46 - 148	20

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 8080

Parameter	CCV % Recovery	MS/MSD % Recovery	Duplicate RPD
Aldrin	85 - 115	42 - 122	20
α-BHC	85 - 115	37 - 134	20
β-BHC	85 - 115	17 - 147	20
δ-BHC	85 - 115	19 - 140	20
γ-BHC	85 - 115	32 - 127	20
Chlordane	85 - 115	45 - 119	20
4,4'-DDD	85 - 115	31 - 141	20
4,4'-DDE	85 - 115	30 - 145	20
4,4'-DDT	85 - 115	25 - 160	20
Dieldrin	85 - 115	36 - 146	20
Endosulfan I	85 - 115	45 - 153	20
Endosulfan II	85 - 115	D - 202	20
Endosulfan Sulfate	85 - 115	26 - 144	20
Endrin	85 - 115	30 - 147	20
Heptachlor	85 - 115	34 - 111	20
Heptachlor epoxide	85 - 115	37 - 142	20
Toxaphene	85 - 115	41 - 126	20
PCB-1016	85 - 115	50 - 114	20
PCB-1221	85 - 115	15 - 178	20
PCB-1232	85 - 115	10 - 215	20
PCB-1242	85 - 115	39 - 150	20
PCB-1248	85 - 115	38 - 158	20
PCB-1254	85 - 115	29 - 131	20
PCB-1260	85 - 115	8 - 127	20

D = Detected result greater than zero

Reference: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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QA Supervisor: Betty Spencer Date: 3/23/94
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QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 6010 and EPA 200 series

Parameter	LCS/LS % Rec	ICV % Rec	CCV % Rec	MS/MSD % Rec
Arsenic	80 - 120	95 - 105	90 - 110	80 - 120
Barium	80 - 120	95 - 105	90 - 110	80 - 120
Cadmium	80 - 120	95 - 105	90 - 110	80 - 120
Chromium	80 - 120	95 - 105	90 - 110	80 - 120
Copper	80 - 120	95 - 105	90 - 110	80 - 120
Lead	80 - 120	95 - 105	90 - 110	80 - 120
Nickel	80 - 120	95 - 105	90 - 110	80 - 120
Selenium	80 - 120	95 - 105	90 - 110	80 - 120
Silver	80 - 120	95 - 105	90 - 110	80 - 120
Thallium	80 - 120	95 - 105	90 - 110	80 - 120
Zinc	80 - 120	95 - 105	90 - 110	80 - 120

	Duplicates RPD
All metals	< 20

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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Total Number of Pages: 1 Pages Revised: —

QUALITY CONTROL ACCEPTANCE CRITERIA

METHOD: EPA 7000 Series

Parameter	LCS/LS % Recovery	CCV % Recovery	MS/MSD % Recovery
Arsenic	80 - 120	90 - 110	80 - 120
Barium	80 - 120	90 - 110	80 - 120
Cadmium	80 - 120	90 - 110	80 - 120
Chromium	80 - 120	90 - 110	80 - 120
Copper	80 - 120	90 - 110	80 - 120
Lead	80 - 120	90 - 110	80 - 120
Nickel	80 - 120	90 - 110	80 - 120
Selenium	80 - 120	90 - 110	80 - 120
Silver	80 - 120	90 - 110	80 - 120
Thallium	80 - 120	90 - 110	80 - 120
Zinc	80 - 120	90 - 110	80 - 120

	Duplicates RPD
All metals	< 20

REFERENCE: SW 846, "Test Methods for Evaluating Solid Waste", Third Edition, November 1986 and Final Update I, November 1990.

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LIVONIA LABORATORY SOPs

Approvals: Laboratory Manager: Thomas J Geyer Date: 4/6/94
Area Supervisor: [illegible] Date: 4/6/94
QA Supervisor: Gary E. Spencer Date: 4/6/94
Revision Number: 2 By: FJS Effective Date: 4/6/94
Total Number of Pages: 29 Pages Revised: All

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WW ANALYTICAL SERVICES

VOLATILE GAS CHROMATOGRAPHY/MASS SPECTROMETRY LABORATORY

Standard Operating Procedure for
Modified Method 8260A,
Capillary column Analysis of Volatile Organics by GC/MS
Written March, 1994, revision: New

Based on EPA SW-846 Method 8260A, 3rd Edition, November 1990

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FRED C. HART ASSOCIATES, INC.

I. INTRODUCTION

This SOP has been written to follow Method 8260 as closely as possible, and has been customized to cover the equipment and techniques being used at WW Engineering and Science, Livonia, Michigan. It will be used as the default method for all volatile analysis unless another method is specifically requested. This SOP is restricted to use by analysts familiar with Method 8260, experienced in the use of purge and trap systems, gas chromatograph/mass spectrometers, and skilled in the interpretation of mass spectra and their use as a quantitative tool. For more specific method references and instructions refer to SW-846, 3rd edition, Method 8260.

Method 8260 is a Gas Chromatography/Mass Spectrometry (GC/MS) procedure for determining volatile organics in a variety of matrices. It is limited to compounds that elute as sharp peaks from a capillary GC column. Such compounds include low molecular weight halogenated hydrocarbons, aromatics, ketones, nitriles, acetates, acrylates, ethers and sulfides. It is applicable to nearly types of samples, regardless of water content, including ground water, aqueous sludges, caustic liquors, acid liquors, waste solvents, oily wastes, mousses, tars, fibrous wastes, polymeric emulsions, filter cakes, spent carbons, spent catalysts, soils and sediments. The sample is introduced into the system using a purge and trap concentrator or by direct injection.

When using the purge and trap technique, an inert gas is bubbled through the liquid sample at an ambient or slightly elevated temperature, and the volatile components are transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the volatile components are trapped. After purging is completed, the sorbent column is heated and back flushed withe inert gas to desorb the components onto a gas chromatographic column. The gas chromatographic column is heated to separate and elute the components, which are then detected with a mass spectrometer which provides quantitation and qualification.
This method is applicable to most volatile organic compounds that have boiling points below 200ø C, and that are insoluble or slightly soluble in water. Volatile, water soluble compounds can be included in this analytical technique, however, for the more soluble compounds, quantitation limits are higher because of poor purging efficiency.

Whether purged or injected directly on column, interferences naturally present in the sample can also cause elevated detection limits and hamper the analysis. Naturally occurring interferences can vary considerably from site to site.

Sample contamination can also cause elevated detection limits or give false positives, and can come from a variety of sources. Improper sampling techniques can contaminate the sample at the job site. During shipment and storage volatile organics (particularly Methylene Chloride and fluorocarbons) can diffuse through the septum and into the sample. During analysis, contamination can come from impurities in the purge gas, or from organic compounds out gassing from the plumbing ahead of the trap where they were deposited by a previously analyzed high level sample. To reduce this ,the use of non-TFE plastic coating, non-TFE thread sealants, and flow controllers with rubber components in the purging device have been eliminated where possible, and a reagent blank is run whenever an unusually high concentrated sample is analyzed, or cross contamination is suspected.

II. PRE-ANALYSIS SECTION C

1.0 OVERVIEW

1.1 The pre-analysis section covers everything that is required prior to running samples. This section includes target lists, equipment used, individual instrument setups, and standard preparation.

2.0 TARGET LISTS, MDL's, PQL's, QUANTITATION IONS, SURROGATES, AND INTERNAL STANDARDS

2.1 Table 1 lists internal standards, surrogates, and Method 8260 target compounds including MDL's, quantitation ions, secondary ions, and internal standard/target matches.

2.2 Table 2 lists the Practical Quantitation Limits (PQL) for water and soil matricies of selected compounds. Compounds not listed in Table 2 have no PQL's determined at this time.

3.0 EQUIPMENT/SET UP CONDITIONS

3.1 Table 3 describes the GC/MS and Pruge and Trap methods used in this SOP. These are guidelines only and may differ depending on equipment.

4.0 STANDARDS

4.1 Great care must be taken to maintain the integrity of all standard solutions. All standards are contained in glass, screw cap bottles or crimp cap vials. The bottle should have minimal head space present, and be capped with lids or mini-inert valves possessing Teflon liners. All standards are stored in a freezer separate from samples, protected from light, between -10ø C and -20ø C. Once any standard begins to fail the continuing calibration it will be replaced. At a minimum, gas standards are replaced every two months and all other standards are replaced every 6 months. Reactive compounds such as 2-chloroethylvinyl ether and styrene may need to be prepared more frequently.

4.2 When standard mixes are purchased, only certified solutions are allowed. When prepared in house from neat compounds, a percent purity adjustment factor is used if the purity of the compound is less than 96%, either by using more of the chemical, or adjusting the final concentration. When the chemical has greater than or equal to 96% purity, no adjustment is necessary. All solvents used to dilute the standards or for final rinsing of glassware are pesticide or purge and trap grade purity. All water used to dilute the standards or for final rinsing of glassware should be free of any organic compounds of interest. All solvents used in standards prep are stored separately from other laboratory solvents and chemicals. When weighing of standards is involved, a calibrated analytical balance is used. All weights are recorded to the nearest ten-thousandth of a gram (0.0001g). When volumes are used, the liquid is allowed to come to ambient temperature before use.

4.3 All standards used in the laboratory must be recorded in standards log books. Vendors, lot numbers, concentrations, purities, etc. must all be recorded. Each standard made or received is given a unique reference number.

4.4 Standards preparation is broken down into specific sections detailing internal standard/surrogate preparation, main volatile standard mix preparation, and BFB preparation.

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TABLE 1

GC/MS MDL, CHARACTERISTIC and QUANTITATION IONS, INTERNAL STANDARDS AND SURROGATES

Internal Standard		IS #	Primary Ion	Secondary Ions
Pentafluorobenzene		1	168	
1,4-Difluorobenzene		2	114	
d5-Chlorobenzene		3	117	82,119
d4-1,4-Dichlorobenzene		4	152	150,115
		Use With		
Surrogate Standards		IS #		
d4-1,2-Dichloroethane		2	65	67,102
d8-Toluene		3	98	100
4-Bromofluorobenzene		4	95	174,176
Compounds	MDL			
Dichlorodifluorormethane	0.12	1	85	87
Chloromethane	0.79	1	50	52
Vinyl Chloride	0.28	1	62	64
Bromomethane	1.8	1	94	96
Chloroethane	0.51	1	64	66
Trichlorofluoromethane	0.20	1	101	103
Diethyl Ether	ND	1	59	74,45
Trichlorotrifluoroethane	ND	1	151	101,103,153
Acetone	15	1	43	58
Acrolein	2.6	1	56	55
1,1-Dichloroethene	2.7	1	96	61,63
Iodomethane	0.43	1	142	141,127
Carbon Disulfide	0.42	1	76	78
Methylene Chloride	0.57	1	84	49,86
Methy-t-Butyl Ether	1.4	1	73	57
Acrylonitrile	2.4	1	53	52, 51
t-1,2-Dichloroethene	1.8	1	96	61,98
Vinyl Acetate	1.1	1	43	86
1,1-dichloroethane	0.31	1	63	65,83
2-Butanone	7.1	1	72	57
Ethyl Acetate	ND	1	45	70,88
2,2-Dichloropropane	1.1	1	77	97
c-l,2-Dichloroethene	0.65	1	96	61,98
Chloroform	0.23	1	83	85
Tetrahydrofuran	5.0	1	42	41,71,72
Bromochloromethane	0.32	1	128	130,49
1,1,1-Trichloroethane	0.26	1	97	61,119
1,1-Dichloropropene	0.39	2	75	77,110
Carbon Tetrachloride	0.48	2	117	119
1,2-Dichloroethane	0.22	2	62	98

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Benzene	0.19	2	78

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Trichlorethene	0.36	2	95	130,132
1,2-Dichloropropane	0.41	2	63	112
Bromodichloromethane	0.28	12	83	85,127
Dibromomethane 0.55	2	93	175,95	
2-Chloroethyl vinyl Ether	10	2	63	65
c-1,3-dichloropropene	0.37	3	75	77,110,112
4-Methyl-2-Pentanone	1.6	3	43	58,85,100
Toluene	0.20	3	91	92
t-1,3-Dichloropropene	0.64	3	75	77,110,112
1,1,2-Trichloroethane	0.30	3	83	97,85
1,3-Dichloropropane	0.33	3	76	78
2-Hexanone	3.3	3	43	58,100
Tetrachloroethene	0.29	3	166	168,129
Dibromochloromethane	0.13	3	129	127
Ethylene Dibromide	0.18	3	107	109,188
1-Chlorohexane	0.39	3	91	93,69,55
Chlorobenzene	0.27	3	112	114,77
1,1,1,2-Tetrachloroethane	0.22	3	131	133, 119
Ethyl Benzene	0.29	3	91	106
p-,m-Xylene	0.71	3	106	91
o-Xylene	0.31	3	106	91
Styrene	0.23	3	104	78
Bromoform	0.26	3	178	175,171
i-Propylbenzene	0.25	4	105	120
1,1,2,2-Tetrachloroethane	0.48	4	83	85,131,133
1,2,3-Trichloropropane	1.5	4	75	110, 112
Bromobenzene	0.33	4	156	77,158
n-Propybenzene	0.34	4	91	120
2-Chlorotoluene	0.35	4	91	126
1,3,5-Trimethylbenzene	0.23	4	105	120
4-Chlorotulene	0.41	4	91	126
t-Butylbenzene	0.29	4	119	134,91
1,2,4-Trimethylbenzene	0.38	4	105	120
s-Butylbenzene	0.21	4	105	134
p-Isopropyltoluene	0.20	4	119	134,91
1,3-Dichlorobenzene	0.30	4	146	148,111
1,4-Dichlorobenzene	0.32	4	146	148,111
Benzyl Chloride	1.0	4	126	91,65
n-Butylbenzene	0.30	4	91	134,92
1,2-Dichlorobenzene	0.43	4	146	148,111
1,2-Dibromo-3-Chloroprpopane	4.3	4	75	157,155
1,2,4-Trichlorobenzene	0.86	4	180	182,145
Hexachlorobutadiene	0.61	4	225	227,223
Naphthalene	3.0	4	128	
1,2,3-Trichlorobenzene	1.4	4	180	182,145

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TABLE 2
PRACTICAL QUANTITATION LIMITS

	WATER	SOIL
Dichlorodifluoromethane	5ug/L	5ug/Kg
Chloromethane	5ug/L	5ug/Kg
Vinyl Chloride	5ug/L	5ug/Kg
Bromomethane	5ug/L	5ug/Kg
Chloroethane	5ug/L	5ug/Kg
Trichlorofluoromethane	5ug/L	5ug/Kg
1,1-Dichloroethene	5ug/L	5ug/Kg
Methylene Chloride	5ug/L	5ug/Kg
t-1,2-Dichloroethene	5ug/L	5ug/Kg
1,1-dichloroethane	5ug/L	5ug/Kg
2,2-Dichloropropane	5ug/L	5ug/Kg
c-1,2-Dichloroethene	5ug/L	5ug/Kg
Chloroform	5ug/L	5ug/Kg
Bromochloromethane	5ug/L	5ug/Kg
1,1,1-Trichloroethane	5ug/L	5ug/Kg
1,1-Dichloropropene	5ug/L	5ug/Kg
Carbon Tetrachloride	5ug/L	5ug/Kg
1,2-Dichloroethane	5ug/L	5ug/Kg
Benzene	5ug/L	5ug/Kg
Trichlorethene	5ug/L	5ug/Kg
1,2-Dichloropropane	5ug/L	5ug/Kg
Bromodichloromethane	5ug/L	5ug/Kg
Dibromomethane	5ug/L	5ug/Kg
c-1,3-Dichloropropene	5ug/L	5ug/Kg
Toluene	5ug/L	5ug/Kg
t-1,3-Dichloropropene	5ug/L	5ug/Kg
1,1,2-Trichloroethane	5ug/L	5ug/Kg
1,3-Dichloropropane	5ug/L	5ug/Kg
Tetrachloroethene	5ug/L	5ug/Kg
Dibromochloromethane	5ug/L	5ug/Kg
Ethylene Dibromide	5ug/L	5ug/Kg
1-Chlorohexane	5ug/L	5ug/Kg
Chlorobenzene	5ug/L	5ug/Kg
1,1,1,2-Tetrachloroethane	5ug/L	5ug/Kg
Ethyl Benzene	5ug/L	5ug/Kg
p-, m-Xylene	5ug/L	5ug/Kg
o-Xylene	5ug/L	5ug/Kg
Stryrene	5ug/L	5ug/Kg
Bromoform	5ug/L	5ug/Kg
i-Propylbenzene	5ug/L	5ug/Kg
1,1,2,2-Tetrachloroethane	5ug/L	5ug/Kg
1,2,3-Trichloropropane	5ug/L	5ug/Kg
Bromobenzene	5ug/L	5ug/Kg
2-Chlorotoluene	5ug/L	5ug/Kg
1,3,5-Trimethylbenzene	5ug/L	5ug/Kg
4-Chlorotoluene	5ug/L	5ug/Kg
t-Butylbenzene	5ug/L	5ug/Kg
1,2,4-Trimethylbenzene	5ug/L	5ug/Kg

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s-Butylbenzene	5ug/L	5ug/Kg
p-Isopropyltoluene	5ug/L	5ug/Kg
1,3-Dichlorobenzene	5ug/L	5ug/Kg
1,4-Dichlorobenzene	5ug/L	5ug/Kg
n-Butylbenzene	5ug/L	5ug/Kg
1,2-Dichlorobenzene	5ug/L	5ug/Kg
1,2-Dibromo-3-Chloropropane	5ug/L	5ug/Kg
1,2,4-Trichlorobenzene	5ug/L	5ug/Kg
Hexachlorobutadiene	5ug/L	5ug/Kg
Naphthalene	5ug/L	5ug/Kg
1,2,3-Trichlorobenzene	5ug/L	5ug/Kg

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TABLE 3
GC/MS Volatile Organic Compounds Method

I. Gas Chromatograph
Column: J&W DB-624, 30meter, 0.53mm ID, 3.0u film thickness.
Carrier: Ultra high purity Helium.
Initial Oven: 30ø C Initial hold: 4 minutes Ramp: 10ø C/minute
Final Oven: 230ø C Final Hold: 11 minutes. Injector: 205ø C Interface: 280ø C.

II. Mass Spectrometer
Scan Range: 35-260 amu Scan Rate: 1.3 scans/second
Source: 250ø C Electron energy: 70 volts (nominal)

III. Tekmar Purge and Trap Concentrator (LSC 2000, ALS 2016/ALS 2032)

Method	1	2	3
Stand-by, ø C	30	30	30
Turbocool	NI	NI	NI
GC Cycle	NI	NI	NI
Prepurge. min	0	0	0
Preheat, min	0	2	2
Sample, ø C	30	40	45
Purge, min	11	11	16
Dry Purge, min	8	8	12
MCM Desorb	NI	NI	NI
Cryo Cooldown, ø C	-190	-190	-190
Desorb Preheat, ø C	220	220	220
Desorb, min.	2	2	2
Desorb, ø C	260	260	260
Inject, min.	2	2	2
Inject, ø C	260	260	260
Bake, min.	9	7	9
Bake, ø C	260	260	260
BGB	Off	On	Off
BGB Delay, sec.	0	0	0
Auto Drain	Off	Off	Off
Valve, ø C	125	125	125
Line, ø C	125	125	125
Mount, ø C	125	125	125
Aux Heater, ø C	NI	NI	NI
2016 Valve, ø C	125	125	125
2016 Line, ø C	125	125	125
2032 Valve, ø C	125	125	125
2032 Line, ø C	125	125	125
Cryo Union, ø C	125	125	125
MCM Bake, ø C	NI	NI	NI
Runs/Sample	1	1	1

Method 1 is for ambient water purge, Method 2 is for elevated soil purge, Method 3 is for elevated F list purge

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4.5 Internal and Surrogate Standards are combined into one mixture. The stocks are purchased from a variety of suppliers and are normally at concentrations of 2,000 and 2,500 ug/ml. To make a 50 ppm (ug/ml) solution for daily use, measure 25 ul of 2,000 ppm and 20 ul of 2,500 ppm solution and mix with sufficient Methanol to make 1.0 ml of total solution. If the stock concentrations vary from those listed, adjust as necessary .

4.6 The volatiles standard consists of a variety of stock solutions and mixtures either purchased or prepared in the laboratory. The exact mixtures may vary depending of availability of commercial mixtures. Since many individual standard solutions and commercial mixtures are used, no specific mixing instructions are possible. The compound list from Table 1 should be used to determine the composition of the VOA standard. Standards purchased either as individuals or mixtures, should be obtained and prepared as necessary to obtain a final concentration of 50ug/ml of each component.

4.7 BFB, for tuning requirements, is made as a separate solution since both 8260 and 524.2 methods are done in the laboratory, a solution concentration of 25 ug/ml is made from purchased stock solution. 2ul of this solution purged in 5.0ml DIW is equivalent to a direct injection of 50 ng of 4-Bromofluorobenzene(BFB).

4.8 Medium level soil extraction standards.

4.8.1 For solid matacies that must be Methanol extracted, three standards are used in place of the normal internal/surrogate standard and matrix spike standard during the analysis. The first is a solution containing only the internal standard at the normal concentration. The second solution consists of 25ug/ml of the surrogate standards and the final solution consists of the matrix spike compounds also at a concentraton of 25ug/ml. Based on a 4.0g initial sample weight in 10.0ml methanol, and 100ul added to 5.0ml reagent water, the concentration of the surrogate and matrix spike compounds will be 6,250ug/Kg wet weight basis.

III. ANALYSIS SECTION

5.0 OVERVIEW

5.1 This section covers everything involved with data acquisition. Sections included in run order are BFB analysis, initial and continuing calibrations, blanks, method certifications, MDL studies, sample analysis, dilutions, and spikes.

5.2 The experience of the analyst performing GC/MS analysis is invaluable to the success of the methods. Each day that analysis is performed, the daily calibration standard should be evaluated to determine if the chromatographic system is operating properly. Questions that should be asked are: Do the peaks look normal?; Is the response obtained comparable to the response from previous calibrations? Careful examination of the standard chromatogram can indicate whether the column is still usable, the injector is leaking, the septum needs replacing, etc. If any major changes are made to the system (e.g., column changed), re-calibration of the system must take place.

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5.3 Every 12 hour shift must begin with the analysis of 4-Bromofluorobenzene (BFB), followed by either a 5 point curve or a continuing calibration standard, and then a blank. BFB must pass the required tuning criteria (Table 4) before any subsequent analysis can begin. There is a 12 hour window that all acquisitions must be started in, beginning at the injection time of BFB. Any compound requiring quantitation under Method 8260 must have an average response factor, first or second degree curve generated from a 5 point calibration and that curve must pass the required System Performance Check Compounds (SPCC) or Continuing Calibration Compounds (CCC) criteria. A daily calibration standard is run on days that a curve is not, and it also must pass the required criteria. The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running a laboratory reagent blank at least at the beginning of every 12 hour shift. Only then can the analysis of actual samples begin. All volatile samples must be analyzed within 14 days of collection, provided that the vials have been preserved to a pH of less than 2 if aromatics are part of the scan, otherwise the sample must be analyzed within 7 days. A matrix spike and matrix spike duplicate must be run on each analytical batch (up to 20 samples). A Laboratory Control Spike (LCS) will be run on a daily basis immediately after the method blank and will consist of the same spike compounds found in the MS/MSD but spiked into reagent water or laboratory sand. Additional quality control method requirements are specified in the Quality Control section (17.0).

6.0 TUNING CRITERIA

6.1 No analysis of any kind may begin until 50 ng of 4-Bromofluorobenzene (BFB) injected onto the system produces a spectra that passes the tuning criteria given in Table 4.

TABLE 4

BFB KEY ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criterion
50	15 to 40% of mass 95
75	30 to 60% of mass 95
95	base peak, 100% relative abundance
96	5 to 9% of mass 95
173	less than 2% of mass 174
174	greater than 50% of mass 95
175	5 to 9% of mass 174
176	greater than 95% but less than 101% of mass 174
177	5 to 9% of mass 176

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Spectrum manipulation may consist only of sequential scan additions and simple background subtraction to remove column bleed ions. No excessive manipulation of the BFB peak is allowed.

7.0 INITIAL CALIBRATION

7.1 In addition to passing the BFB tuning criteria, a 5 point calibration curve is required for initial calibration. The current curve that is used consitsts of: 10, 20, 50 , 100 and 150 ug/L. Other values may be used to either expand the curve range or extend the accuracy and precision. Prepare the standards as directed in Section 7.2. All target compounds must be included in the 5 point curve including internal standards and surrogates. Since the internal standards and surrogates are in the same solution, they will be run at a constant concentration of 50 ug/L throughout the curve.

7.2 Remove the plunger from a 5 ml luer lock syringe. Fill the syringe with reagent water. Replace the syringe plunger and compress the sample. Tilt the syringe so the tip is pointed up and vent any residual air while adjusting the sample curve to 5ml. Next, using microliter syringes, add the indicated amount of standard specified in Table 5. Be sure that needle of the microliter syringe is well beneath the surface of the reagent water in the 5ml syringe. Attach the 5ml syringe to the three port valve on the purging device. Open the valve and inject the sample into the purging vessel.

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TABLE 5

STANDARD VOLUMES REQUIRED FOR 5 POINT CURVE

Amt. of VOA	Std. Req'd
10 ug/L	1ul of 50 mg/L Std
20 ug/L	2ul of 50 mg/L Std
50 ug/L	5ul of 50 mg/L Std
100 ug/L	10ul of 50 mg/L Std
150 ug/L	15ul of 50 mg/L Std.

7.3 Calculate RFs for each compound using the quantitation ion, and the internal standard ion listed in Table 1. The RF is calculated as follows:

$$RF = \frac{Ax * Cis}{Ais * Cx}$$

where:

Ax = Area of the characteristic ion for the target compound being measured.

Ais = Area of the characteristic ion for the specific internal standard.

Cx = Concentration of the compound being measured.

Cis = Concentration of the specific internal standard.

Alternately a linear regression curve or quadratic curve may be used instead of average RF.

7.4 For compounds not listed in Table 1, a major ion that is dissimilar to potential coeluting or interfering ions should be chosen as the quantitation ion. The internal standard chosen should be one that has a retention time closest to the compound being measured. The ion is used should be consistent with the ones listed in Table 1.

7.5 Perform these same operations for all 5 points of the curve.

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7.6 An average RF of all 5 points of the curve must be calculated for each compound. Five compounds are used as the System Performance Check Compounds, or SPCC's. They are Chloromethane, 1,1-Dichloroethane, Bromoform, 1,1,2,2-Tetrachloroethane, and Chlorobenzene. These compounds must have an average RF of at least 0.300 (0.250 for Bromoform and 0.150 for Chloromethane). Analysis cannot begin unless this criteria is met. These compounds typically have RF's of 0.2 - 0.6 and this check is used to monitor compound instability and degradation caused by contaminated lines or active sites in the system. Examples of these occurrences are:

7.6.1 Chloromethane which is the most likely compound to be lost if the purge flow is too fast.

7.6.2 Bromoform is one of the compounds most likely to be purged very poorly if the purge flow is too slow and to be affected by cold spots and/or active sites in the transfer lines. Response of its quantitation ion (m/z 173) is directly affected by the tuning of the GC/MS to meet the instrument performance criteria for BFB at ions m/z 174/176. Increasing the m/z 174/176 ratio may improve Bromoform response.

7.6.3 Tetrachloroethane and 1,1-Dichloroethane are degraded by contaminated transfer lines in purge and trap systems and/or active sites in the trapping material.

7.7 The Percent Relative Standard Deviation (% RSD) also must be calculated for all compounds. Using the RF's from the initial calibration, calculate the % RSD using the following formula:

$$\% \text{ RSD} = (SD/x) * 100$$

where:

RSD = relative standard deviation.

x = mean of the five curve points for a compound.

SD = standard deviation of average RF's for a compound.

7.7.1 All compounds should have a % RSD of less than 30%. The 6 compounds used as Calibration Check Compounds (CCC's) are: 1,1-Dichloroethene, Chloroform, 1,2-Dichloropropane, Toluene, Ethylbenzene, Vinyl Chloride. These compounds must have a % RSD of less than 30%. This last criterion must be met in order for the initial calibration to be valid.

7.8 The internal standard responses and retention times of the initial calibration runs must be evaluated immediately after or during data acquisition, and pass the requirements listed in Section 17.3,

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8.0 CONTINUING CALIBRATION

8.1 On 12 hour shifts when an initial calibration curve is not run, a mid-level continuing calibration standard containing each compound being quantitated is run immediately after BFB (usually 50ng/L). This is done to verify instrument sensitivity, and to confirm the initial calibration curve is still valid. The continuing calibration standard is verified similarly to the initial calibration curve, by checking the SPCC's and the CCC's.

8.1.1 System Performance Check Compounds (SPCC's): A system performance check must be made each 12 hour. shift. If the SPCC criteria are met, a comparison of response factors is made for all compounds. This is the same check that is applied during the initial calibration. The response factor for the SPCC compounds must be $\geq$ 0.300 (0.250 for Bromoform and 0.150 for Chloromethane). If these minimum response factors are not met, the system must be evaluation, and corrective action must be taken before sample analysis begins. Some possible problems are standard mixture degradation, active sites in the injection port inlet, sites in the column or chromatographic system.

8.1.2 Calibration Check Compounds (CCC's): After the SPCC's are met, the CCC's are used to check the validity of the initial calibration. Calculate the percent difference using the following formula:

$$\% \text{ Difference} = [(((\text{average RF}) - (\text{RF})) / (\text{average RF})) * 100]$$

where: (average RF) = average response factor from 5 point initial calibration curve.

(RF) = response factor from daily continuing calibration standard.

8.1.2.1 If the difference for any compound is greater than 20%, the laboratory should consider this a warning limit. The percent difference for each CCC must be less than 25% for the continuing calibration to be valid. If this criteria is not met for any CCC, sample analyses cannot begin and corrective action must be taken. Problems similar to those listed under SPCC's could affect this criteria. If no source of the problem can be determined after corrective action has been taken, a new five point calibration must be generated before quantitative sample analysis begins.

9.0 BLANK

9.1 After BFB and the curve or continuing calibration has been run, a reagent water blank is required before any samples are analyzed to show that the analytical system is free from interferences and contamination. At a minimum, a blank is run at this point during every 12 hour shift. A blank will be run more frequently if contamination is suspected from a high level sample.

9.2 If medium level soil extractions are to be analyzed, a blank consisting of Methanol that has been through all stages of the sample preparation process will be run.

9.3 For soil analysis, a method blank consisting of clean, dried, laboratory sand will be run if low level soil samples are to be analyzed.

10.0 INSTRUMENT/ANALYST/METHOD CERTIFICATION

10.1 Before the analyses of any actual samples, each analyst must demonstrate the ability to generate acceptable accuracy and precision by running a one time analyst certification. While the analyst certification is not instrument dependent, this certification is required on every instrument that will be running samples to demonstrate instrument ability to generate acceptable accuracy and precision. Any time a major modification of the instrument is made, this certification will need to be re-run. The solution to be analyzed will consist of all compounds listed in Table 6, Method 8240B, Revision 2, November 1990 and will be prepared at 2 and 5 times the level of the lowest calibrations standard. Each solution will be run in duplicate and must meet the acceptance criteria listed in Table 6, Method 8240B, Revision 2, November 1990.

10.2 When one or more of the analytes tested fail the acceptance criteria, the analyst must proceed according to Section 10.3.

10.3 Locate and correct the source of the problem and repeat the test for all analytes that failed to meet the criteria. Repeated failure, however, will confirm a general problem with the analyst or instrument. Samples may not be analyzed by any analyst until the certification has been successfully completed.

11.0 MDL

11.1 Every analyte to be quantitated by Method 8260 must have a Method Detection Limit (MDL) study performed on it. Results obtained for analytes that have not had an MDL calculated by this method must be considered estimated. The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero.

11.2 The procedure followed for a MDL study is based on the method given in the Federal Register, Part 136, Appendix B, 7-1-91 edition, revision 1.11. All Method 8260 quality control procedures governing the analyses must be followed.

11.2.1 Seven replicate analyses are performed using reagent water spiked with every analyte of interest, at 1 to 10 times the estimated MDL or at the required PQL concentration.

11.2.2 The standard deviation of the amount found for each analyte of the seven runs is calculated and multiplied by the appropiate Students t value . The resulting number is the calculated MDL.

11.2.3 If the amount spiked is between 1 and 10 times the estiimated MDL, and there are no non-detected recoveries in the set of seven, the MDL result is acceptable. If not the MDL must be re-run, only for the compounds that did not pass. If the study needs to be re-run at a different concentration, the entire set of seven needs to be re-run. If the study does not pass due to poor reproducibility on one of the samples, only that run needs to be re-analyzed. All seven runs do not need to be run in the same 12 hour shift.

12.0 SAMPLE ANALYSIS

12.1 All volatile samples must be run within 14 days of sample collection. Instrument set up conditions should be the same as those used for the standard calibration. For all sample analysis, blank subtraction is not allowed. If the initial analysis of a sample has a concentration of analytes that exceeds the upper level of the 5 point initial calibration curve by more than 20%, the sample must be re-analyzed at a dilution (Section 14.0), or the data must be qualified. Secondary ion quantitation is allowed only when there are interferences with the primary quantitation ion. Samples analyzed following a sample that had high levels of analytes or saturated ions must be re-analyzed if carry-over is suspected. All samples and standard solutions must be allowed to warm to ambient temperature before analyses. All samples, standards, and quality control samples must be spiked with the internal standard/surrogate standard mix. Sample analysis falls into three different categories, purge and trap low level waters and soils, medium level Methanol extracted soils, and high level wastes. All low level soil samples must be analyzed by heated purge.

12.2 Low Level Water Purge and Trap Analysis

12.2.1 Remove the plunger from a 5 mL luer lock syringe. Open the sample which has been allowed to come to ambient temperature, and carefully pour the sample into the syringe barrel tilt the syringe so the tip is pointed up and vent any residual air while adjusting the sample volume to 5.0 mL. This process of taking an aliquot destroys the validity of the sample for future analysis; therefore, if there is only one VOA sample vial, the analyst should fill a second vial by gently pouring the remainder of the sample into a head space free vial to protect against possible loss of sample integrity. This second sample is maintained only until such time when the analyst has determined that the first sample has been analyzed properly.

12.2.2 Pull back slightly on the plunger to create a small head space. Add 5 uL of internal standard/surrogate spiking solution through the tip of the syringe. The addition of 5 uL of the internal standard/surrogate spiking solution to 5 mL of sample results in a concentration of 50 ug/L of each surrogate and 50 ug/L of each internal standard.

12.2.3 Attach the syringe to the three port valve on the purging device. Open the valve and inject the sample into the purging chamber. Close the valve.

12.2.4 Follow the procedure in Section 3.0 for purging and data acquisition.

12.2.5 If, after quantitating the sample according to Section 16.0 any compound(s) exceed(s) the upper calibration standard by more than 20%, the sample will be re-analyzed following the dilution procedure outlined in Section 14.0.

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12.3 Low Level Heated Soil Analysis

12.3.1 This is designed for samples containing individual purgeable compounds of less than1 mg/kg. It is limited to sediment/soil samples and waste that is of a similar consistency (granular and porous). The low level method is based on purging a heated sediment/soil sample mixed with reagent water containing the surrogate and internal standards. Analyze all reagent blanks and standards under the same conditions as the samples. The GC/MS system should be set up, calibrated and ready to analyze samples prior to the preparation of the sample to avoid the loss of volatiles compounds. Follow the initial and daily calibration instructions, including addition of a 40ø C purge temperature.

12.3.2 Remove the plunger from a 5 mL Luerlock type syringe and fill until overflowing with reagent water. Replace the syringe plunger and compress the sample. tilt the syringe so the tip is pointed up and vent any residual air while adjusting the sample volume to 5.0 mL.

12.3.3 Withdraw the plunger slightly and add 5 uL of the internal standard/surrogate spiking solution to the syringe through the tip. The addition of 5 uL of the surrogate/internal standard spiking solution to 5 mL of reagent water results in a concentration of 50 ug/L of each surrogate and 50 ug/L of each internal standard.

12.3.4 Use a 5 g (wet weight) sample if the expected concentration is less than 0.2 mg/kg or a 1g (wet weight) sample for expected concentrations between 0.2 and 1 mg/kg.

12.3.5 The sample consists of the entire contents of the sample container. Do not discard any supernatant liquids. Mix the contents of the sample container with a narrow metal spatula. Weigh the amount determined in 11.3.4 into a tared sample vial. Note and record the actual weight to the nearest 0.1 g. These steps must be performed in a laboratory free of solvent fumes to avoid sample contamination

12.3.6 Add the 5 ml of spiked reagent water to the vial.

12.3.7 Follow the procedure in Section 3.0 for purging and data acquisition.

12.3.8 If, after quantitating the sample according to Section 1560 any compound(s) exceed(s) the upper curve level by more than 20%, the sample will be re-analyzed using Section 14.

12.4 Medium Level Soil Extraction

12.4.1 This method is based on extracting the sample with methanol and is used for samples that have concentrations of analytes greater than1 mg/Kg, and/or for analytes that are insoluble in water. An aliquot of the extract is added to reagent water and purged according to Section 12.2.

12.4.2 The sample consists of the entire contents of the sample container. Do not discard any supernatant liquids. Mix the contents of the sample container with a narrow metal spatula. Weigh 4.0 ñ 0.1g (wet weight) of sample into a tared vial. Using a top loading balance.

12.4.3 Quickly add 9.0 mL of Methanol to the vial for samples and 8.0mL of Methanol for matrix spikes and spike duplicates. Add 1.0ml of surrogate standard to each vial and 1.0ml of matrix spike solution to the MS/MSD vials (See section 4.8). Stopper and shake for 2 min. NOTE: Steps 12.4.2 and 12.4.3 must be performed rapidly and without interruption to minimize loss of volatile organics. These steps must be performed in a laboratory free from solvent fumes.

12.4.4 If the samples will not be analyzed immediately, transfer enough of the Methanol from the extraction to completely fill a 1.5 ml auto sampler vials with no head space. They may be stored at -10ø C to -20ø Cin the dark, prior to analysis. Do the same for a sample of the reagent Methanol for use as a method blank.

12.4.5 Remove the plunger from a 5 mL Luerlock type syringe and fill until overflowing with reagent water. Replace the plunger and compress the water to vent trapped air. Adjust the volume to 5.0 ml. Withdraw the plunger slightly and add 5 uL of the medium level internal standard solution to the syringe through the tip. Now add 100 ul or less of the Methanol extract.

12.4.6 Attach the syringe to the three port valve on the purging device. Open the syringe valve and inject the water/methanol sample into the purging chamber. Close the purge valve.

12.4.7 Follow the procedure in Section 3.0 for purging and acquisition.

12.4.8 If, after quantitating the sample according to Section 16.0 any compound(s) exceed(s) the upper limit by more than 20%, the sample will be re-analyzed using a volume of the Methanol extraction that is calculated to give an estimated final concentration beteen 50ug/Kg and100ug/Kg without dry weight corrections or dilutions.

13.0 SPIKES

13.1 Purge and trap water spikes

13.1.1 Following the sample analysis procedures from Section 12.0, analyze a matrix spike by spiking a 5 ml sample with 5 uL of the 50 mg/L matrix spike standard, and 5 ul of internal standard/surrogate mix. Disregarding any dilutions, this is equivalent to a concentration of 50 ug/L of each compound.

13.1.2 Follow 13.1.1 for the matrix spike duplicate analysis.

13.1.3 Repeat 13.1.1 substituting blank reagent water instead of a sample for the laboratory control spike..

13.2 Purge and trap Soil Spikes

13.2.1 Following the sample analysis procedures from Section 12.0, analyze a matrix spike by spiking a 5 g sample with 5 uL of the 50 mg/L matrix spiking standard, and 5 ul of internal standard/surrogate mix. Disregarding any dilutions, this is equivalent to a concentration of 50 ug/Kg of each compound.

13.2.2 Follow 13.2.1 for the matrix spike duplicate analysis.

13.2.3 Repeat 13.2.1 substituting blank reagent water and laboratory clean and dried sand instead of a sample for the laboratory control spike.

13.3 Purge and trap Methanol Extracted Soil spikes

13.3.1 Following the sample analysis procedures from Section 12.0, analyze a matrix spike and spike duplicate by spiking 5 ml of reagent water with the same amount of Methanol extracted sample as 12.4.

13.3.2 Follow 13.3.1 for the matrix spike duplicate analysis.

13.3.3 Repeat 13.3.1 substituting blank reagent water and Methanol instead of a sample for the laboratory control spike.

14.0 DILUTIONS

14.1 Any sample with an analyte concentration greater than 20% above the high point of the curve requires a dilution. The following procedure is appropriate for diluting low level water samples and the medium level Methanol extracted samples, as well as Methanol soluble waste samples. All steps must be performed without delays until the diluted sample is in the 5 ml syringe. All dilutions should keep the response of the major constituents (previously saturated peaks) in the upper half of the linear range of the curve.

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14.2 Dilutions for high level water samples and Methanol extracted soil samples should be done directly in the 5 ml syringe to be attached to the concentrator. A 5 ml syringe is filled with reagent water and only enough headspace to accommodate the aliquot of sample or extract to be added is left. An appropriate aliquot of the sample or extract should then be injected directly into the syringe and 5 ul of the internal/surrogate standard should be added. The syringe is then attached to the concentrator and follow the procedure in Section 3.0 for purging and acquisition. Intermediate dilutions may be necessary.

14.3 Dilutions for Methanol soluble wastes should be made in methanol by weighing 1.0g of the waste sample into a tared 20 ml vial, which was previously marked with a 10 ml volume. Enough methanol to bring the volume to the 10 ml level is then added. The weight of the waste should be recorded to the nearest 0.1 g. The vial should then be shaken for 2 minutes. An appropriate aliquot of the methanol dilution should then be added to a 5 ml syringe, along with 5 ul of internal/surrogate standard and enough reagent water to bring the final volume to 5.0 ml. The analysts should then attach the syringe to the concentrator and follow the procedure in Section 3.0 for purging and acquisition. Intermediate dilutions may be necessary for extremely high levels.

14.4 Any time Methanol extract aliquots of samples are analyzed on the GC/MS, Equal aliquots of Methanol should be analyzed in the method blank.

IV. POST-ANALYSIS SECTION

15.0 OVERVIEW

15.1 This section covers all post analysis work-up procedures. It includes qualitative and quantitative calculations and policies, quality control procedures including internal standard retention times and areas, surrogate recoveries, spikes and spike recoveries, and data qualifiers.

16.0 QUALITATIVE IDENTIFICATION AND QUANTITATION

16.1 Qualitative Identification

16.1.1 All target analytes are identified by comparison of the sample mass spectrum with the mass spectrum of a standard of the suspected compound (standard reference spectrum), and (2) elution of sample component at the same GC relative retention time (RRT) as those of the standard component retention time.

16.2 Mass Spectra

16.2.1 Mass spectra for standard reference should be obtained on the users GC/MS. These standard reference spectra are obtained through analysis of the calibration standards.

16.2.1.1 All ions present in the standard mass spectra at a relative intensity greater than 10% (most abundant ion in the spectrum equals 100%) must be present in the sample spectrum. The relative intensities of these ions must agree within ñ20% between the standard and sample spectra. For example: an ion with an abundance of 50% in the standard spectra, must be between 30 and 70% abundance in the sample spectra.

16.3 Retention Time

16.3.1 The sample component Relative Retention Time (RRT) must compare within ñ 0.06 RRT units of the RRT of the standard component. If coelution of interfering components prohibits accurate assignment of the sample component RRT from the total ion chromatogram, the RRT should be assigned by using extracted ion current profiles for ions unique to the component of interest.

16.3.2 For samples containing components not associated with the calibration standards, a library search may be made for the purpose of tentative identification. All target analytes are identified by comparison of the sample mass spectrum with the mass spectrum from the NBS library using the procedure outlined in Section 16.4.

16.4 NBS Library Searches

16.4.1 The relative intensities of major ions in the reference spectrum should be present in the sample spectrum.

16.4.2 The relative intensities of the major ions should agree within ñ20%.

16.4.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

16.4.4 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of coeluting compounds.

16.4.5 Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. Data system library reduction programs can sometimes create these discrepancies. Computer generated library search routines should not use normalization routines that would misrepresent the library or unknown spectra when compared to each other. Only after visual comparison of sample with the nearest library searches will the mass spectral interpretation specialist assign a tentative identification.

16.5 Quantitative Analysis

16.5.1 When a compound has been identified, the quantitation of that compound will be based on the integrated abundance from the EICP of the primary characteristic ion given in Table 1. Quantitation will take place using the internal standard technique. The internal standard used shall be the one listed in Table 1. All quantitative results will be reported without correction for recovery data, and without subtraction of blank amounts.

16.5.2 Calculate the concentration of each identified analyte in the sample as follows:

16.5.3 Water and Water-Miscible Waste:

$$RF = \frac{Ax * Cis}{Ais * RF} * DF = ug/L$$

where:

Ax = Area of the characteristic ion for the target compound being measured.

Ais = Area of the characteristic ion for the specific internal standard.

Cis = Concentration of the specific internal standard in ug/L.

RF = Response Factor of appropriate standard.

DF = any Dilution Factors required.

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16.5.4 Sediment/Soil, Sludge, and Waste:

$$RF = \frac{Ax * Cis}{Ais * RF} * \frac{L\ purged}{Kg\ sample} * DF = ug/kg$$

where:

Ax = Area of the characteristic ion for the target compound being measured.

Ais = Area of the characteristic ion for the specific internal standard.

Cis = Concentration of the specific internal standard in ug/L.

RF = Response Factor of appropriate standard.

DF = any Dilution Factors required.

16.5.5 When requested, an estimate of concentration for analytes not present in the quantitation standard will be made. The formulas given above will be used with the following modifications: The areas for Ax and Ais should be the EICP for that internal standard closest to the compound, and the area for Ax should be the most abundant ion in the spectrum. The concentration obtained will be reported indicating that the value is an estimated.

17.0 QUALITY CONTROL

17.1 Each laboratory that uses these methods is required to operate a formal quality control program. The program consist of the following requirements previously covered:

17.1.1 BFB (Section 6.0)

17.1.2 Initial Calibration (Section 7.0)

17.1.3 Continuing Calibration Standard (Section 8.0)

17.1.4 Blank (Section 9.0)

17.1.5 Instrument/Analyst/Method Certification (Section 10.0)

17.1.6 MDL Study (Section 11.0)

17.2 In addition to the above, the following quality control requirements must be followed.

17.3 The internal standard responses and retention times in the calibration standard must be evaluated immediately after or during data acquisition. The retention time for all internal standards must be within 0.00 RRT units from the last continuing calibration standard. The EICP area for all internal standards must be within a factor of two (-50% to +100%) from the last daily calibration standard.

17.3.1 If it appears that a sample matrix effect is causing a deviation, the sample will be re-run to confirm the matrix problem. If it passess the second time, the second run will be reported. If it does not work this second time, all compounds associated with the internal standard that was out will be considered estimated. If many samples are out of control for no apparent reason, the mass spectrometer needs to be inspected for malfunctions and corrections must be made, as appropriate. When corrections are made, reanalysis of samples analyzed while the system was malfunctioning are necessary.

17.4 All surrogate recoveries must fall within the specified recovery windows (Table 6).

17.4.1 If any surrogate compound is out of control due to matrix problems, the sample will be re-run and reported as in section 17.3.1. If many samples are out of control for no apparent reason, the mass spectrometer needs to be inspected for malfunctions and corrections must be made, as appropriate. When corrections are made, re analysis of samples analyzed while the system was malfunctioning are necessary.

17.4.2 Until thirty samples of a given matrix have been analyzed, the recovery windows used are the ones provided in Table 6 if those are the surrogates being used, and 70-120% if they are not the same surrogate compounds. Once thirty water samples and thirty soil samples have been analyzed, in house recovery windows will be generated (Section 17.4.2.1)and used (Table 6). For surrogate compounds that are the same as those in Table 6, the lab generated limits must be within those control limits. At a minimum surrogate recovery limits will be updated annually on a matrix by matrix basis.

17.4.2.1 Calculate the average percent recovery (p) and standard deviation of the percent recovery (s) for each of the surrogates.

17.4.2.2 Calculate the upper and lower control limit for each surrogate standard. This should be done as follows: Upper Control Limit (UCL) = p + 3s
Lower Control Limit (LCL) = p - 3s

17.4.2.3 Two standard deviations will be used when 3 standard deviations gives a negative lower control limit.

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TABLE 6

GC/MS SURROGATE RECOVERY ACCEPTANCE WINDOWS

LAST UPDATED: January, 1994

	Low/Medium	Low/Medium
Surrogate Compound	Water	Soil/Sediment
4-Bromofluorobenzene	86-114	74-111
1,2-Dichloroethane-d4	76-113	70-111
Toluene-d8	88-110	81-116

water and soil windows based on SW-846 Method 8260 limits

17.5 The laboratory must analyze a matrix spike, a matrix spike duplicate, and a laboratory control sample, at a minimum once for every 20 water samples, and every 20 soil samples to assess accuracy. If only one to ten samples are analyzed in a month, at least one matrix spike, one matrix spike duplicate, and one laboratory control sample is required. Generally the set of quality control samples are run at random during the batch of 20 samples

17.6 The following compounds are required in the matrix spikes and laboratory control samples: 1,1-Dichloroethene, Trichloroethene, Chlorobenzene, Toluene, and Benzene. The spiking procedure is outlined in Section 17.0. All recoveries must be within the limits specified in Tables 7 and 8.

17.6.1 If any individual matrix spike recovery falls outside the designated recovery range, or, once in house precision limits are generated any percent difference exceeds the allowable limits, that analyte has failed the acceptance criteria and the result for that analyte in the unspiked sample will be considered estimated. The out of control analyte must then be checked in the laboratory control sample to verify that the out of control matrix spike recovery or matrix spike duplicate precision is due to a matrix interference, and not an out of control system.

17.6.2 If the laboratory control sample is also out of control, no data for any sample in the batch of 20 for that analyte can be reported unqualified. The samples must be re-run or qualified as estimated. The problem must be immediately identified and corrected before any further samples for that analyte can be run. If the laboratory control sample is within its' limits, then only the compound that was out in the spiked aliquot of the sample needs to be estimated in the unspiked sample, not the entire batch of samples. If the laboratory control sample is out of control, and the matrix spike/matrix spike duplicate were acceptable, no data will be estimated.

17.6.2.1 Until 5 matrix spikes, matrix spike duplicates, and laboratory control samples have been analyzed, the recoveries of the matrix spike, matrix spike duplicate, and laboratory control sample will be validated against the method windows given in Tables 7 and 8. Since there are no precision limits provided in the method, until 5 matrix spike duplicates have been analyzed, only accuracy will be monitored.

17.6.2.2 Once five sets of the quality controls samples of a given matrix (waters and soils) have been analyzed, calculate the average percent recovery (R) and the standard deviation of the percent recovery (SD) per matrix. Express the accuracy assessment as a percent recovery interval from R - 3SD to R + 3SD. If R = 90% and SD = 10%, for example, the accuracy interval is expressed as 60-120%. Another set of limits will be calculated the same way for the laboratory control sample windows. Precision windows will be calculated by taking the average of the 5% differences ± 3 standard deviations. Windows will be updated at a minimum annually.

TABLE 7

WATER MATRIX SPIKE/LABORATORY CONTROL SAMPLE ACCEPATANCE CRITERIA

Parameter	Method % Rec. MS	In House % Rec. MSD	In House MSD Precision	In House LCS % Rec.
Benzene	37-151	37-151		37-151
Chlorobenzene	37-160	37-160		37-160
1,1-Dichloroethene	D-234	D-234		D-234
Toluene	47-150	47-150		47-150
Trichloroethene	71-157	71-157		71-157

D = Detected, result must be greater than zero.

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TABLE 8
HEATED SOIL MATRIX SPIKE/LABORATORY CONTROL SAMPLE ACCEPATANCE CRITERIA

Parameter	Method % Rec. MS	In House % Rec. MSD	In House MSD Precision	In House LCS % Rec.
Benzene	44-150	44-150		44-150
Chlorobenzene	47-158	47-158		47-158
1,1-Dichloroethene	D-231	D-231		D-231
Toluene	56-148	56-148		56-148
Trichloroethene	74-143	74-143		74-143

D = Detected, result must be greater than zero.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: Thomas J Seyer Date: 4/6/94
Area Supervisor: MSY Date: 4/6/94
QA Supervisor Gary E. Spencer Date: 4/6/94
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WW ANALYTICAL SERVICES

SEMI-VOLATILE GAS CHROMATOGRAPHY/MASS SPECTROMETRY LABORATORY

Standard Operating Procedure for
Modified METHOD 8270,
Capillary Column Analysis of Semi-Volatile Organics by GC/MS
Written March, 1994 Revision: New

BASED ON EPA SW-846 METHOD 8270, 3rd EDITION, November 1990

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I. INTRODUCTION

Method 8270 is used to determine the concentration of semi-volatile organic compounds in extracts prepared from all types of solid waste matrices, soils, and ground water. Direct injection of a sample is used in limited applications. This method is used to quantify most neutral, acidic, and basic organic compounds that are soluble in methylene chloride and capable of being eluted without derivatization as sharp peaks from a gas chromatographic fused-silica capillary column coated with a slightly polar silicone. Such compounds include polynuclear aromatic hydrocarbons, chlorinated hydrocarbons and pesticides, phthalate esters, organophosphate esters, nitrosoamines, haloethers, aldehydes, ethers, ketones, anilines, pyridines, quinolines, aromatic nitro compounds, and phenols, including nitrophenols. The following compounds may require special treatment when being determined by this method. Benzidine can be subject to oxidative losses during solvent concentration and it's chromatography must be watched for broadening. Hexachlorocyclopentadiene is subject to thermal decomposition in the inlet of the gas chromatograph, chemical reaction in acetone solution and photochemical decomposition. N-nitrosodimethylamine is difficult to separate from the solvent under the chromatographic conditions described. N-nitrososdiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine. Pentachlorophenol, 2,4-Dinitrophenol, 4-Nitrophenol, 4,6-Dinitro-2-Methylphenol, 4-Chloro-3-Methylphenol, Benzoic Acid, 2-Nitroaniline, 3-Nitroaniline, 4-Chloroaniline, and Benzyl Alcohol are subject to erratic chromatographic behavior, especially if the GC system is contaminated with high boiling material. This method is restricted for use by or under the supervision of analysts experienced in the use of gas chromatography/mass spectrometry and skilled in the interpretation of mass spectra. Each analyst must demonstrate the ability to generate acceptable results with this method. Interferences naturally present in the sample can cause elevated detection limits and hamper the analysis. Naturally occurring interferences can vary considerably from site to site. Sample contamination can also cause raised detection limits or false positives, and can come from a variety of sources. Improper sampling techniques can contaminate the sample at the job site. During analysis, contamination can come from impurities in the purge gas, or from organic compounds present in extraction solvents. To reduce this the use of non-TFE plastic coating, non-TFE thread sealants, and flow controllers with rubber components have been eliminated where possible, and a reagent blank is run whenever an unusually concentrated sample is analyzed, or cross contamination is suspected.

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II. PRE-ANALYSIS SECTION

1.0 OVERVIEW

1.1 The pre-analysis section covers everything that is required prior to running samples. This section includes target lists, equipment used, individual instrument setups, and standard preparation.

2.0 TARGET LISTS, MDL's, PQL's, QUANTITATION IONS, SURROGATES AND INTERNAL STANDARDS.

2.1 Table 1 lists internal standards, surrogates and current target compounds including MDL's, quantitation ions, secondary ions and internal standard/target matches.

2.2 Table 2 lists the Practical Quantitation Limits (PQL) for water and soil matrices of selected compounds. Compounds not listed in Table 2 have no PQL's determined at this time.

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TABLE 1

Internal Standards		IS #	Primary Ion	Secondary Ion
d4-1,4-Dichlorobenzene		1	152	115
d8-Naphthalene		2	136	68
d10-Acenaphthene		3	164	162, 160
d10-Phenanthrene		4	188	94,80
d12-Chrysene		5	240	236, 120
d12-Perylene		6	264	265,260
Surrogate Standards		Use with IS #		
2-Fluorophenol		1	112	64
d6-Phenol		1	99	42,71
d5-Nitrobenzene		2	82	54,128
2-Fluorobiphenyl		3	172	171
2,4,6-Tribromophenol		3	330	332,141
d14-Terphenyl		5	244	122,212
	MDL			
N-Nitrosodimethylamine	0.76	1	74	42
Pyridine	ND	1	79	52
Cyclohexanone	ND	1	55	98,42,69
Aniline	0.71	1	93	66,65
Phenol	0.73	1	94	66,65
bis(2-Chloroethyl) ether	0.95	1	93	63,65
2-Chlorophenol	0.87	1	128	130,64
1,3-Dichlorobenzene	1.0	1	146	148,113
1,4-Dichlorobenzene	0.96	1	146	148,113
Benzyl Alcohol	0.88	1	108	79,77
1,2-Dichlorobenzene	1.0	1	146	148,113
2-Methylphenol	0.98	1	108	107
bis(2-Chloroisopropyl) ether	3.0	1	45	79,77,121
4-Methylphenol	0.92	1	108	107
N-Nitroso-di-n-Propylamine	0.93	1	70	42,130,101
Hexachloroethane	1.0	1	117	119,201,199
Nitrobenzene	1.0	2	77	51,123
Isophorone	0.92	2	82	138,95
2-Nitrophenol	0.69	2	139	65,109
2,4-Dimethylphenol	0.82	2	122	107,121
Benzoic Acid	5.3	2	105	77
bis(2-Chloroethoxy) methane	1.0	2	93	123,95
2,4-Dichlorophenol	0.94	2	162	164,98
1,2,4-Trichlorobenzene	1.1	2	180	182,145
Naphthalene	1.1	2	128	127,129
4-Chloroaniline	0.93	2	127	129
Hexachlorobutadiene	1.4	2	225	227,223
4-Chloro-3-Methylphenol	0.74	2	107	142,144
2-Methylnaphthalene	1.1	2	142	141
Hexachlorocyclopentadiene	1.8	3	237	272,235

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2,4,6-Trichlorophenol	0.69	3	196	198,200
2,4,5-Trichlorophenol	1.1	3	196	198,200
2-Chloronaphthalene	0.87	3	162	164,127
2-Nitroaniline	0.96	3	138	65,92
Dimethylphthalate	3.1	3	163	194,164
Acenaphthylene	0.97	3	150	151,153
3-Nitroaniline	0.73	3	138	92,108
Acenaphthene	0.93	3	153	154,152
2,4-Dinitrophenol	1.5	3	184	107,91
Pentachlorobenzene	ND	3	250	248,252
4-Nitrophenol	2.2	3	65	109,93
Dibenzofuran	1.1	3	168	139
2,6-Dinitrotoluene	0.93	3	89	165,63
2,4-Dinitrotoluene	0.98	3	165	182,89,63
Diethylphthalate	1.8	3	149	177,150
4-Chlorophenyl phenyl ether	0.81	3	204	141,206
Fluorene	0.98	3	166	165,167
4-Nitroaniline	1.0	3	138	92,108
Azobenzene	0.77	3	77	128,152,182
4,6-Dinitro-2-Methylphenol	1.1	4	198	182,121,77
N-Nitrosodiphenylamine	0.93	4	169	168,167
4-Bromophenyl phenyl ether	1.1	4	248	250,141
Hexachlorobenzene	1.0	4	284	142,249
Benzidine	3.5	4	184	185
Pentachlorophenol	2.7	4	266	264,268
Pentachlornitrobenzene	ND	4	237	249,295
Phenanthrene	1.0	4	178	176,179
Anthracene	0.88	4	178	176,179
9H-Carbazole	0.89	4	167	139,166
Di-n-Butylphthalate	5.9	4	149	150,104
Fluoranthene	0.94	4	202	100,101
Di-n-Hexyl Adipate	ND	5	129	213,111,101
Pyrene	0.80	5	202	100,101
Butylbenzylphthalate	2.3	5	149	91,206
3,3'-Dichlorobenzidine	1.2	5	252	254,126
Benzo(a)anthracene	0.74	5	228	229,226
bis(2-Ethylhexyl)phthalate	5.0	5	149	167,279
Chrysene	0.96	5	228	229,226
Di-n-Octylphthalate	1.1	6	149	
Benzo(b)fluoranthene	0.91	6	252	253,125
Benzo(k)fluoranthene	1.4	6	252	253,125
Benzo(a)pyrene	1.2	6	252	253,125
Indeno(1,2,3,cd)pyrene	1.5	6	276	138,277
Dibenz(a,h)anthracene	1.5	6	278	279,139
Benzo(g,h,i)perylene	1.6	6	276	138,277

ND = Not determined

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TABLE 2

	PQL* WATER ug/L	PQL* LOW SOIL ug/Kg
Phenol	10	660
bis(2-Chloroethyl) ether	10	660
2-Chlorophenol	10	660
1,3-Dichlorobenzene	10	660
1,4-Dichlorobenzene	10	660
Benzyl Alcohol	20	1300
1,2-Dichlorobenzene	10	660
2-Methylphenol	10	660
bis(2-Chloroisopropyl) ether	10	660
4-Methylphenol	10	660
N-Nitroso-di-n-Propylamine	10	660
Hexachloroethane	10	660
Nitrobenzene	10	660
Isophorone	10	660
2-Nitrophenol	10	660
2,4-Dimethylphenol	10	660
Benzoic Acid	50	3300
bis(2-Chloroethoxy) methane	10	660
2,4-Dichlorophenol	10	660
1,2,4-Trichlorobenzene	10	660
Naphthalene	10	660
4-Chloroaniline	20	1300
Hexachlorobutadiene	10	660
4-Chloro-3-Methylphenol	20	1300
2-Methylnaphthalene	10	660
Hexachlorocyclopentadiene	10	660
2,4,6-Trichlorophenol	10	660
2,4,5-Trichlorophenol	10	660
2-Chloronaphthalene	10	660
2-Nitroaniline	50	3300
Dimethylphthalate	10	660
Acenaphthylene	10	660
3-Nitroaniline	50	3300
Acenaphthene	10	660
2,4-Dinitrophenol	50	3300
Pentachlorobenzene	10	660
4-Nitrophenol	50	3300
Dibenzofuran	10	660
2,6-Dinitrotoluene	10	660
2,4-Dinitrotoluene	10	660
Diethylphthalate	10	660
4-Chlorophenyl phenyl ether	10	660
Fluorene	10	660
4-Nitroaniline	20	1300
4,6-Dinitro-2-Methylphenol	50	3300

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N-Nitrosodiphenylamine	10	660
4-Bromophenyl phenyl ether	10	660
Hexachlorobenzene	10	660
Pentachlorophenol	50	3300
Pentachlornitrobenzene	20	1300
Phenanthrene	10	660
Anthracene	10	660
Di-n-Butylphthalate	10	660
Fluoranthene	10	660
Pyrene	10	660
Butylbenzylphthalate	10	660
3,3'-Dichlorobenzidine	20	1300
Benzo(a)anthracene	10	660
Chrysene	10	660
Benzo(b)fluoranthene	10	660
Benzo(k)fluoranthene	10	660
Benzo(a)pyrene	10	660
Indeno(1,2,3,cd)pyrene	10	660
Dibenz(a,h)anthracene	10	660
Benzo(g,h,i)perylene	10	660

*Taken from SW-846 Method 8270, Revision 1, December 1987, Table 2

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3.0 EQUIPMENT/SET UP CONDITIONS

3.1 Table 3 describes the GC/MS conditions used in this SOP. These are guidelines only and may differ depending on equipment.

TABLE 3
GC/MS Volatile Organic Compounds Method

I. Gas Chromatograph
Column: J&W DB-5ms, 30meter, 0.25mm ID, 0.25u film thickness.
Carrier: Ultra high purity Helium.
Initial Oven: 50° C Initial hold: 5 minutes Ramp 1: 12° C/minute
Oven 1: 200° C Ramp 2: 20° C Final Oven: 280° C
Final Hold: 20.5 minutes. Injector: 275° C Interface: 280° C.
Gas Chromatograph-Mass Spectrometer Interface: Capillary Direct
Sample Introduction: Hewlett Packard 7673 ALS, 1ul injection.

II. Mass Spectrometer
Scan Range: 35-460 amu Scan Rate: 1.3 scans/second
Source: 250° C Electron energy: 70 volts (nominal)

4.0 STANDARDS

4.1 Stock quantitation standard solutions: Standard solutions are prepared from pure standard materials or purchased as certified solutions.

4.1.1 Commercially prepared stock standards are used to prepare the majority of quantitation working standards. They commonly come as mixes of compounds at 2000 ug/ml sealed in various glass ampules that are combined during preparation. The stock standards are mixed in individual crimp cap vials to give a five point calibration curve of 10, 20, 50, 80 and 120 ng/ul concentrations, Surrogates are present at a constant concentration of 50 and 100 ng/ul (BN and Acid). Internal standards are present at a constant 40 ng/ul concentration

4.1.2 Lab made stock standard solutions are prepared by accurately weighing about 0.1000 g of pure materials. The material is dissolved in methylene chloride or other suitable solvent and dilute to volume in a 10 mL volumetric flask. When compound purity is assayed to be 96% or greater, the weight is used without correction to calculate the concentration of the stock standard.

4.1.3 The stock standard solutions are transferred into Teflon-sealed screw-cap bottles, stored at -10 to -20° C and protected from light. Stock standard solutions are monitored for signs of degradation or evaporation.

4.1.4 The multi-component 8270 calibration mix standard will be re-diluted from stock monthly or sooner if compounds fail the CCC and SPCC criterion. The 8270 multi-component stock standard mix itself will be replaced every six months or sooner if necessary. Single component, and non-reactive mixes will be replaced annually or sooner if comparison with quality control check standards indicates a problem.

4.2 Internal standard solutions: The internal standards used are d4-1,4-Dichlorobenzene, Naphthalene-d8, Acenaphthene-d10, Phenanthrene-d10, Chrysene-d12 and Perylene-d12. Each 1 ml

of sample extract undergoing analysis is spiked with the internal standard solution to a concentration of 40 ng/uL.

4.3 GC/MS tuning standard: The methylene chloride tune standard solution contains 50 ng/uL of Decafluorotriphenylphosphine (DFTPP).

4.4 Surrogate standards: The surrogate standards used are Phenol-d6, 2-Fluorophenol, 2,4,6-Tribromophenol, Nitrobenzene-d5, 2-Fluorobiphenyl, and Terphenyl-d14. These standards are purchased as solutions at 2000 ug/ml for acid surrogates and 1000 ug/ml for BN surrogates. These are diluted in acetone to 100 and 50 ug/ml, respectively. 1.0ml added to 1.0L of water sample results in an extract concentration of 100 and 50 ng/ul. 1.0ml added to 30g of soil sample results in 1700 and 3300 ng/ul respectively.

4.5 Matrix spike standards: The compounds in the base-neutral matrix spike solution are Acenaphthene, 1,4-Dichlorobenzene, 2,4,-Dinitrotoluene, N-Nitrosodi-n-Propylamine, Pyrene, and 1,2,4-Trichlorobenzene. The acid spike contains 4-Chloro-3-Methyl phenol, 2-Chlorophenol, 4-Nitrophenol, Pentachlorophenol, and Phenol. The acid spike compounds are purchased at a concentration of 2000ug/ml in methanol. The base/neutral compounds have a concentration of 1000 ug/ml in methylene chloride. They are combined to give a final 1.0L for waters, give a final concentration of 100 and 50 ng/ul. 1.0ml added to 30g of soil results in 1700 and 3300 ng/ul respectively.

III. ANALYSIS SECTION

5.0 OVERVIEW

5.1 This section covers everything involved with data acquisition. Sections included in run order are DFTPP analysis, initial and continuing calibrations, blanks, method certifications, MDL studies, sample analysis, dilutions, and spikes.

5.2 The experience of the analyst performing GC/MS analyses is invaluable to the success of the methods. Each day that analysis is performed, the daily calibration standard should be evaluated to determine if the chromatographic system is operating properly. Questions that should be asked are: Do the peaks look normal?; Is the response obtained comparable to the response from previous calibrations? Careful examination of the standard chromatogram can indicate whether the column is still usable, the injector is leaking, the septum needs replacing, etc. If any changes are made to the system (e.g., column changed), re-calibration of the system must take place.

5.3 Every 12 hour shift must begin with the analysis of Decafluorotriphenylphosphine (DFTPP), followed by either a 5 point curve or a continuing calibration standard, and then a blank. DFTPP must pass the required tuning criteria (Table 4) before any subsequent analysis can begin. There is a 12 hour window that all acquisitions must be started in, beginning at the injection time of DFTPP. Any compound requiring quantitation under Method 8270 must have an average response factor, first or second degree curve generated from a 5 point calibration and that curve must pass the required System Performance Check Compounds (SPCC) or Continuing Calibration Compounds (CCC). A daily calibration standard is run on days that a curve is not, and it also must pass the required criteria. The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running a laboratory reagent blank at least at the beginning of every 12 hour shift. Only then can the analysis of actual samples begin. A matrix spike and matrix spike duplicate must be run on each analytical batch (up to 20 samples). A Laboratory Control Spike (LCS) will be run on a

daily basis immediately after the method blank and will consist of the same spike compounds found in the MS/MSD but spiked into reagent water or laboratory sand. Additional quality control method requirements are specified in the Quality Control section (17.0).

5.4 The internal standards selected in Paragraph 5.2 should permit most of the components of interest in a chromatogram to have retention times of 0.80-1.20 relative to one of the internal standards. The base peak ion from the specific internal standard is used as the primary ion for quantitation (see Table 1). Only if interferences are noted can the next most intense ion be used as the quantitation ion. In this instance the RF for that compound must also be recalculated before any quantitation can take place.

6.0 TUNING CRITERIA

6.1 Each GC/MS system is hardware-tuned to meet the criteria in Table 4 for a 50-ng, or less (1 ul) injection of DFTPP. Background subtraction is designed only to eliminate column bleed or instrument background ions.

TABLE 4
DFTPP KEY IONS AND ION ABUNDANCE CRITERIA

Mass	Ion Abundance Criteria
51	30-60% of mass 198
68	<2% of mass 69
70	<2% of mass 69
127	40-60% of mass 198
197	<1% of mass 198
198	Base peak, 100% relative abundance
199	5-9% of mass 198
275	10-30% of mass 198
365	>1% of mass 198
441	Present but less than mass 443
442	>40% of mass 198
443	17-23% of mass 442

J.W. Eichelberger, L.E. Harris, and W.L. Budde. "Reference Compound to Calibrate Ion Abundance Measurement in Gas Chromatography-Mass Spectrometry", Analytical Chemistry, 47, 995 (1975).

7.0 INITIAL CALIBRATION

7.1 Calibration standards: Calibration standards are at 10, 20, 50, 80 and 160 ng/uL.

7.2 1 uL of each calibration standard is analyzed. Figure 1 shows a chromatogram, with the proper chromatography, of a calibration standard containing the Method 8270 base/neutral and acid analytes. A RF is now calculated for each compound using the quantitation ion given in Table 1, using the following formula:

$$RF = (AxCis)/(AisCx)$$

where

Ax = Area of the characteristic ion for the compound being measured

Ais = Area of the characteristic ion for the specific internal standard
Cx = Concentration of the compound being measured (ng/uL)
Cis = Concentration of the specific internal standard (ng/uL)

7.3 A system performance check must be performed to ensure that average RF's are met before the calibration curve can be used. The System Performance Check Compounds (SPCC's) are listed in Table 5. The minimum acceptable average RF for these compounds SPCC's is 0.050. These SPCC's typically have very low RF's (0.1-0.2) and tend to decrease in response as the chromatographic system or the standard material begins to deteriorate. They are usually the first to show poor performance. Therefore, they must meet the minimum requirement when the system is calibrated. Alternately, a linear regression or quadratic calibration may be used in place of average RF.

7.4 The percent relative standard deviation (% RSD = 100[SD/RF]) is calculated for each compound. The % RSD for each individual Calibration Check Compound (CCC) (see Table 6) must be less than 30%. The relative retention times of each compound in each calibration run should agree within 0.06 relative retention time units.

TABLE 5
SYSTEM PERFORMANCE CHECK COMPOUNDS (SPCC's)

Base/Neutral Fraction	Acid Fraction
N-nitroso-di-n-propylamine	2,4-Dinitrophenol
Hexachlorocyclopentadiene	4-Nitrophenol

TABLE 6
CALIBRATION CHECK COMPOUNDS (CCC's)

Base/Neutral Fraction	Acid Fraction
Acenaphthene	4-Chloro-3-methylphenol
1,4-Dichlorobenzene	2,4-Dichlorophenol
Hexachlorobutadiene	2-Nitrophenol
N-Nitroso-di-n-phenylamine	Phenol
Di-n-octylphthalate	Pentachlorophenol
Fluoranthene	2,4,6-Trichlorophenol
Benzo(a)pyrene	

8.0 CONTINUING CALIBRATION

8.1 A Calibration standard at a mid-level concentration (typically 50 ng/ul) containing all semi-volatile analytes, including all required surrogates and internal standards, are performed immediately following an acceptable DFTPP run during every 12-hr analysis if an initial calibration is not performed. The response factors from the standards are compared with the average response factor from the initial calibration for a specific instrument.

8.2 System Performance Check Compounds (SPCC's): A system performance check is made on every continuing calibration standard. The SPCC criteria must be met in order for the continuing calibration standard to pass. The same SPCC compounds from Table 5 are used for the continuing calibration run. The minimum RF for semi-volatile SPCC's is 0.050. If the minimum response factors are not met, the system is evaluated, and corrective action is taken before sample analysis begins. Some possible problems are standard mixture degradation, injection port inlet contamination,

contamination at the front end of the analytical column, and active sites in the column or chromatographic system. This check must always be met before analysis begins

8.3 Calibration Check Compounds (CCC's): After the system performance check is met, the CCC's listed in Table 6 are used to check the validity of the initial calibration. Calculate the percent difference using:

$$\% \text{ Difference} = \frac{RFi - RFc}{RFi} \times 100$$

where: RFi = average response factor from initial calibration
RFc = response factor from current verification check standard

8.4 If the percent difference for each CCC is less than 25%, the initial calibration is assumed to be valid. If any one CCC has a greater than 25% difference from the initial calibration curve corrective action must be taken. Problems similar to those listed under SPCC's could affect this criterion. If no source of the problem can be determined after corrective action has taken place, the instrument is considered out of control. At a minimum the continuing calibration standard must be re-run. If necessary, a new curve will be run. The CCC criterion must always be met before sample analysis begins.

9.0 BLANK

9.1 After DFTPP and the curve or continuing calibration has been run, a reagent water blank is required before any samples are analyzed showing that the analytical system is free from interferences and contamination. At a minimum a blank is run at this point during every 12 hour shift. A blank will be run more frequently if contamination is suspected from a high level sample or if laboratory contamination is in question. The blank samples should be carried through all stages of the sample preparation and measurement steps, and will be spiked with internal standards and surrogates.

9.2 Since blanks are normally part of the extraction process batch, on those days where the only samples from previous batches are to be re-run, no blank will be analyzed prior to sample analysis.

10.0 INSTRUMENT/ANALYST/METHOD CERTIFICATION

10.1 Before the analyses of any actual samples, each analyst must demonstrate the ability to generate acceptable accuracy and precision by running a one time analyst certification. While the analyst certification is not instrument dependent, this certification is required on every instrument that will be running samples to demonstrate instrument ability to generate acceptable accuracy and precision. Any time a major modification of the instrument is made, such as a new type of column, trap, or a new concentrator, this certification will need to be re-run. The analytes required are listed in Table 7.

10.2 Prepare the certification samples at 2 and 5 times the lowest calibration level by spiking the appropriate matrix with solutions containing all analytes of interest. Samples are extracted normally and spiked with the appropriate level of internal standards. Each level is analyzed in duplicate.

10.3 Calculate the average recovery (x) in ug/L, and the standard deviation of the recovery (s) in ug/L, for each analyte.

10.3.1 For each analyte calculate the appropriate range, x, using the percent range, Ps, in Table 7 for each level analyzed and compare with the data in Table 7. If x for all analytes meet the acceptance

criteria, the system and analyst performance is acceptable and analysis of actual samples can begin. If any individual x falls outside the range for accuracy, then the system performance is unacceptable for that analyte.

10.3.2 When one or more of the analytes tested fail at least one of the acceptance criteria, the analyst must proceed according to 10.4.

10.4 Locate and correct the source of the problem and repeat the test for all analytes that failed to meet the criteria. Repeated failure, however, will confirm a general problem with the measurement system. If this occurs, locate and correct the source of the problem and repeat the test for all compounds in Table 7 beginning with Section 10.1. Samples may not be analyzed by any analyst or on any instrument until the analyst/instrument certification has been successfully completed

11.0 MDL STUDIES

11.1 Every analyte to be quantitated by Method 8270 must have a Method Detection Limit (MDL) study performed on it. Results obtained for analytes that have not had an MDL calculated by this method must be considered estimated. The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the value is above zero. PQL's listed in Method 8270 are used as Operating Detection Limits.

11.2 The procedure followed for a MDL study is based on the method given in the Federal Register, Part 136, Appendix B, 7-1-91 edition, revision 1.11. All Method 8270 quality control procedures governing the analyses must be followed.

11.2.1 Seven replicate analyses are performed using reagent water spiked with every analyte of interest, at 1 to 10 times the estimated MDL or at the required PQL concentration.

11.2.2 The standard deviation of the amount found for each analyte of the seven runs is calculated and multiplied by the appropriate Students t value . The resulting number is the calculated MDL.

11.2.3 If the amount spiked is between 1 and 10 times the calculated MDL, and there are no non-detect recoveries in the set of seven, the MDL result is acceptable. If not the MDL must be re-run, only for the compounds that did not pass. If the study needs to be re-run at a different concentration, the entire set of seven needs to be re-run. If the study does not pass due to poor reproducibility on one of the samples, only that run needs to be re-analyzed. All seven runs do not need to be run in the same 12 hour shift.

12.0 SAMPLE ANALYSIS

12.1 All extracts are stored at -10 to -20° C in the dark in a freezer separate from any standards.

12.2 Every sample extract is spiked with the internal standard solution prior to analysis to a concentration of 40ng/ul.

12.3 The extract is analyzed using the GC/MS operating conditions given in Table 3. All samples to be analyzed contain 50 ng/ul of base/neutral and 100 ng/ul of acid surrogates.

13.0 SPIKES

13.1 The laboratory must analyze a matrix spike, a matrix spike duplicate, and a laboratory control sample, containing the compounds referenced in the appropriate QC documents, attached, at a minimum once for every 20 water samples, and every 20 soil samples to assess accuracy. If only one to ten samples are analyzed in a month, at least one matrix spike, one matrix spike duplicate, and one laboratory control sample is required. Generally the set of quality control samples are run at the beginning of the batch of 20 samples, and when possible towards the end of the 12 hour sequence. Running the quality control samples at the end of the shift will help to document that the instrument was still operating correctly during the entire 12 hour shift.

13.2 If any individual matrix spike recovery falls outside the designated recovery range, or, once in house precision limits are generated any percent difference exceeds the allowable limits, that analyte has failed the acceptance criteria and the result for that analyte in the unspiked sample will be considered estimated. The out of control analyte must then be checked in the laboratory control sample to verify that the out of control matrix spike recovery or matrix spike duplicate precision is due to a matrix interference, and not an out of control system.

13.3 If the laboratory control sample is also out of control, no data for any sample run that day for that analyte can be reported unqualified. The samples must be re-run or qualified as estimated. The problem must be immediately identified and corrected before any further samples for that analyte can be run. If the laboratory control sample is within its' limits, then only the compound that was out in the spiked aliquot of the sample needs to be estimated in the unspiked sample, not the entire batch of samples. If the laboratory control sample is out of control, and the matrix spike/matrix spike duplicate were acceptable, no data will be estimated.

13.4 Until 5 matrix spikes, matrix spike duplicates, and laboratory control samples have been analyzed, the recoveries of the matrix spike, matrix spike duplicate, and laboratory control sample will be validated against the method windows given in the attached quality control documents. Since there are no precision limits provided in the method, until 5 matrix spike duplicates have been analyzed, only accuracy will be monitored.

13.4.1 Once five sets of the quality controls samples of a given matrix (waters, and soils) have been analyzed, calculate the average percent recovery (R) and the standard deviation of the percent recovery (SD) per matrix. Express the accuracy assessment as a percent recovery interval from R - 3SD to R + 3SD. If R = 90% and SD = 10%, for example, the accuracy interval is expressed as 60-120%. Another set of limits will be calculated the same way for the laboratory control sample windows. Precision windows will be calculated by taking the average of the 5 % differences +3 standard deviations. Windows will be updated at a minimum, annually.

14.0 DILUTIONS

14.1 Any sample with an analyte concentration greater than 20% above high point of the curve requires a dilution. All dilutions should keep the response of the major constituents (previously saturated peaks) in the upper half of the linear range of the curve.

IV. POST ANALYSIS SECTION

15.0 OVERVIEW

15.1 This section covers all post analysis work-up procedures. It includes qualitative and quantitative calculations and policies, quality control procedures including internal standard retention times and areas, surrogate recoveries, spikes and spike recoveries, and data qualifiers.

16.0 QUALITATIVE IDENTIFICATION AND QUANTITATION

16.1 Qualitative analysis

16.1.1 An analyte (ie those listed in Table 1) is identified by comparison of the sample mass spectrum with the mass spectrum of a standard of the suspected compound (standard reference spectrum). These standard reference spectra are obtained through analysis of the calibration standards. Two criteria must be satisfied to verify identification: (1) elution of sample component at the same GC relative retention time (RRT) as the standard component; and (2) correspondence of the sample component and the standard component mass spectrum.

16.1.2 The sample component RRT must compare to within ± 0.06 RRT units of the RRT of the standard component in the daily continuing calibration standard. If coelution of interfering components prohibits accurate assignment of the sample component RRT from the total ion chromatogram, the RRT is assigned by using extracted ion current profiles for ions unique to the component of interest.

16.1.3 All ions present in the standard mass spectra at a relative intensity greater than 10% (most abundant ion in the spectrum equals 100%), must be present in the sample spectrum.

16.1.4 The relative intensities of ions specified in Paragraph 8.1.3 must agree within plus or minus 20% between the standard and sample spectra. (Example: For an ion with an abundance of 50% in the standard spectra, the corresponding sample abundance must be between 30 and 70 percent).

16.1.5 For samples containing components not associated with the calibration standards, a library search can be made for the purpose of tentative identification. Only after visual comparison of sample spectra with the nearest library searches will the mass spectral interpretation specialist assign a tentative identification. Guidelines for making tentative identification are:

16.1.5.1 Relative intensities of major ions in the reference spectrum should be present in the sample spectrum.

16.1.5.2 The relative intensities of the major ions should agree within ± 20%.

16.1.5.3 Molecular ions present in the reference spectrum should be present in the sample spectrum.

16.1.5.4 Ions present in the sample spectrum but not in the reference spectrum should be reviewed for possible background contamination or presence of co-eluting compounds.

16.1.5.5 Ions present in the reference spectrum but not in the sample spectrum should be reviewed for possible subtraction from the sample spectrum because of background contamination or coeluting peaks. Data system library reduction programs can sometimes create these discrepancies.

16.2 Quantitative analysis

16.2.1 When a compound has been identified, the quantitation of that compound will be based on the integrated abundance from the EICP of the primary characteristic ion. Quantitation will take place using the internal standard technique. The internal standard used shall be the one nearest the retention time of that of a given analyte.

16.2.2 Calculate the concentration of each identified analyte in the sample as follows:

$$\text{Concentration (ug/L)} = \frac{Ax*Is*Vt}{Ais*RF*Vo*Vi}$$

where:
Ax = Area of characteristic ion for compound being measured
Is = Amount of internal standard injected (ng)
Vt = Volume of total extract, taking into account dilutions (uL)
Ais = Area of characteristic ion for the internal standard
RF = Response factor for compound being measured (Paragraph 6.5.2)
Vo = Volume of water extracted (mL)
Vi = Volume of extract injected (uL)

Sediment/Soil Sludge:

$$\text{concentration (ug/kg)} = \frac{Ax*Is*Vt}{Ais*RF*Vo*Ws*D}$$

where Ax, Is, Vt, Ais, RF, Vi are the same as for water
Ws = Weight of sample extracted or diluted in grams
D = (100-% Moisture in sample)/100, or 1 for a wet-weight basis

16.2.3 When requested, an estimate of concentration for non calibrated components in the sample should be made. The formulas given above should be used with the following modifications: The area Ax should be the most abundant ion in the spectrum, and the RF for the compound should be assumed to be 1. The concentration obtained should be reported indicating that the value is an estimate and which internal standard was used to determine concentration. The nearest internal standard free of interferences will be used.

16.2.4 If the response for any quantitation ion exceeds the initial calibration curve range of the GC/MS system, a dilution of the extract is made. Additional internal standard is added to the diluted extract to maintain the required 40 ng/uL of each internal standard in the extracted volume. The diluted extract is then re analyzed.

17.0 QUALITY CONTROL

17.1 Each laboratory that uses these methods is required to operate a formal quality control program. The program consist of the following requirements previously covered:

17.1.1 DFTPP (Section 6.0)

17.1.2 5 Point Initial Calibration (Section 7.0)

17.1.3 Continuing Calibration (Section 8.0)

17.1.4 Blank (Section 9.0)

In addition to the above requirements, the following is also required.

17.2 Internal Standards

17.2.1 The internal standard responses and retention times in all runs following the continuing calibration standard must be evaluated immediately after or during data acquisition. The retention time for all internal standards must be within ±30 sec from current 12 hour continuing calibration check standard. The EICP area for all internal standards must stay within a factor of two (-50% to +100%) from the current 12 hour continuing calibration standard.

17.2.2 If it appears that a sample matrix effect is causing deviation, the sample will be re-run to confirm the matrix problem. If it passes the second time, the second run will be reported. If it does not work the second time, all compounds associated with the internal standard that was out will be considered estimated. If many samples are out of control for no apparent reason, the mass spectrometer needs to be inspected for malfunctions and corrections must be made, as appropriate. When corrections are made, re-analysis of samples analyzed while the system was malfunction are necessary.

17.3 Surrogates

17.3.1 All samples (except waste dilution) must be spiked with surrogate standards. If any surrogate compound is out of control , the sample will be treated as in section 17.2.2.

17.3.2 Until thirty samples of a given matrix have been analyzed, the recovery windows used are the ones provided in Table 6 if those are the surrogates being used, and 70-130% if they are not the same surrogate compounds. Once thirty water samples and thirty soil samples have been analyzed, in house recovery windows will be generated and used (Table 6). For surrogate compounds that are the same as those in Table 6, the lab generated limits must be within those control limits. At a minimum surrogate recovery limits will be updated annually on a matrix by matrix basis.

17.3.3 Calculate the average percent recovery (p) and standard deviation of the percent recovery (s) for each of the surrogates.

17.3.4 Calculate the upper and lower control limit for each surrogate standard. This should be done as follows:
Upper Control Limit (UCL) = p + 3s
Lower Control Limit (LCL) = p - 3s

17.3.5 Two standard deviations will be used when 3 standard deviations gives a negative lower control limit.

17.3.6 Table 6 lists the method and current surrogate control windows. If any of these limits exceed the method limits, then the default is the method limits. At a minimum, surrogate windows are updated annually.

17.3.7 All surrogate recoveries must fall within the specified recovery windows (Table 6). If recovery is not within limits, the following procedures are performed.Check to be sure that there are no errors in calculations, surrogate solutions and internal standards. Also, check instrument performance. Recalculate the data and/or re analyze the extract if any of the above checks reveal a problem. Re-extracted and re analyze the sample if none of the above are a problem or flag the data as "estimated concentration".

TABLE 6

SURROGATE SPIKE RECOVERY LIMITS FOR WATER AND SOIL/SEDIMENT SAMPLES

	Method	% Recoveries
Surrogate Compound	Water	Soil/Sediment
Nitrobenzene-d5	35-114	23-120
2-Fluorobiphenyl	43-116	30-115
Terphenyl-d14	33-141	18-137
2-Fluorophenol	21-100	25-121
Phenol-d6	10- 94	24-113
2,4,6-Tribromophenol	10-123	19-122

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TABLE 7

QC ACCEPTANCE CRITERIA

Parameter	Test Conc. (ug/l)	Limit for s (ug/l)	Range for x (ug/l)	Range p, Ps (%)
Acenaphthene	100	27.6	60.1-132.3	47-145
Acenaphthylene	100	40.2	53.5-126.0	33-145
Anthracene	100	32.0	43.4-118.0	27.133
Benzo(a)anthracene	100	27.6	41.8-133.0	33-143
Benzo(b)fluoranthene	100	38.8	42.0-140.4	24-159
Benzo(k)fluoranthene	100	32.3	25.2-145.7	11-162
Benzo(a)pyrene	100	39.0	31.7-148.0	17-163
Benzo(ghi)perylene	100	58.9	D-195.0	D-219
Benzyl butyl phthalate	100	23.4	D-139.9	D-152
Bis(2-chloroethyl)ether	100	55.0	42.9-126.0	12-158
Bis(2-chloroethoxy)methane	100	34.5	49.2-164.7	33-184
Bis(2-chloroisopropyl)ether	100	46.3	62.8-138.6	36-166
Bis(2-ethylhexyl)phthalate	100	41.1	28.9-136.8	8-158
4-Bromophenyl phenyl ether	100	23.0	64.9-114.4	53-127
2-Chloronaphthalene	100	13.0	64.5-113.5	60-118
4-Chlorophenyl phenyl ether	100	33.4	38.4-144.7	25-158
Chrysene	100	48.3	44.1-139.9	17-168
Dibenzo(a,h)anthracene	100	70.0	D-199.7	D-227
Di-n-butyl phthalate	100	16.7	8.4-111.0	1-118
1,2-Dichlorobenzene	100	30.9	48.6-112.0	32-129
1,3-Dichlorobenzene	100	41.7	16.7-153.9	D-172
1,4-Dichlorobenzene	100	32.1	37.3-105.7	20-124
3,3'-Dichlorobenzidine	100	71.4	8.2-212.5	D-262
Diethyl phthalate	100	26.5	D-100.0	D-114
Dimethyl phthalate	100	23.2	D-100.0	D-112
2,4-Dinitrotoluene	100	21.8	47.5-126.9	39-139
2,6-Dinitrotoluene	100	29.6	68.1-136.7	50-158
Di-n-octylphthalate	100	31.4	18.6-131.8	4-146
Fluoranthene	100	32.8	42.9-121.3	26-137
Fluorene	100	20.7	71.6-108.4	59-121
Hexachlorobenzene	100	24.9	7.8-141.5	D-152
Hexachlorobutadiene	100	26.3	37.8-102.2	24-116
Hexachloroethane	100	24.5	55.2-100.0	40-113
Indeno(1,2,3-cd)pyrene	100	44.6	D-150.9	D-171
Isophorone	100	63.3	46.6-180.2	21-196
Naphthalene	100	30.1	35.6-119.6	21-133
Nitrobenzene	100	39.3	54.3-157.6	35-180
N-Nitrosodi-n-propylamine	100	55.4	13.6-197.9	D-230
Phenanthrene	100	20.6	65.2-108.7	54-120
Pyrene	100	25.2	69.6-100.0	52-115
1,2,4-Trichlorobenzene	100	28.1	57.3-129.2	44-142
4-Chloro-3-methylphenol	100	37.2	40.8-127.9	22-147
2-Chlorophenol	100	28.7	36.2-120.4	23-134

2,4-Chlorophenol	100	26.4	52.5-121.7	39-135
2,4-Dimethylphenol	100	26.1	41.8-109.0	32-119
2,4-Dinitrophenol	100	49.8	D-172.9	D-191
2-Methyl-4,6-dinitrophenol	100	93.2	53.0-100.0	D-181
2-Nitrophenol	100	35.2	45.0-166.7	29-182
4-Nitrophenol	100	47.2	13.0-106.5	D-132
Pentachlorophenol	100	48.9	38.1-151.8	14-176
Phenol	100	22.6	16.6-100.0	5-112
2,4,6-Trichlorophenol	100	31.7	52.4-129.2	37-144

s = Standard deviation of four recovery measurements, in ug/l.
x = Average recovery for four recovery measurements, in ug/l
.p, Ps = Percent recovery measured.
D = Detected; result must be greater than zero.

Criteria from 40 CFR Part 136 for Method 625. These criteria are based directly on the method performance data from Table 7 in Method 625. Where necessary, the limits for recovery have been broadened to assure applicability of the limits to concentrations below those used to develop Table 7 in Method 625.

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Gary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
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MODIFIED EPA METHOD 8080
PESTICIDES AND PCB'S

1.0 SCOPE AND APPLICATION

This method covers the determination of 32 PCB's and Pesticides. This is a direct inject gas chromatographic (GC) method applicable to the determination of the components listed in Table 1, and is used for the characterization of groundwater, soil, sludge, water-miscible waste, and non-water-miscible waste of any or all of the listed compounds. A second analytical technique (different column or GC/MS) can be utilized to confirm any measurements.

2.0 METHOD SUMMARY

Samples are extracted as described in Section 8.1 along with applicable blanks and quality control samples. All samples are then cleaned up before analysis. Extracted samples are injected into a GC system equipped with an electron capture detector (ECD). Concentration of samples is determined by comparing levels of samples to the levels of a 5 point calibration curve. The method provides two optional gas chromatic columns that may be helpful in resolving the compounds of interest from interferences that may occur.

3.0 ANALYSIS RATE

Instrumental analysis including blanks, duplicates, and standards will allow the analysis of 5 samples in an eight hour period.

4.0 INTERFERENCES

Solvents, glassware and reagents produce artifacts which interfere with the analysis. In addition, phthalate esters and matrix interferences can pose major problems when analyzing pesticides using ECD. Absolute cleanliness is required in the preparation and analysis of samples.

5.0 MATERIALS AND REAGENTS

5.1 Chemicals

- Sodium thiosulfate, ACS granular
- Sulfuric acid, ACS grade
- Acetone, pesticide grad
- Hexane, pesticide grade
- Iso-Octane, pesticide grade
- Methylene Chloride, pesticide grade
- Florisil, PR grade
- Copper Turnings

5.2 Glassware and Hardware
- Various size volumetrics
- Various size microsyringes
- 1.5 ml Autosampler vials with teflon-faced silicon septum
- 40 ml septum vial
- 100 ml amber bottles

5.3 Instrumentation
- Electron capture detector (ECD)
- Chrome Perfect Data System

6.0 SAMPLE COLLECTION, PRESERVATION, & HANDLING

Samples should be collected in either unpreserved 1000 ml amber bottles (liquids, sludges) or unpreserved 125 ml amber containers (soils). Samples are stored at 4°C and brought to ambient temperature just prior to extraction.

7.0 STANDARD PREPARATION

7.1. Stock Standards

Stock standard solutions may be purchased as certified solutions or prepared from pure standard materials. Prepare stock standard solutions in hexane using assayed liquids. Each PCB standard is prepared separately, except for 1221/1254 and 1016/1260 where the first PCB is early and the second is late. Most single-peak pesticides are together in one standard (Supelpreme). A second standard (called Scan 3 mix) containing additional compounds sometimes requested includes a-chlordane and g-chlordane, 2,4'-DDT, Mirex, and PBB. In addition technical grade chlordane and toxaphene each are prepared separately due to their multi-peak responses, or can be run together.

Stored at 4°C, PTFE top vial.

All standards must be replaced after one year, or sooner if comparison with check standards indicates a problem. Calibration standards should be replaced every six months or sooner.

7.1.1 Standard Preparation from Certified Solutions

Commercially prepared stock standards can be used at any concentration if they are certified by the manufacturer or by an independent source.

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(Supelco or PE Express standards are prepackaged at various concentrations.)

Certified solutions are generally used as stock standards unless the analyst wishes to analyze a partial list or prepare a check standard, in which case standards are made gravimetrically from neat compounds. Certified solutions are diluted in hexane to the desired concentration.

7.1.2 Standard Preparation by Gravimetric Method from Neat Compounds

To prepare a standard at approximately 1000 ppm, weigh 0.10g (100 mg) of compound into a 100 ml volumetric. Add hexane (some toluene may be necessary to dissolve some compounds) and stir with a magnetic stirrer or sonicate until all compound is dissolved. The actual concentration of the standard can be calculated as follows:

$$\frac{\text{mg compound}}{0.100\text{ L solvent}} = _____\ \text{ppm}$$

For example:

$$\frac{101\text{ mg PCB 1242}}{0.1\text{ L hex}} = 1010\text{ ppm PCB 1242}$$

7.2 Intermediate Standards

Intermediate standards are generally made by diluting the stock standard 1:100 in hexane.

7.3 Working Standards

Working standard concentrations (for continuing calibration verification) for the various standards are listed below:

PCBs	0.050, 0.10, 0.20, 050 and 1.0 ppm each,				separately	
Toxaphene	0.10.	0.20.	0.50,	0.80,	1.0	ppm
Chlordane	0.020,	0.040,	0.10,	0.16,	0.20	ppm
Pest Mix	0.010,	0.020,	0.050,	0.080,	0.10	ppm

8.0 PROCEDURE

8.1 Sample Prep

8.1.1 Extraction Summary

Samples are extracted as described below along with applicable blanks and quality control samples. All samples are then cleaned up before analysis. (These are summaries only, for detailed extraction procedures please refer to extraction SOP's).

8.1.1.1 Water Samples:
Water samples are extracted with methylene chloride. 1L of sample is shaken with 60 ml $MeCl_2$ for 2 min. The $MeCl_2$ is drawn off and the process is repeated two more times. The sample is then dried through a sodium sulfate column. It is then concentrated to 4 ml and changed over to hexane and blown down to 4 ml.

8.1.1.2 Soil samples:
50 g of sample are sonicated with 100 ml hexane for 3 minutes. This process is repeated twice with additional 100 ml portions of hexane. The sample is then poured through a sodium sulfate filled funnel into a turbovap tube and blown down to 2-4 ml.

8.1.1.3 Oil/Liquid Waste Samples:
0.5 g of sample is injected into 300 ml of hexane, mixed thoroughly, and blown down to 5 ml.

8.1.1.4 Wipes: Sample is sonicated with 50 ml hexane for 3 minutes. This process is repeated with another 50 ml of hexane. The sample is then poured through a sodium sulfate funnel into a turbovat tube and blown down to 4 ml.

8.1.2 Clean-Up

(The following are summaries only, for detailed cleanup procedures please refer to clean up SOP's).

8.1.2.1 Clean Up Process for PCB's
Approximately 500 ul is removed from the 4ml of sample available, and is placed in a 1.5 ml (autosampler) vial. More may be taken if the sample is especially dirty. To this vial is added an equal volume of conc. sulfuric acid by a disposable pipet. This is shaken and allowed to sit ten minutes or until the two layers separate, whichever is greater. The top layer is then

removed and placed in a clean 1.5 ml vial. This procedure is repeated until the extract is clear. Once it is clean, a level line is marked on the vial, 500 ul of iso-octane is added, and it is then blown down with purified nitrogen to a final volume of 500 ul.

8.1.2.2 Clean Up Process for Pesticides

Unfortunately, cleanup for pesticides is limited. The sample may be blown down with iso-octane and copper may be added to it, but florisil and sulfuric acid may not be added as they will react with the pesticides in the sample. Dirty samples and samples extracted for BNA's and PCB's/Pesticides are put through an Alumina column to remove BNA surrogates and other interferences.

8.2 Initial Calibration

8.2.1 PCB Curve

A iso-octane blank is run first (at 1.0 ul) to prove the system is clean. Then each PCB standard is injected at 0.050, 0.10, 0.20, 0.50, 1.0 ppm.

8.2.2 Pesticide Curve

The first injection, called a "slug" is 1 ul of the 10 ppm "Supelpreme" standard. The purpose of this is to fill any active sites in the system. A few iso-octanesare injected to clean out the system, and then an Endrin/DDT breakdown standard is run (0.050 ppm). Using the formulas below, the analyst must calculate % breakdown for endrin and DDT. If % breakdown is $\leq$ 15% analysis may proceed. If not, the glass injection sleeve is replaced, and approximately 3 inches of the capillary column is removed from the injector end. The breakdown standard is then rerun to prove acceptable breakdown. The breakdown standard should be run each day to check for active sites.

Breakdown Calculations

$$\frac{\text{Area Endrin Ald. + Endrin Ketone}}{\text{Area Endrin Ald. + Endrin Ketone + Endrin}} \times 100 = \% \text{ Endrin Breakdown}$$

$$\frac{\text{Area DDE+ DDD}}{\text{Area DDE + DDD + DDT}} \times 100 = \% \text{ DDT Breakdown}$$

The curve consists of 0.01, 0.02, 0.05, 0.80, 0.10 ng levels.

8.2.3 Calibration

Plot five poiont calibration curve of concentration vs. response in area or height.

8.2.4 QC Check Sample

Prepare a QC check sample at the same level as one of the midlevel curve standards. This check sample should be prepared separately from the calibration standards.

Analyze the check sample according to section 8.3 and 8.4 for each parameter compare the percent recovery of the check sample to established acceptance limits. If all parameters are acceptable, the analysis of samples can begin. If any of the recoveries are outside established limits, the analyst must repeat the test for the parameters that failed. If the second test fails, a new calibration curve must be created and the process repeated.

8.3 Sample Analysis

1 ul of sample is injected onto the column. depends on the extraction

Identify the parameters in the sample by comparing the retention times of the peaks in the sample chromatogram with those of the peaks in standard chromatograms. The width of the retention time window used to make identifications should be based upon measurements of actual retention time variations of standards over the course of 72 hours.. Three times the standard deviation of a retention time for a compound can be used to calculate a suggested window size; however, the experience of the analyst should weigh heavily in the interpretation of chromatograms.

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If the response for a peak exceeds the working range of the system, prepare a dilution of the sample and reanalyze.

The following criteria must be met to make a qualitative identification:

- The retention times of the peaks in the sample chromatogram must match the retention time of those peaks in the standard chromatogram.
- All positive pesticide identifications must be confirmed on a second column.
- For PCB, Toxaphene, and Chlordane identification guidelines, see Section 11.0.

8.4 Calculations

After identifying a parameter, the analyst should quantitate that parameter using the guidelines listed below.

First calculate the ng of compound in the extract (if not using a calibration curve):

$$ng = \frac{(pk.\ ht.\ sample)}{(CF)}$$

Then calculate the concentration of compound in the original sample.

Water Samples:

$$\text{Conc. (ug/l)} = \frac{(CC)(DF)(VT)}{(VI)(VS)} \bullet (1\ ug/1000\ ng)(1000\ ul/1\ ml)$$

Soil/Waste Samples:

$$\text{Conc. (mg/kg)} = \frac{(CC)(DF)(VT)}{(VI)(VS)} \bullet (1\ ug/1000\ ng)(1mg/1000ug)(1000ul/1ml)(1000g/1kg)$$

Wipes:

$$\text{Conc. (ug)} = \frac{(CC)(DF)(VT)}{(VI)} \bullet (1000\ ul/1\ ml)(1\ ng/1000\ ng)$$

Where:
DF = dilution factor
CC = ng in sample obtained from calibration curve or CF
VI = ul of sample injected
VS = initial volume of sample (L)
WS = initial weight of sample (g)
VT = total volume of extract (ml)

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8.5 QC Requirements

8.5.1 Method QC

For each analytical batch a laboratory control sample and method preparation blank must be analyzed and recoveries calculated and compared to established control limits.

8.5.2 Matrix QC

A matrix spike and matrix spike duplicate must also be ran for every 20 samples of the same matrix (or once per batch of samples).

8.5.3 Continuing Calibration Verification

The calibration check standard or continuing calibration verification (CCV) standard must be analyzed at a frequency of after every 10 samples analyzed. The recoveries of the CCV must fall within an 85-115% recovery range.

8.5.4 Surrogate

The analyst should monitor the extraction efficiency and matrix effects by spiking each sample with a surrogate before extraction. If surrogate recovery is <50%, data must be qualified due to matrix interferences.

9.0 SAFETY

10.0 CORRECTIVE ACTION

See Corrective Action SOP.

11.0 IDENTIFICATION OF MULTI-RESPONSE COMPOUNDS: PCBs, TOXAPHENE, AND CHLORDANE

Each PCB contains peaks with the same retention time, however, the relative size of peaks to one another is unique for each alachlor. Each PCB has a distinct pattern of peaks, therefore in order to call a sample positive for a PCB it must match the pattern of the standard. The pattern may be changed by a complex matrix or by weathering of the PCB, therefore experienced analytical judgement must be used. PCB 1221 is unique and presents a whole different set of challenges. It elutes very early and is the simplest of patterns. It is the alachlor that is the most affected by matrix, therefore extreme caution must be used when identifying it.

PCBs can be grouped into two distinct groups, those that elute early and those that elute late.

Toxaphene and Chlordane each have unique patterns.

11.1 Early Eluting PCBs

11.1.1 Identification

Each PCB has been separated into groupings. Refer to Figure F1 for all of the following statements, for ease of identification (also refer to Chart 1):

- The initial and by far the most significant criteria will be the relation of peaks in group B.
- Secondly the absence or presence of group C.
- The final criteria is the proportion of group A to group B.
- Most of the time the peaks in group B will be sufficient to determine which PCB is present, use the other two criteria only when your determination is inconclusive.

*PCB 1221 consists of the early peaks of all the other pcbs in this group, exhibit caution in the identification of this alachlor.

11.1.2 Quantitation

- Use at least three (3) peaks.
- Do not use peaks that are disproportionate due to matrix interference.

11.2.2 Quantitation

- Use at least three (3) peaks
- Do not use peaks that are disproportionate due to matrix interference.

11.3 Samples Containing More Than One PCB

11.3.1 Identification

Only one early PCB can be identified as a PCB per sample. Once an alachlor is identified the same peaks cannot be used to identified a different PCB (e.g., it would be impossible to identify both 1248 and

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1242 in the same sample. If both PCBs were present it would appear to be more like one or the other).

Though there are early and late PCBs, there is not a clear dividing line where one set stops and the other begins. PCB patterns may be distorted by overlapping peaks. This is very important to realize when attempting to identify each PCB present. Figure F3 demonstrates what a sample containing two PCBs would look like in the area of overlap, and what peaks to use to identify each PCB. Use group A to identify the early eluting PCBs and group B for late eluting PCBs.

Be careful when a sample contains high levels of an early eluting PCB not to call the later eluting peaks of that PCB a separate alachlor (look at proportions).

11.4 Identifying Toxaphene and Chlordane

The same precautions and guidelines that apply to PCBs are used for identifying these two multi-response pesticides.

12.0 REFERENCES

SW846 Third Edition, November 1986.

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TABLE 2
COMPOUND INFORMATION
Method Detection Limits (MDL)

Compound	Water (ug/l)	Soil (mg/kg)	Cas No.
Aldrin	0.015	0.0012	309-00-2
a-BHC	0.008	0.00064	319-84-6
b-BHC	0.010	0.0008	319-85-7
d-BHC	0.005	0.0004	319-86-8
g-BHC (Lindane)	0.008	0.00064	58-89-9
a-Chlordane	N/A	N/A	5103-71-9
g-Chlordane	N/A	N/A	5103-74-2
Chlordane, Total	0.028	0.00244	57-74-9
4,4'-DDD	0.014	0.0011	72-54-8
4,4'-DDE	0.011	0.00088	72-55-9
2,4'-DDT	N/A	N/A	
4,4'-DDT	0.012	0.00096	50-29-3
Dieldrin	0.009	0.00072	60-57-1
a-Endosulfan	0.010	0.0008	959-98-8
b-Endosulfan	0.010	0.0008	3343-65-9
Endosulfan Sulfate	0.012	0.00096	1031-07-8
Endrin	0.008	0.00064	72-20-8
Endrin Aldehyde	0.016	0.0013	7421-93-4
Endrin Ketone	N/A	N/A	53494-70-5
Heptachlor	0.011	0.00088	76-44-8
Heptachlor Epoxide	0.010	0.0008	1024-57-3
Methoxychlor	0.027	0.0022	72-43-5
Mirex	N/A	N/A	2385-85-5
PBB (BP-6)	N/A	N/A	
PCB-1016	N/A	N/A	12674-11-2
PCB-1221	0.106	0.0085	11104-28-2
PCB-1232	N/A	N/A	11141-16-5
PCB-1242	N/A	N/A	53469-21-9
PCB-1248	N/A	N/A	12672-29-6
PCB-1254	0.092	0.00736	11097-69-1
PCB-1260	N/A	N/A	11096-82-5
Toxaphene	0.108	0.0086	8001-35-2

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TABLE 3
COMPOUND INFORMATION

Compound	Practical Detection Limits (PDL's) Waters (ug/l)	Practical Detection Limits (PDL's) Soils (mg/kg)	Act 307 Detection Limits Waters (ug/l)	Act 307 Detection Limits Soils (mg/kg)
Aldrin	1.0	0.080	0.010	0.0017
a-BHC	1.0	0.080	0.010	0.0017
b-BHC	1.0	0.080	0.010	0.0017
d-BHC	1.0	0.080	0.010	0.0017
g-BHC (Lindane)	1.0	0.080	0.010	0.0017
a-Chlordane	1.0	0.080	0.010	0.0017
g-Chlordane	1.0	0.080	0.010	0.0017
Chlordane, Total	1.0	0.080	---	---
4,4'-DDD	1.0	0.080	0.010	0.0033
4,4'-DDE	1.0	0.080	0.010	0.0033
2,4'-DDT	1.0	0.080	0.010	0.0033
4,4'-DDT	1.0	0.080	0.010	0.0033
Dieldrin	1.0	0.080	0.010	0.0033
a-Endosulfan	1.0	0.080	0.010	0.0033
b-Endosulfan	1.0	0.080	0.010	0.0033
Endosulfan Sulfate	1.0	0.080	0.010	0.0033
Endrin	1.0	0.080	0.010	0.0033
Endrin Aldehyde	1.0	0.080	0.010	0.0033
Endrin Ketone	1.0	0.080	0.010	0.0033
Heptachlor	1.0	0.080	0.010	0.0017
Heptachlor Epoxide	1.0	0.080	0.010	0.0017
Methoxychlor	1.0	0.080	0.010	0.0033
Mirex	1.0	0.080	0.010	0.0067
PBB (BP-6)	10.0	0.80	0.10	0.067
PCB-1016	1.0	0.080	0.10	0.33
PCB-1221	1.0	0.080	0.10	0.33
PCB-1232	1.0	0.080	0.10	0.33
PCB-1242	1.0	0.080	0.10	0.33
PCB-1248	1.0	0.080	0.10	0.33
PCB-1254	1.0	0.080	0.10	0.33
PCB-1260	1.0	0.080	0.10	0.33
Toxaphene	1.0	0.080	0.10	0.17

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TABLE 4
QC ACCEPTANCE CRITERIA

Laboratory Control Sample (LCS)

Waters

Parameter	Test Conc (ug/l)	% Recovery Range
Aldrin	10.0	35.56-125.86
Dieldrin	10.0	55.86-122.94
4,4'-DDT	10.0	51.92-136.04
Endrin	10.0	22.40-183.56
Gamma-BHC (Lindane)	10.0	40.35-140.31
Heptachlor	10.0	34.63-151.51

Soils

Parameter	Test Conc (ug/l)	% Recovery Range
Aldrin	0.20	40.00-161.02
Dieldrin	0.20	18.00-160.56
4,4'-DDT	0.20	32.86-173.80
Endrin	0.20	30.74-177.47
Gamma-BHC (Lindane)	0.20	6.54-161.94
Heptachlor	0.20	44.54-158.48

Matrix Spikes (SPK1, SPK2) and Matrix Spike Duplicates (MSD)

Waters

Parameter	Test Conc (ug/l)	% Recovery Range	% RSD Upper Limit
Aldrin	10.0	43.41-121.47	40.26
Dieldrin	10.0	23.36-150.86	46.60
4,4'-DDT	10.0	38.40-141.60	42.69
Endrin	10.0	30.00-147.00	46.99
Gamma-BHC (Lindane)	10.0	44.63-121.97	43.20
Heptachlor	10.0	134.99-130.57	41.00

Soils

Parameter	Test Conc (ug/l)	% Recovery Range	% RSD Upper Limit
Aldrin	0.20	22.33-163.54	40.88
Dieldrin	0.20	50.91-149.57	44.12
4,4'-DDT	0.20	17.63-140.03	56.98
Endrin	0.20	34.90-162.11	40.19
Gamma-BHC (Lindane)	0.20	37.43-155.33	40.17
Heptachlor	0.20	39.60-164.77	37.66

*Note: These limits are based on on-going statistics and are subject to change.

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PESTICIDE SAMPLE CHROMATOGRAMS

Column 1: 30m RTX 5% Capillary, .32 id, 1 u film thickness

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PESTICIDE SAMPLE CHROMATOGRAMS

Column 2: 30 m 1701 capillary, .32 id, 1 u film thickness

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TOXAPHENE/CHLORDANE SAMPLE CHROMATOGRAMS

Column: 30m RTX 5% capillary, .32 id, 1 u film thickness

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Column: 8' 1.5% SP-2250/1.95% SP-2401 on 100/120 Supelcoport

ANALYSIS SUMMARY

PCB Analysis

- Injector Temp: 250°C
- Detector: Ni^{63} Electron Capture Detector (ECD)
- Detector Temp:300°C
- Carrier Gas: Helium
- Column: DB-5, 30M
- Alternate Column: DB-608, 30M
- Curve standards: 0.050, 0.10, 0.20, 0.50, 1.0 ppm
- Surrogate: Hexabromobenzene must be >50%
- Injection volume: 1 ul

Pesticide Analysis

- Injector temp: 250°C
- Detector: Electron Capture Detector (ECD)
- Detector Temp: 300C
- Carrier Gas: Helium
- Column: DB-5, 30M
- Alternate Column: DB-608, 30M
  Make Up Flow: 0.080, 0.10 ppm
- Curve Standards: 0.01, 0.02, 0.05
- Surrogate: DBC, TMX
- Injection volumes: 1 ul

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RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: B D Jacobs Date: 3/23/94
QA Supervisor: Barry E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 15 Pages Revised: —

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PURGEABLE AROMATICS
EPA METHOD #8020

1.0 SCOPE & APPLICATION

This method covers the determination of 7 purgeable aromatic compounds. This is a purge and trap gas chromatographic (GC) method applicable to the determination of the compounds listed in Table 1, and is used for the characterization of municipal and industrial discharges of any or all of the listed compounds. A second analytical technique (dual column or GC/MS) can be utilized to confirm any measurements.

2.0 METHOD SUMMARY

An inert gas is bubbled through a 5-ml water sample contained in a specially designed purging chamber at ambient temperature or heated for soils at (40°C). The analytes are efficiently transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent trap where the analytes are trapped. After purging is completed, the trap is heated and backflushed with the inert gas to desorb the analytes onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the analytes which are then detected with a photoionization detector.

The method provides an optional gas chromatographic column that may be helpful in resolving the compounds of interest from interferences that may occur.

3.0 ANALYSIS RATE

Instrumental analysis including blanks, standards, methods, matrix spikes and duplicates will allow approximately 16 runs in an eight hour period. This is limited, however, by the sample matrix.

4.0 INTERFERENCES

4.1 Impurities in the purge gas and organic compounds outgassing from the plumbing ahead of the trap account for the majority of contamination problems.

The analytical system must be demonstrated to be free from contamination under the conditions of the analysis by running laboratory reagent blanks as described in Section 8.2.

4.2 The use of non-Teflon plastic tubing, non-Teflon thread sealants, or flow controllers with rubber components in the purge and trap system should be avoided.

4.3 Contamination by carry-over can occur whenever high level and low level samples are sequentially analyzed. To reduce carry-over, the purging device and sample syringe must be rinsed with reagent water between sample analyses. Whenever an unusually concentrated sample is encountered, it should be followed by an analysis of reagent water in the same purging device to check for cross contamination. For samples containing large amounts of water soluble materials, suspended solids, high boiling compounds or high aromatic levels, it may be necessary to wash the purging device with a detergent solution, rinse it with distilled water, and then dry it in an oven at 105°C between analyses. The trap and other parts of the system are also subject to contamination; therefore, frequent bakeout and purging of the entire system may be required.

5.0 MATERIALS & REAGENTS

5.1 Chemicals

- Reagent water (organic free)
- Methanol (purge and trap grade)
- Pure stock standard materials or certified pre-mix standard
- Sodium thiosulfate (ACS), granular

5.2 Glassware and Hardware

- Various size volumetric flasks
- Various size microsyringes
- 15 ml screw-top vial with teflon-faced silicon septum
- 5/25 ml. gas tight syringes
- 40 ml. septum vial

5.3 Instrumentation

- Gas Chromatographs
- Photo-Ionization Detctor
- Data System
- Tekmar LSC-2; ALS 10 Place Automatic Purge & Trap Units
- Tekmar LSC-2; LSC-2000, ALS 1016, ALS 10 Place Purge and Trap

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6.0 SAMPLE COLLECTION, PRESERVATION, & HANDLING

All samples must be iced or refrigerated from the time of collection until analysis. If the sample containers free or combined chlorine, add sodium thiosulfate preservative (10 mg/40 ml is sufficient for up to 5 ppm Cl_2) to the empty sample bottle just prior to shipping to the sampling site. EPA Methods 330.4 and 330.5 may be used for measurements of residual chlorine. Field test kits are available for this purpose.

Grab samples must be collected in glass containers having a total volume of at least 25 ml. Fill the sample bottle just to overflowing in such a manner that no air bubbles pass through the sample as the bottle is being filled. Seal the bottle so that no air bubbles are entrapped in it. If preservative has been added, shake vigorously for one minute. Maintain the hermetic seal on the sample bottle until time of analysis.

All samples must be analyzed within 14 days of collection.

7.0 STANDARD PREPARATION

7.1. Stock Standard

Stock standard solutions may be purchased as certified solutions or prepared from pure standard materials. Prepare stock standard solutions in methanol using assayed liquids. Stock standards are diluted in methanol to make 10ppm intermediate standards.

Transfer the stock standard solution into a Teflon-sealed screw-cap bottle. Store at 4°C and protect from light.

All standards must be replaced after six months, or sooner if comparison with check standards indicates a problem.

7.1.1 Standard Preparation from Certified Solutions

Commercially prepared stock standards can be used at any concentration if they are certified by the manufacturer or by an independent source. (Supelco Purgeable Aromatics Kit 602-S, prepackaged as 200 mg/L in methanol.)

Certified solutions are generally used as stock standards unless the analyst wishes to analyze a partial list, in which case standards are made volumetrically from neat compounds. An intermediate standard at 10ppm is prepared in methanol by diluting the certified solution

7.1.2 Standard Preparation by Volumetric Method from

Neat Compounds

To make a 10,000 ppm stock standard, an amount of each analyte based on the density, and calculated with the formula below, is injected into a 100 ml volumetric flask partially filled with methanol. The flask is brought to volume and inverted three times (after replacing ground glass stopper) to insure proper mixing.

$$\frac{1}{\text{density}} \times 1000 = \text{(ul of analyte injected)}$$

Example for benzene:

$$\frac{1}{0.874} \times 1000 = 1114 \text{ ul}$$

The stock standard is then diluted in methanol to obtain a 5 ppm intermediate standard.

7.2 Working Standards

Working standards include calibration standards and continuing calibration verification standards. These standards are made by diluting intermediate standard into the 5 ml sample syringe which contains 5 ml of organic-free water. These standards must be loaded into the purging device immediately to avoid volatilization. Working standards must contain all compounds of interest and may be prepared from one or more intermediate standards.

8.0 PROCEDURES

8.1 Sample Prep

8.1.1 Water samples require no preparation prior to analysis.

8.1.2 All soils are extracted using a modified high-level extraction procedure if they contain analytes above the range of the curve. 10 grams of soil sample is weighed into a 40 ml vial to which is added 10.0 ml of methanol. The vial is then fitted with a Teflon coated septa cap and shaken for 30 seconds. A methanol blank is prepared by adding 10 ml methanol to another 40 ml vial when prepping samples. A separate methanol blank should be prepared and analyzed each time a batch of samples is prepped. Using a disposable Pasteur pipet, approximately 4

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ml of extract is transferred to a small vial, and refrigerated until analyzed.

8.1.3 Waste samples are prepped by adding 1.0 g of sample into a 50 ml volumetric, partially filled with methanol. The volumetric is then brought to the line with methanol and inverted 3 times to ensure proper mixing. The analyst should also prepare and analyze a methanol blank with each set of samples prepped.

8.2 Initial Calibration

A water blank is injected initially. If the blank shows a contamination peak, water must be purged and the blank rerun. If the water is free of analyte, the standards may be injected, beginning with the lowest and proceeding to the highest. A series of standards consisting of 1,5,20,50 and 100 ug/l concentrations, are normally employed in the generation of the calibration curve. Analyze each calibration standard according to section 8.3 and plot peak area responses vs. concentration of the standard,

Prepare a QC check sample (also called a Laboratory Control Sample or LCS) containing 20 ug/l of each parameter. This check sample should be prepared separately from the calibration standards.

Analyze the check sample according to section 8.3 for each parameter compare the percent recovery of the check sample to establish acceptance limits. If all parameters are acceptable, the analysis of samples can begin. If any of the recoveries are outside established limits, the analyst must repeat the test for the parameters that failed. If the second test fails, a new calibration curve must be created and the process repeated.

8.3 Sample Analysis

Allow the sample to come to ambient temperature prior to introducing it to the syringe. Remove the plunger from a 5 ml syringe. Open the sample bottle (or standard) and carefully pour the sample into the syringe barrel to just short of overflowing. Replace the syringe plunger. Vent any residual air while adjusting the sample volume to 5.0 ml. Since this process of taking an aliquot destroys the validity of the sample for future analysis, the analyst should fill a second syringe or place remaining sample in a 20 ml vial with no headspace at this time to protect against possible loss of analytes. Add 10.0 ul of the surrogate spiking solution, if applicable, and inject sample into purging chamber.

Detailed instrument conditions are included on Analysis summary page (pg. 15).

Identify the parameters in the sample by comparing the retention times of the peaks in the sample chromatogram with those of the peaks in standard chromatograms. The width of the retention time window used to make identifications should be based upon measurements of actual retention time variations of standards over the course of 72 hours.. Three times the standard deviation of a retention time for a compound can be used to calculate a window size; however, the experience of the analyst should weigh heavily in the interpretation of chromatograms.

If the response for a peak exceeds the working range of the system, prepare a dilution of the sample with reagent water from the aliquot in the second syringe and reanalyze.

Assuming no dilution is needed, detection limits are reported at the Practical Detection Limits (PDLs), which generally correspond to the lowest calibration standard. If a dilution is needed, the detection limits should be calculated using the calculations in section 8.4, where CC=water PDL.

8.4 Calculations

Five working standards (1,5,20,50,100 ppb) must be calibrated and plotted of peak area on the vertical axis versus concentration in ug/l on the horizontal axis.

Water Samples:

conc. (ug/l) = (CC)(DF)

Soil/Waste Samples:

conc. (mg/kg) = (CC)(DF)(PE)(1L/1000 ml)(1 mg/1000 ug)(1000 g/1 kg)

or, simplified (CC)(DF)(PF)/1000.

Act 307 Soil Samples:

Soils analyzed for Act 307 detection limits must be based on dry weight of soil; therefore, the following additional calculation is necessary:

adj. conc.(mg/kg) = conc./%S

where: DF = Dilution factor
CC = value obtained from the calibration curve (or water PDL if calculating detection limits)

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PF = Preparation factor, ie: 10 ml MeOH/20 g sample = 0.5
%S= % solid (fraction, ie: 95% solid = 0.95)

NOTE: When calculating soil detection limits, it is important to use the water PDL. For soil samples run at 1:10, report soil PDL unless % solid is so low that the calculated detection limit is greater than the PDL.

8.5 QC Requirements

8.5.1 Method QC

For each working day a laboratory control sample (at 20 ug/l) and method preparation blank must be analyzed and recoveries calculated and compared to established control limits.

8.5.2 Matrix QC

A matrix spike, a matrix spike duplicate, or a duplicate, must also be ran for every 20 samples of the same matrix (or once per batch of samples). Recovering must be calcuated and compared to established control limits (see Table 4). If both MS and MSD are outside limits, and match, a CCV should be run to prove matrix interference.

8.5.3 Continuing Calibration Verification

After analyzing ten samples or once per day (whichever is more frequent), the analyst must perform a continuing calibration verification (CCV). A CCV consists of the calibration standard analyzed at 20 ug/l. All compounds must be within an 85-115% recovery range in order for analysis to continue. The CCV must pass for all compounds of interest before running additional samples. If the CCV fails, analyst should remake the standard. If the remade standard fails, analyst should run the LCS standard. If all standards fail, a new curve should be run.

8.5.4 Surrogate

The analyst should monitor both the performance of the analytical system and the effectiveness of the method with each sample matrix by spiking each sample, standard, and reagent blanks with surrogate compounds. Surrogates used have been chosen on the basis of stability and lack of interference or coelution with compounds of interest.

Prepare a stock spiking solution containing 10 mg/l of each surrogate compound. Add 10 ul of this spiking solution directly into the 5 ml

syringe for every sample, standard, and blank. Recoveries of the surrogate compound must be monitored.

If any one surrogate fails, the analyst must determine the cause of the failure.

-If surrogate in CCV also fails, and a freshly made standard show a change in calibration, a new curve must be run and samples re-analyzed.

-If surrogate in one or more samples (from the same client and location) fails, but the surrogate in the CCV passes, the analyst should select a representative sample to re-analyze.

-If the surrogate in the re-analyzed sample passes, then all affected samples must be re-analyzed.

-If the surrogate in the re-analyzed sample fails (or matches the original run) a matrix spike and matrix spike duplicate (MS/MSD) should be run on that sample.

-If the MS/MSD passes for all compounds of interest, the analyst should note the low surrogate recovery, but NOT qualify the data.

-If the MS/MSD fails, the analyst should qualify the data.

The following surrogates are used:

Fluorobenzene at 50ppb

Bromofluorobenzene at 20ppb

9.0 SAFETY

9.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potentially health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level by whatever means available. The laboratory is responsible for maintaining a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material handling data sheets should also be made available to all personnel involved in the chemical analysis. Additional references to laboratory safety are available and have been identified for the information of the analyst.

9.2 The following parameters covered by this method have been tentatively classified as known or suspected human or mammalian carcinogens: benzene and 1,4-dichlorobenzene. Primary standards of these toxic compounds should be prepared in a hood. A NIOSH/MESA approved toxic gas respirator should be worn when the analyst handles high concentrations of these toxic compounds.

10.0 CORRECTIVE ACTIONS

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See corrective Action SOP.

11.0 REFERENCES

Federal Register, 40 CFR, Part 136, July 1, 1990 Method #601.

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TABLE 1

COMPOUND INFORMATION

Compound	Linear Range (ppb)	Formula	CAS No.
Benzene	1.0-100.0	C_6H_6	71-43-1
Chlorobenzene	1.0-100.0	C_6H_5Cl	108-90-7
1,2-Dichlorobenzene	1.0-100.0	$C_6H_4Cl_2$	95-50-1
1,3-Dichlorobenzene	1.0-100.0	$C_6H_4Cl_2$	541-73-1
1,4-Dichlorobenzene	1.0-100.0	$C_6H_4Cl_2$	100-46-7
Ethylbenzene	1.0-100.0	C_8H_{10}	100-41-4
Toluene	1.0-100.0	C_7H_8	108-88-3
Xylene	1.0-300.0	C_8H_{10}	m: 108-38-3 o: 95-47-6 p: 106-42-3
Acetone*	5.0-50.0	C_3H_6O	67-64-1
2-Butanone* (MEK)	1.0-10.0	$C_6H_{12}O$	591-78-6
4-Hexanone*	2.0-20.0	$C_6H_{12}O$	108-10-1
MIBK*	2.0-20.0	C_4H_8O	78-93-3
MTBE	5.0-50.0	$C_5H_{12}O$	1634-04-4

*These compounds can be detected by this method. The SOP will be amended and issued at a later date.

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TABLE 2

Compound	Practical Detection Limits, (PDL's) Soil (mg/kg)	Water ug/l	Method Detection Limits (MDL's)
Benzene	10.0	1.0	0.34
Chlorobenzene	10.0	1.0	0.22
1,2-Dichlorobenzene	10.0	1.0	0.29
1,3-Dichlorobenzene	10.0	1.0	0.25
1,4-Dichlorobenzene	10.0	1.0	0.22
Ethylbenzene	10.0	1.0	0.31
Toluene	10.0	1.0	0.36
Xylene	10.0	1.0	M: 0.31 P: 0.28 O: 0.28
Acetone*	0.05	5.0	
2-Butanone* (MEK)	0.01	1.0	
4-Hexanone*	0.02	2.0	
MIBK*	0.02	2.0	
MTBE	0.10	50.0	2.33

*These compounds can be detected by this method. The SOP will be amended and issued at a later date.

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TABLE 3

COMPOUND INFORMATION

Compound	Molecular Weight (g/mol)	Density (g/mL)	Boiling Point (ºC)
Benzene	78.11	0.874	80.0
Chlorobenzene	112.56	1.107	132.0
1,2-Dichlorobenzene	147.00	1.306	179.0
1,3-Dichlorobenzene	147.00	1.288	172.0
1,4-Dichlorobenzene	147.00	1.241	173.0
Ethylbenzene	106.17	0.867	136.0
Toluene	92.13	0.866	110.6
P-Xylene	106.17	0.866	138.0
M-Xylene	106.17	0.868	138-139
O-Xylene	106.17	0.870	143-145
Acetone*	58.08	0.791	56.0
2-Butanone* (MEK)	72.11	0.805	80.0
4-Hexanone*	100.16	0.815	123.0
MIBK*	100.16	0.800	117.0
MTBE	88.15	0.740	55.2

*These compounds can be detected by this method. The SOP will be amended and issued at a later date.

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RETENTION TIMES (min) AND ELUTION ORDER

Compound	Column 1	Column 3
1. Benzene	9.25	18.06
2. Toluene	12.92	23.72
3. Chlorobenzene	15.05	25.02
4. Ethylbenzene	15.25	27.50
5. M-Xylene	15.43	33.15
6. P-Xylene	15.43	34.50
7. O-Xylene	15.99	34.50
8. 4-Chlorotoluene (surrogate)	17.38	—
9. 1,3-Dichlorobenzene	18.27	39.67
10. 1,4-Dichlorobenzene	18.40	41.91
11. 1,2-Dichlorobenzene	18.91	41.09

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SAMPLE CHROMATOGRAMS

EARTH TECH
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ANALYSIS SUMMARY

Gas Chromatograph:

- Injector Temp: 175°C
- Detector Temp: 250°C
- Detector: Photoionization Detector (PID) or
  Flame Ionization Detector (FID): Air @ 300 ml/min
  Hydrogen @ 30 ml/min
- Carrier Gas: Helium
- Column: DB-624 30mm .53 id capillary
  Temperature Program: Hold at 40°C for 6 min. then programmed @ 10°/min to 150°C, hold 2 min, then 40°C/min to 200°C, then hold 2 min.
  Carrier Flow: 10 ml/min
  Make up flow: 30-40 ml/min
- 1st Alternate Column: DB-624 75m .53 id capillary
  Tempeature Program: Hold at 35°C for 7 min, then programmed @ 10°C/min to 190°C, hold 0.1 min.
  Carrier Flow: 10 ml/min
  Make up flow: 30-40 ml/min
- 2nd Alternate Column: 1% SP-1000 on 60/80 Carbopack B, 8' x 0.1" id glass
  Temperature Program: Hold at 45°C for 4 min, then programmed at 10°C/min to 220°C and held for 25 min.
  Carrier flow: 30 ml/min

Concentrator:

- Purge Gas: Helium @ 30-40 ml/min
- Purge 11 min
- Desorb 4 min @ 180°C
- Bake 4 min at 210°C

Curve Standards: 1,5,20,50,100 ppb

Surrogates: Fluorobenzene
a,a,a-Trifluorobenzene or 4-Chlorotoluene
Tetrachloroethene or 3-Bromo Chlorobenzene at 20ppb each

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1.0 INDUCTIVELY COUPLED PLASMA: ATOMIC EMISSION SPECTROSCOPY

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA Supervisor: Amy E. Spencer Date: 3/23/94

Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 11 Pages Revised: —

3.0 PRINCIPAL METHOD REFERENCE

3.1 SW846, November 1986 Third Edition
USEPA Method 6010 Revision 0
Date September 1986

Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 200.7

4.0 SCOPE AND APPLICATION

4.1 Inductively coupled plasma atomic emission spectroscopy (ICP) determines a wide range of elements in solution, such as metals. The method is applicable to a large number of metals in a large variety of matricies. Most matricies require solubilization or digestion prior to analysis.

5.0 SUMMARY OF METHOD

5.1 Prior to analysis, samples must be solubilized or digested using appropriate Sample Preparation Methods. See Methods 3005-3050/200.0/200.7.

5.2 This method describes the sequential, multielemental determination of elements by ICP. The method measures element-emitted light by optical spectrometry. Samples are nebulized and the resulting aerosol is transported to the plasma torch. Element-specific atomic-line emission spectra are produced by a radio-frequency inductively coupled plasma. The spectra are dispersed by a grating spectrometer, and the intensities of required for trace element determination. Background must be measured adjacent to analyte lines on samples during analysis. The position selected for the background-intensity as occurs at the analyte wavelength measured. Background correction is not required in cases of line broadening where a background correction measurement would actually

degrade the analytical result. The possibility of additional interferences named in Section 3.0 should also be recognized and appropriate corrections made; tests for their presence are described in Section 8.5.

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Table 1
RECOMMENDED WAVELENGTHS AND
ESTIMATED INSTRUMENTAL DETECTION LIMIT

Element	Wavelength[a] (nm)	Estimated Detection Limit[b] (ug/l)
Arsenic	193.696	53
Barium	233.527	2
Beryllium	313.042	0.3
Boron	249.773	5
Calcium	422.673	10
Chromium	267.716	7
Cobalt	228.614	7
Copper	324.754	6
Iron	238.204	7
Magnesium	383.826	30
Manganese	257.610	2
Molybdenum	202.030	8
Nickel	231.604	15
Selenium	196.026	75
Silicon	251.610	58
Silver	328.068	7
Sodium	589.592	29
Thallium	190.864	40
Titanium	334.941	1
Vanadium	292.402	8
Zinc	213.856	2

a The wavelengths listed are recommended because of their sensitivity and overall acceptance. Other wavelengths may be substituted if they can provide the needed sensitivity and are treated with the same corrective techniques for spectrial interference (see Paragraph 3.1). In time, other elements may be added as more information becomes available and as required.

b The estimated instrumental detection limits shown are taken from Reference 1 in Section 10.0 below. They are given as a guide for an instrumental limit. The actual method detection limits are sample dependent and may vary as the sample matrix varies.

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6.0 INTERFERENCES

6.1 Spectral interferences are caused by: (1) overlap of a spectral line from another element; (2) unresolved overlap of molecular band spectra; (3) background contribution from continuous or recombination phenomena; and (4) stray light from the line emission of high-concentration elements. Spectral overlap can be compensated for by computer-correcting the raw data after monitoring and measuring the interfering element. Unresolved overlap requires selection of an alternate wavelength. Background contribution and stray light can usually be compensate for by a background correction adjacent to the analyte line.

Users of simultaneous multielement instruments must verify the absence of spectral interference from an element in a sample for which there is no instrument detection channel. Potential spectral interferences for the recommended wavelengths are given in Table 2. The data in Table 2 are intended as rudimentary guides for indicating potential interferences; for this purpose, linear relations between concentration and intensity for the analytes and the interferents can be assumed.

6.1.1 The interference is expressed as analyte concentration equivalents (i.e., false analyte concentrations) arising from 100 mg/L of the interference element. For example, assume that As is to be determined (at 193.696 nm) in a sample containing approximately 10 mg/L for As equivalent to approximately 1.3 mg/L. Therefore, the presence of 10 mg/L of A1 would result in a false signal for As equivalent to approximately 0.13 mg/L. The user is cautioned that other instruments may exhibit somewhat different levels of interference than those shown in Table 2. The interference effects must be evaluated for each individual instrument since the intensities will vary with operating conditions, power, viewing height, argon flow rate, etc.

6.1.2 The dashes in Table 2 indicate that no measurable interferences were observed even at higher interferent concentrations. Generally, interferences were discernible if they produced peaks, or background shifts, corresponding to 2 to 5% of the peaks generated by the analyte concentrations.

6.1.3 At present, information on the listed silver and potassium wavelengths is not available, but is has been reported that second-order energy from the magnesium 383.231-nm wavelength interferes with the listed potassium line at 766.491 nm.

Table 2

ANALYTE CONCENTRATION EQUIVALENTS ARISING FROM INTERFERENCE AT THE 100-mg/L LEVEL

Analyte	Wavelength (nm)	Interferent a,b Al	Ca	Cr	Cu	Fe	Mg	Mn	Ni	Tl	V
Aluminium	308.215	---	---	---	---	---	--	0.21	---	---	1.4
Antimony	206.833	0.47	---	2.9	---	0.08	---	---	---	0.25	0.45
Arsenic	193.696	1.3	---	0.44	---	---	---	---	---	---	1.1
Barium	455.403	---	---	---	---	---	---	---	---	---	---
Beryllium	313.042	---	---	---	---	---	---	---	---	-0.04	0.05
Boron	249.773	0.04	---	---	---	0.32	---	---	---	---	---
Cadmium	226.502	---	---	---	---	0.03	---	---	0.02	---	---
Calcium	317.933	---	---	0.08	---	0.01	0.01	0.04	---	0.03	0.03
Chromium	267.716	---	---	---	---	0.003	---	0.04	---	---	0.04
Cobalt	228.616	---	---	0.03	---	0.005	---	---	0.03	0.15	---
Copper	324.754	---	---	---	---	0.003	---	---	---	0.05	0.02
Iron	259.940	---	---	---	---	---	---	0.11	---	---	---
Lead	220.353	0.17	---	---	---	---	---	---	---	---	---
Magnesium	279.079	---	0.02	0.10	---	0.13	---	0.25	---	0.07	0.11
Manganese	257.610	0.005	---	0.01	---	0.002	0.002	---	---	---	--
Molybdenum	202.030	0.05	---	---	---	0.03	---	---	---	---	---
Nickel	231.604	---	---	---	---	---	---	---	---	---	---
Selenium	196.026	0.23	---	---	---	0.09	---	---	---	---	---
Silicon	288.158	---	---	0.07	---	---	---	---	---	---	0.01
Sodium	588.995	---	---	---	---	---	---	---	---	0.08	---
Thallium	190.864	0.30	---	---	---	---	---	---	---	---	---
Vanadium	292.402	---	---	0.05	---	0.005	---	---	---	0.02	---
Zinc	213.856	---	---	---	0.14	---	---	---	0.29	---	---

a Dashes indicate that no interference was observed even when interferents were introduced at the following levels:

Al - 1000 mg/L
Ca - 1000 mg/L
Cr - 200 mg/L
Cu - 200 mg/L
Fe - 1000 mg/L
Mg - 1000 mg/L
Mn - 200 mg/L
Tl - 200 mg/L
V - 200 mg/L

b The figures recorded as analyte concentrations are not the actual observed concentrations; to obtain those figures, add the listed concentration to the interferent figure.

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6.2 Physical interferences are effects associated with the sample nebulization and transport processes. Changes in viscosity and surface tension can cause significant inaccuracies, especially in samples containing high dissolved solids or high acid concentrations. If physical interferences are present, they must be reduced by diluting the sample, by using a peristaltic pump or by using the standard additional methods. Another problem that can occur with high dissolved solids is salt buildup at the tip of the nebulizer, which affects aerosol flow rate and causes instrumental drift. The problem can be controlled by wetting the argon prior to nebulization, using a tip washer, or diluting the sample. Also, it has been reported that better control of the argon flow rate improves instrument performance; this is accomplished with the use of mass flow controllers.

6.3 Chemical interferences include molecular compound formation, ionization effects, and solute vaporization effects. Normally, these effects are not significant with the ICP technique. If observed, they can be minimized by careful selection of operating conditions (incident power, observation position, and so forth), by buffering of the sample, by matrix matching, and by standard addition procedures. Chemical interferences are highly dependent on matrix type and the specific analyte element.

7.0 APPARATUS, MATERIALS, AND REAGENTS

7.1 Inductively coupled argon plasma emission spectrometer:

7.1.1 Computer-controlled emission spectrometer with background correction.

7.1.2 Radio frequency generator.

7.1.3 Argon gas supply: Welding grade or better.

7.1.4 Eppendorf pipettors or comparable capable of delivering 0.05 - 10 mls

7.1.5 Class A volumetric flasks, various volumes.

7.1.6 Class A reusable pipets, various volumes.

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7.2 Operating conditions: The analyst should follow the instructions provided by the instrument's manufacturer. For operation with organic solvents, use of the auxiliary argon inlet is recommended, as are solvent-resistant tubing, increased plasma (coolant) argon flow, decreased nebulizer flow, and increased RF power to obtain stable operation and precise measurements. Sensitivity, instrumental detection limit, precision, linear dynamic range, and interference effects must be established for each individual analyte line on that particular instrument. All measurements must be within instrument linear range where coordination factors are valid. The analyst must (1) verify that the instrument configuration and operating conditions satisfy the analytical requirements and (2) maintain quality control data confirming instrument performance and analytical results.

7.3 Reagents

7.3.1 Acids used in the preparation of standards and for sample processing must be reagent grade or better. Redistilled acids may be used.

7.3.1.1 Concentrated hydrochloric acid, trace metal grade (Fisher Cat #A50B-211).

7.3.1.2 Concentrated hydrochloric acid, Optima grade (Fisher Cat #A466-1).

7.3.1.3 Hydrochloric acid, trace metal grade (1:1): Add 500 mls concentrated HCl to 400 mls. ASTM Type II water. Cool. Dilute to 1L.

7.3.1.4 Concentrated nitric acid, trace metal grade (Fisher Cat. #A509-211).

7.3.1.5 Concentrated nitric acid, Optima grade (Fisher Cat. #A-467-1).

7.3.2 ASTM Type II water (ASTM D1093): Water should be monitored for impurities.

7.3.3 Standard stock solutions may be purchased or prepared from ultra high purity grade chemicals or metals (99.99 to 99.999% pure). All salts must be dried for 1 hour at 105 degrees C, unless otherwise specified.

(CAUTION: Many metal salts are extremely toxic if inhaled or swallowed. Wash hands thoroughly after handling.)

8.0 INSTRUMENTAL CONDITIONS

Incident Watts	650
Reflected Watts	000 to 005
Plate Volts	3300-3600
Plate Current	60-110 ma
Drive Volts	2-5
Coolant Flow	24 psi
Plasma Flow	32 psi
Carrier Flow	36 psi

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9.0 PROCEDURE

9.1 Follow manufacturer's operating instructions.

9.2 Preliminary treatment of all matrices is always necessary because of the complexity and variability of sample matrices. Solubization and digestion procedures are presented in Sample Preparation Methods (Methods 3005-3050/200.0/200.7).

9.3 Set up the instrument with proper operating parameters established in Paragraph 7.2. The instrument must be allowed to become thermally stable before beginning (usually requiring at least 30 minutes of operation prior to calibration).

Three sets of standards should be prepared with ASTM Type II water and the following acid concentrations:

10.0 CALCULATIONS

10.1 The concentration of each sample is read directly from the computer and dilution factors should be taken into account in the ID weight files.

11.0 QUALITY CONTROL

11.1 All quality control data should be maintained and available for easy reference or inspection.

11.2 Dilute and reanalyze samples that are more concentrated than the linear calibration limit.

11.3 Employ a minimum of one laboratory blank per sample batch to determine if contamination of any memory effects are occurring.

11.4 Analyze one spike and one method spike duplicate (MSD) for every 20 samples. A spike and method spike duplicate are samples into which a calculated extra amount of metal is pipetted in. This checks the accuracy of the sample preparation method.

11.5 It is recommended that whenever a new or unusual sample matrix is encountered, a series of tests be performed prior to reporting concentration data for analyte elements. These tests, as outlined in 5.1 through 5.3, will ensure the analyst that neither positive nor negative interferences are operating on any of the analyte elements to distort the accuracy of the reported values.

11.5.1 Serial dilution: If the analyte concentration sufficiently high (minimally, a factor of 10 above the instrument detection limit after dilution), an analysis of 1:4 agree within 10% of the original determination. If not, a chemical physical interference effect should be suspected.

11.5.2 Matrix spike addition: An analyte spike added to a portion of a prepared sample, or its dilution, should be recovered to within to 115% of the known value. The spike addition should produce a minor level of 10 times and a maximum of 100 times the instrumental detection limit. If the spike is not recovered within the specific limit matrix effect should be suspected. The use of a standard-add analysis procedure can usually compensate for this effect. CAUTION: The standard-addition technique does not detect coincidental spectrial overlap. If suspected, use of computer compensation, an alternative wavelength, or comparison of an alternate method is recommended.

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11.5.3 Standard addition: The standard-addition technique involves adding known amounts of standard to one or more aliquots of the process sample solution. This technique compensates for a sample constitute that enhances or depresses the analyte signal, thus producing a different slope from that of the calibration standards. It will not correct additive interferences which cause a baseline shift. The signal version of this technique is the single addition method, in which identical aliquots of the sample solution, each of volume V_X, are taken. To the first (labeled A) is added a small volume V_S of a standard solution of concentration c_S. To the second (labeled B) is added same volume V_S of the solvent. The analytical signals of A and B measured and corrected for nonanalyte signals. The unknown sample concentration c_X is calculated.:

$$c_X = \frac{S_B V_S c_S}{(S_A - S_B) V_X}$$

where S_A and S_B are the analytical signals (corrected for the blank) of solutions A and B, respectively. Vs and cs should be chosen so that S_A is roughly twice S_B on the average. It is best if Vs is made much less to the sample matrix. If a separation or concentration step is used, the additions are best made first and carried through the entire procedure. For the results of this technique to be valid, the following limitations must be taken into consideration:

1. The analytical curve must be linear.
2. The chemical form of the analyte added must respond the same way as the analyte in the sample.
3. The interference effect must be constant over the working range of concern.
4. The signal must be corrected for any additive interference.

The absorbance of each solution is determined and then plotted on the vertical axis of a graph, with the concentrations of known standards plotted on the horizontal axis. When the resulting line is extrapolated back to zero absorbance, the point of interception of the abscissa is the concentration of the unknown. The abscissa on the left of the ordinate is scaled the same as on the right side, but in the opposite direction from the ordinate. An example of a plot so obtained is shown in Figure 1.

11.5.4 A method of standard addition must be performed on any TCLP sample whose spike recovery is not greater than 50%.

11.6 Check the instrument standardization by analyzing appropriate quality control check standards as follows.

11.6.1 Check instrument calibration using a calibration blank and a calibration standard.

11.6.2 An ICS (initial calibration standard) is placed after the calibration standard and blank. Acceptable limits are ±5% of original calibration standard.

11.6.3 An IEC (interelement correction) standard is placed at the beginning and end of each run. Acceptable limits are ±20% of its actual concentration.

11.6.4 An ICV (initial calibration verification) is placed after the ICS in each run. Acceptable limits are ±10% of CCV standard concentration.

11.6.5 Verify calibration every 10 samples with a blank and CCV.

11.6.6 At the end of each run, verify calibration using a calibration blank, IEC, and CCV.

11.6.6.1 The results of the check standard are to agree within 10% of the expected value; if not, terminate the analysis, correct the problem, and recalibrate the instrument.

11.6.6.2 The results of the calibration blank are to agree within three standard deviations of the mean blank value. If not, repeat the analysis two more times and average the results. If the average is not within three standard deviations of the background mean, terminate the analysis, correct the problem, recalibrate, and reanalyze the previous 10 samples.

11.7 Verify the interelement and background correction factors at the beginning and end of an analytical run or twice during every 8-hour work shift, whichever is more frequent.

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Perkin Elmer 1100B Atomic Absorption Spectrophotometer
Equipment Protocol for FLAA analysis

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: R P Strauss Date: 3/23/94
QA Supervisor: Barry E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 15 Pages Revised: —

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FAA

I. Safety

A. Before operating A.A., make sure exhaust fan, (located on the north wall by the light switches) is on.

B. Gas Cylinders

1. When turning on gases, always turn on air supply before acetylene. When turning instrument off, always turn acetylene off before air.

2. All gas cylinders must be securely fastened to the wall or counter.

3. Bleed air and gas lines after analysis.

D. The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual."

1. Gloves and safety glasses must be worn at all times when handling digested samples.

II. Maintenance {Read Procedure prior to cleaning assembly}

A. The analysis of petroleum samples tend to leave organic residues inside the flame assembly. Each time the flame is used the following procedures must be followed to eliminate this residue.

1. Aspirate acetone for 5 minutes.
2. Aspirate 1% nitric acid for 5 minutes.
3. Turn flame off and let burner head cool down.
4. Remove the burner head.
5. Pour enough water through the neck of the burner chamber to remove all traces of organic solvent.
6. Reconnect burner head.
7. Change the cork O-ring (located in the end cap) with the rubber O -ring used for water analysis.

a. Unscrew the four end cap screws.
b. Shift the endcap assembly away from the burner chamber.
c. Remove the O-ring, and replace.

B. Cleaning the burner head - if an uneven flame occurs along the slot of the burner head, or if organic residues are present, the burner head slot must be attended to:

1. Remove any particulate matter in the slot with a razor blade or a small, thin piece of metal.
2. Remove scrapings from inside and outside the burner head.
3. If required, soak the burner head in a detergent solution overnight, rinse with D.I. water and dry with compressed air.

C. Be sure lamp is clean. Remove fingerprints and dust with Kimwipes.

D. Clean AAS windows with a Kimwipe.

III. Procedure

A. Lamp Installation

1. Insert the appropriate lamp into the turret, and position the lamp in front of the window.

2. Plug the lamp into an HCl (Hollow Cathode Lamp) port. (If HCl port 1 is used for analysis, a second lamp can be warming up in HCl port 2.

3. Turn instrument on by pressing the green button, located at the lower left corner of the A.A. unit.

4. Wait until the instrument has gone through the internal diagnostics check. This will take approximately two minutes.

B. Element Select Mode

1. If diagnostics proceeds without error, the Element Select Mode screen page will appear.

2. Enter date, (yy/mm/dd) and press soft key labeled [DATE].

3. Key in the atomic number of the element to be determined and press [ELEMENT] soft key.

4. The lamp current setting will display a preset default value. If an alternative current is to be used, key in the new mA value and press [L. Curr].

5. Select [FLAME MODE].

6. For current Wavelengths, Slit Widths, Flame Gases and

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Sensitivity Checks, see appendix A of FLAA protocol.

* 7. Refer to P-E 1100B Operator's Manual for individual metal specifications including:

a. Alternate Wavelengths and Slits
b. Characteristic Concentrations
c. Sensitivity Check
d. Linear Range
e. Bead/Spoiler
f. Recommended Flame

8. If a stored program is to be used, press [User Index]. This enables the analyst to call up a program which has been established to run a particular elemental analysis.

a. Once the User Index is on the screen, press the number of the program to be used. Press [Recall], to load program. (Allow 3-4 minutes)

b. This automatically sets the preprogrammed wavelength, fuel and air flows, lamp current, standard concentrations, hold time, and replicates.

c. If any changes need to be made to the program, Press [Prog] key and make any changes using cursor arrows and the keypad.

d. Functions of the other keys in User Index:

1. [STORE FILE]: Stores a program.
2. [RECALL FILE]: Loads a stored program.
3. [DELETE FILE]: Removes a stored program.
4. [RENUMBER #:#]: Changes location of program.
5. [PAGE UP]: Moves to following screen.
6. [PAGE DOWN]: Moves to previous screen.

e. Go to Section C.

9. If no program is to be used, depress [Setup] mode key to put the Spectrophotometer into Setup Mode.

C. Setup Mode

1. The Setup Mode screen displays the energy level and a bar graph of the lamps intensity.

2. Energy levels depend on the installed lamp. Typically, ranges are between 50-75.

3. Align the lamp and optimize the wavelength, using the following steps:

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a. To optimize lamp intensity, rotate the lamp in one direction until the greatest intensity is achieved. (the bar graph will increase to the right). If the bar graph goes off the screen, press [Gain] key and graph will readjust.

b. Once rotation of the lamp is completed, align with the two set screws located on the turret. Use the coarse adjustment screw first. Obtain the highest intensity level, then fine adjust with the second screw.

4. In SETUP MODE, there are four soft keys allowing the user to make adjustments to the lamp current, slit width wavelength and background source.

   a. [LAMP CURRENT]: Adjusts current.
   b. [SLIT]: Adjusts slit width.
   c. [WAVELENGTH]: Adjusts wavelength
   d. [BG CORR ON/OFF]: Turns on background correction

5. Allow the instrument and the radiation source to warm up. This usually will take 15-30 minutes.

D. Burner head installation

1. Install the burner unit and appropriate head.

   a. Secure unit with the burner unit securing screws, located at the base of the furnace assembly.

   b. Push in the Burner Interlock Handle.

      NOTE: Flame will not ignite if burner interlock handle is not fully inserted.

   c. Install the required burner head.

      1. Select the appropriate burner head for the determination (flame to be used).
      2. Turn the knurled locking ring several turns counter-clockwise to loosen.
      3. Insert the base of the burner head into the neck of the burner chamber.
      4. Push down the burner head until it bottoms in the metal bracket.
      5. Tighten the knurled locking ring and at the same time push down on the burner head to make sure that the base sits properly in the neck of the burner chamber.
      6. Slip the loops of the burner head hold-down cables over the hooks in the rear of the metal bracket.

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NOTE: Flame will not light if cables are not fastened.

d. Rotate the flame igniter tube over the burner head by hand to check that the tube does not strike the burner head. If it strikes the head, raise the igniter assembly by pushing it upwards from underneath until the igniter tube clears the burner head.
e. Plug in the FUEL connector.
f. Plug in the NEBulizer connector.
g. At this point, check to see if the burner head is blocking the path of the wavelength.

1. Use a white index card with a small cross drawn on one edge, 3/8 inch at intersection: (Figure 1)

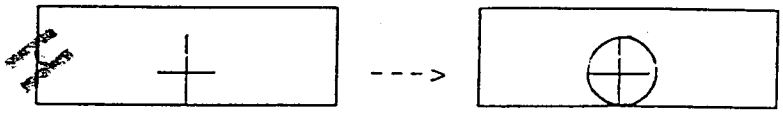


figure 1 figure 2

2. Align the wavelength path by centering the light with the cross on the card. (Figure 2) This can be done using the following knobs:

a. Rotational control--located just below the chamber, this knob allows the burner head to rotate left or right.
b. Vertical control--located on the lower left of the flame base, this knob adjusts the assembly up or down.
c. Horizontal control--located on the lower right of the flame base, this knob adjusts the assembly back and forth.

3. Avoid erroneous high absorbance due to the burner head completely blocking the wavelength path.

2. Depress [Cont] mode key to put the Spectrometer into Continuous Mode.

E. Burner Head Alignment

1. After waiting 15-30 minutes for the lamp to warm-up, the instrument is ready for flame ignition.

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2. Safety

a. Ensure that the burner head is installed properly.
b. Ensure the burner head hold-down cables are correctly attached.
c. Ensure the FUEL and NEBulizer connectors are properly connected.
d. Ensure the siphon interlock is filled with water.
e. Ensure the float moves freely.
f. To avoid flashbacks, do not allow the burner head slot to become clogged.
g. Never open the cover on the siphon interlock while the flame is burning.
h. Do not adjust the nebulizer when using a nitrous oxide/acetylene flame.

Flame ignition

a. Gas flows can be stored in the programs. For current gas flow rates, used on the PE 1100B, see appendix B, FLAA protocol.

b. Place the tubing to the nebulizer in the rinse solution, containing deionized water, 2% nitric acid and 2% hydrochloric acid.

c. Turn air on. (Valve located on wall just left of the AAS)

d. Turn acetylene on so that the valve is open all the way. Twist valve back 1/4 turn.

NOTE: If nitrous oxide is to be used, plug regulator in. Turn nitrous oxide on in a similar manner as the acetylene.

e. Press red [Flame ON/OFF] button and allow a few seconds for the flame to ignite. Flame will automatically ignite.

f. Program will automatically adjust fuel and oxidant levels for that particular analysis.
g. For manual fuel adjustment, press [Atom contr] soft key.

1. [C2H2 <---]: decreases acetylene flow
2. [C2H2 --->]: increases acetylene flow
3. [OXIDANT --->]: increases air flow
4. [OXIDANT <---]: decreases air flow
5. [SELECT N2O]: selects nitrous oxide

NOTE: When the nitrous oxide/acetylene flame is first ignited, the flame may separate or split, forming a 'V'j along the burner

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slot. As the burner head warms up the 'V' will close and form a normal flame suitable for analytical operation.

h. Aspirate with water or solvent at all times. When using organic solvents, use methanol as transitional solvent between water and organic.

4. Aligning burner head in Continuous Mode

a. Aspirate blank and press soft key labeled [Autozero].
b. Once the instrument has been zeroed, aspirate the highest standard.
c. Adjust to the highest absorbency using (in order) the Rotational, Vertical and Horizontal adjustment knob.

d. Adjust the nebulizer flow for highest absorbance.
e. Check Characteristic Concentration

1. Aspirate the blank, press [AUTOZERO]
2. Enter the required standard concentration. (See PE manual for requirements)
3. Aspirate standard
4. Press [CHAR. CONC]
5. A value will appear on the screen, this value should be within 10% of the cookbook value given by Perkin-Elmer. If value is considerably outside this range go back to step 4a and readjust alignment. Recheck C.C.

4. Press [Run] soft-key. The user is now ready to standardize the instrument.

IV. Calibration of Standards

A. To go into PROGRAM ELEMENT MODE press [Prog] soft key.

B. Screen description

1. The top line will show the following default settings and cannot be changed in this mode:

a. FURNACE or FLAME
b. Wavelength (nm)
c. Slit (nm)
d. Date

2. The following can be altered by using the cursor and keypad:

a. Technique: (AA, BG, AA-BG, EMMIS), most analyses will

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use AA-BG, see individual SOP's for requirements.

b. Signal Processing: (PA: Peak Area , PH: Peak Height) Do not change default setting
c. Read Delay: Set for 1 second
d. Replicates: All flame work requires 3 replicates per reading. An average will then be taken.
e. Background Full Scale: Set to Auto.
f. Lamp Current: Set in SETUP mode, do not change.
g. Integration Time: Set for 3 seconds.
h. Printer: Choose DATA/SUPPL & CALIB. This prints the AA readings, BG readings and a printout of the calibration curve.
i. Plot Full Scale: Set to Auto.
j. Calibration: Set to Auto.
k. Calibration units: press [mg/l] for flame work
l. Sample units: press [mg/l] for flame work
m. S1-S8: allows the concentrations of 8 standards to be entered. See the individual element SOP's for the particular requirements.
n. Reslope: Since no autosampler is programmed with flame analysis, this can be left blank. Manually, the mid-range standard can be entered, and used to reslope the calibration curve. Alternatively, the actual standard soft-key does the same job.

C. After all values have been entered in PROGRAM MODE, press the [Print] soft-key. Press [PRINT SCREEN] for a permanent copy of the program.

D. Press [PRINTER ON/OFF] to turn the printer on. The box should turn green. The user is now ready to calibrate the curve and run samples.

E. Press [Run] to enter run mode.

1. See individual metal SOP's for standard preparation.

2. Calibration Procedure

a. Press [STDS 1-4] and [STDS 5-8]. If any standard points from a previous calibration (indicated by a green box) are present, clear last calibration by pressing 0, and then the standard point. (The green box clears).

b. Aspirate the blank and press [AUTOZERO]. Absorbance value should read zero. Perform this twice to establish your baseline.

c. Aspirate the standard with the lowest concentration and press the soft key for that concentration.

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d. Absorbance and concentration will be shown on screen printed out.

e. Repeat for the remaining standards.

f. After the final standard is read, the calibration curve will be printed.

g. Verify the concentrations by running each against the new curve. (See Section E-3) Concentration values must agree within 10% of the actual concentration of standards. (See QC Section VI for Actions of Non-Conformance)

h. If the curve is valid, the user is now ready to run samples.

E. Running Samples

1. The following is the order in which samples are to be run: (See QC Section VI for a definition of abbreviations and requirements):

a. ICB (Calibration Blank)
b. ICV: 1 (First Standard verification)
c. ICV: 2 (Second Standard verification)
d. ICV: 3 (Any addition standards that need verification)
e. LCS (Outside reference)
f. MPB (Digested method blank)
g. LS (Digested lab spike)
h. Sample (QC batch sample)
i. Dup (Sample duplicate)
j. SPK (Matrix Spike)
k. MSD (Matrix Spike Duplicate)
l. All remaining samples.
*m. Curve must be checked every 10 samples using a minimum of a CCB and midrange CCV.

2. Procedure

a. Aspirate sample and press [Read] button.
b. Results will be shown on the screen and on the print-out. A final concentration, based on the average of three replicates, along with the absorbance and background absorbance will by printed.
c. Aspirate remaining samples in the same manner as step 2a.
d. If a dilution is required, press [WT/VOL CORREC]

1. Enter solution volume and press [VOL (L)].
2. Enter solution mass and press [WT (G)]
3. Aspirate sample and press [Read]

V. Shutdown

A. After aspirating the last sample return tube to rinse water, and flush system out for 3-5 minutes.

B. Press [Flame On/Off]

C. Press [Atom. Cont.] to purge the gas lines.

D. Press [Fuel] and [Oxidation] soft keys until the pressure gauges on tanks read zero.

E. Turn acetylene off.

F. Turn air off.

G. Turn AA unit off.

H. Turn printer off.

I. Clean area around AAS unit.

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VI. Quality Assurance

A. Quality Control Samples

1. Definitions of Abbreviations and Nonconformance Actions (The following QC sample shall be included for each analytical batch of samples).

a. ICB--Initial Calibration Blank

The initial calibration blank is a reagent blank that is analyzed as a sample once a calibration curve has been generated for a particular test. The ICB will check how close your curve passes through zero. Acceptance limits for an ICB is + or - the test reporting D.L. If the ICB is outside these limits the instrument must be recalibrated and the ICB reanalyzed.

b. ICV--Initial Calibration Verification

The initial calibration standard is a mid range standard. This standard is analyzed as a sample and calculated against your standard curve. The ICV will check the precision of your curve. Acceptance limits for this standard are + or - 10% or as stated for a particular method. If the ICV falls outside these limits the instrument must be recalibrated and the process repeated.

c. LCS--Laboratory Control Standard

The laboratory control sample is a known reference sample that is traceable to an outside source. The purpose of the LCS QC type is to validate the accuracy of your analysis. Acceptance limits for this QC type are based upon a 95% confidence limit generated from historical data for this test. If the LCS falls outside the established limits, the analytical batch must be flagged for re-extraction, re-digestion or reanalysis.

d. MPB--Method Prepared Blank

The method preparation blank is a blank that has been carried through the entire analytical process including any sample pretreatment procedures. The MPB will monitor any contaminates that may affect the sample results. General acceptance limits for a MPB is + or - the test ODL. For some specific tests the MPB values may be subtracted from the regular sample results if outlined in the method. If contamination is detected in the MPB, the entire pretreatment batch must be flagged for re-extraction or digestion. If it is not possible to re-prep the samples then all

analyses reported for that batch must be qualified.

e. LS--Laboratory Spike

The laboratory spike is an aliquot of deionized water that has been spiked with a known amount of stock reference standard or spiking solution. The purpose of the laboratory spike is to verify the analyst's spiking procedure and assure that any matrix interference shown by the spike and spike duplicate is really matrix induced.

f. CCB--Continuing Calibration Blank

The continuing calibration blank is a reagent blank that is analyzed as a sample, generally after 10 samples have been tested. The CCB must be run prior to re-zeroing an instrument. The CCB will validate whether significant instrument drift has occurred during the analytical run. Frequency of analysis is after every 10 samples. Acceptance limits are + or - the test ODL concentration. If the CCB falls outside the control limits, the instrument must be recalibrated, and all samples since the last successful CCB must be rerun.

g. CCV--Continuing Calibration Verification

The CCV is the midrange standard that was analyzed as the ICV. The CCV will validate any drift of the curve. Acceptance limits for this QC are + or - 20%, or as stated for a particular method. If the CCV falls outside the acceptance window, the instrument must be recalibrated and all samples since the last successful CCV must be rerun.

h. SPK--Matrix Spike

The sample matrix spike is an aliquot of a sample that has been spiked with a known amount of a stock reference standard or spiking solution. Spikes are run at a frequency of one per matrix type up to a maximum of 20 samples. The purpose of the SPK is to monitor sample matrix effects on the test. Acceptance limits are 80-120%.

i. DUP--Sample Duplicate

The sample duplicate is a replicate analysis of a particular sample that has been carried through the entire analytical process. A DUP is required for each matrix type within the analytical batch at a frequency equivalent to the SPK. The purpose of the DUP is to monitor precision within the analytical process.

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j. MSD--Matrix Spike Duplicate

A spike duplicate is an aliquot of the same sample used for the spike that has been spiked with a known amount of a stock reference standard or spiking solution. A spike duplicate is required for each matrix type within a digestion. Frequency is the same as the SPK. Acceptance limits are 80-120%.

2. Calibration protocol and Confirmation

a. A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient should be greater than 0.995. If this fails the problem must be corrected.

b. Calibration should be performed by using appropriate standards that bracket the range of samples to be analyzed.

c. An initial calibration blank (ICB) is run immediately after the curve. The ICB must not be greater than or equal to + or - the reported detection limit.

d. The residual error from the fit of the ICV should not be greater than 10% for any standard.

e. The LCS must be + or - 20% the true value.

f. Run a CCB and A CCV every 10 samples. The CCV must be + or - 20% the true value.

g. At least one spiked sample and spiked duplicate sample must be run for every batch of 20 samples (of similar matrix). The recoveries must fall within the control limits. If not, determine the problem and qualify the nonconformance.

h. % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If out of limits, determine the problem and qualify the nonconformance.

i. Dilute samples with analyte concentrations that exceed the highest standard.

j. During calibration, efforts should be made to ensure that the instrument reaches baseline prior to analysis of each standard. {Automatic BOC performed on the PE 1100B}.

VII. Calculations and Data Handling

A. Concentrations are read directly from then calibration curve.

B. Printed results from the AA are in final concentration form.

C. Blank correction has not been employed in the metals lab. If the MPB is greater then the detection limit, this value is recorded. The source of the contamination is determined, and the recorded value is qualified.

D. If dilution of sample is required, then multiply the result from the calibration curve by the dilution factor:

C * (V1 /V2)

1. C = concentration from calibration curve
2. V1 = final volume of the Sample (mls)
3. V2 = sample aliquot (mls)

E. Calculations for solid samples, report all results as mg/kg:

(C * V1) / W

1. C = mg/l concentration from calibration curve
2. V1 = final volume of sample (ml)
3. W = weight of sample (grams)

F. The following forms and logs must be fully filled:

1. Maintenance log
2. PE 1100B Flame instrument log
3. Benchsheets

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Element	λ	Slit (nm)	Air/C2H2	N2O/C2H2	Bead/Spoiler	Linear Range	Energy	EXP	Std Chk	Chk ABS.	Comment
Ag	328.1	0.7	18/21	----------	Bead	0.01-0.50 mg/L	66	10	1.0	1.621	
Al	309.3	0.7	----------	23/31	Spoiler	0.20-20.0 mg/L	69	10	1.0	0.054	1,10,11
Ca	422.7	0.7	----------	25/25	Spoiler	0.50-100 mg/L	63	10	10.0	0.203	2,10,11
Cd	228.8	0.7	30/20	----------	Bead	0.01-0.50 mg/L	62	10	1.0	3.500	3
Co	240.7	0.2	18/14	----------	Bead	0.01-1.0 mg/L	59	10	1.0	0.775	
Cu	324.8	0.7	12/16	----------	Bead	0.01-1.0 mg/L	70	10	1.0	1.230	
Fe	248.3	0.2	15/21	----------	Bead	0.01-1.0 mg/L	50	10	1.0	1.062	
Hg	253.7	0.7	----------	----------	----------	0.1-15 mg/L	62	10	2.0	0.900	4
K	766.5	0.4	25/20	----------	Spoiler	0.1-50 mg/L	69	1/1	1.0/10.0	0.152/0.310	5,6,9
Li	670.8	1.4	25/20	----------	Bead	0.02-1.0 mg/L	66	10	1.0	2.409	6
Mg	285.2	0.7	30/15	----------	Spoiler	0.50-100 mg/L	69	1/10	1.0/10.0	0.038/0.378	2,9
Mn	279.5	0.2	25/20	----------	Bead	0.01-1.0 mg/L	58	10	1.0	1.745	
Na	589.0	0.14	20/15	----------	Spoiler	0.50-100 mg/L	67	1	1/10	0.155/0.385	7,9
Ni	232.0	0.2	23/15	----------	Bead	0.01-1.0 mg/L	56	10	1.0	0.771	
Pb	217.0	0.7	25/25	----------	Bead	0.05-1.0 mg/L	59	10	1.0	0.433	
Sb	217.6	0.2	25/20	----------	Bead	0.2-2.0 mg/L	54	10	1.0	0.280	
Sn	286.3	0.7	----------	20/25	Spoiler	1.0-20.0 mg/L	71	10	10.0	0.121	8,10,11
Tl	276.8	0.7	19/20	----------	Bead	0.10-2.0 mg/L	55	10	1.0	0.243	
Zn	213.9	0.7	25/25	----------	Spoiler	0.02-1.0 mg/L	60	10	1.0	2.336	
Zn	213.9	0.7	25/25	----------	Spoiler	0.1-10.0 mg/L	60	10	10.0	2.336	9

AA-4 SOP

1: KCl Must be added to samples and standards prior to analysis.
2: LnCl2 Must be added to samples and standards prior to analysis.
3: May be ran to 2 ppb with a special curve from 2 to 250. Please see SOP for more information.
4: Cold Vapor method. See SOP for detailed instructions for this metal.
5: Emmision method. Requires two curves using S1, S2, S3. Please refer to SOP.
6: Must use red filter.
7: CsCl2 Must be added to samples and standards prior to analysis.
8: HCl (10% V/V) Must be added to nondigested samples and standards prior to analysis.
9: Head must be turned so that the Chk ABS is achelved with the Std Chk.
10: Use small head (N2O head).
11: Wear special UV glasses to avoid eye damage.

Perkin-Elmer 5000 Atomic Absorption Spectrophotometer

1. Turn Monitor on, [press yellow button].
2. Depress reset button to boot the system.
3. Screen will display the following:

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   Options:
   A. Enter Regression Data
   B. Print Reports (there are no reports waiting)
   C. Exit The Program

4. To run analysis, enter [A]. The following screen will appear:

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   Please enter header information now. If you do not wish to enter more reports, type DONE when asked for the Analyst.

   Analyst (or DONE) :

5. Type in your name or initials. Press [Enter]
6. The current date will appear. If this date is incorrect, type in the correct date, (MM-DD-YY). Press [Enter]
7. Under (Parameter :) type in the element you will be analyzing. Press [Enter]
8. Under (Matrix :) type in the matrix of the sample, (example: water, soil, leachate, sludge). Press [Enter]
9. Under (Standard Units :) type [mg/l]. Press [Enter]
10. Under (Observed Units :) type [mg/l]. Press [Enter]
11. The program will then ask:

    Is this data correct? (Y/N)

    If the information is correct, type Y. If incorrect, type N and repeat steps 4-10. You may also cursor to the mistake and change the entry.

12. The following screen will appear:

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    Please enter standards data now. Press <x> to regress your data.

Standards	Observations

13. Enter your initial standard concentration, press [Enter]. You are now ready to run the calibration curve.

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Perkin Elmer 1100B Atomic Absorption Spectrophotometer
Equipment Protocol for GFAA analysis

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: R Ruckstuhl Date: 3/23/94
QA Supervisor: Gary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 16 Pages Revised: —

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I. Scope and Application

Graphite furnace atomic absorption spectroscopy (GFAAS) is a reliable method for determining trace level concentrations of metals in environmental samples. With proper pretreatment of samples, this method is applicable to soil samples, drinking, surface, and saline waters, and domestic and industrial wastes.

II. Instrumentation

A. Perkin-Elmer 1100B Atomic Absorption Spectrophotometer
B. Perkin-Elmer AS40 Autosampler
C. Perkin-Elmer HGA 400 Graphite Furnace

III. Safety

A. Before operating A.A., make sure exhaust fan, (located on the north wall by the light switches) is on.

B. The analyst must comply with all standard operating procedures for health and safety as oulined in the "WWES Laboratory Safety Manual."

1. Gloves and safety glasses must be worn at all times when handling digested samples, and concentrated acids.
2. UV radiation is emitted during the atomization stage, therefore, UV protected eyeglasses should be worn if looking at furnace. Ordinary safety glasses will, in general, provide sufficient protection, but additional side shields will ensure a further margin of safety.

C. Fasten all gas cylinders securely to a wall or counter.

D. The furnace generates high temperatures. The furnace controller will indicate when the furnace is cooled down after a heating cycle. Do not attempt to manually inject a sample before the furnace cools down. This may subject the operator to hazardous fumes from sample volatilization. There is also the potential for a severe burn.

IV. Maintenance

A. Clean furnace windows periodically.

1. See section VII-D-7 for cleaning conditions.
2. Procedure

a. Unscrew the two halves of the window.
b. Remove glass disk and wipe with a Kimwipe.
c. Replace window in the left and right hand assembly.
d. Absorbance due to windows should be <0.100.

B. Change pyrocoated, graphite tubes if wear is evident.

1. Environmental Express provides graphite tubes with inserted L'Vov platforms.
2. Procedure

a. Turn argon off by pressing the gas release valve to the 'open' position. The valve is located on the lower right of the graphite furnace box.
b. Shift the right hand side of the furnace assembly as far to the right as possible.
c. Remove the old graphite tube, and replace with the new tube and platform. Make sure the the platform grooves are pointing toward the left hand side of the furnace assembly, and the injection hole is centrally alligned.
d. Push back the right hand assembly and, simultaneously, press the gas release valve to the 'On' position.
e. Condition the tube with the following program:

Step	Furnace Temp.	Ramp	Hold
1	2650	60	2
2	20	1	20
3	2650	10	10
4	20	1	20
5	2650	10	10
6	20	1	20
7	2650	10	10

C. Change contact tubes if wear is impeding analytical results. (See PE 1100 B, User's Manual for instructions)

D. Keep work area clean.

E. Be sure lamp is clean. Remove fingerprints and dust with a Kimwipe.

F. Clean AAS windows with a Kimwipe.

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V. Procedure: Initial AAS set-up

A. Turn on the Argon gas supply to the furnace. Turn the valve all the way open, twist the valve back 1/4 turn. (Pressure is set at 400 kPa)

B. Turn on the cooling water to the furnace. (Water is located on the south wall, use top valve)

C. Turn on the AS40 Autosampler. (Red switch is located on the lower, right side of Autosampler Control)

D. Turn on the HGA 400 graphite furnace programmer. (Red switch is located on the lower, right side of Graphite Furnace Control box). Adjust gas flow to 300 mLs/min.

E. Lamp Installation

1. Insert the appropriate lamp into the turret, and position the lamp in front of the window.

2. Plug the lamp into an HCl (Hollow Cathode Lamp) port. (If HCl port 1 is used for analysis, a second lamp can be warming up in HCL port 2).

3. Turn instrument on by pressing the green button, located at the lower, left corner of the A.A. unit.

4. Wait until the instrument has gone through the internal diagnostics check. This will take approximately two minutes.

VI. Program: Element Select Mode

A. If diagnostics proceeds without error, the Element Select Mode screen page will appear.

B. Enter date, (yy/mm/dd) and press soft key labeled [DATE].

C. Key in the atomic number of the element to be determined and press [ELEMENT] soft key.

D. The lamp current setting will display a preset default value. If an alternative current is to be used, key in the new mA value and press [L. Curr].

E. Select [FURNACE MODE].

F. For current Wavelengths, Slit Widths, and Sensitivity Checks, see individual metals SOP's.

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G. Alternatively, Refer to P-E 1100B Operator's Manual for individual metal specifications including:

1. Alternate Wavelengths and Slits
2. Characteristic Concentrations
3. Sensitivity Check
4. Modifiers

H. If a stored program is to be used, press [User Index]. This enables the analyst to call up a program which has been established to run a particular elemental analysis.

1. Once the User Index is on the screen, press the number of the program to be used. Press [Recall], to load program. (Allow 3-4 minutes)

2. This automatically sets the preprogrammed wavelength, lamp current, standard concentrations, and replicates.

3. If any changes need to be made to the program, Press [Prog] key and make any changes using cursor arrows and the keypad.

4. Functions of the other keys in User Index:

   a. [STORE FILE]: Stores a program.
   b. [RECALL FILE]: Loads a stored program.
   c. [DELETE FILE]: Removes a stored program.
   d. [RENUMBER #:#]: Changes location of program.
   e. [PAGE UP]: Moves to following screen.
   f. [PAGE DOWN]: Moves to previous screen.

5. Go to Section C.

I. If no program is to be used, depress [Setup] mode key to put the Spectrophotometer into Setup Mode.

J. Setup Mode

1. The Setup Mode screen displays the energy level and a bar graph of the lamps intensity.

2. Energy levels depend on the installed lamp. Typically, ranges are between 50-75.

3. Align the lamp and optimize the wavelenghth, using the following steps:

   a. To optimize lamp intensity, rotate the lamp in one direction until the greatest intesity is achieved. (the bar graph will increase to the right). If the bar graph goes off the screen, press [Gain] key and graph will readjust.

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b. Once rotation of the lamp is completed, align with he two set screws located on the turret. Use the coarse adjustment screw first. Obtain the highest intensity level, then fine adjust with the second screw.

c. In SETUP MODE, there are four soft keys allowing the user to make adjustments to the lamp current, slit width wavelength and background source.

1. [LAMP CURRENT]: Adjusts current.
2. [SLIT]: Adjusts slit width.
3. [WAVELENGTH]: Adjusts wavelength
4. [BG CORR ON/OFF]: Turns on background correction

d. Allow the instrument and the radiation source to warm up. This usually will take 15-30 minutes.

VII. Furnace Assembly Installation

A. Depress [Cont] mode key to put the Spectrometer into Continuous Mode.

B. Press [Autozero].

C. Assembly Procedure:

1. Slide the furnace assembly and autosampler into the AA unit.
2. Lock the two handles located at the base of the furnace, and make sure the assembly is firmly in place.
3. Place the drain hose into a container.

D. Furnace Alignment

1. Press [Setup] soft key.
2. Make sure the background is turned off. If it is not, press [BG CORR. ON/OFF] (one box will appear on screen).
3. Press [Gain] and wait 2-3 minutes for wavelength to stabilize.
4. Press [Cont] to enter continuous mode, again.
5. Press [Autozero]
6. Remove both the right and left hand windows, located on the furnace. Windows come out by twisting and pulling in an outward motion.
7. Check both windows- if windows appear dirty, wipe clean with a Kimwipe, (See Section IV-A).
8. Rotate assembly out of the radiation beam.
9. Press [AUTOZERO].
10. Replace Assembly to the original position. If value is 0.000 go to step VII-D-11.

a. Release the lever.
b. Shift entire furnace left or right and obtain the value

closest to 0.000.

c. Use the large knob located under the left window, and adjust to 0.000, this adjusts the assembly up and down.
d. Use the small knob located in front, to adjust assembly back and forth.
e. Once 0.000 appears on the screen, go back to step VII-D-10, and repeat.

11. With the reading at 0.000 the beam is unimpeded. Place the left and right windows back into the assembly.

    a. If the absorbance due to the windows is ≤0.100, go to step VII-D-12
    b. If the absorbance due to the windows is >0.100, go to step IV-A-1, clean windows and repeat step IV
    c. Record the absorbance in the Furnace Run Log.

12. Press [Setup]
13. Turn on Background Correction by pressing [BG CORR. ON/OFF] and allow 10 minutes for D2 lamp to warm up.
14. The user is now ready to program the furnace, set the autosampler, check the characteristic concentration, calibrate the curve, and run samples.

VIII. Autosampler

A. When the autosampler was initially turned on, it automatically rinsed out the capillary tubing with four rinses of a 0.1% nitric acid/water solution. The sampling arm then moved to a resting position.

B. Autosampler alignment procedure:

1. Using the handwheel, swing the sampling arm over to the furnace so that the capillary tip is positioned just above the sample introduction port.
2. Turn the LOCK release, (located on the front of the sampler) clockwise. This allows movement of the autosampler platform.
3. With the horizontal control (located on the front of the sampler) and the lateral control (located on the left side of the sampler), carefully align the sampler so that the capillary tip can be lowered into the sample introduction hole in the graphite tube without striking the edge. Perform this alignment very carefully to avoid damaging the capillary tip.
4. When the capillary tip is correctly aligned, turn LOCK control counterclockwise to secure.
5. Lower the tip into the graphite tube until it is 2-3 mm above L'Vov platform.
6. Located next to the sampling arm are two knobs. Use the knob to adjust the tip to the required height above the platform.
7. The capillary tip is at the correct height when the sample droplet contacts smoothly with the graphite platform.

C. Press [STAND BY] to set sampling arm into its working position.

D. A digital readout of 20 ul will be displayed. This indicates the introduction of 20 ul to the graphite system. Alternate volumes can be used by entering the value on the keyboard, and then pressing [SAMPLE VOLUME].

E. A digital readout of 0 ul is present at the alternate volume position. If the user wishes to automatically introduce the matrix modifier, enter the volume using the keypad, then press the button, [ALT VOLUME]. The sampling arm with take the indicated volume of sample, inject into the graphite tube, and then take the indicated volume of modifier, and inject this solution onto the sample.

F. Enter the number of relicates per sample reading and press [REPL].

NOTE: The number of replicates indicated on the autosampler must equal the number of replicates on the AAS program.

G. Enter the number of standards and press [#STDS].

H. Enter the last sample position and press [LAST SAMPLE].

I. Press [Reset] to move the tray to the AZ position.

J. The autosampler is now ready to assist in the calibration of the curve.

IX. Programming the PE HGA 400 programmer

A. Adjust the gas flow to 300 mLs/min using the ADJ.GAS knob located at the base of the graphite box.

1. MINIFLOW can be used, See P-E Operator's Manual and the individual metal SOP's for specific requirements.

2. Gas valve must be in the ON postion.

B. Specific programs, found on the particular SOP's can be entered by keying in the values using the keypad and the following buttons:

1. [STEP]
2. [TEMP]
3. [RAMP TIME]
4. [HOLD TIME]

C. After entering the atomization step (usually step 4 or 5) press the following:

1. [REC]: records value to printer
2. [READ]: reads a value at peak absorbance
3. [STOP FLOW]: stops the flow of purge gas
4. BOC is performed automatically within the AAS unit.

D. Enter the atomization temp and go to Section X.

X. Calibration of Optical Temperature Sensor

A. Press [MANUAL TEMP]. The graphite tube will heat to the atomization temperature.

B. With [MANUAL TEMP] on, adjust the CAL knob, (located on the furnace) until both a red light and a green light occur simultaneously.

C. The user is now ready to check the Characteristic Mass, Calibrate a working curve and run samples.

XI. Checking Characteristic Mass

A. Located in the individual metal SOP's are cookbook values for the Characteristic Mass M(o) of a particular element.

1. The Characteristic Mass is the mass of analyte that gives 1% absorption or 0.0044 absorbance.

2. $$M(o) = \frac{uL * ug/L * 0.0044}{A\text{-}s}$$

3. The value should be within 20% of the cookbook value.
4. The characteristic mass is generally measured in peak area.
5. If the value is within 20%, the setup check out, and no further action is required.
6. If the C.M. >20%, then troubleshoot for low absorbance.
7. If the C.M. <20%, then

   a. Check for accuracy of the standard
   b. Check for contamination

B. Procedure

1. Press [Run] soft key.
2. Prepare a reference solution of the analyte element that will generate an absorbance signal of 0.2 A.
3. Set the blank solution in postion 1.

   a. Press on autosampler [1], [MANUAL], [START/STOP]
   b. 20 ul of blank will be injected into the furnace.

c. The furnace program will automatically dry, atomize, and read the concentration of the metal.

4. At the end of the HGA program, note the absorbance reading obtained for the blank solution (PEAK AREA).
5. Repeat Step XI-B-3 by placing an aliquot of the reference solution into the graphite tube.
6. When the measurement is complete, press [CHAR. MASS] soft key.
7. Key in the blank value, press [BLANK VALUE] soft key.
8. Key in the volume of the reference solution, press [VOLUME].
9. Key in the concentration of the reference solution and press [CONC] soft key.
10. Press [CALC. MASS], the characteristic mass is displayed on screen.
11. Compare the value obtained with the cookbook value. (See section XI-A)

XII. Calibration of Curve

A. To go into PROGRAM ELEMENT MODE press [Prog] soft key.

B. Screen description

1. The top line will show the following default settings and cannot be changed in this mode:

   a. FURNACE or FLAME
   b. Wavelength (nm)
   c. Slit (nm)
   d. Date

C. The following can be altered by using the cursor and keypad:

1. Technique: (AA, BG, AA-BG, EMMIS), most analyses will use AA-BG, see individual SOP's for requirements.
2. Signal Processing: (PA: Peak Area, PH: Peak Height)
3. Read delay: Not Applicable with furnace
4. Replicates: Furnace work requires a minimum of two replicates per run. An average will then be taken.
5. Background Full Scale: Set to Auto.
6. Lamp Current: Set in SETUP mode, do not change.
7. Integration time: This is equal to the atomization time set on the HGA 400 programmer.
8. Printer: Choose DATA/SUPPL & CALIB. This prints the AA readings, BG readings and a printout of the calibration curve.
9. Plot Full Scale: Set to Auto.
10. Calibration: Set to auto.
11. Calibration Units: press [ug/l] for furnace work.
12. Sample units: press [ug/l] for furnace work.
13. S1-S8: allows the concentrations of 8 standards to be entered. See the individual element SOP's for the particular requirements.
14. Reslope: Set with the midrange standard concentraition.

D. After all values have been entered in PROGRAM MODE, press the [Print] soft key. Press [PRINT SCREEN] for a permanent copy of the program.

E. Press [PRINTER ON/OFF] to turn the printer on. The box should turn green. The user is now ready to calibrate the curve and run samples.

F. Press [Run] to enter run mode.

1. Calibration procedure: (See individual metal SOP's for standard preparation)

   a. Press [STDS 1-4] and [STDS 5-8]. If any standard points from a previous calibration (indicated by a green box) are present, clear the last calibration by pressing [0], and then the standard point. (The green box clears).
   b. Load the calibration blank solution in the AZ position of the autosampler and add the indicated amount of matrix modifier. (See inidividual SOP's).
   c. Load S1-S3 in the remaining calibration positions on the autosampler. These standards must correspond to the the AA program in section XII-C-13. (Any remaining standards can be loaded in position 1-5, and manually calibrated, by running the standard and pressing the corresponding soft key [S4]-[S8]).
   d. On the autosampler press [RESET], [START/STOP].
   e. The standards will run according to the amount of replicates the user has indicated.
   f. A curve will automatically be calibrated.

2. Verification of the curve

   a. After the final standard is read, the calibration curve will be printed.
   b. Verify the calibration curve by running the blank, a low range (around the M.D.L.) sample, and the midrange standard. The midrange standard must agree within 10% of the actual concentration.
   c. If the curve is valid, the user is now ready to run samples.

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3. Running Samples

a. The following is the order in which samples are to be run: (See QC Section ___ for a definition of the abbreviations and requirements):

1. ICB (Calibration Blank)
2. ICV (Midrange Standard)
*3. LDL (Low Detection Limit Check)
4. LCS (Outside Reference)
5. MPB (Digested Method Blank)
6. LS (Digested Lab Spike)
7. Sample (QC Batch Sample)
8. Dup (Sample duplicate)
9. SPK (Matrix Spike)
10. MSD (Matrix Spike Duplicate)
11. All Remaining Samples.
12. Curve must be checked every 10 samples using a minimum of a CCB and the midrange CCV. (See QC sections for actions of nonconformance)

4. Procedure

a. Pour 2.0 mLs of sample into Autosampler cups.
b. Add the appropriate amount of matrix modifier.
c. Place cups in proper locations. [Record locations in graphite run log]
d. Press [1], [MANUAL], [START/STOP].
e. Graphite furnace will analyze until the indicated last sample is reached.
f. If dilution is required, press [WT/VOL CORRECT]

1. Enter solution volume and press [VOL (L)]
2. Enter solution mass and press [WT (G)]

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XIII. Quality Assurance

A. Quality Control Samples

1. Definitions of Abbreviations and Nonconformance Actions (The following QC sample shall be included for each analytical batch of samples).

a. ICB--Initial Calibration Blank

The initial calibration blank is a reagent blank that is analyzed as a sample once a calibration curve has been generated for a particular test. The ICB will check how close your curve passes through zero. Acceptance limits for an ICB is + or - the test reporting D.L. If the ICB is outside these limits the instrument must be recalibrated and the ICB reanalyzed.

b. ICV--Initial Calibration Verification

The initial calibration standard is a mid range standard. This standard is analyzed as a sample and calculated against your standard curve. The ICV will check the precision of your curve. Acceptance limits for this standard are + or - 10% or as stated for a particular method. If the ICV falls outside these limits the instrument must be recalibrated and the process repeated.

c. LCS--Laboratory Control Standard

The laboratory control sample is a known reference sample that is traceable to an outside source. The purpose of the LCS QC type is to validate the accuracy of your analysis. Acceptance limits for this QC type are based upon a 95% confidence limit generated from historical data for this test. If the LCS falls outside the established limits, the analytical batch must be flagged for re-extraction, re-digestion or reanalysis.

d. MPB--Method Prepared Blank

The method preparation blank is a blank that has been carried through the entire analytical process including any sample pretreatment procedures. The MPB will monitor any contaminates that may affect the sample results. General acceptance limits for a MPB is + or - the test ODL. For some specific tests the MPB values may be subtracted from the regular sample results if outlined in the method. If contamination is detected in the MPB, the entire pretreatment batch must be flagged for re-extraction or digestion. If it is not possible to re-prep the samples then all

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analyses reported for that batch must be qualified.

e. LS--Laboratory Spike

The laboratory spike is an aliquot of deionized water that has been spiked with a known amount of stock reference standard or spiking solution. The purpose of the laboratory spike is to verify the analyst's spiking procedure and assure that any matrix interference shown by the spike and spike duplicate is really matrix induced.

f. CCB--Continuing Calibration Blank

The continuing calibration blank is a reagent blank that is analyzed as a sample, generally after 10 samples have been tested. The CCB must be run prior to re-zeroing an instrument. The CCB will validate whether significant instrument drift has occurred during the analytical run. Frequency of analysis is after every 10 samples. Acceptance limits are + or - the test ODL concentration. If the CCB falls outside the control limits, the instrument must be recalibrated, and all samples since the last successful CCB must be rerun.

g. CCV--Continuing Calibration Verification

The CCV is the midrange standard that was analyzed as the ICV. The CCV will validate any drift of the curve. Acceptance limits for this QC are + or - 20%, or as stated for a particular method. If the CCV falls outside the acceptance window, the instrument must be recalibrated and all samples since the last successful CCV must be rerun.

h. SPK--Matrix Spike

The sample matrix spike is an aliquot of a sample that has been spiked with a known amount of a stock reference standard or spiking solution. Spikes are run at a frequency of one per matrix type up to a maximum of 20 samples. The purpose of the SPK is to monitor sample matrix effects on the test. Acceptance limits are 80-120%.

i. DUP--Sample Duplicate

The sample duplicate is a replicate analysis of a particular sample that has been carried through the entire analytical process. A DUP is required for each matrix type within the analytical batch at a frequency equivalent to the SPK. The purpose of the DUP is to monitor precision within the analytical process.

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j. MSD--Matrix Spike Duplicate

A spike duplicate is an aliquot of the same sample used for the spike that has been spiked with a known amount of a stock reference standard or spiking solution. A spike duplicate is required for each matrix type within a digestion. Frequency is the same as the SPK. Acceptance limits are 80-120%.

2. Calibration protocol and Confirmation

a. A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient should be greater than 0.995. If this fails the problem must be corrected.

b. Calibration should be performed by using appropriate standards that bracket the range of samples to be analyzed.

c. An initial calibration blank (ICB) is run immediately after the curve. The ICB must not be greater than or equal to + or - the reported detection limit.

d. The residual error from the fit of the ICV should not be greater than 10% for any standard.

e. The LCS must be + or - 20% the true value.

f. Run a CCB and A CCV every 10 samples. The CCV must be + or - 20% the true value.

g. At least one spiked sample and spiked duplicate sample must be run for every batch of 20 samples (of similar matrix). The recoveries must fall within the control limits. If not, determine the problem and qualify the nonconformance.

h. % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If out of limits, determine the problem and qualify the nonconformance.

i. Dilute samples with analyte concentrations that exceed the highest standard.

j. During calibration, efforts should be made to ensure that the instrument reaches baseline prior to analysis of each standard. {Automatic BOC performed on the PE 1100B}.

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VIV. Shutdown

A. Turn cooling water off.

B. Turn Autosampler off.

C. Turn Graphite Furnace Control Box off.

D. Turn off Argon gas.

E. Turn AAS unit off.

F. Remove graphite furnace/autosampler assembly and place on rack.

G. Turn printer off.

H. Clean area around AAS unit

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XV. Calculations and Data Handling

A. Concentrations are read directly from the calibration curve.

B. Printed results from the AA are in final concentration form.

C. Blank correction has not been employed in the metals lab. If the MPB is greater than the detection limit, this value is recorded. The source of the contamination is determined, and the recorded value is qualified.

D. If dilution of the sample is required, then multiply the result from the calibration curve by the dilution factor.

C * (V1 / V2)

1. C = concentration from calibration curve
2. V1 = final volume of the sample (mLs)
3. V2 = sample aliquot (mLs)

E. Calculations for solid samples, report all results as ug/kg.

(C * V1) / W

1. C = ug/L concentration from calibration curve
2. V1 = final volume of sample (mLs)
3. W = weight of sample (grams)

F. The following forms and logs must be fully filled:

1. Maintenance log
2. PE 1100B furnace run log
3. Benchsheets

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USEPA METHOD 3050
FLAME/ICP DIGESTION OF SOIL, SLUDGE AND SEDIMENT

Approvals: Laboratory Manager: T J Geyer Date: 3/23/94
Area Supervisor: [signature] Date: 3/23/94
QA supervisor: Gary E. Spencer Date: 3/23/94
Revision Number: 1 By: TJG Effective Date: 3/23/94
Total Number of Pages: 6 Pages Revised: —

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TITLE: Standard Operating Procedure for the Acid Digestion of Sediments, Sludge, and Soils for metals analysis by Flame AA or ICP

I. Scope and Application

- Specific Method Utilized: Method 3050, EPA Test Methods for Evaluating Solid Waste, Volume One, Section A, 1986.
- Procedure can be used for the preparation of solid wastes, including soils, sludges and Sediments.
- Specific analytes(s) being determined: Al, As, Ba, Be, Cd, Ca, Cr, Co, cu, Fe, Pb, Mg, Mn, Ni, K, Se, Na, Tl, V, Zn
- Required Reporting Limits: Refer to ICP or FLAA detection limit study, for the individual element limits of detection using the ARL 3560 B, ICP Analyzer or P-E 1100 B, A.A.

II. Summary

A two gram sample (wet weight) is digested using nitric acid, hydrochloric acid and hydrogen peroxide. The sample is concentrated to approximately 5-10 mLs, then, brought up to a final volume of 50 mls using milli-Q, deionized water. The elements are analyzed using the ICP unit or FLAA. Results are reported according to the dry weight of the sample.

III. Definitions

- ICP: Inductively Coupled Plasma

IV. Responsibilities

- The technician is responsible for QA/QC preparation of samples prior to digestion. This includes sample batching and spiking.
- The technician is responsible for making sure glassware is clean and contamination-free.

- The analyst is responsible for informing the group leader of any supplies that are needed, or ordering the supplies.

- The technician is responsible for determining the dry weight of the solid sample.

V. Interferences and Helpful Hints

- Helpful Hints

  a. Sludge and Soil samples can contain diverse matrix types, thoroughly homogenize before digestion.
  b. Maintain consistency when weighing sample or adding acids.
  c. Interferences are discussed in the referring analytical method.
  d. HCl is not recommended for Ag digestion.
  e. Periodically, observe and stir flasks. Do not let them go dry. Rinse flask sides off with deionized water.
  f. Bring samples up to volume using graduated, conical, centrifuge tubes.

- **CAUTION:** This method uses hot, concentrated acids, so caution and proper protective wear must be utilized, including goggles, gloves and lab coat. Add acids and peroxides under the hood.

VI. Sampling, Sample preservation, and Holding Times

- Sampling Methodologies

  a. Sampling Conditions: all sample containers must be prewashed with detergents, acids, and Type II water.
  b. Container Specifications: Plastic or Glass

- Preservative: Soils must be stored in a refrigerator at 4 °C.

- Holding times: 28 days

VII. Safety

- All work is to be done under the hood.
- Avoid breathing acid fumes.
- Avoid body contact with sample. Wear safety equipment including safety glasses, gloves, and lab coat. In case of contact with acid, run cold water over affected area for 10-15 minutes. Use the eyerinse sink if acid contacts eyes. Report all accidents to the group leader.
- Be careful not to touch the hot plate. An operating hot plate unit can cause injury.

VIII. Quality Control Requirements

- Type and Frequency of QC Check

  a. (MPB) Method Prepared Blank

  A deionized water blank must be carried through the entire digestion procedure. Run one method blank every twenty samples, or one per batch. The method blank is used to determine elemental contamination that may be found in the deionized water.

  b. (LS) Laboratory Spike

  A prepared standard, of known concentration, is digested. The concentration of the laboratory standard used in this lab will be 0.50 ppm - 1.0 ppm for elements of concern (two to five times the D.L.) Run one laboratory spike every twenty samples, or one per batch.

  c. (DUP) Sample duplicate

  A sample duplicate will be digested every twenty samples, or one duplicate per batch. An equal, homogeneous representation of the original sample is used. Duplicate values should be less than or equal to 20% relative percent difference.

  d. (SPK) or (MS) and (MSD) Matrix Spike and Matrix Spike Dup.

  Spiked samples of known concentration will be digested every twenty samples, or one every batch. The recommended spiking levels are two to five times the sample concentrations. Levels should be equal to those of the LS. SPK and MSD recoveries should be within 80-120%.

- Evaluation procedure

  a. Samples are analyzed using the ICP or FLAA.
  b. Corrective action: If samples fall outside QA/QC ranges, sample is redigested and reanalyzed.

IX. Apparatus and Materials

- Specifications for Apparatus, Instruments, and Equipment

  a. Hot Plates: Thermolyne
  b. Stir Plate
  c. Analytical balance: Sartorius 0.01 g
  d. Drying Oven: VWR 1310

- Materials: (digestion)

  a. 150 mL beakers
  b. 50-100 mL graduated cylinders
  c. Watchglasses

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d. Pipets
e. Whatman No. 41 filter papers
f. Filters/Funnels
g. Water bottles

o Materials: (dry weight determination)

a. Aluminum weighing trays
b. wooden tongue depressors

X. Reagents and Standards

o Specifications for Reagents

a. Concentrated Nitric Acid: (trace metal grade)
b. Concentrated Hydrochloric Acid: (trace metal grade)
c. Hydrogen Peroxide: (30%)
d. Certified Reference Solutions

o Specifications for Standards

A 100 ppm multi-elemental Spiking Solution (SPEX) is used to spike samples. Spiking stock solutions are received, logged into a standards/reagent notebook, and stored at room temperature until expiration date. Samples are logged by: date received, element, concentration, quantity, manufacturer and expiration date. If standards are prepared, procedure is logged in one of the following logbooks: AA run log, ICP run log or standards preparation log.

XI. Procedure for the determination of percent dry weights

1. Record all data on the percent dry weight worksheet found in the percent dry weight notebook.

2. Use Sartorius (A200S) analytical balance.

3. Weigh and record aluminum pan.

4. Weigh out, approximately 20.00 g of sample, [Record weight].

5. Place in oven and let dry for 24 hours at 105 degrees C.

6. Cool in dessicator, reweigh dry sample, [Record weight].

7. Calculations:

   a. Net, Dry = Gross, Dry - Pan Tare
   b. % Dry Weight = (Sample, Dry)/(Sample, Wet) * 100%

8. Use percent dry weight in final, concentration, calculation.

XII. Procedure for the digestion of soil, sludge and sediment

IMPORTANT: BE SURE TO FILL OUT DIGESTION LOG WITH: DATE OF DIGESTION, ANALYSTS INITIALS, CLIENT, DILUTION, TESTS, DIGESTION METHOD, SAMPLE, BATCH Q.C. AND SPIKING INFORMATION.

1. Rinse, with 1:1 nitric acid, 50 mL graduated cylinders and 150 mL beakers.

2. Arrange samples on counter and label the beakers with the job number, sample number, dilution and tests. Label tests as follows:

    1. TM: total metals run by ICP
    2. FLAA: metals run by AA flame
    3. X: individual metal (example: Pb)

3. Batch quality control is run every 20 samples or as requested by a specific client. Label six beakers as follows:

    1. MPB (Date of Digestion): Method Prepared Blank
    2. LS (Date of Digestion): Laboratory Spike
    3. Sample #
    4. Sample #-DUP: Duplicate
    5. Sample #-SPK or MS: Matrix Spike
    6. Sample #-MSD: Matrix Spike Duplicate

4. Stir samples and form a consistent, homogeneous mixture. Use a pestle and mortar for consistency. Remove any large stones.

5. Weigh out 2.00 g of sample into a 150 mL beaker. [Record weight on the beaker and in the digestion logbook. Also, record final volume of solution: Example 2.02 g / 50 mL]

** PERFORM ALL REMAINING STEPS UNDER THE HOOD **

6. Add 5.0 mL concentrated trace metal nitric acid and 10 mL milli-Q water. Mix the slurry. Cover with watchglass. Spike designated QC sample.

7. Heat at 95 degrees C for 10-15 minutes. Cool, add 5.0 mLs additional trace metal nitric acid.

8. Let sample evaporate to approximately 5.0 mLs. Remove from hotplate and Cool. [Do not let sample go dry]

9. Add 2.0 mLs water and 1.0 mL 30% hydrogen peroxide. Place on hotplate and evaporate. Continue adding peroxide until effervescence is minimal, and no noticeable change in sample appearance. Do not exceed 10 mLs peroxide. Cool.

10. Add 5.0 mLs hydrochloric acid. Cover with watchglass. Heat for an additional 15-20 minutes (until fumes are a light yellow. Remove from hotplate and cool.

11. Rinse watchglasses into beakers. Wash the sides of the beaker.

12. Rinse 50 mL volumetric flasks with DI water. Rinse filters and Whatman #41 filter paper with 1:1 nitric acid.

13. Filter the sample into the volumetric flask. Rinse the beaker a minimum of three times.

14. Label the plastic centrifuge cylinder exactly as the beaker was labeled. Sample number, tests and dilution.

15. Keep the batch together and place on the counter for analysis.

XII. Data Reporting

- The concentrations determined are to be reported on the basis of dry weights
- Enter date of digestion in LIMS.
- Record sample number, date of digestion, spike concentration method of digestion, final dilution, and test in digestion notebook.

XIII. References

- Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.
- EPA Test Methods for Evaluating Solid Waste, 3rd Edition, Volume 1A, Section A, September 1986.

XIV. SOP prepared by: GES

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1.0 COPPER (Cu)-GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Gary C. Spencer Date: 10-6-94
Revision Number: 2 By: GCS Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: All

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 202.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7211

4.0 PARAMETER LIST

4.1 Copper

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of copper in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.

[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer: Single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Copper hollow cathode lamp or electrodeless discharge lamp.

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II)

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I)

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l copper stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Magnesium Nitrate/Palladium Modifier

12.7.1 Preparation of 1% Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. HNO3 and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of concentrated HCl and 5 ml of water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of Mg(NO3)2-6H2O, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium Nitrate-Madnesium nitrate

Take 15 ml of 1% Pd and 10 ml of 1% Mg(NO3)2 and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug Mg(NO3)2.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

10 ug/l Cu-100 ml volumetric flask
30 ug/l Cu-100 ml volumetric flask
60 ug/l Cu-100 ml volumetric flask
10,000 ug/l Cu-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1 ml 1000 ppm Cu stock standard into 100 ml flask labeled 10,000 ug/l Cu.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.10 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 10 ug/l Cu. Dilute to volume and mix.

13.9 Pipet 0.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 100 ug/l Cu. Dilute to volume and mix.

13.10 Pipet 0.6 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60 ug/l 60. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

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14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	1	9
2	120	10	30
3	1000	10	30
4	2300	0	5
5	2650	1	6
6	20	1	5

Wavelength: 324.8 nm with a 0.7 nm slit

Modifier: 0.005 mg Pd + 0.003 mg $Mg(NO_3)_2$ per 5 ul

Lamp: Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.11 A-s @ 5.0 ug/l

M(O) (P-E 1100 B): 4.0

17.0 FLOW CHART

18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

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A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be $\pm 10\%$ of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be $\pm 20\%$ of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be $\pm 20\%$ of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than or equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be $<20\%$ if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol. 1A, September 1986, Revision 1, December 1987.

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1.0 ARSENIC (As) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Dwyer Date: 10/6/94
Area Supervisor: T Duncan Date: 10/6/94
QA Supervisor: Gary E Spencer Date: 10-6-94
Revision Number: 2 By: TJD Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: All

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 206.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7060

4.0 PARAMETER LIST

4.1 Arsenic

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of arsenic in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp or Electrodeless discharge lamp.

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I)

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l arsenic stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Magnesium Nitrate/Palladium Modifier

12.7.1 Preparation of 1% Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. HNO3 and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of concentrated HCl and 5 ml of water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of $Mg(NO3)2\text{-}6H2O$, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium Nitrate-Madnesium nitrate

Take 15 ml of 1% Pd and 10 ml of 1% $Mg(NO3)2$ and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug $Mg(NO3)2$.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l As-100 ml volumetric flask
60.0 ug/l As-100 ml volumetric flask
120.0 ug/l As-100 ml volumetric flask

10,000 ug/l As-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm As stock standard into 100 ml flask labeled 10,000 ug/l As.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l As. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60.0 ug/l As. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l As. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	1	9
2	120	10	30
3	1300	10	30
4	2300	0	5
5	2650	1	6
6	20	1	5

Wavelength: 193.7 nm with a 0.7 L nm slit

Modifier: 0.005 mg Pd + 0.003 mg $Mg(NO_3)_2$ per 5 ul

Lamp: Electrodeless Discharge or Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.15 A-s @ 25 ug/l

M(O) (P-E 1100 B): 15.0

17.0 FLOW CHART

18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than of equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol.1A, September 1986. Revision 1, December 1987.

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1.0 CADMIUM (Cd) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Lucy E Spencer Date: 10-6-94
Revision Number: 2 By: FSB Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: All

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 213.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7131

4.0 PARAMETER LIST

4.1 Cadmium

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of cadmium in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall or counter.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp or Electrodeless discharge lamp.

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type I).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I)

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l cadmium stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Magnesium Nitrate/Palladium Modifier or Ammonium Phosphate

12.7.1 Preparation of 1% Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc HNO3 and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of concentrated HCl and 5 ml of water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

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12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of Mg(NO3)2-6H2O, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium Nitrate-Madnesium nitrate

Take 15 ml of 1% Pd and 10 ml of 1% Mg(NO3)2 and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug Mg(NO3)2.

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13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

1.0 ug/l Cd-100 ml volumetric flask
2.0 ug/l Cd-100 ml volumetric flask
5.0 ug/l Cd-100 ml volumetric flask

1000 ug/l Cd-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 1,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 0.10 ml 1,000 ppm Cd stock standard into 100 ml flask labeled 1000 ug/l Cd.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.10 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 1.0 ug/l Cd. Dilute to volume and mix.

13.9 Pipet 0.20 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 2.0 ug/l Cd. Dilute to volume and mix.

13.10 Pipet 0.5 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 5.0 ug/l Cd. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	1	20
2	500	10	30
3	20	0	10
4	1650	0	5
5	2650	1	6
6	20	1	5

Wavelength: 228.8 nm with a 0.7 nm slit

Modifier: 0.005 mg Pd + 0.003 mg Mg(NO3)2 per 5 ul or
0.05 mg NH4H2PO4 + 0.003 Mg(NO3)2 per 5 ul

Lamp: Electrodeless Discharge or Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.18 A-s @ 1.0 ug/l

M(O) (P-E 1100 B): 0.5

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than or equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol. 1A, September 1986, Revision 1, December 1987.

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1.0 CHROMIUM (Cr) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: TJ Hayes Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Jay E. Spencer Date: 10-6-94

Revision Number: 2 By: TJS Effective Date: 10/6/94
Total Number of Pages: 9 Pages Revised: All

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3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 218.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7191

4.0 PARAMETER LIST

4.1 Chromium

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Chromium in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - Single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type I).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I).

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l Cr stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Calcium nitrate solution or Magnesium Nitrate

12.7.1 Calcium nitrate solution: Dissolve 11.8 grams of calcium nitrate, Ca(NO3)2-4H2O (analytical reagent grade), in Type II water and dilute to 1 liter.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of Mg(NO3)2-6H2O, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

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13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l Cr-100 ml volumetric flask
60.0 ug/l Cr-100 ml volumetric flask
120.0 ug/l Cr-100 ml volumetric flask

10,000 ug/l Cr-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm Cr stock standard into 100 ml flask labeled 10,000 ug/l Cr.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l Cr. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60.0 ug/l Cr. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l Cr. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	1	9
2	120	10	30
3	1650	10	30
4	2500	0	4
5	2650	1	6
6	20	1	5

Wavelength: 357.9 nm with a 0.7 nm slit

Modifier: $Ca(NO_3)_2 \cdot 4H_2O$ or 0.05 mg $Mg(NO_3)_2$

Lamp: Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.15 A-s @ 5.0 ug/l

M(O) (P-E 1100 B): 3.0

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than or equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol. 1A, September 1986, Revision 1, December 1987.

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1.0 LEAD (Pb) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Geyer Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Gary E. Spencer Date: 10-6-94
Revision Number: 24 By: TSB Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: All

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 239.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7421

4.0 PARAMETER LIST

4.1 Lead

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Lead in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - Single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp or Electrodeless Discharge Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I).

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l lead stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Palladium + Magnesium Nitrate solution or Ammonium Phosphate

12.7.1 Preparation of 1 % Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. nitric acid and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of conc. HCl and 5 ml water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of $Mg(NO3)2\text{-}6H2O$, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium-Magnesium Nitrate solution

Take 15 ml of 1% Pd and 10 ml of 1% $Mg(NO3)2$ and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug magnesium nitrate.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l Pb-100 ml volumetric flask
60.0 ug/l Pb-100 ml volumetric flask
120.0 ug/l Pb-100 ml volumetric flask

10,000 ug/l Pb-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm Pb stock standard into 100 ml flask labeled 10,000 ug/l Pb.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l Pb. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60.0 ug/l Pb. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l Pb. Dilute to volume and mix.

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13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	100	5	20
2	140	5	20
3	500	10	40
4	1900	0	5
5	2650	1	6
6	20	1	5

Wavelength: 283.3 nm with a 0.7 nm slit

Modifier: 0.015 mg Pd + 0.01 mg $Mg(NO_3)_2$ per 5 ul
0.05 NH_4PO_4 + 0.003 Mg $(NO_3)_2$ per 5 ul

Lamp: Hollow Cathode or Electrodeless Discharge

Sensitivity check (P-E 1100 B) @ 20 ul: 0.18 A-s @ 20.0 ug/l

M(O) (P-E 1100 B): 10.0

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than of equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol. 1A, September 1986. Revision 1, December 1987.

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1.0 SELENIUM (Se) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: _____ Date: 10/6/94
Area Supervisor: _____ Date: 10/6/94
QA Supervisor: _____ Date: 10-6-94
Revision Number: 2 By: TSS Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: —

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 270.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7740

4.0 PARAMETER LIST

4.1 Selenium

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Selenium in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.

[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - Single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.

10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Electrodeless Discharge Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I).

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l selenium stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Palladium + Magnesium Nitrate solution

12.7.1 Preparation of 1 % Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. nitric acid and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of conc. HCl and 5 ml water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of Mg(NO3)2-6H2O, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium-Magnesium Nitrate solution
Take 15 ml of 1% Pd and 10 ml of 1% Mg(NO3)2 and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug magnesium nitrate.

12.8 Nickel nitrate solution (5%): Dissolve 24.780 g of ACS reagent grade Ni(NO3)2-6H2O or equivalent in Type II water and dilute to 100 ml.

12.9 Nickel nitrate solution (1%): Dilute 20 ml of the 55 nickel nitrate to 100 ml with Type II water.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l Se-100 ml volumetric flask
60.0 ug/l Se-100 ml volumetric flask
120.0 ug/l Se-100 ml volumetric flask

10,000 ug/l Se-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm Se stock standard into 100 ml flask labeled 10,000 ug/l Se.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l Se. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled

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60.0 ug/l Se. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l Se. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	1	9
2	120	10	30
3	1100	10	30
4	2100	0	5
5	2650	1	6
6	20	1	5

Wavelength: 196.0 nm with a 2.0 nm slit

Modifier: 0.015 mg Pd + 0.01 mg $Mg(NO_3)_2$ per 5 ul
or 1 % nickel nitrate $Ni(NO_3)_2$

Lamp: Electrodeless Discharge

Sensitivity check (P-E 1100 B) @ 20 ul: 0.19 A-s @ 50 ug/l

M(O) (P-E 1100 B): 23

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than of equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol.1A, September 1986. Revision 1, December 1987.

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1.0 SILVER (Ag) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Gysi Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Gary E Spencer Date: 10-6-94
Revision Number: 2 By: TSS Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: —

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 272.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7761

4.0 PARAMETER LIST

4.1 Silver

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Silver in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to methods 3020 or 3050 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I)

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l silver stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Palladium + Magnesium Nitrate solution

12.7.1 Preparation of 1 % Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. nitric acid and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of conc. HCl and 5 ml water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of $Mg(NO3)2\text{-}6H2O$, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium-Magnesium Nitrate solution
Take 15 ml of 1% Pd and 10 ml of 1% $Mg(NO3)2$ and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug magnesium nitrate.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

3.0 ug/l Ag-100 ml volumetric flask
9.0 ug/l Ag-100 ml volumetric flask
18.0 ug/l Ag-100 ml volumetric flask

1000 ug/l Ag-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 1,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 0.1 ml 1.000 ppm Ag stock standard into 100 ml flask labeled 1,000 ug/l Ag.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.30 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 3.0 ug/l Ag. Dilute to volume and mix.

13.9 Pipet 0.90 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 9.0 ug/l Ag. Dilute to volume and mix.

13.10 Pipet 1.8 ml of the 1,000 ug/l standard and transfer it to the 100 ml flask labeled 18.0 ug/l Ag. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

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14.0 SAMPLE PREPARATION

See Method 3020 or 3050 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 Specific Element Program Conditions

Step	Furnace	Time	Hold
1	90	1	9
2	120	10	30
3	1000	10	30
4	1800	0	5
5	2650	1	6
6	20	1	5

Wavelength: 328.1 nm with a 0.7 nm slit

Modifier: 0.015 mg Pd + 0.01 mg $Mg(NO_3)_2$ per 5 ul

Lamp: Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.12 A-s @ 2.0 ug/l

M(O) (P-E 1100 B): 1.5

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be $\pm$10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be $\pm$20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be $\pm$20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than of equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol 1A, September 1986, Revision 1, December 1987.

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1.0 ANTIMONY (Sb) - GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: T J Boyer Date: 10/6/94
Area Supervisor: [signature] Date: 10/6/94
QA Supervisor: Amy E. Spencer Date: 10-6-94
Revision Number: 2 By: TJB Effective Date: 10/6/94
Total Number of Pages: 10 Pages Revised: —

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 204.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7041

4.0 PARAMETER LIST

4.1 Antimony

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Antimony in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

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Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to method 3005 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily-volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 To eliminate other interferences use magnesium nitrate/palladium as a matrix modifier.

7.7 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.

[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I)

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l antimony stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

12.7 Palladium + Magnesium Nitrate solution

12.7.1 Preparation of 1 % Palladium Solution

To 0.5 grams of high purity Pd powder, add 5 ml conc. nitric acid and 5 ml of deionized water. Heat for approximately 1 hour until the volume is reduced to about 1-2 ml. Add 1-2 ml nitric acid plus 100 ul of conc. HCl and 5 ml water and warm for 30 minutes. Repeat this second step until a total of 5 ml of nitric acid have been added, then dilute to 50 ml. This solution is stable for several months.

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12.7.2 Preparation of 1 % Magnesium nitrate solution

To 1.7 grams of $Mg(NO3)2\text{-}6H2O$, add 1 ml concentrated nitric acid and bring to a total volume of 100 ml with deionized water.

12.7.3 Preparation of Palladium-Magnesium Nitrate solution
Take 15 ml of 1% Pd and 10 ml of 1% $Mg(NO3)2$ and dilute to 50 ml with 1% nitric acid. A 5 ul volume injected into the graphite furnace will contain 15 ug Pd and 10 ug magnesium nitrate.

13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l Sb-100 ml volumetric flask
60.0 ug/l Sb-100 ml volumetric flask
120.0 ug/l Sb-100 ml volumetric flask

10,000 ug/l Sb-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm Sb stock standard into 100 ml flask labeled 10,000 ug/l Sb.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l Sb. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60.0 ug/l Sb. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l Sb. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix J).

14.0 SAMPLE PREPARATION

See Method 3005 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	100	5	20
2	140	5	20
3	500	10	40
4	1900	0	5
5	2650	1	6
6	20	1	5

Wavelength: 217.6 nm (Primary), 231.1 nm (Secondary)
with an 0.7 nm slit

Modifier: 0.015 mg Pd + 0.01 mg Mg(NO3)2 per 5 ul

Lamp: Hollow Cathode

Sensitivity check (P-E 1100 B) @ 20 ul: 0.2 A-s @ 50 ug/l

M(O) (P-E 1100 B): 22

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be $\pm 10\%$ of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be $\pm 20\%$ of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be $\pm 20\%$ of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than or equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol. 1A, September 1986. Revision 1, December 1987.

1.0 NICKEL (Ni) GRAPHITE FURNACE ATOMIC ABSORPTION SPECTROSCOPY (GFAA)

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2.0 RECORD OF APPROVAL

Approvals: Laboratory Manager: Thomas J Geyer Date: 10/6/94
Area Supervisor: R Duncan Date: 10/6/94
QA Supervisor: Kay E Spencer Date: 10-6-94
Revision Number: 2 By: TJG Effective Date: 10/6/94
Total Number of Pages: 9 Pages Revised: 10/6/94

3.0 PRINCIPAL METHOD REFERENCE

3.1 Method for Chemical Analysis of Water and Wastes
Revised March 1983
USEPA Method 249.2

SW-846 Test Methods for Evaluating Solid Wastes
Vol. 1A, September, 1986
USEPA Method 7520

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4.0 PARAMETER LIST

4.1 Nickel

5.0 SCOPE AND APPLICATION

5.1 This method is the graphite furnace atomic absorption method for the analysis of Nickel in aqueous and non-aqueous samples.

6.0 SUMMARY OF TEST METHOD

6.1 Graphite furnace atomic absorption spectroscopy (GFAAS) is a fast and reliable method for the quantification of trace metals in environmental samples. Its sensitivity and ability to analyze diverse sample types makes it the most prevalent method in use for the determination of metals at ppb and sub-ppb levels.

Prior to analysis, most samples need some type of dissolution procedure performed on them. This 'pretreatment' of the sample usually involves heating the sample in the presence of a combination of HNO_3, and H_2O_2. Please refer to method 3050 or 3020 for a more in-depth discussion of these techniques.

In GFAAS, the sample is pipetted into a graphite tube using a hand pipette or some type of mechanical pump able to dispense microliter quantities. The tube is heated to a low temperature (around 110C) by passing a current through the graphite. When the sample is completely dried, the tube is heated to a higher temperature. This step, called the pyrolysis or char step, attempts to volatilize any organics and/or any easily volatilized metals which could interfere in the atomization step. At this point, the furnace may or may not cool the tube down. The decision to cool the tube down is based on the design of the furnace; the newer transversal heating method not needing a cool-down step. Next, the tube is heated quickly (in about 1 second) to the atomization temperature. The metal of interest is volatilized from the tube, creating free atoms in the ground state. Light from an emission source (usually an HCL or EDL) is passed through the tube containing the atoms The lamp usually contains only the metal of interest, hence the wavelengths of light emitted from the source correspond to the wavelengths of light that the free atoms can absorb. The free atoms absorb the light as it is passed through the tube, causing a decrease in the intensity of the light reaching the detector. This decrease in intensity is directly proportional to the number of free atoms, and hence, the concentration of the analyte in the sample.

A standard curve is constructed by measuring the absorbance of known concentrations of the analytes and linearly or nonlinearly plotting concentration versus absorbance. The absorbance of the unknown sample is then measured, and the value for the concentration is extrapolated from the standard curve.

7.0 INTERFERENCES AND CORRECTIVE PROCEDURES

7.1 Continuum background correction cannot correct for all types of background interference. The use of Zeeman background correction will correct this problem.

7.2 Interference from a smoke-producing matrix may be reduced by extending the char time and/or charring at a higher temp.

7.3 Anion interference studies show that the nitrate anion is preferred. If another anion is required, a minimum amount should be used. This applies particularly to hydrochloric and, to a lesser extent, to sulfuric and phosphoric acids.

7.4 Contamination can be major sources of error because of the low sensitivities of the furnace. Work areas and glassware should be kept clean. Pyrolytic graphite

can also become contaminated. As many as 5 to 10 high-temperature burns may be required to clean the tube before use.

7.5 To suppress sulfate interference (up to 1500 ppm) lanthanum may be added as the nitrate to both samples and calibration standards.

7.6 Use plastic glassware whenever possible.

8.0 SAFETY PRECAUTIONS

8.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.2 Gloves and safety glasses must be worn at all times when handling concentrated acids. Gloves are also recommended when handling digested samples.

8.3 Fasten all gas cylinders securely to a wall, counter, etc.

8.4 Check the AA Hood to be sure it is operating correctly.

8.5 The graphite tube during atomization emits intense UV radiation. UV protected eyeglasses should be worn.

8.6 During the read step strong magnetic fields are created. Anyone wearing an electronic pacemaker or having metallic implants should remain at least 0.6 meters away from the furnace during operation.

8.7 See "GFAA Instrument Setup and Operation," Standard Operating Procedures.

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9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

Measurement	Digestion Vol. Req.[a] (ml)	Collection Volume (ml)[b]	Preservative	Holding Time
Metals (except mercury):				
Total recoverable	100	500	HNO_3 to pH <2	6 mo
Dissolved	100	500	Filter on Site; HNO_3 to pH <2	6 mo
Suspended	100	500	Filter on site	6 mo
Total	100	500	HNO_3 to pH <2	6 mo

[a]Solid samples must be at least 200 g and usually require no preservation other than storing at 4°C until analyzed.
[b]Either plastic or glass containers may be used.

10.0 APPARATUS/INSTRUMENTATION

10.1 Atomic Absorption Spectrophotometer - single or double beam instrument having a grating monochromator, photomultiplier detector, adjustable slits, and a wavelength range of 190 to 800 nm.

10.1.1 Perkin-Elmer 1100 B A.A.S.
10.1.2 Perkin-Elmer 4100 ZL A.A.S.

10.2 Hollow Cathode Lamp

10.3 Graphite furnace. Any furnace capable of reaching the specified temperatures.

10.4 Class A volumetric pipets.

10.5 Class A volumetric flasks.

10.6 Eppendorf pipets (capable of delivering 10 ul to 1000 ul).

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11.0 ROUTINE PREVENTIVE MAINTENANCE

11.1 Change graphite tubes if wear is evident. Be sure to condition the tube prior to analysis.

11.2 Clean furnace windows periodically.

11.3 Clean filters once per week. Be sure they are dry when you replace them.

11.4 Keep work area clean.

11.5 Be sure lamp is clean. Remove fingerprints, dust, etc. with a Kimwipe©.

11.6 Clean AA windows with a Kimwipe©.

11.7 See SOP for GFAA Instrument Setup and Operation

12.0 CHEMICALS AND REAGENTS

12.1 Distilled deionized water (ASTM Type II).

12.2 Concentrated nitric acid, optima grade (HNO_3).

12.3 Milli-Q water (ASTM Type I).

12.4 Concentrated nitric acid, trace metal grade (HNO_3).

12.5 1000 mg/l nickel stock standard solution.

12.6 Laboratory control sample (LCS) from a different source than the stock standard.

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13.0 STANDARDS

13.1 Rinse volumetric flasks several times with ASTM Type II water.

13.2 Label the flasks as follows:

20.0 ug/l Ni-100 ml volumetric flask
60.0 ug/l Ni-100 ml volumetric flask
120.0 ug/l Ni-100 ml volumetric flask

10,000 ug/l Ni-100 ml volumetric flask

13.3 Add approximately 20 ml ASTM Type II water to each flask.

13.4 Acid match each working standard to the matrix to be analyzed.

13.5 Preserve 10,000 ppb std and other stds used for serial dilution at 1.0% HNO_3.

13.6 Pipet 1.0 ml 1,000 ppm Ni stock standard into 100 ml flask labeled 10,000 ug/l Ni.

13.7 Dilute flask to volume, mix making sure the solution is well equilibrated.

13.8 Pipet 0.20 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 20.0 ug/l Ni. Dilute to volume and mix.

13.9 Pipet 0.60 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 60.0 ug/l Ni. Dilute to volume and mix.

13.10 Pipet 1.2 ml of the 10,000 ug/l standard and transfer it to the 100 ml flask labeled 120.0 ug/l Ni. Dilute to volume and mix.

13.11 Complete the standards log book (see Appendix A).

14.0 SAMPLE PREPARATION

See Method 3050 and 3020 for pre-treatment of samples.

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15.0 CALIBRATION PROCEDURES (INSTRUMENT ANALYSES)

15.1 See SOP for GFAA Instrument Setup and Operation

16.0 ANALYTICAL PROCEDURE AND SPECIFIC ANALYTE SETUP

16.1 See Standard Operating Procedure for GFAA Instrument Setup and Operation

16.2 **Specific Element Program Conditions**

Step	Furnace	Time	Hold
1	90	5	9
2	120	10	30
3	1400	10	30
4	2500	0	5
5	2650	1	6
6	20	1	5

Wavelength: 232.0 nm with an 0.7 nm slit

Modifier: No modifier recommended

Lamp: Hollow Cathode

Sensitivity check (P-E 1100 B): @ 20 ul: 0.17 A-s @ 25.0 ug/l

M(O) (P-E 1100 B): 13.0

17.0 FLOW CHART

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18.0 CALCULATIONS/DATA HANDLING

18.1 For determination of metal concentration read the metal value from the calibration curve or directly from the read-out system of the instrument.

18.2 If dilution of sample was required then multiply the result from the calibration curve by the dilution factor:

A(V/C) = concentration in sample

A=concentration from calibration curve
V=final volume of sample (mls)
C=sample aliquot (mls)

18.3 For solid samples, report all results as mg/kg as follows:

(AxV)/W = mg/kg sample

A=mg/l concentration from calibration curve
V=final volume of sample (ml)
W=weight of sample (grams)

18.4 See SOP for GFAA Instrument Setup and Operation.

19.0 DATA REPORTING

19.1 Fill out all benchsheets, initialize and date.

19.2 Fill out all instrument and maintenance log-books.

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20.0 QUALITY ASSURANCE

20.1 A calibration curve must be prepared each day with a minimum of a reagent blank and three standards. The correlation coefficient must be ≥ 0.995. If this fails the problem must be corrected.

20.2 An initial calibration blank (ICB) is run immediately after the curve and must not be greater than or equal to +/- the reported detection limit.

20.3 An initial calibration verification (ICV) is analyzed next. This is a mid-range standard and must be ±10% of the true value.

20.4 A laboratory control sample (LCS) is analyzed next. This is a non-digested separate source Q.A. sample to check the accuracy of the standards. This must be ±20% of the true value.

20.5 Run continuing calibration verifications (CCV) every 10 samples and at the end of the run. These must be ±20% of the true value.

20.6 Run continuing calibration blanks (CCB) every 10 samples and at the end of the run. These must not be greater than of equal to +/- the reported detection limit.

20.7 At least one spiked sample and spiked duplicate sample must be run for every 20 samples or with each matrix type. The recoveries must fall within Lims Control Limits. If not, flag the data as estimated.

20.8 % RSD of duplicate injections must be <20% if above the detection limit. If unacceptable, then rerun. If still unacceptable then estimate the data.

21.0 REFERENCES

21.1 Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, Revised March 1983.

21.2 Methods for Evaluating Solid Wastes, SW-846, Vol 1A, September 1986. Revision 1, December 1987.

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ACID DIGESTION OF SOILS, SLUDGES AND SEDIMENTS FOR GRAPHITE FURNACE ATOMIC ABSORPTION

Approvals: Laboratory Manager: Thomas J Berger Date: 10/6/94
Area Supervisor: [signature] Date:
QA supervisor: Barry E. Spencer Date: 10-6-94
Revision Number: 1 By: TJB Effective Date: 10/6/94
Total Number of Pages: 8 Pages Revised:

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1.0 PRINCIPLE METHOD REFERENCE

SW-846, Test Methods for Evaluating Solid Waste
Vol. 1A, Revision 1, December 1987
USEPA Method 3050

2.0 PARAMETER LIST

2.1 As, Ag, Be, Cd, Cr, Co, Cu, Fe, Pb, Mo, Ni, Se, Tl, V

3.0 SCOPE AND APPLICATION

3.1 This acid digestion method is used to prepare sediments, sludges and soil samples for analysis by graphite furnace atomic absorption (GFAA).

4.0 SUMMARY OF METHOD

A one gram sample, (wet weight), is digested using nitric acid and hydrogen peroxide. The sample is concentrated to approximately 5-10 mls, them, brought up to a final volume of 50 mls using milli-Q, deionized water. The elements are analyzed by graphite furnace atomic absorption. Results are reported according to the dry weight of the sample.

5.0 DEFINITIONS

5.1 GFAA: Graphite Furnace Atomic Absorption

6.0 RESPONSIBILITIES

6.1 The technician is responsible for QA/QC preparation of samples during the digestion. This includes sample batching and spiking.

6.2 The technician is responsible for making sure glassware is clean and contamination-free.

6.3 The analyst is responsible for informing the group leader of any supplies that are needed, or ordering the supplies.

6.4 The technician is responsible for determining the dry weight of the solid sample.

7.0 INTERFERENCES AND HELPFUL HINTS

7.1 Sludge and Soil samples can contain diverse matrix types. Prior to digestion, mix thoroughly with a pestle and mortar, until homogeneous.

7.2 Maintain consistency when weighing sample or adding acids.

7.3 Samples containing large amounts of organic materials should be oxidized by acid digestion to minimize broad-band absorption.

7.4 Periodically, observe and swirl flasks. Do not let them go dry. Rinse flask sides off with deionized water.

7.5 Bring samples up to volume using graduated cylinders, or volumetric flasks, then transferring solution to a suitable plastic container.

7.6 Spiked samples and any relevant standard reference material should be processed to aid in determining whether Method 3050 is applicable to a given waste.

8.0 SAFETY PRECAUTIONS

8.1 **CAUTION:** This method uses hot, concentrated acids, so caution and proper protective wear must be utilized, including goggles, gloves and lab coat. Add acids and peroxides under the hood.

8.2 All work is to be done under the hood.

8.3 Avoid breathing acid fumes.

8.4 Avoid body contact with sample. Wear safety equipment including safety glasses, gloves, and lab coat. In case of contact with acid, run cold water over affected area for 10-15 minutes. Use the eyerinse sink if acid contacts eyes. Report all accidents to the group leader.

8.5 Be careful not to touch the hot plate. An operating hot plate unit can cause injury.

9.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING

9.1 All samples must have been collected using a sampling plan that addresses the considerations referred to in SW-846, Chapter (See sample preparation standard operating procedures)

9.2 All sample containers must be prewashed with detergents, acids, and Type II water. Plastic and glass containers are both suitable.

9.3 Preservatives: Soils and sludges must be stored in a refrigerator at 4 degrees celsius.

9.4 To ensure there is enough sample for QC and repeat analysis, at least 30 grams of material is needed.

10.0 APPARATUS AND MATERIALS

10.1 Specifications for Apparatus, Instruments, and Equipment

a. Hot Plates

b. Stir Plate

c. Analytical balance: Capable of reading 0.0001 g

d. Drying Oven

e. Centrifuge

10.2 Materials: (digestion)

a. 150 mL beakers or 125 ml Phillip's beakers

b. 10 and 50 mL graduated cylinders

c. Ribbed watchglasses

d. Spatulas

e. Whatman No. 41 filter papers

f. Filters/Funnels

g. Water bottles

h. Oxford or Eppendorf Pipettor

i. Centrifuge tubes

k. Thermometers: That covers range of 0 to 200 degrees C.

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10.3 Materials: (dry weight determination)

a. aluminum weighing trays

b. wooden tongue depressors

11.0 REAGENTS AND STANDARDS

11.1 Specifications for Reagents

a. Concentrated Nitric Acid: (trace metal grade and Optima or Ultrex)

b. Certified Reference Solutions

c. Hydrogen Peroxide: (30%)

d. Deionized, Milli-Q water (ASTM Type I)

e. 1:1 nitric acid for cleaning filters. Measure equal amounts of trace metal nitric acid and Type II water into containers and mix. Always add acid to water.

12.0 STANDARDS

12.1 Refer to SOP, "Spiking Procedure for Graphite Furnace."

13.0 ROUTINE PREVENTIVE MAINTENANCE

13.1 Keep hot plates and counters clean daily.

13.2 Calibrate pipettors, periodically.

13.3 Keep balance clean, calibrate daily.

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c. Batch quality control is run every 20 samples or as requested by a specific client. Label six beakers as follows:

1. MPB (Date of Digestion): Method Prepared Blank
2. LS (Date of Digestion): Laboratory Spike
3. Sample #
4. Sample #-DUP: Duplicate
5. Sample #-SPK Matrix Spike
6. Sample #-MSD: Matrix Spike Duplicate

d. Stir samples and form a consistent, homogeneous mixture. use a pestle and mortar for consistency. Remove any large stones.

e. Weigh 1.0 grams of sample into a 150 mL beaker, (or a 125 ml Phillip's beaker). [Record weight on the beaker and in the digestion log book. Also, record final volume of solution: example 1.02 g / 50 ml]

f. **** PERFORM ALL REMAINING STEPS UNDER THE HOOD ****

g. Add 10 ml of milli-Q water, using a 10 ml graduate cylinder.

h. Spike the sample marked LS, SPK and MSD according to "Spiking Procedure for Graphite Furnace," SOP.

i. Add 2.5 ml of Optima (Ultrex) nitric acid. Cover with a ribbed watchglass.

j. Place samples on the hotplate and heat at 95 degree C. Reflux for 15-20 minutes. Do not allow sample to boil or go dry.

k. Cool. Add another 2.5 mls of nitric acid and reflux 30-45 minutes. Do not allow samples to boil or go dry.

l. Add 1 ml aliquots of 30% hydrogen peroxide slowly to the beaker. Continue adding peroxide until effervescence is minimal, and no noticeable change in sample appearance. Do not exceed 10 mls peroxide.

m. Reflux until volume is about 5 ml.

n. Rinse 50 ml volumetric flasks with Milli-Q. Rinse watchglasses into beakers. Wash the sides of the beakers.

o. Rinse filters and Whatman #41 filter paper with 1:1 nitric acid.

p. Filter the sample into the volumetric flask or graduated cylinder. Rinse the beaker and filter a minimum of three times. Dilute to mark.

q. Label the plastic centrifuge cylinders exactly as the beaker was labeled: Sample number, test, dilution. Transfer the solution from the flask to the tube.

r. To remove insoluble material, the sample may be centrifuged or allowed to settle by gravity overnight.

   a. Centrifugation: Centrifugation at 2,000-3,000 rpm for 10 minutes is usually sufficient to clear the supernatant.

s. Keep the batch together and place on the counter for analysis.

t. Fill out the digestion log book.

15.0 QUALITY CONTROL REQUIREMENTS

15.1 Type and Frequency of QC Check

1. (MPB) Method Prepared Blank

   A deionized water blank must be carried through the entire digestion procedure. Run one method blank every twenty samples, or one per batch. The method blank is used to determine elemental contamination that may be found in the deionized water and/or glassware.

2. (LS) Laboratory Spike

   A prepared standard, of known concentration, (See Procedure for Spiking for Graphite Furnace) is digested. Run one laboratory spike every twenty samples, or one per batch.

3. (DUP) Sample duplicate

   A sample duplicate will be digested every twenty samples, or one duplicate per batch. An equal, homogeneous representation of the original sample is used.

4. (SPK) and (MSD) Matrix Spike and Matrix Spike Dup.

   Spiked samples of known concentration will be digested every twenty samples, or one every batch. Levels should be equal to those of the LS.

16.0 DATA REPORTING

16.1 The concentrations determined are to be reported on the basis of dry weight correction.

16.2 Enter date of digestion in LIMS.

16.3 Record sample number, date of digestion, spike concentration method of digestion, final dilution, and test in digestion notebook.

17.0 REFERENCES

17.1 Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.

17.2 EPA Test Methods for Evaluating Solid Waste, 3rd Edition, Volume 1A, Section A, Revision December 1987.

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14.0 SAMPLE PREPARATION

14.1 Procedure for the determination of percent dry weights

IMPORTANT: RECORD ALL DATA IN THE PERCENT DRY WEIGHT LOGBOOK. INCLUDE: CLIENT, JOB NUMBER, SAMPLE NUMBER, OVEN TEMPERATURE AND ANALYSTS INITIALS.

a. Weigh and record aluminum pan, (to 0.0001 g)

b. Weigh out approximately 20.0000 g of sample, [Record]

c. Place in oven and let dry for 24 hours at 105 degrees celsius.

d. Remove from oven, cool in desiccator.

e. Reweigh dried sample. [Record]

f. Calculations

$$\% \text{ solid} = \frac{(\text{Dry Sample} + \text{Cup Weight (g)}) - (\text{Cup Weight (g)})}{\text{Wet Sample Weight (g)}} \times 100$$

g. Use the percent dry weight in the final concentration calculation.

14.2 Procedure for the preparation of Soils, Sludges and Sediments

IMPORTANT: BE SURE TO FILL OUT DIGESTION LOG WITH: DATE OF DIGESTION, ANALYSTS INITIALS, CLIENT, DILUTION, TESTS, DIGESTION METHOD, SAMPLE, BATCH Q.C. SPIKING INFORMATION, ACID LOT NUMBERS AND HOTPLATE TEMPERATURE.

a. Rinse, with 1:1 nitric acid, 50 ml graduated cylinders, 50 ml volumetric flasks and 150 beakers, (or 125 ml Phillip's beakers).

b. Arrange samples on counter and label the beakers with the job number, sample number, dilution and tests. Label tests as follows:

1. TM: total metals run by ICP
2. FLAA: metals run by AA flame
3. X: individual metal (example: Pb)

Spiking Procedure for Graphite Furnace

pprovals: Laboratory Manager: _____ Date: 10/6/94
Area Supervisor: _____ Date: _____
QA Supervisor: _____ Date: 10/6/94
Revision Number: 1 By: RJS Effective Date: 10/6/94
Total Number of Pages: 2 Pages Revised: —

IMPORTANT: BE SURE TO FILL OUT METALS STANDARD RECORD BOOK WITH: DATE, PREPARER, PARAMETERS, CONCENTRATIONS, PREPARATION PROCEDURE, VOLUME, PRESERVATIVE, STANDARD REFERENCE NUMBER, AND SHELF LIFE.

I. PREPARATION OF MULTI-ELEMENT SPIKING SOLUTION

1. Add the following volumes of AA stock standards to a 100 mL volumetric flask:

   a. 1.0 mL of 1000 ppm Pb stock = 10 ppm Pb
   b. 1.0 mL of 1000 ppm Cu stock = 10 ppm Cu
   c. 1.0 mL of 1000 ppm Zn stock = 10 ppm Zn
   d. 1.0 mL of 1000 ppm Cr stock = 10 ppm Cr
   e. 1.0 mL of 1000 ppm Ni stock = 10 ppm Ni
   f. 1.0 mL of 1000 ppm Tl stock = 10 ppm Tl
   g. 1.0 mL of 1000 ppm Se stock = 10 ppm Se
   h. 1.0 mL of 1000 ppm As stock = 10 ppm As
   i. 1.0 mL of 1000 ppm Sb stock = 10 ppm Sb
   j. 0.05 mL of 1000 ppm Cd stock = 0.5 ppm Cd

2. Add 1.0 mL of (Ultra-pure) nitric acid preservative.

3. Dilute to 100 mLs.

4. Check concentrations on the ICP.

5. Shelf Life: 4-6 weeks

II. PREPARATION OF Ag SPIKING SOLUTION

1. Preparation of 10 ppm Ag intermediate (I) standard: Add 1.0 ml of 1000 ppm Ag stock solution to a 100 ml volumetric flask.

2. Preparation of 1.0 ppm Ag intermediate standard: Add 10 ml of 10 ppm intermediate (I) to a 100 mL volumetric flask.

III. SAMPLE SPIKING

1. To a final sample volume of 25 mL, add 0.10 ml of the multi-element Spiking Solution and Ag Spiking Solution.

2. To a final sample volume of 50 mL, add 0.20 mL of the multi-element Spiking Solution and Ag Spiking Solution.

3. To a final sample volume of 100 mL, add 0.40 mLs of multi-element Spiking Solution and Ag Spiking Solution.

IV. FINAL CONCENTRATIONS

[Cd] = 2.0 ppb
[Ag] = 4.0 ppb
[Sb] = 40 ppb
[Pb] = 40 ppb
[Cu] = 40 ppb
[As] = 40 ppb
[Cr] = 40 ppb
[Zn] = 40 ppb
[Tl] = 40 ppb
[Ni] = 40 ppb
[Se] = 40 ppb

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WW ENGINEERING & SCIENCE, INC.
STANDARD OPERATING PROCEDURE

1.0 SOIL AND SEDIMENT, TOTAL PETROLEUM HYDROCARBON-INFRARED.

2.0 RECORD OF APPROVAL

Laboratory Manager Will T. Hey Date: 4-6-94
QA Supervisor [signature] Date: 4-8-94
Area Supervisor Todd E. Davis Date: 4-8-94
Redlined on 4-1-94 by Todd Davis 4-1-94 JD

Revision Number: 003 PROCEDURE NUMBER : 17-102
By: [signature] Effective Date: 4-8-94
Total No of Pages: 11 Pages Revised: 11

3.0 PARAMETER LIST

3.1 Petroleum Hydrocarbons

4.0 SCOPE AND APPLICATION

4.1 This method is for the measurement of fluorocarbon-113 extractable petroleum hydrocarbons in soils.

4.2 The method is applicable to measurement of light fuels, although loss of about half of any gasoline present during the extraction manipulations can be expected.

4.3 The method is sensitive to levels of 20mg/kg.

5.0 SUMMARY OF TEST METHOD

5.1 A 30-g sample of soil is weighed up.

5.2 Anhydrous sodium sulfate is used to dry the sample.

5.3 After drying, the hydrocarbons are extracted with 1,1,2-trichloro-1,2,2-trifluorethane (Freon-113) using the Soxhlet apparatus.

5.4 The freon extract is then treated with silica gel to remove non-hydrocarbon contaminants.

5.5 The freon extract is then analyzed using a Miran 1FF IR Analyzer.

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6.0 INTERFERENCES AND CORRECTIVE PROCEDURES

6.1 The rate and time of extraction in the Soxhlet apparatus must be exactly as directed because of varying solubilities of the different greases.

7.0 SAFETY PRECAUTIONS

7.1 The analyst must comply with all standard operating procedures for health and safety as outlined in the "WWES Laboratory Safety Manual".

8.0 SAMPLE SIZE, COLLECTION, PRESERVATION AND HANDLING PROCEDURES

8.1 Soils are to be collected in glass wide mouth containers with inert closures, and stored at 4°C until time of analysis.

8.2 All analyses must be performed within 14 days of sample collection.

9.0 APPARATUS/INSTRUMENTATION

9.1 Soxhlet Extraction Apparatus

9.2 Balance, Readable to 0.01 g

9.3 Extraction Thimbles

9.4 500 ml round bottom flasks

9.5 Beakers, 400 mL

9.6 Filter paper (P8)

9.7 Hot plates

9.8 Glass funnels

9.9 Miran 1FF IR Analyzer

9.10 10 mm Quartz window cuvet

9.11 Reflux condensers

9.12 500ml Kuderna-Danish (K-D) flasks

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9.13 10ml concentrator tubes

9.14 3-ball Snyder column with top ball joints

9.15 Distillation manifold

9.16 Friedrich condenser

9.17 Hot water bath

9.18 Teflon boiling chips

10.0 CHEMICALS AND REAGENTS

10.1 Reagent grade sodium sulfate, anhydrous(Na_2SO_4). (granular)

10.2 IR grade trichlorotrifluorethane
(1,1,2-trichloro-1,2,2-trifluoroethane)

10.3 Deionized water

10.4 Reagent grade hexadecane ($C_{16}H_{34}$)

10.5 Reagent grade 2,2,4-Trimethylpentane(iso-octane) (C_8H_{18})

10.6 Reagent grade Chlorobenzene (C_6H_5Cl)

10.7 Chromatography grade silica Gel (60-200 Mesh). (powder)

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11.0 STANDARDS

11.1 Reference Oil

- Prepare the following mixture and store in a sealed container to prevent evaporation.

  3 ml hexadecane
  3 ml iso-octane (2,2,4-trimethylpentane)
  2 ml chlorobenzene
  Should be stored in a 40 ml vial in the refrigerator for no longer than 6 months.

11.2 Primary Stock Solution

- Tare a dry 100 ml volumetric flask. Using a pasteur pipet, add about ~~0.1g~~ reference oil to flask and accurately record weight to nearest ~~0.1 mg~~. Dilute to volume with Freon. Concentration will be about ~~1000~~ mg/l.
- Should be stored in ~~a~~ 40 ml vials in the refrigerator for no longer than 6 months.

11.2.1 Primary stock solution must be labeled with the following information:

- initials of preparer
- date of preparation
- concentration
- name of parameter

11.3 Working Standards

- Pipet appropriate volumes of ~~primary~~ stock solution into into 100 ml volumetric flasks to make five standards from 1 mg to 50 mg per 100 ml and dilute to volume with Freon. Example:

Concentration mg/100 ml	ml of 5000 ppm stock in 100 ml
1.0	0.20
10.0	2.0
20.0	4.0
40.0	8.0
50.0	10.0

- Prepare fresh, as needed.

12.0 SAMPLE PREPARATION

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12.1 Extraction

12.1.1 Weigh out 30 ± 0.5 g of soil. Place in a 400-mL beaker.

12.1.2 Add anhydrous sodium sulfate and mix until all liquids are absorbed.

12.1.3 Add the mixture to the extraction thimble.

12.1.4 Pour approximately 250ml of freon into a 500ml round bottom flask and label the flask with the sample number.

12.1.5 Gently slide the thimble with sample into a Soxhlet and connect the Soxhlet to the round bottom flask.

12.1.6 Connect the top of the Soxhlet to the reflux condenser. Extract for 4 hours on a hot plate in the Soxhlet apparatus using Freon. Allow to cool.

12.1.7 Disconnect the round bottom flask from the Soxhlet and insure that all extract (freon) has washed into the flask.

12.1.8 Discard sample and add approximately one crucible of silica gel to the round bottom flask. Allow the extract (freon) to stand for approximately 15 minutes with silica gel.

12.1.9 Filter extract thru funnel lined with P8 filter paper, anhydrous sodium sulfate, and silica gel into K-D flask that has been pre-rinsed with freon.

12.1.10 Rinse the round bottom flask with freon and pour through the funnel into the K-D one time. Rinse freon through the funnel and Na_2SO_4 into the K-D.

12.1.11 Method Blank: Extract approximately 30g of Na_2SO_4 and prepare blank the same way as a regular analytical sample. Analyze the extracted freon. Enter 30g for sample weight. Result should be <20mg/kg.

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12.1.12 Laboratory Control Sample (LCS): Use approximately 30g of Na_2SO_4, and spike with ~~1500~~ 1500 µl of ~~1000~~mg/l IR standard. Prepare LCS the same way as a regular analytical sample.

12.1.13 Matrix spikes are prepared the same as the LCS, except using a thimble filled with prepped samples, instead of Na_2SO_4.

12.2 Concentration of extract

12.2.1 Remove the funnel full of sample and Na_2SO_4 and discard. Add a freon rinsed boiling chip to the K-D and allow it to settle into the concentrator tube. Attach a freon rinsed 3-ball Snyder column to the top of the K-D. Affix the Snyder column to the distillation manifold, and allow the concentrator tube and the entire rounded bottom of the K-D to be immersed in the hot water of a hot water bath. A receiving vessel (4L reagent bottle) should be attached to the opposite end of the condenser to catch the distilled freon.

12.2.2 Concentrate the extract to approximately 9ml. Remove the K-D from the distillation manifold. Allow the freon to drain from the Snyder column into the K-D. Dry the glass joint between the K-D and concentrator tube and disconnect. Volumize the extract to 10ml with freon in the concentrator tube and transfer into a culture tube.

12.3 Instrumentation

NOTE: Wavelength is preset on interior of instrument at 2950 cm-1 alphatic C-H stretch frequency and requires no adjustment.

12.3.1 Turn on the power of the Foxboro Miran IFF Infrared Analyzer by using the black switch on the front panel. Verification is red light.

12.3.2 Allow instrument to warm up for not less than 5 minutes.

12.3.3 Remove 1cm cuvet from storage box and rinse with fresh freon into waste beaker.

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NOTE: Since human skin surfaces can contain chemical compounds with C-H stretch properties, only the frosted (non-transmitting) sides of the cuvet should be touched with hands.

12.3.4 Fill cuvet to mark with fresh freon.

12.3.5 Wipe exterior dry with Kimwipe.

12.3.6 Insert cuvet into holder with marked side (6) facing the operators left (away from instrument).

12.3.7 Zero the Instrument

12.3.7.1 Set range selector to .1A (most sensitive scale). Set response control on 1.

12.3.7.2 Move small lever on fine zero control (top knob) to front (toward operator) to unlock control.

12.3.7.3 Set needle to zero using fine zero control.

NOTE: Use reflecting strip behind needle to align eye and avoid parallax.

12.3.7.4 After zero is set, move lock lever forward (away from operator) to lock zero.

12.3.7.5 Remove cuvet from holder and empty freon into waste beaker.

12.3.7.6 Blanch inverted cuvet onto Kimwipe to remove excess freon.

12.3.8 Check the three ranges (.1A, .25A, 1A) with one point on each curve.

12.3.8.1 Pour ~~1.0~~ 1.5 standard ~~100~~ 150 ppm TPH into cuvet. (This standard is made by diluting 1.0 ml of 1500 mg/L IR Std to 10 ml with Freon)

NOTE: This standard is chosen because it can be used on all three ranges. Take all readings on bottom, %T scale.

12.3.8.2 Check reading on all three ranges and record in laboratory notebook.

NOTE: Standard reading must agree within 2% of initial calibration curves. Notify supervisor for corrective action if readings are outside range.

12.3.8.3 Pour standard back into original flask.

12.3.9 Read QA samples and record %T readings in laboratory notebook.

NOTE: Rinse cuvet with fresh freon between QA samples and blanch on Kimwipe.

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12.3.1) Read test samples and record IR %T readings in laboratory notebook.

NOTE: Rinse cuvet with fresh freon between test samples and blanch on Kimwipe. If there is a white film on inside of cuvet that will not rinse out of cuvet after sample reading, proceed as follows:

a) Rinse cuvet with methanol and swab interior surface with a clean cotton swab.
b) Drain methanol from cuvet and blanch inverted cuvet on Kimwipe.
c) Rinse cuvet 5 times with freon.
d) Check zero on instrument with fresh freon.
e) If a positive reading is obtained, repeat steps a) - d) above.
f) Consult supervisor if repeated methanol washings do not remove film from cuvet.

NOTE: After every 10 samples, recheck zero with fresh freon. If zero has changed, reset zero with freon blank as described in section 12.3.2 above. Also recheck 1.0 standard as described in section 12.3.2 above. Record all rechecks of zero and standards in laboratory notebook.

12.3.4 Secure instrument after use.

12.3.4.1 Turn off main power switch.

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12.3.11.2 Rinse cuvet with fresh freon and blanch inverted on Kimwipe.

12.3.11.3 Wipe cuvet on dry Kimwipe and place in storage box.

12.3.11.4 Place cover on instrument.

13.0 FLOW CHART

14.0 CALCULATIONS/DATA HANDLING

14.1 Basic rules apply for significant figure reporting: report 2 significant figures.

14.2 Determine ppm (mg/l) TPH in cuvet from %T readings recorded in laboratory notebook using the three prepared calibration curves.

14.3 Determine ppm (mg/kg) TPH by the following formula:

$$\text{Concentration in sample (mg/kg)} = \text{Concentration in cuvet (mg/L)} \times \frac{\text{Final Volume (10ml)}}{\text{Weight of sample}}$$

NOTE: If dry weight correction is required, use the following formula:

$$\text{Concentration (mg/kg)} \times \frac{1}{\text{total solids}} = \text{Corrected Concentration (mg/kg)}$$

15.0 DATA REPORTING

15.1 The following must be included on the laboratory benchsheet for each batch turned in:

- A listing of standard concentrations, standard log numbers, method name, client name, date extracted, and matrix.

15.2 The instrument log book must be filled out for each batch turned in, with the following information:

- date analyzed
- analysts initials

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- calibration standards used
- sample numbers analyzed
- dilution factors, if any
- % solids if dry weight results are requested
- absorbances

The following data is to be put on the worksheet for each sample analyzed:

- concentration in mg/kg
- corrected dry weight concentration, in mg/kg, if requested
- QA/QC results
- date analyzed
- analysts initials

16.0 QUALITY ASSURANCE / QUALITY CONTROL

16.1 Each day, or every 20 test samples, a reagent blank is extracted and analyzed.

16.2 Every 20 test samples, a LCS and a matrix spike is extracted and analyzed.

17.0 DETECTION LIMITS

17.1 The detection limit for IR soils is 20mg/kg.

18.0 REFERENCES

18.1 Principle method reference

18.1.1 USEPA Methods for Chemical Analysis of Water and Wastes Method 418.1; EPA-600/4-79-020; Revised March 1983.

18.2 Test Methods for Evaluating Solid Waste (SW-846) Method 9071.

18.3 Standard Methods for Examination of Water and Wastewater 17th Edition (1989), Part 5520 E, 5520C, 5520F.

APPENDIX C.2

SITE WIDE HEALTH AND SAFETY PLAN

AREA WIDE
SITE HEALTH AND SAFETY PLAN

General Motors Corporation
Pontiac Central Manufacturing Facility/Centerpoint Business Campus
Pontiac, Michigan

SEPTEMBER 1994

REF. NO. 5770 (10)

CONESTOGA-ROVERS & ASSOCIATES

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HEALTH AND SAFETY PLAN (HASP)

PROJECT TITLE: PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS (SITE)

PREPARED BY: CONESTOGA-ROVERS & ASSOCIATES (CRA)

Approved By: _____ Date:_____
Project Manager - CRA
Glenn Turchan

Approved By: _____ Date:_____
Industrial Hygienist - CRA
Jill Jackman

Approved By: _____ Date:_____
Industrial Hygienist - CRA
Mike Sheppard

SITE HEALTH AND SAFETY PLAN (HASP)

1.0 SITE HEALTH AND SAFETY INFORMATION

1.1 PURPOSE

This Health and Safety Plan (HASP) provides guidelines, requirements and procedures intended to help protect the health and safety of Conestoga-Rovers & Associates (CRA) employees while they are on-Site conducting field activities. A copy of this HASP will be maintained at the Site during periods of field activity by CRA personnel. Additionally, a Site-specific HASP will be developed and implemented by the selected contractor for work performed at the Site by the contractor, if required. The contractor's Site-specific HASP will address, at a minimum, all the requirements outlined in this HASP. A copy of the Site-specific HASP will also be maintained on-Site during all Site activities by the contractor.

This HASP is designed to ensure:

1) that personnel working on-Site are not exposed to hazardous materials which could adversely affect their health and safety;

2) that the health and safety of the general public and the environment is not compromised by off-Site migration of contaminated materials; and

3) compliance is achieved with governmental (OSHA Title 29, Code of Federal Regulations, Parts 1910 and 1926) and professional (American Conference of Governmental Industrial Hygienists (ACGIH)) regulations and guidelines.

All Site operations will be conducted in accordance with the provisions of this HASP. Cost and scheduling considerations will not be considered as justification for modifying this plan.

1.2 ORGANIZATIONAL STRUCTURE

The following CRA employees are designated to carry out stated job responsibilities related to this project.

- Principal in Charge: Alan Van Norman
- Project Manager: Glenn Turchan
- Project Coordinator: Renato Pasqualoni
- Resident Engineer(s): Frank Ring
- Project Health and Safety Officer: Frank Ring
- Project Industrial Hygienist: Mike Sheppard
- CRA Corporate Health & Safety Manager: Mitchell S. Bergner, CIH

1.3 SITE DESCRIPTION

For the purposes of this HASP, the "Site" is defined to include the GM Pontiac Central Manufacturing Facility, Centerpoint Business Campus and adjacent properties identified to be part of the project.

Figure 1 shows the Site location. Figure 2 is a Site plan.

1.4 SCOPE OF WORK

Activities to be performed at the Site are anticipated to include: oversight of investigative drilling, monitoring well installation, and test pit excavation; oversight of excavation, construction activities including segregation and stockpiling of soils (including potentially contaminated materials); and collection of investigative/confirmatory soil or groundwater samples.

These activities are being conducted in areas identified by GM.

1.5 PROJECT TASKS

The following is a list of activities to be performed on Site:

- Observe excavation operations

- Observe investigation activities
- Sample collection

1.6 SITE FACILITIES AND FEATURES

Site Security:	Site security is under the control of GM. The Site is enclosed by a chain link fence topped with three strands of barbed wire. Gates are kept locked or are manned by security guards which are hired by GM.
Potable Water:	Potable water sources are located in Building 43 as well as other buildings at the Site. Access to potable water will be arranged with GM, as necessary.
Communication:	CRA personnel will have access to a telephone in the CRA trailer located inside Building 43.
Site Control:	GM will establish work zones prior to mobilization or commencing any work.
Unusual Features:	A portion of the Site is currently under re-development as a commercial/industrial park (e.g. Centerpoint Business Campus).
Utilities:	Access to Site utilities will be arranged with GM as required. Utilities will be cleared by GM, as required.

1.7 POTENTIAL CHEMICAL HAZARDS ON SITE

The Site is a closed truck assembly facility. Approximately half of the facility is currently being redeveloped as an industrial/commercial

park. Potential hazards at the Site include heavy equipment, construction debris and residual chemical constituents from plant operations including underground storage tanks (USTs), sumps, and painting operations.

Table 1 lists selected hazardous substances that are known or suspected to be present on Site based on laboratory analyses of samples obtained by CRA during previous Site investigations.

Health effects, exposure limits and guidelines for selected hazardous substances of concern on Site are described further in Table 2.

1.8 PERSONAL PROTECTIVE EQUIPMENT

All on-Site personnel will be equipped with personal protective equipment (PPE) appropriate for the hazardous material(s) being handled and the nature of work being completed. All PPE will be kept clean and well maintained and used in accordance with the Standard Operating Procedure found in Appendix A.

PPE, as required for general Site-work within any area designated as an Exclusion Zone (EZ), will consist of:

1) Half or full-face piece air purifying respirators equipped with dual organic vapor and high-efficiency particulate cartridges (such as MSA GMC-H or equivalent);

2) Contaminant resistant disposable outerwear;

3) Chemical resistant gloves;

4) Steel toe and shank work boots;

5) Disposable chemical-resistant overboots if walking in or on contaminated soils;

6) Hard hats;

7) Hearing protection, if necessary; and

9) Eye protection.

Table 3 lists job activities at this Site and the required levels of protection. The HSO has the authority to change these levels based on actual or changing Site conditions after conferring with the CRA industrial hygienist. All field deviations from this plan should be documented on the appropriate form found in Appendix B.

1.9 AIR MONITORING AND ACTION LEVELS

Table 4 indicates which air monitoring instruments should be used on-Site and the frequency of measurement for each activity of concern. Air monitoring should be conducted periodically or continuously, as indicated on Table 4, in the breathing zone (a two foot radius around a person's head). The HSO or person performing the sampling should record the real-time air monitoring information in either a site safety and health log book developed specifically for this Site or in the Site field log. For more information on air sampling see Appendix C, Air Monitoring SOP.

Table 5 indicates the action levels for various air monitoring instruments.

1.10 OVERVIEW OF PROJECT TASK HAZARDS

Table 6 lists Site tasks and identifies potential safety and health hazards which have been evaluated and incorporated into this HASP through recommended work practices, levels of protection and monitoring equipment usage.

A complete hazard analysis for tasks routinely performed by CRA employees on Site is located in Appendix D, Hazard Evaluation. Material safety data sheets (MSDSs) for material brought to the Site by CRA can be found in Appendix G.

1.11 DECONTAMINATION

Decontamination procedures will be strictly adhered to for all personnel, vehicles, and equipment used any area designated as an Exclusion Zone. CRA's SOP for decontamination can be found in Appendix E.

1.12 MEDICAL SURVEILLANCE

This Site does not require site-specific medical examinations beyond the requirements in 1910.120(f). CRA will comply with 29 CFR 1910.120(f) for medical programs. Appendix F contains CRA's Standard Operating Procedure for Medical Surveillance applicable to any employee working within any area designated as an Exclusion Zone.

1.13 TRAINING

All CRA employees entering an area designated as an Exclusion Zone will have attended an OSHA 40-hour training course. If this training has occurred greater than one year ago, then a current 8-hour OSHA refresher course will have been attended. The HSO will verify these certifications prior to anyone entering any area designated as an Exclusion Zone.

Additionally, a Site briefing will be held for all employees and authorized visitors by the HSO during Site mobilization covering the following topics:

- Site hazards, history;
- List of contaminants involved;
- Underground /overhead utilities;
- Work zones;
- Decontamination area and procedures;
- Levels of protection;
- Respiratory protection;

- Location of emergency telephones;
- Emergency alarm signals;
- Emergency evacuation routes;
- Hospital and route to hospital;
- Fire extinguisher location(s);
- Smoking and eating areas;
- Heat/cold stress;
- HASP sign-off.

Employees and visitors will sign the Pre-Entry Briefing Form in Appendix B as a record of this training prior to entering any area designated as an Exclusion Zone.

2.0 EMERGENCY ACTION PLAN

2.1 PURPOSE

This Emergency Action Plan is designed to facilitate prompt and safe evacuation of CRA employees. This plan shall be implemented immediately in the event of an emergency that could threaten human health or the environment. This plan is intended to be compatible with and to integrate the emergency response plan of local emergency service providers.

2.2 APPLICABILITY

These emergency action procedures shall be communicated to all CRA on-Site employees, contractors and visitors. When another party has responsibility for health and safety on the Site, CRA employees shall comply with the other party's HASP and this HASP. When the two HASPs are in conflict or are not compatible, the more protective provision shall govern CRA employees.

2.3 EMERGENCY TELEPHONE NUMBERS

The emergency telephone numbers found in Table 7 shall be prominently posted near each CRA telephone. If cellular phones are being used, verify that 911 properly operates and connects to a dispatcher near the Site and not where the phone is registered.

2.4 EMERGENCY MAP

A map showing the route to the hospital with directions can be found on Figure 3. Copies of this map shall also be posted on-Site with Table 7.

2.5 EMERGENCY EQUIPMENT

An emergency equipment station must be available near the working area and will consist of first-aid supplies appropriate for initial treatment of burns, abrasions and dermal contact with Site-specific hazardous materials.

2.6 EMERGENCY EVACUATION PROCEDURES

In the event of an emergency necessitating evacuation such as fire, explosion or significant release of a hazardous substance, employees will evacuate the immediate area or the Site, if necessary, and rely on emergency service providers such as the local fire and police departments or emergency medical services to assist in the handling of the emergency.

Emergency evacuation routes will be identified prior to the beginning of Site activities. This evacuation route shall be communicated to all employees at the initial site orientation.

2.7 "BUDDY" SYSTEM

All work in any area designated as an Exclusion Zone that involves handling hazardous materials or is otherwise hazardous will be done using the "buddy" system. CRA employees will ensure that another person on Site knows of their location at all times.

2.8 EMERGENCY COORDINATOR

The HSO is the designated Emergency Coordinator for CRA personnel. In his/her absence, the duties would be assumed by the Site Supervisor.

The duties of the emergency coordinator are as follows:

- contact GM to alert necessary emergency services; and
- assist GM as required.

2.9 EMERGENCY DECONTAMINATION

In the event of emergencies involving serious or potentially serious injuries, contact emergency service providers immediately. Decontaminate injured person(s) as much as possible without aggravating injuries prior to transport to a medical facility.

2.10 PPE AND EMERGENCY EQUIPMENT

All attempts should be made to carefully move the injured out of the area designated as an Exclusion Zone, however, in the event of an emergency requiring emergency service intervention, those providers will be providing their own personal protective equipment except in the case of emergency medical services. If emergency providers have to enter the Exclusion Zone, all work is to cease to minimize the amount of air contaminants present. It may be necessary to provide boots and protective clothing consistent with the requirement of this HASP.

2.11 EMERGENCY NOTIFICATION PROCEDURES

The following course of action shall be taken if an emergency situation develops:

1) Evacuate as necessary.

2) Notify the proper emergency services for assistance. See Table 7 for telephone numbers. Inform the emergency services personnel of the type of work being performed so that the need for decontamination can be assessed.

3) Notify any other affected personnel at the Site.

4) Contact the Project Manager and the Safety and Health Manager to inform them of the incident as soon as possible. The Project Manager will notify the appropriate parties including the Owner or Owner's Representative.

5) Prepare a summary report of the incident for the Project Manager and Health and Safety Manager as soon as possible after the incident. This document must be filed in the project file.

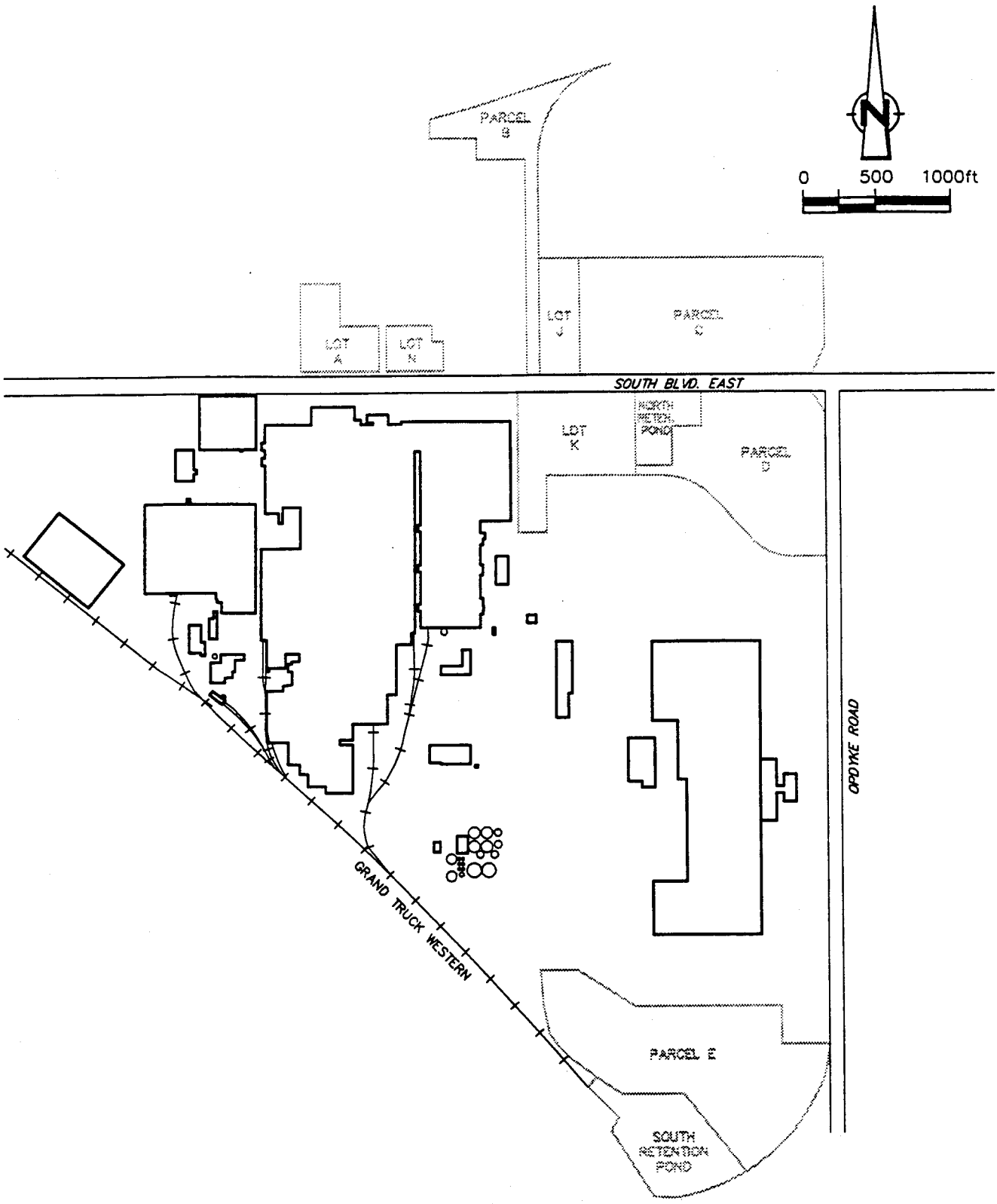


figure 2

SITE PLAN
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (10) SEPT 20/94(W) REV.0 (P-36)

TABLE 1

MAXIMUM CONCENTRATION OF SITE CONTAMINANTS IN SOIL
PONTIAC CENTRAL MANUFACTURING
FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*Maximum Concentration (mg/kg)*	*Media*
Lead	17,200	Soil
Benzene	15	Soil
Toluene	370	Soil
Ethylbenzene	170	Soil
Xylene	670	Soil
Cyanide	3.7	Soil
Chromium	68	Soil
Naphthalene	4.8	Soil
2-Methylnaphthalene	2	Soil
Acenaphthene	0.8	Soil
Dibenzofuran	0.7	Soil
Fluorene	0.8	Soil
Phenanthrene	2.4	Soil
Anthracene	0.4	Soil
Di-n-butylphthalate	2.6	Soil
Fluoranthene	1.6	Soil
Pyrene	2.9	Soil
Benzo(a)anthracene	0.9	Soil
Chrysene	1.2	Soil
Benzo(b)fluoranthene	1.4	Soil
Benzo(k)fluoranthene	0.6	Soil
Benzo(a)pyrene	0.6	Soil
Indeno(1,2,3-c,d)pyrene	0.7	Soil
Benzo(g,h,i)pyrene	0.9	Soil
Trans-1,2-Dichloroethane	0.18	Soil
Vinyl Chloride	0.56	Soil
Methylene Chloride	0.25	Soil
Acetone	0.62	Soil
cis-1,2-Dichloroethene	5.2	Soil
Tetrachloroethylene	0.23	Soil
Trichloroethylene	1.2	Soil
Chloroform	0.18	Soil
Carbon Disulfide	0.21	Soil
4-Methylphenol	3.1	Soil
Dibenzo(a,h)anthracene	0.74	Soil
Arsenic	0.15	Soil
Berylium	0.0007	Soil
Cadmium	0.07	Soil
Copper	3.4	Soil
Nickel	0.34	Soil

TABLE 2

TOXICITY PROFILE FOR SELECTED HAZARDOUS SUBSTANCES ON-SITE
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*IDLH (ppm)*	*TLV (ppm)*	*PEL (ppm)*	*I.P. (eV)*	*Acute Effects*	*Other*
Lead	700 mg/m3	0.15 mg/m3	0.05 mg/m3	--		
Benzene	3,000 ppm	10 ppm	1 ppm	9.2	Irritation of eyes, nose and respiratory	
Toluene	2,000 ppm	50 ppm	100 ppm	8.8	Dizziness, headache, dermatitis	
Ethylbenzene	2,000 ppm	100 ppm	100 ppm	8.8	Irritation of eyes, mucous membrane, headache	
Xylene	1,000 ppm	100 ppm	100 ppm	--	Dizziness, drowsiness, irritation of eyes, nose and throat	
Cyanide	50 ppm	5 mg/m3	5 mg/m3	15.1	Vomiting, headache, irritation of eyes and skin	
Chromium	500 ppm	0.5 mg/m3	1 mg/m3	--	Respiratory System	
Naphthalene	500 ppm	10 ppm	10 ppm	8.1	Headache, vomiting, eye irritation	
2-Methylnaphthalene						

TABLE 2

TOXICITY PROFILE FOR SELECTED HAZARDOUS SUBSTANCES ON-SITE
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*IDLH (ppm)*	*TLV (ppm)*	*PEL (ppm)*	*I.P. (eV)*	*Acute Effects*	*Other*
Acenaphthene						
Dibenzofuran						
Fluorene						
Phenanthrene						
Anthracene						
Di-n-butylphthalate	9300 mg/m3	5 mg/m3	5 mg/m3	--	Irritation of Upper Respiration Tract, stomach	Suspected Human Carcinogen
Fluoranthene						
Pyrene						
Benzo(a)anthracene						
Chrysene			0.2 mg/m3			
Benzo(b)fluoranthene						Suspected Human Carcinogen
Benzo(k)fluoranthene						
Benzo(a)pyrene						

TABLE 2

TOXICITY PROFILE FOR SELECTED HAZARDOUS SUBSTANCES ON-SITE
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*IDLH (ppm)*	*TLV (ppm)*	*PEL (ppm)*	*I.P. (eV)*	*Acute Effects*	*Other*
Indeno(1,2,3-c,d)pyrene						
Benzo(g,h,i)perylene						
Trans-1,2-Dichloroethene						
Vinyl Chloride		5 ppm	1 ppm	10.0	Weakness, abdominal pain	Human Carcinogen
Methylene Chloride	5000 ppm	50 ppm	500 ppm	11.3	Sleepiness, light headiness, irritation of eyes	Suspected Human Carcinogen
Acetone	20000 ppm	750 ppm	1000 ppm	9.7	Irritation of eyes, nose and throat	
cis-1,2-Dichloroethene						
Tetrachloroethylene	500 ppm	25 ppm	100 ppm	9.3	Irritation of eyes, nose and throat	
Trichloroethylene	1000 ppm	50 ppm	100 ppm	9.5	Headaches, irritation of eyes	
Chloroform	1000 ppm	10 ppm	50 ppm	11.4	Dizziness, irritation of eyes, skin	

TABLE 2

TOXICITY PROFILE FOR SELECTED HAZARDOUS SUBSTANCES ON-SITE
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*IDLH (ppm)*	*TLV (ppm)*	*PEL (ppm)*	*I.P. (eV)*	*Acute Effects*	*Other*
Carbon Disulfide	500 ppm	10 ppm	20 ppm	10.1	Dizziness, headache, eye and skin burns	
4-Methylphenol						
Dibenzo (a,h)anthracene						
Arsenic		0.01 mg/m3			Respiratory irritants	Human Carcinogen
Beryllium		0.002 mg/m3	0.002 mg/m3		Weakness, weight loss	Suspect Carcinogen
Cadmium		0.01 mg/m3			Coughing, vomiting, diarrhea	Suspect Carcinogen
Copper		1 ppm	1 ppm		Coughing, weakness, irritation of eyes	
Nickel		1 ppm	1 ppm		Headache, nausea, vomiting	Human Carcinogen

TABLE 3

SITE ACTIVITIES AND LEVELS OF PROTECTION PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Activity	*Level of Protection*
• oversight of investigative drilling activities	Modified Level C or Level D
• collection of investigative samples	Modified Level C or Level D
• oversight of test pit/soil excavation activities i) known contaminants ii) unknown contaminants	Modified Level C or Level D
• collection of investigative/ confirmatory samples from excavation i) known contaminants ii) unknown contaminants	Level B or Modified Level C

TABLE 4

AIR MONITORING INSTRUMENTS AND FREQUENCY FOR SITE ACTIVITIES
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Activity	*PID*	*OVA*	*Combustible Gas Indicator*	*Dust Monitor*	*Oxygen Monitor*	*Tubes*	*Other*
Soil Sample Collection	X Hourly		X Hourly		X Hourly		
Oversight of Drilling	X		X	X	X		
Oversight of Test Pit or Soil Excavation	X Continuously*		X Continuously*	X Continuously*	X Continuously*		
Soil Verification Sample Collection from Excavation	X Continuously*		X Continuously*	X Continuously*	X Continuously*		

Note:

* Continuously monitor breathing zone until level of hazard/protection can be determined. Discuss results with HSO and IH, set monitoring schedule based on findings and dicussions.

TABLE 5

ACTION LEVELS FOR
VARIOUS AIR MONITORING INSTRUMENTS
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Instrument	*Hazard*	*Action Levels*	*Action*
PID/OVA	Organic Vapors	≤Background	Level D
		>1 ppm above background	Level C with full mask respirator
		>50 ppm	Level B
Combustible Gas Indicator	Explosive Gases	<10% LEL	Level D
		>10% LEL	Leave Area and Reassess
Miniram Dust Monitor	Contaminated Dusts	≤1 mg/m3 above background	Level D
		>1 mg/m3 above background	Level C
		>50 mg/m3 above background	Level B
Oxygen Monitor		<19.5% and >23.5%	Cease operations Evacuate, confer with HSO Reevaluate Work Plan or up to Level B

TABLE 6

OVERVIEW OF PROJECT TASK HAZARDS
PONTIAC CENTRAL MANUFACTURING FACILITY/CENTERPOINT BUSINESS CAMPUS

Task	*Potential for Inhalation Over Exposure*	*Potential for IDLH Conditions*	*Potential for Skin Contact/ Eye Irritation*	*Potential for Explosion*	*Potential for Oxygen Deficiency*
• Overisght of Investigation Drilling Activities			X		
• Collection of Investigative Samples			X		
• Oversight of Test Pit/ Soil Excavation Activities	X		X		
• Collection of Investigative/ Confirmatory Samples from Excavation	X	X	X		X

TABLE 7

EMERGENCY TELEPHONE NUMBERS
PONTIAC CENTRAL MANUFACTURING
FACILITY/CENTERPOINT BUSINESS CAMPUS

Agency	*Contact*	*Telephone Number*
Hospital	St. Joseph's Mercy Hospital	(810) 858-3000
Local Police	Emergency Operator	911
Local Fire	Emergency Operator	911
GM Project Manager	Ralph Mitchell	810-456-6503
GM Environmental Manager	Keith West	313-556-0821

APPENDIX A

PERSONAL PROTECTIVE EQUIPMENT AND ACTION LEVELS

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1.0 PERSONAL PROTECTIVE EQUIPMENT (PPE) PROGRAM

1.1 SCOPE

CRA has established this personal protective equipment (PPE) program for site operations to provide guidelines and procedures that enable employees to most effectively use the PPE provided to them. Discussion of all protective equipment, except respiratory protection, is provided in this section. Respiratory protection is included under a separate SOP.

1.2 CHEMICAL HAZARDS

Protection from contaminated soils and water may be provided by the use of chemical resistant clothing, gloves (one or two layers) and steel toe and shank boots, with or without over-boots. All PPE for a given site is specified in a site-specific HASP. Inhalation of chemical hazards is covered under the respiratory protection SOP (Section 15).

1.3 PHYSICAL HAZARDS

Physical hazards, such as overhead hazards, high ambient noise levels and temperature extremes, vary significantly from site to site. It is CRA's policy that hard hats, safety boots, and safety glasses be worn routinely for the performance of all on-site tasks when construction hazards are present. This provides protection from potential overhead and particle eye hazards. Guidelines for temperature extremes may be found in the heat and cold stress SOPs (Sections 12 and 13). These guidelines include appropriate clothing, engineering or administrative controls. Hearing protection is required for all soil boring and monitoring well installations. Steel toed boots are mandatory on all sites for protection from falling objects, sharp objects, and trips and falls.

1.4 PPE SELECTION

Levels of personal protection vary according to the activities being conducted and the hazards that may be encountered. PPE selection is made on the basis of site-specific chemical and physical hazards. The USEPA terminology for protective equipment used on site falls into one of the following categories. There are also variations of each category which will be specified under each site-specific HASP.

1.4.1 Level D

Level D protection shall be worn when a hazardous atmosphere is not present nor is expected to be present based on planned work activities. Level D protection is designed to offer basic skin and body protection. Level D does not provide protection from inhalation exposure to hazardous substances. Modifications to Level D adjust the level of skin and body protection to the appropriate site conditions.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank;
- Short or long sleeved shirt and pants or coveralls; and
- Safety glasses with side shields or splash goggles.

Optional PPE

- Hard hat;
- Face shield; and
- Hearing protection.

1.4.2 Level C

Level C protection is designed to offer air purifying respiratory protection in addition to body protection. Level C will be used when:

- the types of air contaminants have been identified, an air-purifying respirator (APR) that can remove the contaminants is available, the air contaminants have adequate warning properties and the criteria for the use of an APR have been met;

- concentrations of unidentified airborne organic compounds in the breathing zone are greater than background for a period of 15 minutes with a ceiling of 5 ppm above background; or

- concentrations of airborne particulates in the breathing zone (for 15 or more minutes) are greater than established action levels for particulates.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank;
- Chemical-resistant clothing;
- Chemical-resistant outer gloves;
- APR with half or full-facepiece and appropriate cartridge; and
- Safety glasses with side shields if wearing a half mask respirator.

Optional PPE

- Hard hat;
- Face shield;
- Chemical-resistant inner gloves;
- Disposable boot covers;
- Hearing protection; and
- Emergency escape mask.

1.4.3 Level B

Level B protection is designed to offer enhanced skin protection and supplied air respiratory protection in the form of an SCBA or air line respirator with a 5-minute escape bottle. Level B is used when:

- concentrations of unidentified airborne organic compounds in the breathing zone are greater than 5 ppm for a period of 15 minutes; or
- concentrations of chemicals in the air are immediately dangerous to life and health (IDLH) or above maximum use limits of a full-face APR; or
- oxygen deficient or potentially oxygen deficient atmospheres (less than 19.5% O_2) are possible; or
- handling, investigation and/or sampling of unknown drummed waste; or
- confined space entry requires Level B protection.

Required PPE

- Chemical-resistant or leather boots with safety toe and steel shank and overboots;
- Chemical-resistant clothing;
- Chemical-resistant inner gloves;
- Chemical-resistant outer gloves;
- Positive-pressure/pressure-demand SCBA or airline respirator with escape bottle.

Optional PPE

- Hard hat;
- Disposable boot covers;
- Hearing protection;
- Cooling vest; and
- Two-way radio.

1.4.4 Level A

Level A protection is designed to offer the greatest level of skin, respiratory, and eye protection. Level A is used when:

- concentrations of unidentified airborne contamination exceed 500 to 1,000 ppm above background; or
- the materials are an extreme skin adsorption hazard.

Required PPE

- Positive pressure, full face-piece, self-contained breathing apparatus;
- Totally-encapsulating chemical-protective suit;
- Chemical-resistant outer gloves;
- Chemical-resistant inner gloves;
- Chemical-resistant boots with safety toe and steel shank; and
- Chemical-resistant disposable protective suit.

Optional PPE

- Hard hat (under suit);
- Hearing protection;
- Cooling vest; and
- Two-way radio.

1.5 PERSONAL PROTECTIVE EQUIPMENT USE GUIDELINES

1.5.1 Protective Clothing

The criteria used to determine the need for PPE for a specific activity are listed below:

1.5.1.1 Hard Hats

Required when the potential for overhead hazards exist or when intrusive activities involving powered equipment are conducted. Examples include exploration of abandoned buildings, soil boring, well installation, test excavating, or other construction/investigation activities involving heavy equipment operations. In addition, hard hats are required if required by other contractors or by the owner. Hard hats used by CRA must meet ANSI and/or CSA standards for impact resistance and construction.

1.5.1.2 Safety Glasses

Required when activities involving powered equipment such as soil boring, well installation, test excavation, or other activities involving the observation of heavy equipment operations occur. Side shields are required when work involves handling or being in close proximity to chemical, grinding, grouting operations, or concrete pouring or other activities where debris or flying objects can become easily airborne and may irritate the eye if eye contact occurs. Safety glasses used by CRA must meet ANSI and/or CSA standards for impact resistance.

A splash shield may be worn when materials known or suspected to be contaminated may splash the face or eyes and when skin or eye irritation or absorption is a concern (i.e., PCB, PAH-contaminated material(s)).

1.5.1.3 Steel-Toed Boots

Leather steel-toed work boots shall be worn, at a minimum, on all sites covered by a HASP. Required when activities involving powered equipment such as soil boring, well installation, test excavation, or other construction/investigation activities involving the observation of heavy equipment operations. In addition, steel-toed boots are required if required by contractors, owners, or when activities may involve

carrying/handling heavy materials or walking over uneven terrain. CRA safety boots must meet ANSI and/or CSA standards. If there is a potential for contamination, disposable or reusable overboots must be worn.

1.5.1.4 Cotton Coveralls/Work Clothes

Cotton coveralls may be used to protect skin and work clothes from non toxic particulates such as dust, dirt and mud. Required when activities are restricted to outside of the exclusion zone. Work in an exclusion zone will usually require an upgrade to a different level of protection.

1.5.1.5 Tyvek[1]

Tyvek is a disposable, non-porous material. It may be used to provide protection from toxic particulates such as lead dust and asbestos, and may be used for wind protection in the winter. Required when tasks may involve bodily contact with potentially contaminated materials. This would involve collecting samples and other activities where minor splashing or soiling of clothing is likely.

1.5.1.6 Poly-Coated Tyvek

Poly-coated Tyvek is a disposable, polyethylene-coated material. It may be used as protection from potential chemical liquid splash. Required when bodily contact may occur with heavily contaminated materials, coal tar contaminated materials, or PCB contaminated materials. Also required when the degree of contamination is unknown and activities may involve bodily contact with these substances or when investigation/remediation activities generates a splash potential.

---

[1]Tyvek is being used generically to describe disposable, chemical-resistant clothing.

1.5.1.7 Saranex Tyvek

Saranex Tyvek is a saran-coated Tyvek material which is impermeable to most chemicals and may be used when a higher level of skin protection than offered by poly-coated Tyvek is required.

1.5.1.8 Chemical-Resistant Boots/Boot Covers

Disposable boot covers will be worn over leather steel-toed work boots when walking on contaminated materials. They may also be worn when muddy conditions are anticipated. They may be worn over chemical-resistant boots when there is not sufficient water on the site for decontamination. Two pair of disposable boot covers may be worn over leather steel-toed boots in lieu of one pair over chemical-resistant boots.

Chemical-resistant steel-toed boots may be worn when walking on contaminated materials or when contact with contaminated materials is anticipated under wet conditions. They may be worn uncovered only when there is sufficient water on the site for thorough decontamination, or when the nature of the contaminant facilitates quick volatilization from footwear.

1.5.1.9 Gloves

Inner nitrile gloves (4 to 6 mil in thickness) will be worn as a precaution when handling materials which may be contaminated or when a dermal hazard exists. They may also be worn inside outer gloves when there is a greater likelihood of contact with materials known or suspected to be contaminated to provide protection against degradation/leakage of the outer gloves.

Outer gloves of nitrile, vinyl, neoprene, butyl, or viton (11 to 14 mil in thickness) will be worn when handling materials known or suspected to be contaminated or when a serious dermal hazard exists.

Selection of glove types is based on degradation and permeability of glove material provided by various manufacturers to expected contaminants on a site. In cold weather, insulated vinyl-coated gloves may be worn as outer gloves.

One pair of surgical or 4 mil nitrile gloves is required when handling containers which contain contaminated samples. A second pair of gloves is required when collecting the contaminated sample from split spoon samplers or bailers or when performing headspace analysis. This second pair shall be replaced immediately after handling or collecting the sample.

1.6 WORK TASK DURATION

In selecting PPE, the estimated duration of job tasks and project duration must be considered. Protective equipment should be chosen which will provide protection for a full work shift or for the duration of the task to be accomplished. If site conditions are such that protective equipment cannot provide adequate protection for the duration of the task, several factors should be considered to determine appropriate work task duration, including:

- Clothing/glove permeation and penetration rates for chemicals;
- Respirator/filter cartridge capacity and breakthrough times;
- Ambient temperature and weather conditions; and
- Integrity of the Tyvek, boot covers, and gloves.

These factors are incorporated into the selection of personal protective equipment and will be addressed as appropriate in a site HASP. In addition, as soon as the integrity of any PPE is compromised, the work task shall stop until the PPE can be replaced.

1.7 MAINTENANCE AND STORAGE

Non-disposable protective equipment such as hard hats, boots, safety glasses, and respirators will be decontaminated daily or more frequently if necessary and stored in an appropriate clean area. Most disposable clothing is to be discarded at the end of the work shift or more frequently as necessary. If, after inspection and decontamination, it has been determined that reusable PPE is damaged, it will be disposed of promptly. Disposal methods will be specified in the site HASP as methods vary from site to site.

1.8 DECONTAMINATION

Decontamination procedures for PPE are covered under the SOP for decontamination.

1.9 TRAINING AND FITTING

All CRA employees with 40-hour training have been trained in the use and selection of PPE and have been provided hands-on training on using PPE. Each CRA employee involved with field work is fit tested annually with a respirator according to the procedures outlined in the SOP for respiratory protection. All CRA employees involved with field work are expected to provide proper ANSI and/or CSA certified safety boots. CRA provides hard hats, safety glasses, with side shields (safety sunglasses, if necessary) and disposable PPE. A large inventory of clothing, gloves and boot covers is maintained in various sizes in CRA offices. Each employee is encouraged to try on the various sizes to determine the best fitting size of all PPE.

1.10 DRESSING/REMOVAL PROCEDURES FOR PPE

Clothing required for protection from exposure to hazardous substances will be put on at the site before entry into the exclusion zone. If protective outer garments are necessary, the suit will be put on first, followed by boots, boot covers, and gloves. Hems on the legs of protective clothing shall be worn outside of chemical resistant boots and taped with duct tape at the ankle. If boot covers are used, the hems shall be tucked into the boot cover and taped below the knee. Hems on the sleeves of protective clothing should be worn outside of gloves and taped at the wrist, if necessary. Respirators will be donned following the guidelines in the respirator SOP.

CRA employees leaving the exclusion zone will remove and decontaminate their equipment and protective clothing at designated decontamination zones as described in the site HASP.

1.11 PPE INSPECTION

CRA employees are required to periodically check the integrity of PPE through self inspection, both before and during use. The frequency and degree of inspection depends on the specific article and its frequency of use. A primary inspection will be done by the user before each use. Inspection guidelines are presented in the following sections.

1.11.1 Protective Clothing Inspection

- Visually inspect for tears, non uniform coatings, imperfect seams, malfunctioning closures.
- Hold up to the light to check for pinholes.
- Flex product to check for cracks and deterioration.

1.11.2 In-Use Inspection

PPE should be periodically inspected for signs of ripping/tearing or heavy contamination of PPE. In the event of torn/ripped or heavily contaminated PPE, CRA employees must proceed immediately to the decontamination zone to remove and replace the PPE.

1.11.3 Respiratory Protection Inspection

The inspection of respiratory protection equipment is discussed in the respirator SOP.

1.12 EVALUATION OF EFFECTIVENESS OF PPE PROGRAM

The CRA PPE program is evaluated on a continual basis by an industrial hygienist. This evaluation occurs at annual refresher training sessions and is reviewed regularly with input from field staff.

1.13 PPE LIMITATIONS

Selection of chemical-resistant clothing should be performed by personnel trained in evaluation of the clothing and its limitations. Consideration of the following factors and limitations is generally considered in the selection of PPE described in site HASPs.

- Not all materials protect against all chemicals and chemical combinations, and not all materials provide a barrier for prolonged exposure periods. Since most contaminated soils/water are mixtures of hazardous substances, there is limited permeation data available for those mixtures. Selection should be made for clothing offering the widest range of protection against the chemicals expected to be on site.

- Protective clothing is generally nonporous and is designed to prevent skin exposure to hazardous substances. Consequently, the nonporous nature does not allow for sufficient cooling of the body through sweating and other heat release functions. Temperature extremes will be considered in the site HASP when selection of PPE is made, and suggestions will be made on duration of use of PPE, and recommended break schedule as appropriate to weather conditions.

- In cold weather, the polymer coating on some disposable clothing may become inflexible and tear more easily.

Other limitations to consider are:

- Ability of material to withstand the physical stress of the task (e.g., boot covers torn by walking on sharp objects).

- Degree to which protective clothing may interfere with a worker's ability to perform tasks (e.g., full facepiece respirator interferes with ability to read, heavy gloves reducing note-taking ability).

APPENDIX B

FORMS

FORM 1

HEALTH AND SAFETY PLAN
DEVIATION AMENDMENT

Amendment Number: _____ Date: _____

Project Name: _____ Reference Number: _____

Amendment Section: _____

Amendment: _____

_____

_____

_____

_____

Reason for Amendment: _____

_____

_____

_____

Amendment discussed with Project Manager on _____ and approved.

Amendment discussed with Industrial Hygienist on _____ and approved.

_____ _____

Preparer of Amendment Date

c.c. Project File
Project Manager
Industrial Hygienist

FORM 2

PRE-ENTRY BRIEFING

Site Name: _____ Reference Number: _____

Date: _____ Briefing Given By: _____

Topics Covered Attached: _____

Name	*Company*

APPENDIX C

AIR MONITORING

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1.0 OVERVIEW

Air monitoring is conducted to help ensure that the level of protection selected is appropriate for different phases of the field operations. Real-time air monitoring using direct reading instruments is conducted based on the nature of site activities. Real-time air monitoring needs to be performed whenever:

- site remediation begins;
- operations change;
- work begins on a different portion of the site;
- any intrusive site activity begins;
- contaminants other than those previously identified are being handled; or
- when obviously contaminated materials, leaking drums or containers are handled.

Air monitoring efforts are focused on those employees conducting tasks representative of potential maximum exposure and on all employees likely to be exposed to any substance above the OSHA Permissible Exposure Limit (PEL) or other published exposure level.

2.0 MONITORING PROCEDURES

Two types of air monitoring are conducted, real-time and personal monitoring. Real-time monitoring provides instant readout and is conducted for on-site screening for exposures to airborne levels of hazardous substances to determine the appropriate level of employee protection. Personal exposure monitoring involves collecting a sample for subsequent laboratory analysis and is conducted to quantify specific airborne concentrations of hazardous substances when comparisons need to be made to 8-hour time weighted averages.

Monitoring is conducted in the breathing zone. The breathing zone is defined as an area within a two-foot radius around the head. Information obtained from air monitoring is used to assure proper selection of engineering controls, personal protective levels, work zones, work practices and to assure compliance with OSHA PELs and other published exposure levels.

3.0 INITIAL ENTRY

Prior to initial site entry, a site history is obtained to determine potential contaminants that may be encountered and to assist in personal protective equipment selection. During initial entry, real-time instruments may be used to monitor for those IDLH conditions that could potentially be encountered such as toxic, explosive, combustible and oxygen deficient atmospheres. When the site history indicates that ionizing radiation is suspected to be present, real-time instrumentation for determining levels of radiation are used. Additionally, visual observations are made continuously during the initial entry so that actual or potential IDLH conditions or other dangerous conditions can be noted for present and future use.

4.0 SITE CHARACTERIZATION

During site characterization, real-time monitoring is conducted where there is a reasonable possibility for exposure. Real-time monitoring is continued if the possibility of an IDLH or flammable atmosphere condition exists, or if there is an indication, based on initial entry monitoring, that exposures may approach action levels determined in the HASP. Additionally, personal exposure monitoring is conducted when there is no suitable real-time instrument to monitor airborne levels of any of the hazardous substances anticipated.

During site characterization, periodic monitoring is conducted whenever:

- work begins on a different portion of the site;
- when contaminants other than those identified during initial entry are being handled;
- a different type of operation is initiated; or
- when work is conducted in areas of obvious contamination.

5.0 SITE REMEDIATION

Periodic real-time and/or personal exposure monitoring is conducted throughout the remedial investigation phase and during the actual site remediation phase of a hazardous waste operation, when contaminated soil, water, waste or containers are moved or disturbed. Personal exposure monitoring is conducted when there is no suitable real-time instrument to monitor airborne levels of any of the hazardous substances anticipated.

The frequency of personal exposure monitoring will be sufficient to characterize employee exposure and to confirm selection of personal protective levels.

If the air monitoring results indicate airborne hazardous substances above the action levels established in this HASP, the personal protective level will be upgraded to the next indicated level and air monitoring will continue. If the air monitoring results indicate that levels are below the action levels established, it may be determined that subsequent personal exposure monitoring is not required, and the current level of protection is sufficient to provide protection from potential exposure. Air monitoring results may be used to determine that the current level of protection may be downgraded.

6.0 ACTION LEVELS FOR DIRECT READING INSTRUMENTS

These are guidelines for setting action levels for direct reading instruments and, while they are generally valid, specific site conditions must be evaluated by an IH to determine if any alterations to the SOP is necessary or appropriate. CRA's IH should be consulted when establishing site-specific action levels.

6.1 ORGANIC VAPORS

Action levels for organic vapors are based on direct instrument readings made in the breathing zone from organic vapor detectors such as a photoionization detector (PID) or flame ionization detector (FID). These are relative, not absolute readings.

When the environment being sampled consists of chemical constituents, the following action levels are to be adhered to for unknown or known VOCs:

6.1.1 Unknown VOCs - Action Levels

Sustained Instrument Reading[1]	Level of Protection
≤ Background	Level D
< 5 meter units above background	Level C
≥ 5 meter units above background	Cease operations and move to a safe area. Confer with HSO. Re-evaluate work plan. Abandon location or upgrade to Level B and continue.

If the chemical constituents are known, the following action levels can be used:

[1]Sustained = Maintained for at least 15 minutes.

6.1.2 Known VOCs - Action Levels

Instrument Reading	Level of Protection
≤ 10 x TLV	Level C with half mask[2, 3]
> 10 to < 50 x TLV	Level C with full facepiece[1, 2]
> 50 x TLV	Level B with supplied air[4]

In situations where multiple, known substances exist, use the TLV for the material with the lowest allowable level (e.g., if benzene (TLV = 10 ppm) and toluene (TLV = 100 ppm) are present, use benzene's TLV for protection calculation).

6.2 COMBUSTIBLE GASES

Action levels are based on the readings from a combustible gas meter. The readings are generally given as a percentage of the lower explosion limit (%LEL) and are collected in the general work area. An atmospheric oxygen level of less than 19.5% may affect the readings from a combustible gas meter and give lower than actual levels. Test oxygen content first.

6.2.1 Non-Confined Space Readings, General Area

Instrument Reading	Action to be Taken
0-10% LEL	Continue working and monitoring atmosphere for combustible gases. Inform personnel working in the area whenever readings >5% LEL.

[2]As long as the material in question can be filtered by an APR and has good warning properties and normal oxygen content.
[3]Is below the IDLH level.
[4]With emergency escape bottle or SCBA.

10-20% LEL	Continue working with caution. Inform personnel working in area of readings. Be prepared to cease operations.
>20% LEL	Cease operations and move to a safe place. Re-evaluate work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if operations are to continue. **DO NOT CONTINUE WORKING UNTIL CONDITIONS ARE CONSISTENTLY BELOW 20% LEL.**

HOT WORK is only to be conducted at 0% LEL.

For field work being conducted at non-landfill drilling sites, the following action levels can be used for combustible gas readings taken at or near the borehole versus in the general area:

BOREHOLE READING

Instrument Reading	Action to be Taken
<20% LEL	Continue working and monitoring atmosphere for combustible gases. Inform personnel working in the area whenever readings are >10% LEL.
20 - 40% LEL	Continue working with caution. Inform personnel in area of readings. Be prepared to cease operations.
>40% LEL	Cease operations and move to a safe area. Re-evaluate work plan. Engineering controls such as forced ventilation and use of non-sparking tools are to be implemented if

operations are to continue. **DO NOT CONTINUE WORKING UNTIL CONDITIONS ARE CONSISTENTLY BELOW 40% LEL.** Supplied air or SCBA respiratory protection may be necessary.

6.2.2 Combustible Gases at Landfill Sites

Under development.

6.3 OXYGEN

A direct reading oxygen meter is used to determine the percent of oxygen in the atmosphere.

Instrument Reading	Action to be Taken
<19.5% or >23.5%	Cease operations and move to a safe area. Re-evaluate work plan. Engineering controls such as forced ventilation and use of non sparking tools are to be implemented if operations continue. **DO NOT CONTINUE WORKING UNTIL OXYGEN LEVELS ARE BETWEEN 19.5 AND 23.5%.** When oxygen levels are outside this range, combustible gas meter readings are not reliable. Supplied air or SCBA respiratory protection may be necessary.

6.4 HYDROGEN CYANIDE (HCN)

Whenever an alarm sounds on a direct reading HCN meter, cease work activity immediately, move to a safe area and contact the

HSO. The ceiling concentration for HCN is 10 ppm. If the unit is equipped with an alarm, it should be set just under 10 ppm.

If approval is given by the HSO, verification of the presence of HCN is to be made using colorimetric tubes which are specific for HCN detection. The person taking the sample is to wear air supplied respiratory protection. There is no air-purifying cartridge approved for use in an atmosphere containing HCN.

If the presence of HCN is confirmed, cease activities until the HSO gives instructions or confer with CRA's IH. If the colorimetric tubes do not indicate the presence of HCN, check the calibration of the direct reading meter and continue with site activities cautiously continuing to monitor for HCN with the direct reading meter.

6.5 HYDROGEN SULFIDE (H_2S)

Whenever readings approach 10 ppm on a direct reading H_2S meter, cease work immediately, move to a safe area and contact the HSO. H_2S has a TLV level of 10 ppm.

If approval is given by the HSO, verification of the presence of H_2S is to be made using colorimetric detector tubes. The person taking the sample is to wear air supplied respiratory protection. There is no air-purifying cartridge approved for use in an atmosphere containing H_2S.

If the presence of H_2S is confirmed, cease activities and wait for directions from the site HSO or confer with CRA's IH. If the colorimetric tubes do not indicate the presence of H_2S, continue with site activities cautiously and continue to monitor after checking the calibration of the direct reading meter.

6.6 CARBON MONOXIDE (CO)

Whenever a detection is made with a direct reading CO meter in excess of 20 ppm, cease work immediately, move to a safe area and contact the site HSO.

If approval is given by the HSO, verification of the presence of CO is to be made with colorimetric tubes which can detect CO. The person taking the sample is to wear air-supplied respiratory protection. There is no air-purifying cartridge approved for use in an atmosphere containing CO.

If the presence of CO is confirmed, cease activities and wait for directions from the HSO or confer with CRA's IH. If the colorimetric tubes do not indicate the presence of CO, continue with site activities cautiously and continue to monitor after verifying the calibration of the direct reading meter.

6.7 TOTAL DUST

The TLV for nuisance dust is 10 mg/m^3. When other toxic materials are present an adjustment is necessary to this number to make it a valid real-time indicator. Typically, an action level of 5 mg/m^3 total dust (50 percent of the nuisance dust TLV) will generally be more conservative than an action level determined for specific particulate compounds.

To determine if 5 mg/m^3 total dust is protective enough for the chemical of concern, follow the procedure provided below:

1. Multiply the known fraction of the chemical in the soil by the action level for total dust to determine what the airborne concentration of the chemical would be at the dust action level. Compare with 50 percent of the TLV, PEL or STEL (whichever is lowest). If the airborne concentration is lower, the action limit should remain 5 mg/m^3 total dust.

Example:

The PEL for lead is 0.05 mg/m^3 and the OSHA action level is 0.025 mg/m^3. Fifty percent of the PEL is 0.025 mg/m^3. If the concentration of the lead in the soil is 1,000 mg/kg (or ppm), then:

$$\frac{1{,}000 \text{ mg Pb}}{10^6 \text{ mg soil}} \times \frac{5 \text{ mg soil}}{\text{m}^3 \text{ air}} = \frac{0.005 \text{ mg Pb}}{\text{m}^3 \text{ air}}$$

A comparison of 0.005 mg/m^3 airborne lead at the dust action level with the action level for lead (0.025 mg/m^3) shows that the dust action level is protective enough for lead monitoring.

2. Alternatively, to determine a soil concentration of concern (i.e., the concentration corresponding with the chemical's action level), divide the chemical action level by the dust action level to determine the concentration of chemical required in the soil to reach the action level.

Example:

$$\frac{0.025 \text{ mg Pb}}{\text{m}^3 \text{ air}} \times \frac{\text{m}^3 \text{ air}}{5 \text{ mg soil}} = \frac{0.025 \text{ mg Pb}}{5 \text{ mg soil}} = \frac{5{,}000 \text{ mg Pb}}{\text{kg soil}}$$

In this case, soil with 5,000 mg/kg lead would be at the OSHA action level when total dust is also at the action level of 5 mg/m^3.

APPENDIX D

HAZARD EVALUATION/ANALYSIS

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1.0 SAFETY AND HEALTH RISK ANALYSIS

Table D.1 describes potential safety and health risks which may be encountered by CRA employees while performing site tasks. Site operations may involve handling materials which are known or suspected to be contaminated. Exposure to these materials may occur through one or more of the following routes.

1.1 INHALATION

Substances that primarily pose an inhalation hazard are those that volatilize easily at ambient temperatures. A rule of thumb is that substances with vapor pressures greater than that of naphthalene (0.08 mm Hg) may be considered volatile at ambient temperatures.

1.2 INGESTION

Ingestion may occur through eating or smoking with contaminated hands or in contaminated work areas. Incidental ingestion of contaminated particulates may also occur under dusty conditions generated in contaminated areas.

1.3 SKIN AND EYE CONTACT

Some hazardous substances may be absorbed through the skin into the bloodstream. Many other substances are not absorbed but react with the skin surface causing irritation or burns. Absorption occurs most readily through open wounds, inflamed skin or through eye contact. These hazardous substances are noted with the word "skin" in Table 2.

1.4 INJECTION

Exposure may occur if a hazardous substance is injected into the skin through skin puncture or cut by a contaminated foreign object such as spikes, metal edges, wood slivers, etc.

2.0 PHYSICAL HAZARDS

Site operations and tasks may involve inherent physical safety hazards. These hazards are described in the following paragraphs. site-specific hazards may be discussed in Section 1 of this HASP.

2.1 UTILITIES

Overhead and underground utilities (e.g., electric, gas, telephone, water, sewer, drainage, etc.) and associated pipes in the project work areas must be located. Underground utilities shall be located and marked by the utility owners before the start of any intrusive activity. Overhead utilities shall be located and, where appropriate, protected before the setup and operation of heavy equipment, such as drill rigs, cranes, loaders, man-lifts, etc.

2.2 HEAVY EQUIPMENT OPERATION

Site operations may involve the use of heavy equipment such as drill rigs, backhoes, dozers, loaders, scrapers, trucks, etc. The following information describes additional safety procedures while working around heavy equipment.

1) Maintain visual contact with the operator at all times while working near the equipment.

2) Keep a safe observation distance of at least the reach of the backhoe bucket plus five feet except when working directly with the backhoe operator.

3) Never walk directly in back or to the side of heavy equipment without the operator's knowledge. Understand the direction the equipment is likely to move and how quickly it may make the maneuver.

4) Always stay out of the reach of operating equipment unless working directly with the operator.

5) Assure that underground and overhead utilities have been identified.

6) Be aware of footing and surroundings at all times.

7) Do not work near equipment that may be unsafe because of deterioration, missing parts, obvious defects or improper operation. Do not permit use of such equipment by any contractor.

8) If working within reach of operating equipment, always alert operator of your position.

9) If heavy equipment and other vehicles share a common roadway, be alert to this traffic and yield right-of-way. Park in a clear area, not in an area obstructed from the operator's view.

2.3 EXCAVATIONS

Any entry to an excavation or trench shall be performed in accordance with the CRA excavation entry procedure. If soil samples are required from excavations, samples shall be taken from the backhoe bucket or from the spoils pile, or other non-entry methods, whenever possible.

2.4 LIGHTING

Work areas must have adequate lighting for employees to see to work and identify hazards.

2.5 LIFTING

Heavy objects, such as pumps and generators, should be lifted with proper lifting techniques and preferably by at least two persons. Material handling equipment should be used when an object is either too heavy or bulky to handle safely.

2.6 DETERIORATED/ABANDONED BUILDINGS

If there are abandoned buildings on site, they may be structurally unstable or the roof, ceiling, floors, walkways, and doors may be damaged. Hard hats, steel toed boots, and safety glasses should always be used when entering those buildings. An initial walk through with a buddy shall be conducted in/near any abandoned facility to identify physical hazards. These types of buildings should be entered only if necessary.

2.7 ELECTRICAL POWER

Electrical equipment must be properly grounded or double insulated and should be inspected prior to use. Any electrical equipment in questionable condition shall not be used. Operation of electrical equipment in wet conditions must be avoided unless equipment and electric service are specifically designed for water immersion. Ground fault interrupter circuits must be used for all exterior or wet applications.

2.8 SLIPPING

Slipping on wet, muddy surfaces can be minimized by diverting water away from work areas or by avoiding slippery surfaces. Boots with good treads shall be worn if the area is wet or muddy. Walking in puddles, drilling mud, and drilling additives should be avoided. Slipping on snow or icy surfaces should be minimized whenever possible.

2.9 LIMITATIONS DUE TO PERSONAL PROTECTIVE EQUIPMENT

The use of PPE may limit visibility, hearing, or manual dexterity. In addition, wearing PPE may require additional physical exertion of the wearer. These limitations are to be evaluated prior to performing a particular task and compensated for, as appropriate.

2.10 NOISE EXTREMES

Noise exposure may occur on site from heavy equipment operations, especially while working in the area of operating equipment. A general rule of thumb to determine if noise levels are high enough to require hearing protection is to observe if two persons standing approximately two feet apart have to raise their voices to converse. If conversation cannot occur without shouting, noise levels exceed 85 dBA and hearing protection shall be utilized. Hearing protection is available in the form of ear plugs, muffs, or both.

2.11 IONIZING RADIATION

Sites that have been used by hospitals and research facilities should be particularly suspect of posing an ionizing radiation hazard. These materials may be found in drums, including lab packs, as either a solid or liquid. The best precaution for individuals working at landfills is constant monitoring for ionizing radiation. Initial monitoring shall be conducted to detect high levels of radiation where radiation is suspected to be present. Exposure monitoring is continuously conducted with TLD badges or rings.

2.12 HEAT STRESS AND COLD STRESS

Heat stress and cold stress identification, prevention, and treatment guidelines are attached to this appendix.

3.0 COLD STRESS

3.1 OVERVIEW

Fatal exposures to cold have been reported in employees failing to escape from low environmental air temperatures or from immersion in low temperature water. Hypothermia, a condition in which the body's deep core temperature falls significantly below 98.6°F, can be life threatening. A drop in core temperature to 95°F or lower must be prevented.

Air temperature is not sufficient to determine the cold hazard of the work environment. The wind-chill must be considered as it contributes to the effective temperature. The body's physiologic defense against cold includes constriction of the blood vessels, inhibition of the sweat glands to prevent loss of heat via evaporation, glucose production, and involuntary shivering to produce heat by rapid muscle contraction.

The frequency of accidents increases with cold temperature exposures as the body's nerve impulses slow down, individuals react sluggishly and numb extremities make for increased clumsiness. Additional safety hazards include ice, snow blindness, reflections from snow, and possible skin burns from contact with cold metal.

There are certain predisposing factors that make an individual more susceptible to cold stress. It is the responsibility of the project team members to inform the Health and Safety Officer to monitor an individual, if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a cold related illness or disorder.

3.2 PREDISPOSING FACTORS

Predisposing factors that will increase an individual's susceptibility to cold stress are listed below:

- Dehydration: The use of diuretics and/or alcohol, or diarrhea can cause dehydration. Dehydration reduces blood circulation to the extremities.

- Fatigue During Physical Activity: Exhaustion reduces the body's ability to constrict blood vessels. This results in the blood circulation occurring closer to the surface of the skin and the rapid loss of body heat.

- Age: Some older and very young individuals may have an impaired ability to sense cold.

- Alcohol Consumption: Alcohol dilates the blood vessels near the skin surface resulting in excessive body heat loss.

- Sedative Drugs: Sedatives may interfere with the transmission of impulses to the brain, thereby interfering with the body's physiological defense against cold. Some prescription drugs may react the same way.

- Poor Circulation: Vasoconstriction of peripheral vessels reduces blood flow to the skin surface.

- Heavy Work Load: Heavy work loads generate metabolic heat and make an individual perspire even in extremely cold environments. If perspiration is absorbed by the individual's clothing and is in contact with the skin, cooling of the body will occur.

- The Use of PPE: PPE usage which traps sweat inside the PPE may increase an individual's susceptibility to cold stress.

- Lack of Acclimatization: Acclimatization, the gradual introduction of workers into a cold environment, allows the body to physiologically adjust to cold working conditions.

- History of Cold Injury: Previous injury from cold exposures may result in increased cold sensitivity.

3.3 PREVENTION OF COLD STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing cold related ailments and disorders. These include acclimatization, fluid and electrolyte replenishment, eating a well balanced diet, wearing warm clothing, the provision of shelter from the cold, thermal insulation of metal surfaces, adjusting work schedules, and employee education.

- Acclimatization: Acclimatization is the gradual introduction of workers into the cold environment to allow their bodies to physiologically adjust to cold working conditions. However, the physiologic changes are usually minor and require repeated uncomfortably cold exposures to induce them.

- Fluid and Electrolyte Replenishment: Cold, dry air can cause employees to lose significant amounts of water through the skin and lungs. Dehydration affects the flow of blood to the extremities and increases the risk of cold injury. Warm, sweet, caffeine-free, non-alcoholic drinks, and soup are good sources to replenish body fluids.

- Eating a Well-Balanced Diet: Restricted diets including low salt diets can deprive the body of elements needed to withstand cold stress. Eat high energy foods throughout the day.

- Warm Clothing: It is beneficial to maintain air space between the body and outer layers of clothing in order to retain body heat. However, the insulating effect provided by such air spaces is lost when the skin or clothing is wet.

The parts of the body most important to keep warm are the feet, hands, head and face. As much as 40 percent of body heat can be lost when the head is exposed.

Recommended clothing includes:

- Inner layers (t-shirts, shorts, socks) should be of a thin, thermal insulating material.
- Wool or thermal trousers. Denim is not a good protective fabric.
- Felt-lined, rubber-bottomed, leather-upper boots with a removable felt insole is preferred. Change socks when wet.
- Wool shirts/sweaters should be worn over inner layer.
- A wool cap is good head protection. Use a liner under a hard hat.
- Mittens are better insulators than gloves.
- Face masks or scarves are good protection against wind.
- Tyvek/poly-coated Tyvek provides good wind protection.
- Wear loose fitting clothing, especially footwear.
- Carry extra clothing in your vehicle.
- Shelters with heaters should be provided for the employees' rest periods if possible. Sitting in a heated vehicle is a viable option. Care should be taken that the exhaust is not blocked and that windows are partially open to provide ventilation.
- At temperatures of 30°F (-1°C) or lower, cover metal tool handles with thermal insulating material if possible.
- Schedule work during the warmest part of the day if possible, rotate personnel and adjust the work/rest schedule to enable employees to recover from the effects of cold stress.

3.3.1 Employee Education

Employees have already been trained to recognize and treat the effects of cold stress during their 40-hour training. Signs, symptoms, and treatment of cold stress should be reviewed in project safety meetings where applicable. The buddy system will help in preventing cold stress once the employees are trained to recognize the signs and symptoms of cold stress.

3.3.2 Cold Stress Prevention Guidelines

It may not be practically feasible to implement all the above prevention measures. Follow the guidelines given below when the ambient air temperature is -5°F (-20°) or lower:

- Contact the PM or the IH to determine if the project team should be on site in such temperatures;
- Dress warm;
- Replenish fluids and electrolytes at regular intervals;
- Provide shelter from the cold; and
- Adjust work/rest schedules.

3.3.3 Adjust Work-Rest Schedules

Follow the work/rest schedule in Table 12.1. It is based on the cooling power of air which is a function of wind speed and ambient air temperature.

3.4 FIRST-AID TREATMENT GUIDELINES

The following describes symptoms of different stages in cold stress and the related first-aid treatment guidelines.

3.4.1 Frostbite

Stages

Incipient (frost nip)	May be painless. Tips of ears, nose, cheeks, fingers, toes, chin affected. Skin blanched white.
Superficial	Affects skin/tissue just beneath skin; turns purple as it thaws. Skin is firm, waxy; tissue beneath is soft, numb.
Deep	Tissue beneath skin is solid, waxy, white with purplish tinge. Entire tissue depth is affected.

First-Aid

Incipient	Warm by applying firm pressure - blow warm breath on spot or submerge in warm water (102°F to 110°F) (39°F to 43°C). Do not rub the area.
Superficial	Provide dry coverage, steady warmth; submerge in warm water.
Deep	Hospital care is needed. Do not thaw frostbitten part if needed to walk on. Do not thaw if there is danger of refreezing. Apply dry clothing over frostbite. Submerge in water; do not rub.

3.4.2 General Hypothermia

Stages

- Shivering
- Indifference
- Decreased Consciousness
- Unconsciousness
- Death

Symptoms

- Muscle Tension
- Uncontrollable Shivering
- Glassy Stare
- Decreased Muscle Function
- Speech Distortion
- Blue, Puffy Skin
- Slow Pulse
- Shallow Breathing
- Coordination Loss
- Stumbling
- Forgetfulness
- Freezing Extremities
- Dilated Pupils
- Fatigue

Emergency Response

- Keep person dry; replace wet clothing
- Apply external heat to both sides of patient using available heat sources, including other bodies.
- Give warm liquids - not coffee or alcohol - after shivering stops and if conscious.
- Handle gently.
- Transport to medical facility as soon as possible.
- If more than 30 minutes from a medical facility, warm person with other bodies.

4.0 HEAT STRESS

4.1 OVERVIEW

Heat induced occupational illnesses, injuries, and reduced productivity occur in situations in which the total heat load (environmental plus metabolic) exceeds the body's capacities to maintain normal body functions without excessive strain. Heat stress is the sum of the heat generated in the body plus the heat gained from the environment minus the heat lost from the body to the environment. The body's response to heat stress is called heat strain. The level of heat stress at which excessive heat strain will result depends on the heat tolerance of the individual. Certain predisposing factors may reduce an individual's ability to tolerate heat stress.

Using PPE may put a hazardous waste worker at an increased risk of developing heat stress. Health effects may range from heat rash or heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors, including environmental conditions such as temperature and relative humidity, protective clothing which limits natural heat loss through perspiration, workload, and the individual characteristics of the worker.

It is the responsibility of the project team members to inform the HSO or IH if any of the predisposing factors listed below apply to them. This enables the HSO to monitor the individual if necessary, or use other means of preventing/reducing the individual's likelihood of experiencing a heat related illness or disorder.

4.2 PREDISPOSING FACTORS

Predisposing factors that will increase the individual's susceptibility to heat stress are listed below:

- Lack of Physical Fitness: Such individuals experience more physiological strain including a higher heart rate, a higher body temperature, less

efficient sweating, and slightly higher oxygen consumption as compared to fit individuals.

- Obesity: Overweight individuals produce more heat per unit surface area than thin individuals and have a lowered ability to dissipate heat.

- Age: Older individuals may have a decreased ability to cope with heat stress.

- Dehydration: Dehydrated individuals will have a decreased ability to cool the body by sweating. Diarrhea can cause dehydration.

- Alcohol, Medications, and Drug Use: Alcohol consumption may dehydrate individuals and certain medications/drugs may act as diuretics. Hence, the individual may have a decreased ability to lose heat by sweating.

- Infection, Sunburn, Illness, and Certain Chronic Diseases: These factors may interfere with the body's normal mechanisms to lose heat.

- Heart Conditions or Circulatory Problems: Heat stress may place an additional strain on the heart and circulatory system that could harm the individual as well as decrease the individual's physiologic response.

- Low Salt Diet: Could affect the individual's electrolyte balance.

- Pregnancy

- Previous History of Heat Stroke or Heat Exhaustion: May increase the individual's susceptibility to heat stress.

- Heavy Work Load: Will generate metabolic heat thereby increasing the heat stress placed on the individual

- The Use of PPE Over Light Summer Clothing: This will decrease the ability of an individual to lose heat by sweating as evaporative cooling can no longer occur.

- Lack of Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their bodies to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.

4.3 PREVENTION OF HEAT STRESS

There are a variety of measures that can be implemented to prevent or reduce the likelihood of employees developing heat stress related disorders. These include fluid and electrolyte replenishment, the provision of shelter from the sun and heat, work schedule adjustment, the use of cooling devices, acclimatization, heat stress monitoring, and employee education, as discussed below:

- Fluid and Electrolyte Replenishment: Personnel should drink about 16 ounces of water before starting work and drink water at every break. To encourage water consumption, cool water and disposable cups should be made available. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, personnel should be encouraged to drink more. Replacing body fluids with Gatorade is an option. It is advisable to have Gatorade on site if the air temperature is 70°F (21°C) or more and the workers are performing tasks with a moderate to heavy work load in chemical resistant clothing.

- Shelter From the Sun and Heat: Air-conditioned (if possible) or shaded areas should be made available for rest periods. Sitting in an air-conditioned truck is an acceptable option.

- Work Schedule Adjustment: Scheduling work for early mornings and/or late afternoons will avoid the hottest parts of the day and reduce the heat stress placed on personnel, rotation of personnel will help reduce overexertion of workers and adjusting the work-rest schedule will help personnel recover from the effects of heat stress periodically.

- Use of Cooling Devices: The use of cooling devices like field showers, hose-down areas or cooling vests should be considered for project tasks that involve heavy work loads in chemical resistant clothing.

- Acclimatization: Acclimatization is the gradual introduction of workers into a hot environment to allow their body to physiologically adjust to hot working conditions. Acclimatized individuals generally have lower heart rates and lower body temperatures. In addition, they sweat sooner and more profusely and even have more dilute sweat (thereby losing less electrolytes) than non-acclimatized individuals.

- Heat Stress Monitoring: Monitoring hot environments for potential heat stress should be initiated when the ambient air temperature is in excess of 70°F. There are several ways to monitor heat stress: measuring heart rate, oral temperature, loss of body weight and the Wet Bulb Globe Temperature using a Reuter-Stokes or Quest Electronics heat stress monitor. CRA employees are advised to measure their heart rates as a primary means of heat stress monitoring following the guidelines in Section 13.3.2 and Table 13.1.

- Employee Education: Workers have already been trained to recognize and treat the effects of heat stress during the 40-hour training course. Signs, symptoms, and treatment of heat stress should be discussed in site safety meetings. The buddy system will help in preventing heat stress once the employees are trained to recognize the signs and symptoms of heat stress.

4.3.1 Prevention Practices

It may not be practically feasible to implement all of the above prevention measures. The following has been developed as a field guide for use in actual field situations.

Ambient air temperature is 70°F (21°C) or more:

- Replenish fluids and electrolytes. Drink cool (50°F to 60°F/10°C to 15°C) fluids hourly. The fluids should be caffeine-free and non-alcoholic. Do not wait until you are thirsty. Your normal thirst mechanism is not sufficient to overcome the effects of dehydration. If you feel thirsty, you are already becoming dehydrated.

- Provide shelter from the sun and heat.

Ambient air temperature is 70°F (21°C) or more and chemical-resistant clothing is being used:

- Same as above;
- Adjust work schedules if feasible; and
- Initiate heat stress monitoring and/or the use of cooling devices.

4.3.2 Heat Stress Monitoring

Heat stress monitoring may be performed by monitoring the heart rate. Heart rate should be measured at the beginning of the work shift, at regular intervals and at the start of each rest period.

1) If the heart rate is <110 beats per minute (bpm), personnel may continue the current work/rest schedule.

2) If the heart rate is >110 bpm, take a 10-minute break. Monitor heart rate at the end of the rest period. If not <110 bpm, rest until the heart rate is <110 bpm. Reduce the current work time between breaks by

approximately one hour. If the next scheduled monitoring session shows a heart rate of >110 bpm once again, reduce the work time between breaks by one hour.

4.4 HEAT STRESS FIRST AID

4.4.1 Heat Cramps

Cause: Excessive water loss/electrolyte imbalance.

Symptoms	First-Aid Guidelines
Muscular pain in arms, legs, abdomen	Administer sips of Gatorade (1/2 glass every 15 minutes)
Faintness, dizziness, exhaustion	Do not massage cramping muscles
Normal temp, cool moist skin	Relax person

4.4.2 Heat Exhaustion

Cause: Large amount of water loss; blood circulation diminishes.

Symptoms	First-Aid Guidelines
Moist, clammy, skin, usually pale	Move to a cool place
Dilated pupils	Apply cold, wet compresses to skin
Weak, dizzy, nauseous, headache	Raise feet 8 to 12 inches
Normal or low body temperature	Administer sips of Gatorade (1/2 glass every 15 minutes)
	Get medical attention

4.4.3 Heat Stroke

Cause: Body overheats; temperature rises; no sweating occurs

Symptoms	First-Aid Guidelines
No sweating occurs	Get emergency medical assistance ASAP
Dry, hot skin, usually red	Remove from sunlight
Constricted pupils	Wet down body with cool water or rubbing alcohol
Hot body temperature (105°F to 110°F/40.5°C to 43.5°C)	Elevate head/shoulders
Strong, rapid pulse	Wrap in wet, cold wrapping
Unconsciousness may occur	Once cooled to 102°F (38.9°C), stop cooling measures
Muscular twitching	

TABLE D.1

SAFETY AND HEALTH RISK ANALYSIS FOR PROJECT TASKS

Task	*Task Description*	*Chemical Hazards*	*Physical Hazards*
Reconnaissance	Walk around Site, nonintrusive investigation Observe/measure topography; stake line and grade for construction	Low potential for skin and inhalation exposure to contaminated soil	Slip/trip/fall hazards
Observation of Remedial Construction, Observation of Other Construction Activities and Observation of Excavation/Stockpiling of Materials	Observe: - Site grading, cap and liner construction - Drain installation - Various other heavy construction in contaminated and clean areas	Low potential for skin exposure to contaminated soil and inhalation exposure to dust and soil gas	Heavy equipment operations, excavation cave-ins, equipment operation hazards
Observation of Intrusive Site Investigations/Test Trenching	Direct and/or Observe: - Soil boring advancement - Monitoring well installation - Test Trenching	Potential for skin exposure to contaminated soil and inhalation exposure to dust and soil gas	Equipment operation hazards, cave-ins
Nonintrusive Geophysical Survey	Perform electromagnetic survey	Low potential for skin exposure to contaminated soil	Lifting hazards, slip/trip/fall
Soil Gas Survey	Collect soil gas with soil probe/perform headspace analysis	Potential for skin exposure to contaminated soil and inhalation exposure to soil gas	Underground utilities, unknown obstructions
Water Sample Collection	Collect water samples from surface water and monitoring wells/measure water levels	Potential for skin exposure to contaminated water and inhalation exposure to volatiles in water	Lifting hazards
Waste/Sludge Sample Collection	Collect waste/sludge material from waste/sludge lagoon/pit	Potential for skin exposure to concentrated waste/ sludge and inhalation exposure to contaminated waste/sludge vapor	Slip/trip/fall
Soil Sample Collection	Collect and classify soil samples from soil borings and/or trench soils	Potential for skin exposure to contaminated soil and inhalation exposure to soil gas and dust	Equipment operation hazards
Aquifer Testing	Slug Test/Pumping Test/Monitoring Well Development	Potential for skin exposure to contaminated water and inhalation exposure to volatiles in water	Slip/trip/fall, lifting hazards

TABLE D.2

WORK/REST SCHEDULE
FOR AN EIGHT HOUR WORK SHIFT

Air Temperature with Sunny Sky		*Work/Break Schedule (Minutes)*				
°F	*°C*	*No Wind*	*5 mph Wind*	*10 mph Wind*	*15 mph Wind*	*20 mph Wind*
-05 to -09	-20 to -23	110/10	110/10	75/10	55/10	40/10
-10 to -14	-23 to -26	110/10	75/10	55/10	40/10	30/10
-15 to -19	-26 to -28	75/10	55/10	40/10	30/10	Stop
-20 to -24	-29 to -31	55/10	40/10	30/10	Stop	Stop
-25 to -29	-32 to -34	40/10	30/10	Stop	Stop	Stop
-30 to -34	-35 to -37	30/10	Stop	Stop	Stop	Stop
-35 & Below	-38 & Below	Stop	Stop	Stop	Stop	Stop

Note:

This table addresses the health hazards related to cold weather work. The practicality of working under a work/rest schedule, together with the ability of the necessary equipment to function properly in cold weather, may be more restrictive than the health hazards and also need to be considered.

The cold stress schedule applies to light or sedentary work activities. Light to moderate work activities can be moved down one level, moderate to heavy work activities can be moved down two levels if workers are acclimated, have proper protective clothing and show no signs of cold stress.

0 - 5 mph Wir Light flag moves.
15 mph Wind Raises newspaper sheet.
10 mph Wind Light flag fully extended.
20 mph Wind Blowing and drifting snow.

TABLE D.3

RECOMMENDED HEART RATE MONITORING FREQUENCY

	70 °F - 80 °F (21 °C - 27 °C)	*80 °F - 90 °F (27 °C - 32 °C)*	*90 °F - 100 °F (32 °C - 38 °C)*	*>100 °F (38 °C)*
Relative Humidity Less than 80%				
Light Summer Clothing	Every 3 hours	Every 3 hours	Every 2 hours	Every 2 hours
Kleengard or Cotton Coveralls	Every 3 hours	Every 3 hours	Every 2 hours	Every hour
Tyvek, Poly-coated or Saranex Tyvek	Every 2 hours	Every 2 hours	Every hour	Stop work and re-assess
Relative Humidity 80% or Greater				
Light Summer Clothing	Every 3 hours	Every 2 hours	Every 2 hours	Every hour
Kleengard or Cotton Coveralls	Every 2 hours	Every 2 hours	Every hour	Every hour
Tyvek, Poly-coated or Saranex Tyvek	Every 2 hours	Every hour	Every hour	Stop work and re-assess

APPENDIX E

DECONTAMINATION

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1.0 DECONTAMINATION

1.1 SCOPE

PPE and monitoring equipment must either be decontaminated or properly discarded upon exiting from the exclusion zone. This practice prevents cross-contamination to clean areas. All CRA employees and CRA subcontractors must enter and exit the exclusion zone through the contaminant reduction zone and decontamination area. The configuration of these zones will vary from site to site and will be defined in the site-specific HASP.

1.2 DECONTAMINATION METHODS

Decontamination methods shall involve physically removing contaminants, neutralizing contaminants or removing contaminants through a combination of both physical and chemical means. The types, locations, physical states, and concentrations of contamination present will determine the appropriate method of decontamination.

1.3 PROCEDURES

This SOP contains personnel decontamination procedures for Levels B, C, and D. Level A decontamination is beyond the scope of this SOP. The Site Health and Safety Officer is responsible to monitor these procedures and may modify them to suit the site conditions and specific levels in use. General standard operating procedures to be followed are:

- Minimize contact with contaminants in order to minimize the need for extensive decontamination.
- Gloves, boot covers, and disposable outer clothing shall be rolled down with the insides out.
- Sampling/monitoring equipment, when feasible, shall be enclosed in plastic bags to prevent cross-contamination.

- Decontamination solutions of soap and water or trisodium phosphate (TSP) detergent and water shall be used at a minimum.

1.4 EQUIPMENT DECONTAMINATION

Monitoring equipment will be decontaminated before leaving the site by wiping with a damp cloth or by removing and properly disposing of a protective covering. Construction equipment will typically be manually scraped then steam cleaned. The HSO is responsible to verify that this has been done satisfactorily.

1.5 WASTE DISPOSAL

CRA project management will determine a disposal method based on an approved plan for each specific site.

1.6 MANAGEMENT AND DISPOSAL OF DECONTAMINATION SOLUTIONS

Decontamination solutions must be treated or properly disposed of. In determining if a particular management disposal option is appropriate, the following should be considered:

- the contaminants, their concentrations and the total volume of decontamination solution;
- media potentially affected (e.g., groundwater, soil) under management options;
- location of the nearest population(s) and the likelihood and/or degree of site access;
- potential exposure to workers; and
- potential for environmental impacts.

1.7 SHOWERS AND CHANGE ROOMS

Showers and/or change rooms may be provided for CRA employees when the duration of project activities extends for a long period of time or will be provided when site conditions warrant the need for a separate change area. Showering requirements vary from site to site and are defined in the site specific HASP based on site-specific conditions.

LEVEL B - ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from Exclusion Zone.

Step 2 - Outer Boot/Glove Wash and Rinse

- Scrub outer boots/gloves with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry location.

Step 4 - Outer Garment Removal

- If using self-contained breathing apparatus (SCBA), remove SCBA back pack and keep the facepiece on until garments are removed. Remove chemical protective outer garments and deposit in appropriate container.

Step 5 - Respiratory Protection Removal

- Remove hard hat and face piece, and place them on a clean surface.
- Wash and rinse face piece.
- Wipe off and store face piece in a clean, dry location.

Step 6 - Inner Glove Removal

- Remove inner gloves.
- Deposit in container for disposal.

Step 7 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

For Air Tank Exchange Only, Complete the Following Steps:

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from Exclusion Zone.

Step 2 - Glove Removal

- Remove gloves.
- If gloves are disposable, deposit in container with plastic liner
- If gloves are non-disposable, store in a clean, dry location.

Step 3 - Tank Change

- Exchange air tank.
- Don new gloves.
- Tape joints and return to exclusion zone.

LEVEL C - ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from Exclusion Zone.

Step 2 - Outer Boot/Glove Wash and Rinse

- Scrub outer boots/gloves and/or splash suit with decontamination solution
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry place.

Step 4 - Outer Garment Removal

- Remove chemical protective outer garments and deposit in appropriate container.

Step 5 - Respiratory Protection Removal

- Remove hard hat and respirator and deposit on a clean surface.
- Discard respirator cartridges in appropriate container.
- Wash and rinse respirator.
- Wipe off and store respirator in a clean, dry location.

Step 6 - Inner Glove Removal

- Remove inner gloves.
- Deposit in container for disposal.

Step 7 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

For Cartridge Exchange Only, Complete the Following Steps:

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from Exclusion Zone.

Step 2 - Glove Wash and Rinse

- Scrub gloves and/or splash suit with decontamination solution.
- Rinse using water.

Step 3 - Glove Removal

- Remove gloves.
- If gloves are disposable, deposit in container with plastic liner.
- If gloves are non-disposable, store in a clean, dry place.

Step 4 - Respirator Cartridge Change

- Exchange respirator cartridges.
- Don new outer boots/gloves.
- Tape joints and return to exclusion zone.

LEVEL D - MODIFIED ROUTINE DECONTAMINATION

Step 1 - Equipment Drop

- Deposit equipment used on site (tools, sampling devices, monitoring equipment, radios, etc.) on plastic drop cloths.
- Decontaminate or dispose of items before removal from exclusion zone.

Step 2 - Outer Boot/Glove Wash and Rinse

(Optional, include if necessary for gross decontamination).

- Scrub outer boots/gloves and/or splash suit with decontamination solution.
- Rinse using water.

Step 3 - Outer Boot/Glove Removal

- Remove outer boots/gloves.
- If outer boots/gloves are disposable, deposit in container with plastic liner.
- If outer boots/gloves are non-disposable, store in a clean, dry place.

Step 4 - Outer Garment Removal

- Remove chemical protective outer garments and deposit in an appropriate container.
- Remove hard hat and safety glasses. Decontaminate as necessary. Deposit on a clean surface.

Step 5 - Inner Glove Removal

- Remove inner gloves.
- Deposit in a container for disposal.

Step 6 - Field Wash

- Thoroughly wash hands and face with soap and water.
- Shower as soon as possible.

APPENDIX F

MEDICAL REQUIREMENTS

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1.0 MEDICAL SURVEILLANCE

1.1 OVERVIEW

All CRA employees with 40-hour training participate in a medical surveillance program that meets the requirements of 29 CFR 1910.120(f). These employees carry a pocket card that indicates the date of their most recent medical exam. Employees are provided with a confidential exam and receive feedback from the examining physician. The physician's written opinion is kept on file at CRA's Corporate IH's office in St. Paul, Minnesota and is available upon request.

All CRA employees involved in field activities have been trained in the recognition of signs and symptoms that might indicate over-exposure to physical or chemical hazards during their initial 40-hour training and during annual 8-hour refresher training.

1.2 BASELINE (NEW HIRE) MEDICAL SURVEILLANCE

Baseline medical evaluations are provided to all employees without cost at the time of their 40-hour training or prior to working on sites covered by this SOP manual. The baseline evaluation includes a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards. Special emphasis is placed on fitness for duty, including the ability to wear any required personal protective equipment under conditions that may be expected at a work site. The baseline medical surveillance exam consists of: medical history; vital signs; vision screening; hands on exam; blood profile including complete blood count and blood chemistry; urinalysis with a microbiological screen; pulmonary function testing consisting of FVC, FEV, FEV1, and resting EKG if deemed necessary by the physician; two-view chest x-ray and audiometry. Tetanus shots are given if needed. All results are reviewed by a contracting physician.

1.3 PERIODIC MEDICAL SURVEILLANCE

Periodic medical surveillance is conducted annually for all employees who may be requested to conduct field activities. The attending physician is responsible for determining if non CRA specified testing is required based on the medical and work history review. The same testing protocol is used as the baseline surveillance exam except for x-rays, vision screening and audiometric testing. These are performed at the discretion of the physician.

1.4 SITE-SPECIFIC MEDICAL MONITORING

In the event that CRA employees will be working on a site that has specific medical monitoring requirements not found in the annual or baseline testing (i.e., PCB, lead or pesticide monitoring), these medical evaluations will be performed on an individual basis to be determined by the attending physician. If the physician determines that the medical evaluation frequency or exam parameters should be changed, these changes will be effective immediately.

1.5 EXPOSURE/INJURY/MEDICAL SUPPORT

In the event that notification reveals that an employee has possibly been overexposed to hazardous substances or health hazards above the PEL or TLV, has been injured or has developed signs or symptoms indicating possible overexposure, an additional medical evaluation will be performed as soon as possible. The context of this exam will be determined by the attending physician who has been advised of the possible overexposure.

1.6 TERMINATION MEDICAL EVALUATION

Upon termination of employment with CRA or upon reassignment to work within the company that does not involve working on

or near hazardous waste operations, a medical evaluation is offered to the employee if one has not been completed in the past six months. This exam is similar to the baseline surveillance exam with other parameters the physician deems necessary.

1.7 INFORMATION PROVIDED TO THE PHYSICIAN

CRA has provided Occupational Medicine Consultants with a copy of the Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) and its appendices. Job descriptions for CRA employees, measured and anticipated exposure levels, personal protective equipment used and information from previous medical examinations are also provided.

1.8 RECORD KEEPING

CRA receives a written statement for all medical evaluations from the examining physician, documenting that the employee is qualified to work on or near hazardous waste operations and to wear respiratory protection. The employee receives a confidential letter from the physician and test results if requested. All medical records are confidentially maintained at the offices of the attending physician and are made available to employees or their designee upon written request. The physician's written opinion indicating an employee's suitability to work in hazardous waste operations and their physical ability to wear respiratory protection is maintained at CRA's Corporate IH's office in St. Paul, Minnesota.

APPENDIX G

MATERIAL SAFETY DATA SHEETS

MATERIAL SAFETY DATA SHEET

MSDS NUMBER: 721-100

SECTION 1 PRODUCT IDENTIFICATION

TRADE NAME: I.P.A. 99

MANUFACTURER/SUPPLIER'S NAME: SHELL CANADA CHEMICAL COMPANY
ADDRESS: P.O. Box 100, Station M
Calgary, Alberta
Canada
T2P 2H5 **PHONE: 403-691-3111**

SHELL EMERGENCY TELEPHONE NUMBER
BUSINESS HOURS : (403) 691-2220
AT ALL OTHER TIMES : 1-800-661-7378

CANUTEC
24 HOUR EMERGENCY TELEPHONE
(613) 996-6666

CHEMICAL SYNONYMS
Propanol-2, Isopropanol

PRODUCT USE
Organic Solvent

WHMIS CLASS AND DESCRIPTION
Class B2 Flammable Liquid
Class D2B Other Toxic Effects - Eye Irritant

CANADIAN TDG DESCRIPTION (ROAD & RAIL)
SHIPPING NAME: ISOPROPANOL
CLASS DESCRIPTION:
Class 3.2 Flammable Liquid

PACKING GROUP:
II

UN NUMBER: 1219

SECTION 2 INGREDIENTS & TOXICOLOGICAL PROPERTIES

LEGEND: CBI - CONFIDENTIAL BUSINESS INFORMATION

2A - PRODUCT & CONTROLLED INGREDIENTS

PRODUCT: I.P.A. 99 **100% VOL**
CAS# : 67-63-0 WHMIS CONTROLLED: YES

Rat	Oral	LD50	>	4720,0 mg/kg	
	Inhal.	LC50		12000,0 ppm	8,00 hrs
Rabbit	Dermal	LD50	>	12900,0 mg/kg	

EYES AND FACE
Chemical safety goggles should be worn.

SKIN (HANDS, ARMS AND BODY)
Impervious gloves (viton, nitrile) should be worn at all times when handling this material. Impervious clothing (apron, coveralls) should also be worn in confined workspaces or where the risk of skin exposure is much higher.

RESPIRATORY
If exposure exceeds occupational exposure limits, wear a NIOSH- approved respirator. Proper equipment includes an approved combination organic vapour/ particulate filter chemical cartridge respirator for low concentrations, or an atmosphere-supplied, positive pressure demand, self-contained or airline breathing apparatus for high concentrations.

MECHANICAL VENTILATION
Highly recommended for all indoor situations to control fugitive emissions. Electrical and mechanical equipment should be explosion-proof. Concentrations in air should be maintained below the recommended threshold limit value if unprotected personnel are involved.
For personnel entry into confined spaces (i.e. bulk storage tanks) a proper confined space entry procedure must be followed including ventilation and testing of tank atmosphere. Local ventilation recommended where mechanical ventilation is ineffective in controlling airborne concentrations below the recommended occupational exposure limit.
Make up air should always be supplied to balance air exhausted (either generally or locally).

SECTION 5 PREVENTATIVE MEASURES

STORAGE AND HANDLING
Flammable. Store in a cool, dry, well ventilated area, away from heat and ignition sources. Avoid breathing vapours and prolonged or repeated contact with skin. Vapours may accumulate and travel to distant ignition sources and flashback. Use explosion-proof ventilation to prevent vapour accumulation. Empty containers may contain hazardous product residues. Fixed equipment as well as transfer containers and equipment should be grounded to prevent accumulation of static charge. Can attack aluminum at elevated temperature. Launder contaminated clothing prior to reuse. Use good personal hygiene.

SPILL AND LEAK HANDLING PROCEDURES
Issue warning "Flammable". Eliminate all ignition sources. Handling equipment must be grounded. Isolate hazard area and restrict access. Try to work upwind of spill. Avoid direct contact with material. Wear appropriate breathing apparatus (if applicable) and protective clothing. Stop leak only if safe to do so. Dike and contain land spills; contain water spills by booming. Use water fog to knock down vapours; contain runoff. For large spills remove by mechanical means and place in containers. Absorb residue or small spills with absorbent material and remove to non-leaking containers for disposal. Flush area with water to remove trace residue. Dispose of recovered material as noted below. Notify appropriate environmental agency(ies).

7B - REACTIVITY DATA

HAZARDOUS COMBUSTION / DECOMPOSITION PRODUCTS
Vapour forms a flammable/explosive mixture with air between upper and lower flammable limits.
Carbon monoxide and carbon dioxide are produced on combustion.

INCOMPATIBILITY
Avoid contact with strong oxidizing agents and acids. Aluminum at high temperatures.

CONDITIONS OF REACTIVITY/INSTABILITY
Avoid excessive heat, open flames and all ignition sources.

STABLE	: YES	**SENSITIVITY TO MECHANICAL IMPACT**	: NO
HAZARDOUS POLYMERIZATION:	NO	**SENSITIVITY TO STATIC DISCHARGE**	: YES

SECTION 8 ENVIRONMENTAL DATA

REGULATIONS AND STANDARDS
No Canadian federal standards. This product, or all components, are listed on the Domestic Substances List, as required under the Canadian Environmental Protection Act.

ENVIRONMENTAL EFFECTS AND HAZARDS
Do not allow product or runoff from fire control to enter storm or sanitary sewers, lakes, rivers, streams, or public waterways. Block off drains and ditches. Provincial regulations require and federal regulations may require that environmental and/or other agencies be notified of a spill incident. Spill area must be cleaned and restored to original condition or to the satisfaction of authorities. May be harmful to aquatic life. Aquatic toxicity rating (TLm 96) =10 to 100ppm. No food chain concentration potential.

BIODEGRADABILITY
Biodegradable(fast). Rapid volatilization.

SECTION 9 LABEL INFORMATION

TRADE NAME: I.P.A. 99

WHMIS DESCRIPTION
Class B2 Flammable Liquid
Class D2B Other Toxic Effects - Eye Irritant

HAZARD STATEMENTS
Flammable Liquid. Irritating to eye.

NITRIC ACID
NITRIC ACID
NITRIC ACID

MATERIAL SAFETY DATA SHEET

FISHER SCIENTIFIC
112 COLONNADE ROAD
NEPEAN, ONTARIO
K2E 7L6
(613)226-8874

EMERGENCY CONTACT:
REGULATORY AFFAIRS OFFICER
(613)226-8874

DATE 10/13/89

ACCT: 17871-00
INDEX: 0132
CAT NO: A200225

PURCHASE ORDER NUMBER

031101

SUBSTANCE IDENTIFICATION

CAS-NUMBER 7697-37-2

SUBSTANCE: **NITRIC ACID**

TRADE NAMES/SYNONYMS:
AQUA FORTIS; WFNA; RFNA; HYDROGEN NITRATE; AZOTIC ACID; NITRYL HYDROX' ';
NITAL; STCC 4918528; UN 2031;
A-200; A-200-C; A-200-S; A-202; A-206-C; A-509; A-467; HNO3; /4; ACC16550

CHEMICAL FAMILY:
INORGANIC ACID

MOLECULAR FORMULA: H-N-O3

MOLECULAR WEIGHT: 63.01

CERCLA RATINGS (SCALE 0-3): HEALTH=3 FIRE=0 REACTIVITY=1 PERSISTENCE=0
NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

COMPONENTS AND CONTAMINANTS

COMPONENT: NITRIC ACID PERCENT: 70

COMPONENT: WATER PERCENT: 30

OTHER CONTAMINANTS: NONE

EXPOSURE LIMITS:
NITRIC ACID:
2 PPM (5 MG/M3) OSHA TWA; 4 PPM (10 MG/M3) OSHA STEL
2 PPM (5 MG/M3) ACGIH TWA; 4 PPM (10 MG/M3) ACGIH STEL
2 PPM NIOSH RECOMMENDED 10 HOUR TWA

1000 POUNDS SARA SECTION 302 THRESHOLD PLANNING QUANTITY
1000 POUNDS SARA SECTION 304 REPORTABLE QUANTITY

PHYSICAL DATA

DESCRIPTION: COLORLESS TO PALE YELLOW LIQUID WITH A SUFFOCATING ODOR.

BOILING POINT: 181 F (83 C) MELTING POINT: -44 F (-42 C)

SPECIFIC GRAVITY: 1.5027 @ 25 C VAPOR PRESSURE: 47.9 MMHG @ 20 C

EVAPORATION RATE: NOT AVAILABLE SOLUBILITY IN WATER: VERY SOLUBLE

VAPOR DENSITY: 3.2

SOLVENT SOLUBILITY: SOLUBLE IN ETHER.

FIRE AND EXPLOSION DATA

FIRE AND EXPLOSION HAZARD:
NEGLIGIBLE FIRE HAZARD WHEN EXPOSED TO HEAT OR FLAME.

OXIDIZER: OXIDIZERS DECOMPOSE, ESPECIALLY WHEN HEATED, TO YIELD OXYGEN OR OTHER GASES WHICH WILL INCREASE THE BURNING RATE OF COMBUSTIBLE MATTER. CONTACT WITH EASILY OXIDIZABLE, ORGANIC, OR OTHER COMBUSTIBLE MATERIALS MAY RESULT IN IGNITION, VIOLENT COMBUSTION OR EXPLOSION.

FIREFIGHTING MEDIA:
WATER, DRY CHEMICAL OR SODA ASH
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FOR LARGER FIRES, FLOOD AREA WITH WATER FROM A DISTANCE
(1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4).

FIREFIGHTING:
MOVE CONTAINER FROM FIRE AREA IF POSSIBLE. COOL CONTAINERS EXPOSED TO FLAMES WITH WATER FROM SIDE UNTIL WELL AFTER FIRE IS OUT. STAY AWAY FROM STORAGE TANK ENDS. FOR MASSIVE FIRE IN STORAGE AREA, USE UNMANNED HOSE HOLDER OR MONITOR NOZZLES; ELSE WITHDRAW FROM AREA AND LET FIRE BURN (1987 EMERGENCY RESPONSE GUIDEBOOK, DOT P 5800.4, GUIDE PAGE 44).

USE FLOODING AMOUNTS OF WATER AS FOG. COOL CONTAINERS WITH FLOODING AMOUNTS OF WATER, APPLY FROM AS FAR A DISTANCE AS POSSIBLE. AVOID BREATHING CORROSIVE VAPORS, KEEP UPWIND. CONSIDER EVACUATION OF DOWNWIND AREA IF MATERIAL IS LEAKING.

TRANSPORTATION DATA

DEPARTMENT OF TRANSPORTATION HAZARD CLASSIFICATION 49CFR172.101:
OXIDIZER

DEPARTMENT OF TRANSPORTATION LABELING REQUIREMENTS 49CFR172.101 AND 172.402:
OXIDIZER AND CORROSIVE

DEPARTMENT OF TRANSPORTATION PACKAGING REQUIREMENTS: 49CFR173.268

EXCEPTIONS: NONE

TOXICITY

NITRIC ACID:
TOXICITY DATA:
ANHYDROUS: 110 MG/KG UNREPORTED-MAN LDLO; REPRODUCTIVE EFFECTS DATA (RTECS
MONOHYDRATE: NO DATA AVAILABLE.
TRIHYDRATE: NO DATA AVAILABLE.
CARCINOGEN STATUS: NONE.
LOCAL EFFECTS: CORROSIVE- INHALATION, SKIN, EYES, INGESTION.
ACUTE TOXICITY LEVEL: INSUFFICIENT DATA.
TARGET EFFECTS: NO DATA AVAILABLE.
AT INCREASED RISK FROM EXPOSURE: PERSONS WITH IMPAIRED PULMONARY FUNCTION, PRE-EXISTING EYE AND SKIN DISORDERS.

HEALTH EFFECTS AND FIRST AID

INHALATION:
NITRIC ACID:
CORROSIVE. 100 PPM IMMEDIATELY DANGEROUS TO LIFE OR HEALTH.
ACUTE EXPOSURE- INHALATION OF ACIDIC SUBSTANCES MAY CAUSE SEVERE RESPIRATO IRRITATION WITH COUGHING, CHOKING, AND POSSIBLY YELLOWISH BURNS OF THE MUCOUS MEMBRANES. OTHER INITIAL SYMPTOMS MAY INCLUDE DIZZINESS, HEADACHE NAUSEA, AND WEAKNESS. PULMONARY EDEMA MAY BE IMMEDIATE IN THE MOST SEVER EXPOSURES, BUT MORE LIKELY WILL OCCUR AFTER A LATENT PERIOD OF 5-72 HOUR THE SYMPTOMS MAY INCLUDE TIGHTNESS IN THE CHEST, DYSPNEA, DIZZINESS FROTHY SPUTUM, AND CYANOSIS. PHYSICAL FINDINGS MAY INCLUDE HYPOTENSION, WEAK, RAPID PULSE, MOIST RALES, AND HEMOCONCENTRATION. IN NON-FATAL CASE COMPLETE RECOVERY MAY OCCUR WITHIN A FEW DAYS OR WEEKS OR, CONVALESCENCE MAY BE PROLONGED WITH FREQUENT RELAPSES AND CONTINUED DYSPNEA AND OTHER SIGNS AND SYMPTOMS OF PULMONARY INSUFFICIENCY. IN SEVERE EXPOSURES, DEAT DUE TO ANOXIA MAY OCCUR WITHIN A FEW HOURS AFTER ONSET OF THE SYMPTOMS O PULMONARY EDEMA OR FOLLOWING A RELAPSE.
CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION AND DURATION OF EXPOSURE, REPEATED OR PROLONGED EXPOSURE TO AN ACIDIC SUBSTANCE MAY CAUSE EROSION THE TEETH, INFLAMMATORY AND ULCERATIVE CHANGES IN THE MOUTH, AND POSSIBL JAW NECROSIS. BRONCHIAL IRRITATION WITH COUGH AND FREQUENT ATTACKS OF BRONCHIAL PNEUMONIA MAY OCCUR. GASTROINTESTINAL DISTURBANCES ARE ALSO POSSIBLE.

FIRST AID- REMOVE FROM EXPOSURE AREA TO FRESH AIR IMMEDIATELY. IF BREATHING HAS STOPPED, GIVE ARTIFICIAL RESPIRATION. MAINTAIN AIRWAY AND BLOOD PRESSURE AND ADMINISTER OXYGEN IF AVAILABLE. KEEP AFFECTED PERSON WARM AND AT REST. TREAT SYMPTOMATICALLY AND SUPPORTIVELY. ADMINISTRATION OF OXYGEN SHOULD BE PERFORMED BY QUALIFIED PERSONNEL. GET MEDICAL ATTENTION IMMEDIATELY.

SKIN CONTACT:
NITRIC ACID:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH LIQUID OR VAPOR MAY CAUSE SEVERE PAIN, BURNS AND POSSIBLY YELLOWISH STAINS. BURNS MAY BE DEEP WITH SHARP EDGES AND HEAL SLOWLY WITH SCAR TISSUE FORMATION. DILUTE SOLUTIONS OF NITRIC ACID MAY PRODUCE MILD IRRITATION AND HARDEN THE EPIDERMIS

WITHOUT DESTROYING IT.
CHRONIC EXPOSURE- EFFECTS DEPEND ON THE CONCENTRATION AND DURATION OF EXPOSURE. REPEATED OR PROLONGED CONTACT WITH ACIDIC SUBSTANCES MAY RESUL IN DERMATITIS OR EFFECTS SIMILAR TO ACUTE EXPOSURE.

FIRST AID- REMOVE CONTAMINATED CLOTHING AND SHOES IMMEDIATELY. WASH AFFECTED AREA WITH SOAP OR MILD DETERGENT AND LARGE AMOUNTS OF WATER UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). IN CASE OF CHEMICAL BURNS, COVER AREA WITH STERILE, DRY DRESSING. BANDAGE SECURELY, BUT NOT TOO TIGHTLY. GET MEDICAL ATTENTION IMMEDIATELY.

EYE CONTACT:
NITRIC ACID:
CORROSIVE.
ACUTE EXPOSURE- DIRECT CONTACT WITH ACIDIC SUBSTANCES MAY CAUSE PAIN AND LACRIMATION, PHOTOPHOBIA, AND BURNS, POSSIBLY SEVERE. THE DEGREE OF INJU DEPENDS ON THE CONCENTRATION AND DURATION OF CONTACT. IN MILD BURNS, THE EPITHELIUM REGENERATES RAPIDLY AND THE EYE RECOVERS COMPLETELY. IN SEVER CASES, THE EXTENT OF INJURY MAY NOT BE FULLY APPARENT FOR SEVERAL WEEKS. ULTIMATELY, THE WHOLE CORNEA MAY BECOME DEEPLY VASCULARIZED AND OPAQUE RESULTING IN BLINDNESS. IN THE WORST CASES, THE EYE MAY BE TOTALLY DESTROYED. CONCENTRATED NITRIC ACID MAY IMPART A YELLOW COLOR TO THE EYE UPON CONTACT.
CHRONIC EXPOSURE- EFFECTS DEPEND ON THE CONCENTRATION AND DURATION OF EXPOSURE. REPEATED OR PROLONGED EXPOSURE TO ACIDIC SUBSTANCES MAY CAUSE CONJUNCTIVITIS OR EFFECTS AS IN ACUTE EXPOSURE.

FIRST AID- WASH EYES IMMEDIATELY WITH LARGE AMOUNTS OF WATER, OCCASIONALLY LIFTING UPPER AND LOWER LIDS, UNTIL NO EVIDENCE OF CHEMICAL REMAINS (AT LEAST 15-20 MINUTES). CONTINUE IRRIGATING WITH NORMAL SALINE UNTIL THE PH HAS RETURNED TO NORMAL (30-60 MINUTES). COVER WITH STERILE BANDAGES. GET MEDICAL ATTENTION IMMEDIATELY.

INGESTION:
NITRIC ACID:
CORROSIVE.
ACUTE EXPOSURE- ACIDIC SUBSTANCES MAY CAUSE CIRCUMORAL BURNS WITH YELLOW DISCOLORATION AND CORROSION OF THE MUCOUS MEMBRANES OF THE MOUTH, THROAT AND ESOPHAGUS. THERE MAY BE IMMEDIATE PAIN AND DIFFICULTY OR INABILITY T SWALLOW OR SPEAK. EPIGLOTTAL EDEMA MAY RESULT IN RESPIRATORY DISTRESS AN POSSIBLY ASPHYXIA. MARKED THIRST, EPIGASTRIC PAIN, NAUSEA, VOMITING AND DIARRHEA MAY OCCUR. DEPENDING ON THE DEGREE OF ESPOHAGEAL AND GASTRIC CORROSION, THE VOMITUS MAY CONTAIN FRESH OR DARK PRECIPITATED BLOOD AND LARGE SHREDS OF MUCOSA. SHOCK WITH MARKED HYPOTENSION, WEAK, RAPID PULSE SHALLOW RESPIRATION, AND CLAMMY SKIN MAY OCCUR. CIRCULATORY COLLAPSE MAY ENSUE AND IF UNCORRECTED, LEAD TO RENAL FAILURE. IN SEVERE CASES, GASTRI AND TO A LESSER DEGREE, ESOPHAGEAL PERFORATION AND SUBSEQUENT PERITONITI MAY OCCUR AND BE ACCOMPANIED BY FEVER AND ABDOMINAL RIGIDITY. ESOPHAGEAL GASTRIC AND PYLORIC STRICTURE MAY OCCUR WITHIN A FEW WEEKS, BUT MAY BE DELAYED FOR MONTHS OR EVEN YEARS. DEATH MAY RESULT WITHIN A SHORT TIME FROM ASPHYXIA, CIRCULATORY COLLAPSE OR ASPIRATION OF EVEN MINUTE AMOUNTS LATER DEATH MAY BE DUE TO PERITONITIS, SEVERE NEPHRITIS OR PNEUMONIA. CO AND CONVULSIONS SOMETIMES OCCUR TERMINALLY.
CHRONIC EXPOSURE- DEPENDING ON THE CONCENTRATION, REPEATED INGESTION OF ACIDIC SUBSTANCES MAY RESULT IN INFLAMMATORY AND ULCERATIVE CHANGES IN T MUCOUS MEMBRANES OF THE MOUTH AND OTHER EFFECTS AS IN ACUTE INGESTION. REPRODUCTIVE EFFECTS HAVE BEEN REPORTED IN ANIMALS.

FIRST AID- DO NOT USE GASTRIC LAVAGE OR EMESIS. DILUTE THE ACID IMMEDIATELY BY DRINKING LARGE QUANTITIES OF WATER OR MILK. IF VOMITING PERSISTS, ADMINISTER FLUIDS REPEATEDLY. INGESTED ACID MUST BE DILUTED APPROXIMATELY 100 FOLD TO RENDER IT HARMLESS TO TISSUES. MAINTAIN AIRWAY AND TREAT SHOCK. (DREISBACH, HANDBOOK OF POISONING, 12TH ED.). GET MEDICAL ATTENTION IMMEDIATELY. IF VOMITING OCCURS, KEEP HEAD BELOW HIPS TO HELP PREVENT ASPIRATION.

ANTIDOTE:
NO SPECIFIC ANTIDOTE. TREAT SYMPTOMATICALLY AND SUPPORTIVELY.

REACTIVITY

REACTIVITY:
REACTS EXOTHERMICALLY WITH WATER.

INCOMPATIBILITIES:
NITRIC ACID:
- ACETIC ACID: MAY REACT EXPLOSIVELY.
- ACETIC ANHYDRIDE: EXPLOSIVE REACTION BY FRICTION OR IMPACT.
- ACETONE: MAY REACT EXPLOSIVELY.
- ACETONITRILE: EXPLOSIVE MIXTURE.
- 4-ACETOXY-3-METHOXYBENZALDEHYDE: EXOTHERMIC REACTION.
- ACROLEIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
- ACRYLONITRILE: EXPLOSIVE REACTION AT 90 C.
- ACRYLONITRILE-METHACRYLATE COPOLYMER: INCOMPATIBLE.
- ALCOHOLS: POSSIBLE VIOLENT REACTION OR EXPLOSION; FORMATION OF EXPLOSIVE COMPOUND IN THE PRESENCE OF HEAVY METALS.
- ALKANETHIOLS: EXOTHERMIC REACTION WITH POSSIBLE IGNITION.
- 2-ALKOXY-1,3-DITHIA-2-PHOSPHOLANE: IGNITION REACTION.
- ALLYL ALCOHOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
- ALLYL CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
- AMINES (ALIPHATIC OR AROMATIC): POSSIBLE IGNITION REACTION.
- 2-AMINOETHANOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
- 2-AMINOTHIAZOLE : EXPLOSIVE REACTION.
- AMMONIA (GAS): BURNS IN AN ATMOSPHERE OF NITRIC ACID VAPOR.
- AMMONIUM HYDROXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
- AMMONIUM NITRATE: FORMS EXPLOSIVE MIXTURE.
- ANILINE: IGNITES ON CONTACT.
- ANILINIUM NITRATE: FORMS EXPLOSIVE SOLUTION.
- ANION EXCHANGE RESINS: POSSIBLE VIOLENT EXOTHERMIC REACTION.
- ANTIMONY: VIOLENT REACTION.
- ARSINE: EXPLOSIVE REACTION.
- ARSINE-BORON TRIBROMIDE: VIOLENT OXIDATION.
- BASES: REACTS.
- BENZENE: EXPLOSIVE REACTION.
- BENZIDINE: SPONTANEOUS IGNITION.
- BENZONITRILE: POSSIBLE EXPLOSION.
- BENZOTHIOPHENE DERIVATIVES: FORMATION OF POSSIBLY EXPLOSIVE COMPOUNDS.
- N-BENZYL-N-ETHYLANILINE: VIGOROUS DECOMPOSITION.
- 1,4-BIS(METHOXYMETHYL)2,3,5,6-TETRAMETHYLBENZENE: GAS EVOLUTION.
- BISMUTH: INTENSE EXOTHERMIC REACTION OR EXPLOSION.
- 1,3-BIS(TRIFLUOROMETHYL)BENZENE: POSSIBLE EXPLOSION.
- BORON: VIOLENT REACTION WITH INCANDESCENCE.
- BORON DECAHYDRIDE: EXPLOSIVE REACTION.
- BORON PHOSPHIDE: IGNITION REACTION.
- BROMINE PENTAFLUORIDE: IGNITION REACTION.

N-BUTYL MERCAPTAN: IGNITION REACTION.
N-BUTYRALDEHYDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CADMIUM PHOSPHIDE: EXPLOSIVE REACTION.
CALCIUM HYPOPHOSPHITE: IGNITION REACTION.
CARBON (PULVERIZED): VIOLENT REACTION.
CELLULOSE: FORMS EASILY COMBUSTIBLE ESTER.
CHLORATES: REACTS.
CHLORINE: INCOMPATIBLE.
CHLORINE TRIFLUORIDE: VIOLENT REACTION.
CHLOROBENZENE: POSSIBLE EXPLOSION.
4-CHLORO-2-NITROANILINE: FORMS EXPLOSIVE COMPOUND.
CHLOROSULFONIC ACID: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
COAL: EXPLOSIVE MIXTURE.
COATINGS: MAY BE ATTACKED.
CRESOL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CROTONALDEHYDE: VIOLENT DECOMPOSITION WITH IGNITION.
CUMENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
CUPRIC NITRIDE: EXPLOSIVE REACTION.
CUPROUS NITRIDE: VIOLENT REACTION.
CYANATES: POSSIBLE EXPLOSIVE REACTION.
CYCLOHEXANONE: VIOLENT REACTION.
CYCLOHEXYLAMINE: FORMS EXPLOSIVE COMPOUND.
CYCLOPENTADIENE: EXPLOSIVE REACTION.
1,2-DIAMINOETHANEBIS(TRIMETHYLGOLD): EXPLOSIVE REACTION.
DIBORANE: SPONTANEOUS IGNITION.
DI-2-BUTOXYETHYL ETHER: VIOLENT DECOMPOSITION REACTION.
2,6-DI-T-BUTYL PHENOL: FORMATION OF EXPLOSIVE COMPOUND.
DICHLOROETHANE: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
DICHLOROETHYLENE: FORMS EXPLOSIVE COMPOUND.
DICHLOROMETHANE: FORMS EXPLOSIVE SOLUTION.
DICYCLOPENTADIENE: SPONTANEOUS IGNITION.
DIENES: IGNITION REACTION.
DIETHYLAMINO ETHANOL: POSSIBLE EXPLOSION.
DIETHYL ETHER: POSSIBLE EXPLOSION.
3,6-DIHYDRO-1,2,2H-OXAZINE: EXPLOSIVE INTERACTION.
DIISOPROPYL ETHER: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
DIMETHYLAMINOMETHYLFERROCENE: VIOLENT DECOMPOSITION IF HEATED.
DIMETHYL ETHER: FORMS EXPLOSIVE COMPOUND.
DIMETHYL HYDRAZINE: IGNITES ON CONTACT.
DIMETHYL SULFOXIDE + 1,4-DIOXANE: EXPLOSION.
DIMETHYL SULFOXIDE + <14% WATER: EXPLOSIVE REACTION.
DINITROBENZENE: EXPLOSION HAZARD.
DINITROTOLUENE: EXPLOSIVE REACTION.
DIOXANE + PERCHLORIC ACID: POSSIBLE EXPLOSION.
DIPHENYL DISTIBENE: EXPLOSIVE OXIDATION.
DIPHENYL MERCURY + CARBON DISULFIDE: VIOLENT REACTION.
DIPHENYL TIN: IGNITION REACTION.
DISODIUM PHENYL ORTHOPHOSPHATE: VIOLENT EXPLOSION.
DIVINYL ETHER: POSSIBLE IGNITION REACTION.
EPICHLOROHYDRIN: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHANESULFONAMIDE: EXPLOSIVE REACTION.
ETHOXY-ETHYLENE DITHIOPHOSPHATE: IGNITION ON CONTACT.
N-ETHYL ANILINE: IGNITION REACTION.
ETHYLENE DIAMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ETHYLENE GLYCOL: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
ETHYLENEIMINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
5-ETHYL-2-METHYL PYRIDINE: EXPLOSIVE REACTION.
ETHYL PHOSPHINE: IGNITION REACTION.

5-ETHYL-2-PICOLINE: FORMS EXPLOSIVE COMPOUNDS.
FERROUS OXIDE (POWDERED): INTENSE EXOTHERMIC REACTION.
FLUORINE: POSSIBLE EXPLOSIVE REACTION.
FORMIC ACID: EXOTHERMIC REACTION WITH RELEASE OF TOXIC GASES.
2-FORMYLAMINO-1-PHENYL-1,3-PROPANEDIOL: POSSIBLE EXPLOSION.
FUEL OIL (BURNING): EXPLOSION.
FULMINATES: REACTS.
FURFURYLIDENE KETONES: IGNITES ON CONTACT.
GERMANIUM: VIOLENT REACTION.
GLYCEROL: POSSIBLE EXPLOSION.
GLYOXAL: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
HEXALITHIUM DISILICIDE: EXPLOSIVE REACTION.
HEXAMETHYLBENZENE: POSSIBLE EXPLOSION.
2,2,4,4,6,6-HEXAMETHYLTRITHIANE: EXPLOSIVE OXIDATION.
HEXENAL: EXPLODES ON HEATING.
HYDRAZINE: VIOLENT REACTION.
HYDRAZOIC ACID: ENERGETIC REACTION.
HYDROGEN IODIDE: IGNITION REACTION.
HYDROGEN PEROXIDE: FORMS UNSTABLE MIXTURE.
HYDROGEN PEROXIDE AND KETONES: FORMS EXPLOSIVE PRODUCTS.
HYDROGEN PEROXIDE AND MERCURIC OXIDE: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN PEROXIDE AND THIOUREA: FORMS EXPLOSIVE COMPOUNDS.
HYDROGEN SELENIDE: IGNITION REACTION.
HYDROGEN SULFIDE: INCANDESCENT REACTION.
HYDROGEN TELLURIDE: IGNITION AND POSSIBLE EXPLOSIVE REACTION.
INDANE AND SULFURIC ACID: EXPLOSIVE REACTION.
ISOPRENE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
KETONES (CYCLIC): VIOLENT REACTION.
LACTIC ACID + HYDROFLUORIC ACID: EXPLOSIVE REACTION.
LITHIUM: IGNITION REACTION.
LITHIUM SILICIDE: INCANDESCENT REACTION.
MAGNESIUM: EXPLOSIVE REACTION.
MAGNESIUM + 2-NITROANILINE: MAY IGNITE ON CONTACT.
MAGNESIUM PHOSPHIDE: INCANDESCENT REACTION.
MAGNESIUM SILICIDE: VIOLENT REACTION.
MAGNESIUM-TITANIUM ALLOY: FORMS SHOCK AND HEAT SENSITIVE MIXTURE.
MANGANESE (POWDERED): INCANDESCENCE AND POSSIBLE EXPLOSION.
MESITYL OXIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
MESITYLENE: POSSIBLE EXPLOSIVE REACTION.
METALS: VIOLENT REACTION WITH EXPLOSION OR IGNITION.
METAL ACETYLIDES: VIOLENT OR EXPLOSIVE REACTION.
METAL CARBIDES: VIOLENT OR EXPLOSIVE REACTION.
METAL CYANIDES: EXPLOSIVE REACTIONS.
METAL FERRICYANIDE OR FERROCYANIDE: VIOLENT REACTION.
METAL SALICYLATES: FORMS EXPLOSIVE COMPOUNDS.
METAL THIOCYANATES: POSSIBLE EXPLOSION.
2-METHYLBENZIMIDAZOLE + SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
4-METHYLCYCLOHEXANONE: EXPLOSIVE REACTION.
2-METHYL-5-ETHYLPYRIDINE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
METHYL THIOPHENE: IGNITION REACTION.
NEODYMIUM PHOSPHIDE: VIOLENT REACTION.
NICKEL TETRAPHOSPHIDE: IGNITION REACTION.
NITRO AROMATIC HYDROCARBONS: FORMS HIGHLY EXPLOSIVE PRODUCTS.
NITROBENZENE: EXPLOSIVE REACTION, ESPECIALLY IN THE PRESENCE OF WATER.
NITROMETHANE: EXPLOSIVE REACTION.
NITRONAPHTHALENE: EXPLOSION HAZARD.
NON-METAL OXIDES : EXPLOSIVE REACTION.

OLEUM: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
ORGANIC MATERIALS: FIRE AND EXPLOSION HAZARD.
ORGANIC SUBSTANCES AND PERCHLORATES: POSSIBLE EXPLOSION.
ORGANIC SUBSTANCES AND SULFURIC ACID: POSSIBLE EXPLOSION.
PHENYL ACETYLENE + 1,1-DIMETHYLHYDRAZINE: VIOLENT REACTION.
PHENYL ORTHOPHOSPHORIC ACID DISODIUM SALT: FORMS EXPLOSIVE PRODUCTS.
PHOSPHINE + OXYGEN: SPONTANEOUS IGNITION.
PHOSPHONIUM IODIDE: IGNITION REACTION.
PHOSPHORUS (VAPOR): IGNITES WHEN HEATED.
PHOSPHOROUS HALIDES: IGNITION REACTION.
PHOSPHORUS TETRAIODIDE: VIGOROUS REACTION.
PHOSPHORUS TRICHLORIDE: EXPLOSIVE REACTION.
PHTHALIC ACID AND SULFURIC ACID: POSSIBLE EXPLOSIVE REACTION.
PHTHALIC ANHYDRIDE: EXOTHERMIC REACTION AND FORMS EXPLOSIVE PRODUCTS.
PICRATES: REACTS.
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POLYALKENES: INTENSE REACTION..
POLYDIBROMOSILANES: EXPLOSIVE REACTION.
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POLYPROPYLENE: TEMPERATURE AND PRESSURE INCREASE IN A CLOSED CONTAINER.
POLY(SILYLENE): IGNITION.
POLYURETHANE (FOAM): VIGOROUS REACTION.
POTASSIUM HYPOPHOSPHITE: EXPLOSIVE REACTION.
POTASSIUM PHOSPHINATE: EXPLODES ON EVAPORATION.
B-PROPIOLACTONE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
PROPIOPHENONE + SULFURIC ACID: EXOTHERMIC REACTION ABOVE -5 C.
PROPYLENE GLYCOL + HYDROFLUORIC ACID + SILVER NITRATE: EXPLOSIVE MIXTURE.
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REDUCING AGENTS: POSSIBLE EXPLOSIVE OR IGNITION REACTION.
RESORCINOL: POSSIBLE EXPLOSION.
RUBBER: VIGOROUS REACTION, POSSIBLE EXPLOSION.
SELENIUM: VIGOROUS REACTION.
SELENIUM HYDRIDE: IGNITION OR INCANDESCENT REACTION.
SELENIUM IODOPHOSPHIDE: EXPLOSIVE REACTION.
SILICON: VIOLENT REACTION.
SILICONE OIL: POSSIBLE EXPLOSION.
SILVER BUTEN-3-YNIDE: EXPLOSION.
SODIUM: SPONTANEOUS IGNITION.
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SULFURIC ACID + GLYCERIDES: EXPLOSIVE REACTION.
SULFURIC ACID + TEREPHTHALIC ACID: VIOLENT REACTION.
SURFACTANTS + PHOSPHORIC ACID: EXPLOSION HAZARD.
TERPENES: SPONTANEOUS IGNITION.
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TETRABORANE DECAHYDRIDE: EXPLOSIVE REACTION.
TETRAPHOSPHOROUS DIIODOTRISELENIDE: EXPLOSIVE REACTION.
TETRAPHOSPHOROUS IODIDE: IGNITES ON CONTACT.
TETRAPHOSPHOROUS TETRAOXIDE TRISULFIDE: VIOLENT REACTION.
THIOALDEHYDES: VIOLENT REACTION.

THIOKETONES: VIOLENT REACTION.
THIOPHENES: EXPLOSIVE REACTION.
TITANIUM: FORMS SHOCK-SENSITIVE COMPOUND.
TITANIUM ALLOYS: POSSIBLE EXPLOSIVE REACTION.
TITANIUM-MAGNESIUM ALLOY: POSSIBLE EXPLOSION ON IMPACT.
TOLUENE: VIOLENT REACTION.
TOLUIDENE: IGNITION REACTION.
1,3,5-TRIACETYLHEXAHYDRO-1,3,5-TRIAZINE + TRIFLUOROACETIC ANHYDRIDE: EXPLOSIVE REACTION.
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TRIMETHYLTRIOXANE: INTENSE REACTION.
TRIS(IODOMERCURI)PHOSPHINE: VIOLENT DECOMPOSITION.
TRITHIOACETONE: EXPLOSIVE REACTION.
TURPENTINE: EXPLOSIVE MIXTURE.
UNSYMMETRICAL DIMETHYL HYDRAZINE: SPONTANEOUS IGNITION.
URANIUM: EXPLOSIVE REACTION.
URANIUM ALLOY: VIOLENT REACTION.
URANIUM DISULFIDE: VIOLENT REACTION.
URANIUM-NEODYMIUM ALLOYS: EXPLOSIVE REACTION.
VINYL ACETATE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
VINYLIDENE CHLORIDE: TEMPERATURE AND PRESSURE INCREASE IN CLOSED CONTAINER.
WOOD: POSSIBLE IGNITION.
P-XYLENE: INTENSE REACTION IN PRESENCE OF SULFURIC ACID.
ZINC: INCANDESCENT REACTION.
ZINC ETHOXIDE: POSSIBLE EXPLOSION.
ZIRCONIUM-URANIUM ALLOYS: EXPLOSIVE REACTION.

DECOMPOSITION:
THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE TOXIC OXIDES OF NITROGEN.

POLYMERIZATION:
HAZARDOUS POLYMERIZATION HAS NOT BEEN REPORTED TO OCCUR UNDER NORMAL TEMPERATURES AND PRESSURES.

STORAGE AND DISPOSAL

OBSERVE ALL FEDERAL, STATE AND LOCAL REGULATIONS WHEN STORING OR DISPOSING OF THIS SUBSTANCE. FOR ASSISTANCE, CONTACT THE DISTRICT DIRECTOR OF THE ENVIRONMENTAL PROTECTION AGENCY.

STORAGE

PROTECT AGAINST PHYSICAL DAMAGE. SEPARATE FROM METALLIC POWDERS, CARBIDES, HYDROGEN SULFIDE, TURPENTINE, ORGANIC ACIDS, AND ALL COMBUSTIBLE, ORGANIC OR OTHER READILY OXIDIZABLE MATERIALS. PROVIDE GOOD VENTILATION AND AVOID DIRECT SUNLIGHT (NFPA 49, HAZARDOUS CHEMICALS DATA, 1975).

STORE AWAY FROM INCOMPATIBLE SUBSTANCES.

THRESHOLD PLANNING QUANTITY (TPQ):
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 302 REQUIRES THAT EACH FACILITY WHERE ANY EXTREMELY HAZARDOUS SUBSTANCE IS PRESENT IN A QUANTITY EQUAL TO OR GREATER THAN THE TPQ ESTABLISHED FOR THAT SUBSTANCE NOTIFY THE STATE EMERGENCY RESPONSE COMMISSION FOR THE STATE IN WHICH IT IS

LOCATED. SECTION 303 OF SARA REQUIRES THESE FACILITIES TO PARTICIPATE IN LOC EMERGENCY RESPONSE PLANNING (40 CFR 355.30).

DISPOSAL

DISPOSAL MUST BE IN ACCORDANCE WITH STANDARDS APPLICABLE TO GENERATORS OF HAZARDOUS WASTE, 40 CFR 262. EPA HAZARDOUS WASTE NUMBER D002.

****

CONDITIONS TO AVOID

MAY IGNITE OTHER COMBUSTIBLE MATERIALS (WOOD, PAPER, OIL, ETC.). REACTS VIOLENTLY WITH WATER AND FUELS. FLAMMABLE, POISONOUS GASES MAY ACCUMULATE IN TANKS AND HOPPER CARS. RUNOFF TO SEWER MAY CREATE FIRE OR EXPLOSION HAZARD.

CONSULT NFPA PUBLICATION 43A, STORAGE OF LIQUID AND SOLID OXIDIZING MATERIALS FOR STORAGE REQUIREMENTS.

****

SPILL AND LEAK PROCEDURES

SOIL SPILL:
DIG A HOLDING AREA SUCH AS A PIT, POND OR LAGOON TO CONTAIN SPILL AND DIKE SURFACE FLOW USING BARRIER OF SOIL, SANDBAGS, FOAMED POLYURETHANE OR FOAMED CONCRETE. ABSORB LIQUID MASS WITH FLY ASH OR CEMENT POWDER.

NEUTRALIZE SPILL WITH SLAKED LIME, SODIUM BICARBONATE OR CRUSHED LIMESTONE.

AIR SPILL:
APPLY WATER SPRAY TO KNOCK DOWN AND REDUCE VAPORS. KNOCK-DOWN WATER IS CORROSIVE AND TOXIC AND SHOULD BE DIKED FOR CONTAINMENT AND LATER DISPOSAL.

WATER SPILL:
ADD SUITABLE AGENT TO NEUTRALIZE SPILLED MATERIAL TO PH-7.

OCCUPATIONAL SPILL:
KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL. DO NOT TOUCH SPILLED MATERIAL. STOP LEAK IF YOU CAN DO IT WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. DO NOT GET WATER INSIDE CONTAINER. FOR SMALL SPILLS, FLUSH AREA WITH FLOODING AMOUNTS OF WATER. FOR LARGER SPILLS, DIKE FAR AHEAD OF SPILL FOR LATER DISPOSAL. KEEP UNNECESSARY PEOPLE AWAY. ISOLATE HAZARD AREA AND DENY ENTRY. VENTILATE CLOSED SPACES BEFORE ENTERING.

REPORTABLE QUANTITY (RQ): 1000 POUNDS
THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) SECTION 304 REQUIRES THAT A RELEASE EQUAL TO OR GREATER THAN THE REPORTABLE QUANTITY FOR THIS SUBSTANCE BE IMMEDIATELY REPORTED TO THE LOCAL EMERGENCY PLANNING COMMITTEE AND THE STATE EMERGENCY RESPONSE COMMISSION (40 CFR 355.40). IF THE RELEASE OF THIS SUBSTANCE IS REPORTABLE UNDER CERCLA SECTION 103, THE NATIONAL RESPONSE CENTER MUST BE NOTIFIED IMMEDIATELY AT (800) 424-8802 OR (202) 426-2675 IN THE METROPOLITAN WASHINGTON, D.C. AREA (40 CFR 302.6).

PROTECTIVE EQUIPMENT

VENTILATION:
PROVIDE LOCAL EXHAUST OR PROCESS ENCLOSURE VENTILATION TO MEET PUBLISHED EXPOSURE LIMITS.

RESPIRATOR:
THE FOLLOWING RESPIRATORS AND MAXIMUM USE CONCENTRATIONS ARE RECOMMENDATIONS BY THE U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, NIOSH POCKET GUIDE TO CHEMICAL HAZARDS OR NIOSH CRITERIA DOCUMENTS; OR DEPARTMENT OF LABOR, 29CFR1910 SUBPART Z.
THE SPECIFIC RESPIRATOR SELECTED MUST BE BASED ON CONTAMINATION LEVELS FOUND IN THE WORK PLACE AND BE JOINTLY APPROVED BY THE NATIONAL INSTITUTE OF OCCUPATIONAL SAFETY AND HEALTH AND THE MINE SAFETY AND HEALTH ADMINISTRATION

NITRIC ACID:

125 MG/M3- ANY SUPPLIED-AIR RESPIRATOR OPERATED IN A CONTINUOUS-FLOW MODE.

250 MG/M3- ANY SELF-CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE.
ANY SUPPLIED-AIR RESPIRATOR WITH A FULL FACEPIECE.
ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT-OR BACK-MOUNTED CANISTER PROVIDING PROTECTI AGAINST NITRIC ACID.
ANY CHEMICAL CARTRIDGE RESPIRATOR WITH A FULL FACEPIECE AND CARTRIDGE(S) PROVIDING PROTECTION AGAINST NITRIC ACID.

ESCAPE- ANY AIR-PURIFYING FULL FACEPIECE RESPIRATOR (GAS MASK) WITH A CHIN-STYLE OR FRONT-OR BACK-MOUNTED CANISTER PROVIDING PROTECTI AGAINST NITRIC ACID.
ANY APPROPRIATE ESCAPE-TYPE SELF-CONTAINED BREATHING APPARAT .

NOTE: ONLY NON-OXIDIZABLE SORBENTS ARE ALLOWED (NOT CHARCOAL).

FOR FIREFIGHTING AND OTHER IMMEDIATELY DANGEROUS TO LIFE OR HEALTH CONDITION

SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN PRESSUR DEMAND OR OTHER POSITIVE PRESSURE MODE.

SUPPLIED-AIR RESPIRATOR WITH FULL FACEPIECE AND OPERATED IN PRESSURE-DEMAN OR OTHER POSITIVE PRESSURE MODE IN COMBINATION WITH AN AUXILIARY SELF-CONTAINED BREATHING APPARATUS OPERATED IN PRESSURE-DEMAND OR OTHER POSITIVE PRESSURE MODE.

CLOTHING:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE (IMPERVIOUS) CLOTHING AND EQUIPMEN TO PREVENT ANY POSSIBILITY OF SKIN CONTACT WITH THIS SUBSTANCE.

GLOVES:
EMPLOYEE MUST WEAR APPROPRIATE PROTECTIVE GLOVES TO PREVENT CONTACT WITH THI SUBSTANCE.

EYE PROTECTION:
EMPLOYEE MUST WEAR SPLASH-PROOF OR DUST-RESISTANT SAFETY GOGGLES AND A FACESHIELD TO PREVENT CONTACT WITH THIS SUBSTANCE. CONTACT LENSES SHOULD NOT BE WORN.

EMERGENCY WASH FACILITIES:

WHERE THERE IS ANY POSSIBILITY THAT AN EMPLOYEE'S EYES AND/OR SKIN MAY BE EXPOSED TO THIS SUBSTANCE, THE EMPLOYER SHOULD PROVIDE AN EYE WASH FOUNTAIN AND QUICK DRENCH SHOWER WITHIN THE IMMEDIATE WORK AREA FOR EMERGENCY USE.

AUTHORIZED - FISHER SCIENTIFIC
CREATION DATE: 12/04/84 REVISION DATE: 03/30/89

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APPENDIX H

RESPIRATORY PROTECTION

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1.0 RESPIRATORY PROTECTION

1.1 PRACTICE

The primary control of respiratory hazards shall be accomplished, whenever feasible, through the use of engineering controls, hazard substitution, revised work practices or other administrative controls. However, when such controls are not feasible, appropriate respiratory protection shall be used in accordance with the procedures established in this SOP. Any deviation from the requirements set forth must have approval from an IH.

1.1.1 Authorization

CRA employees requiring respiratory protection must have authorization from an IH. Office management shall notify an IH of respirator needs. The work situation will then be assessed and a respirator will be issued based on the hazard(s) the individual is exposed to. Reassessment of the hazard and the individual's needs will be repeated periodically.

1.1.2 Medical Surveillance

All personnel designated to use respirators must successfully complete a physical exam as part of the medical requirements placed on persons exposed to hazardous substances and for users of respiratory protection (29 CFR 1910.134 and 1910.120). The medical exam will be repeated annually. All medical data will be reviewed by a consulting occupational physician. The physician will generate a written opinion on the suitability of the employee to wear a respirator.

1.1.3 Air Quality

When air supplied respirators are used, the breathing air shall meet the Compressed Gas Association (CGA-CG7.1) Standards for Grade D breathing air or better.

1.1.4 Air Cylinders

Cylinders used to supply breathing air are tested and maintained as prescribed in Shipping Container Specifications (49 CFR 178). SCBA cylinders are approximately 2,400 psi pressure when full. Compressed air cylinders are visually inspected annually and hydrostatically tested once every five years for steel cylinders and once every three years for composite cylinders. These test dates are stamped on the cylinder for future reference.

1.2 FIT TESTING

1.2.1 Qualitative or Quantitative Fit Testing

Fit testing of the respirator will be conducted by an IH or other designated, trained personnel following the medical evaluation. All users of respirators must be fit tested to assure proper protection. Only the brand and size a person is fitted for is allowed to be used in the field. DO NOT SUBSTITUTE RESPIRATORS FOR A BRAND AND SIZE THAT YOU HAVE NOT BEEN PROPERLY FITTED FOR. The fit test will be accomplished by the use of irritant smoke (stannic chloride aerosol), Isoamyl Acetate using a standardized testing protocol or quantitatively. Records will be maintained by the Corporate IH with copies available in CRA field offices for audit purposes. After fit testing, the employee will be issued an authorization card. This card serves as a reference for the proper type of respirator to use as well as prima facie proof of proper medical and training clearance for regulatory purposes. The user shall have the card available at any time when on CRA business where respiratory protection is used or hazardous waste cleanup sites are being entered.

1.2.2 Positive and Negative Fit Testing

All personnel will be instructed in the proper method of testing respirator fit by use of the **Positive and Negative** pressure test. This test is to be done by the user each and every time a respirator is donned. This test is performed to help the wearer assess respirator function and find gross leaks between the face and facepiece. This positive-negative pressure test checks the presence and functioning of the respirator valves as well as leakage that may occur due to improper cartridge seal or respirator face fit. This test is required by U.S. Regulation 29 CFR 1910.134 prior to each use of any respirator in a contaminated atmosphere.

1.2.2.1 Positive Pressure

1) Block off the exhalation valve cover openings.

   MSA: Exhalation valve cover can be blocked with the palm of the hand.

   Scott: Exhalation valve covers have front openings as well as four small side openings. These openings are difficult to block off with the hands. However, a small piece of flexible material such as Saran wrap or latex can be used.

   North: Exhalation valve cover has long narrow openings around its perimeter. These can be blocked by encircling the fingers around the valve cover.

2) The person exhales gently, creating a slight positive pressure within the facepiece. The positive pressure should be maintained for at least 10 seconds.

3) If no outward leakage is detected, the person has passed the test.

4) If leakage is detected (usually felt as a cool sensation against the skin or a loss of pressure), the respirator is either malfunctioning or a gross leak between the face and facepiece is present. The following should be done when a failure occurs: Re-don or readjust the respirator.

If the facepiece continues to lose pressure, although previous positive or negative pressure tests performed with that respirator had passed, it is probably malfunctioning. Consult Industrial Hygiene. It is also possible that there are new scars or wrinkles, beard growth, missing teeth or dentures, significant weight gain or loss, etc. to cause gross leakage into the facepiece. When such new conditions exist, reevaluation of the respirator in a test atmosphere is necessary.

1.2.2.2 Negative Pressure

1) Block off the respirator cartridge inlet openings.

MSA: Cartridges can be blocked with the palms of the hands or with disposable latex gloves.

Scott: Cartridges can be blocked by using the palms of the hands or with gloves.

North: Cartridges can be blocked only with gloves.

2) Inhale gently, holding the negative pressure for at least 10 seconds.

3) If no inward leakage of air is detected, the person has passed the test.

4) If leakage is detected, see 4) above.

1.2.3 Exceptions

1.2.3.1 Facial Hair

Any individual with facial hair which protrudes into the sealing surface of the masks will be refused fitting. Fitting, issuance, and use will be based on clean shaven faces only. Employees with facial hair which interferes with respirator fit are not permitted to work at sites where respiratory protection must be worn.

1.2.3.2 Glasses

Employees who wear prescription glasses and must wear a full face respirator shall be fitted with special eyeglass adapters. Contact lenses are not permitted to be worn with any type of respiratory protection.

1.3 TRAINING

Proper training of respirator users is required to insure that all respirators will provide adequate protection against respiratory hazards and so that the user will understand the device's limitations. The training will include the following elements:

1) An explanation of the nature of respiratory hazards and what may happen if the respirator is not used properly.

2) A description of what engineering and administrative controls may be utilized to reduce the effects of the respiratory hazard and why respirators are required.

3) An explanation of the various types of respirators and why specific types have been selected.

4) A discussion of the function, capabilities and limitations of respirator cartridges.

5) Instruction in the inspection, fit and maintenance of the respirator.

6) Instructions in recognizing and handling emergency situations.

1.4 MAINTENANCE AND CARE OF RESPIRATORS

A program for the maintenance and care of respirators will include the following:

1) Inspection for defects;
2) Cleaning and disinfecting;
3) Repair/miscellaneous maintenance; and
4) Storage.

1.4.1 Inspection for Defects

Employees shall inspect their respirators before each use. A respirator that is not routinely used but is kept ready for emergency use shall be inspected after each use and at least monthly to assure that it is in satisfactory condition. SCBA shall be inspected monthly if kept for emergency response (i.e., long duration site remediation).

Inspection shall include a check of the tightness of the connections and the condition of the face piece, headbands, valves, breathing tubes and canisters. Rubber or elastic parts shall be inspected for pliability and signs of deterioration. Any respirator with worn or defective parts will be immediately taken out of service.

Before and after each use, respirators will be inspected for the following:

1) Tightness of connections and condition of the facepiece;

2) The headstraps or head harness should be examined for: breaks, loss of elasticity, broken or malfunctioning buckles and attachments, and excessively worn head-harness serrations that might permit slippage;

3) Valves and valve seats;

4) Connecting tube and canisters, air or oxygen cylinders;

5) Rubber or elastomer parts for pliability and deterioration; and

6) Regulators, fittings and gauges.

The following contains inspection information for various types of respirators.

Air Purifying Respirators

1) Check rubber facepiece for dirt, pliability of rubber, deterioration and cracks, tears, holes or distortion from improper storage.

2) Check straps for breaks, tears, loss of elasticity, broken snaps and proper tightness.

3) Check valves (exhalation and inhalation) for holes, warpage, cracks, etc. After removing its cover, the exhalation valve should be examined for: foreign material, distortion, defective or missing valve cover or improper installation of valve into the valve seat.

4) Check filters or cartridges for dents, corrosion, etc. (loose or missing gaskets, improperly seated cartridges).

5) Check for cracked or badly scratched lenses in full facepieces; incorrectly mounted lens, broken or missing mounting clips.

Atmosphere-Supplying Respirators

1) Check appropriate items above.

2) Check air supply system for breaks or kinks in supply hoses and detachable coupling attachments.

3) Follow manufacturer's recommendations for the specific equipment.

4) Check air supply level and warning devices.

1.4.2 Cleaning and Disinfecting

The respirator must be washed after each day's use. If the respirator is shared it must also be disinfected according to the manufacturer's instructions. Organic solvents of any kind must not be used for cleaning. Air purifying filters must not be wetted.

1.4.2.1 Cleaning

1) Remove any filters, cartridges or canisters and, if required by the manufacturer, straps and speaking diaphragms from the facepiece. Remove regulators on airline or SCBA.

2) Wash respirator parts excluding cartridges and canisters in warm (not to exceed 140°F), soapy water or in a product specifically designed by respirator manufacturers for this purpose. A plastic bristle hand brush may be helpful in removing dirt from respirator parts.

3) Rinse all parts thoroughly in warm water.

4) Air dry all parts.

5) Reassemble the respirator and insert new cartridges if needed.

6) Place the respirator in a plastic bag or container and seal it for storage. The respirator facepiece should be stored in its normal position so as not to distort the elastomer.

1.4.2.2 Disinfection

1) Disinfection should be done with a cleaner/disinfection agent purchased from the respirator vendor. If that material is not available the following NIOSH procedures can be followed:

   a) Immerse the respirator body for two minutes in a 50 ppm chlorine solution (about 2 mL bleach to 1 liter of water). Rinse thoroughly in clean water and air dry.

   b) Immerse the respirator body for two minutes in an aqueous solution of iodine (add 0.8 mL of iodine in 1 liter water). The iodine is about 7% ammonium and potassium iodide, 45% alcohol and 48% water. Rinse thoroughly in clean water and air dry.

2) Immersion times have to be limited to minimize damage to the respirator. The solutions can age rubber and rust metal parts.

   NOTE: The air-purifying elements must be removed from the respirator prior to cleaning and sanitizing the respirator. Never allow the air-purifying elements to come in contact with water or cleaning/sanitizing solution.

1.4.3 Storage

Respirators must be stored to protect them from contamination and mechanical damage at all times when not in use. New, cleaned or reconditioned respirators are to be kept in a clean, sealed plastic bag

or container, stored in a normal position. A suitable cabinet or drawer should be used to protect respirators and supplies from dirt, extremes of temperature, or bright sunlight. They are not to be left in vehicles or on site perimeter fences, in change sheds, etc.

APPENDIX I

CONFINED SPACE ENTRY

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1.0 CONFINED SPACE ENTRY

1.1 DEFINITIONS

Attendant	An individual who is stationed outside of a confined space for the duration of the entry. The attendant monitors the entrants and performs air monitoring. The attendant is responsible to summon emergency assistance if needed.
Authorized Entrant	An individual who is authorized by CRA or their respective employers to enter a confined space.
Confined Space	(1) is large enough and so configured that an employee can bodily enter and perform assigned work; (2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vats, pits, sewers, leachate collection sumps, trenches, etc. that have limited means of entry); and (3) is not designated for continuous employee occupancy. Depths may vary but the rule of thumb is anything deeper than four feet or if the face may break the plane of the space.
Engulfment	Means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction or crushing.
Entry	The action by which a person passes through an opening into a confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry Permit (permit)

The written or printed document that is provided by the employer to allow and control entry into a confined space and that contains the following information:

- The space to be entered;
- The purpose of the entry;
- The date and the authorized duration of the entry permit;
- The authorized entrants within the space by name as will enable the attendant to determine quickly and accurately who is inside of the space;
- The name of the attendant;
- The name of the entry supervisor (usually the HSO);
- The hazards of the space to be entered;
- The measures used to isolate the space to eliminate or control hazards before entry;
- The acceptable entry conditions;
- The results of the initial and periodic tests performed, accompanied by the name or initials of the tester;
- The rescue and emergency services phone numbers;
- The communication procedures to be used to contact the entrants during entry;
- PPE, test equipment and rescue equipment;
- Any additional permits, such as hot work permits, necessary in the space.

CRA's entry permit is attached to the end of this section.

Entry Supervisor	The person responsible for determining if acceptable entry conditions are present at the confined space where entry is planned, for authorizing entry and overseeing entry operations. This is usually the site HSO.
Hazardous Atmosphere	Means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue, injury or acute illness from one or more of the following causes: (1) Flammable gas, vapor or mist in excess of 10 percent of its lower flammable limit (LFL); (2) Airborne combustible dust at a concentration that meets or exceeds its LFL; (3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent; (4) Atmospheric concentration of any substance for which a PEL or TLV is published and may be exceeded; (5) Any other condition that is IDLH.
Hot Work Permit	Means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning and heating) capable of providing a source of ignition.
Isolation	A process by which a confined space is removed from service and completely protected against the release of energy and material into the space by such means as blanking or blinding; misaligning or removing sections of pipe or ducts; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Immediately Dangerous to Life or Health (IDLH)	Any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a confined space.
Non-Permit Confined Space	Means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm. This situation must be verified by an IH.
Oxygen Deficient Atmosphere	An atmosphere containing less than 19.5 percent oxygen.
Oxygen Enriched Atmosphere	An atmosphere containing more than 23.5 percent oxygen.
Permit Required Confined Space	A confined space that has one or more of the following characteristics: (1) Contains or has a potential to contain a hazardous atmosphere; (2) Contains a material that has the potential for engulfing the entrant; (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or (4) Contains any other recognized serious safety or health hazard.
Prohibited Condition	Any condition in a confined space that is not allowed by the permit during the period when entry is authorized.

1.2 RESPONSIBILITIES

1.2.1 Responsibilities of the Project Manager (PM)

During the early project/work design phase, it is the Project Manager's (PM's) responsibility to confer with CRA's IH to define the logistical, equipment and manpower requirements necessary to execute a safe confined space entry and exit. The sooner the IH is apprised of the situation the better, as certain requirements may be necessary which will impact the complexity of the contract.

1.2.2 Responsibilities of the Site Health and Safety Officer (HSO) for Confined Space Entry

The HSO is to review the HASP to confirm that the identity of each confined space where activity is to take place on site has been noted. A confined space is defined as any tank, vessel, silo, storage bin, manhole, hopper, vault, pit, trench, diked area or any other enclosed space with limited means of egress or entry that meets either of the following criteria:

- Contains an actually or potentially hazardous atmosphere or other recognized safety or health hazard.
- Contains the potential for engulfment by particulate matter or liquid.

Prior to the start of site activities, the HSO is to:

- Assure the availability and use of all personal protective equipment (PPE) and clothing necessary for safe entry.
- Assure that rescue and safety related equipment, such as lifting or retrieval devices, are readily available prior to entry.

- Provide for and require the use of retrieval lines or equivalent equipment to make non-entry rescues possible.

- Provide appropriate vehicle and pedestrian guards, barriers or other means to protect the entry party and attendants from local traffic hazards and to protect non-entering personnel and traffic from hazards arising from the confined space.

- Verify all employees authorized or allowed to enter any confined space have been trained in permit entry confined spaces.

- Determine actual and potential hazards associated with the space at the time of entry and choose the appropriate means to execute a safe entry.

- Assure all necessary control measures are completed:
  - Isolation (i.e., lock-out, blanking, disconnections, etc.)
  - Space preparation (i.e., cleaning, purging, inert atmosphere in place, etc.)

- Assure, by appropriate testing, that the control measures used are effective. Assure proper calibration of monitoring equipment.

- Determine and evaluate the source of any atmospheric contamination found at the time of entry.

- Provide an attendant for each permit entry of a confined space unless this entry constitutes a low hazard, below-ground chamber as defined later in this SOP, in which case a non-attendant entry is permitted provided all of the requirements set for non-attendant entry, as detailed later in this SOP, are met.

- Complete the Confined Space Entry Permit. Identify by job title or name those persons who must sign the entry permit and the duties of each, including the person in charge of entry. The Permit is valid for no more than one shift or one confined space. Keep expired Permits on file with other site documents.

1.3 RESPONSIBILITIES OF THE PERSON(S) AUTHORIZING OR IN CHARGE OF ENTRY

The authorizing person is to:

- Verify that the necessary pre-entry conditions, including atmospheric gas levels, are measured and recorded on the Confined Space Entry Permit.
- Verify that the means for summoning emergency assistance is operable and is on the Permit.
- Complete all portions of the Permit and assure that the pre-entry and authorizing signature portions of the Permit are completed before any employee enters a confined space.
- Terminate the entry upon becoming aware of a non-permitted condition.
- Serve as attendant if another qualified person is not available.

1.3.1 Responsibilities of the Attendant

The attendant is to:

- Remain outside the confined space. **UNDER NO CIRCUMSTANCES IS THE ATTENDANT TO ENTER THE CONFINED SPACE, EVEN IN AN EMERGENCY, UNTIL HELP ARRIVES.**
- Not leave for any reason while entry continues, except for self-preservation, unless replaced by a qualified individual.
- Maintain continuous communication with all authorized entrants within the confined space by voice, radio, telephone, visual observation or other equally effective means.

- Order entrants to exit the space at the first indication of an unexpected hazard, indication of a toxic reaction, unusual conduct of entrants or external situation that could pose a hazard to the entrants.

- Know the procedure and have the means to summon immediate emergency assistance.

- Not allow anyone to enter the space to affect a rescue unless that person is wearing appropriate PPE, including a safety belt or harness with a lifeline and the necessary respiratory protection.

- Warn unauthorized persons not to enter or to exit immediately if they have entered.

- Assist in handling tools and materials, relaying messages, prevent fouling of airlines and lifelines in use.

1.4 CONFINED SPACE ENTRY LIMITATIONS

The HSO is to allow entry into confined spaces only if all of the following criteria are met:

- No other non-entry procedure can be used to complete the necessary work.

- There is no danger of engulfment.

- At least one of the following items is in place:

  - The space has been ventilated using a mechanically powered ventilator for a period of time not less than that specified in the ventilation nomograph for that ventilator and that the ventilation continues throughout the entry.

- A combination of appropriate atmospheric testing and mechanically powered ventilation is used.

- Appropriate continuous atmospheric testing assures that permit conditions are maintained.

Non-attendant confined space entries are not permitted except to low hazard spaces as detailed later in this SOP.

1.5 CONFINED SPACE ENTRY TO LOW HAZARD SPACES

A low hazard confined space is defined as a space where there is no danger of engulfment and where the atmosphere can not become IDLH. An atmosphere can be considered IDLH if the level of oxygen drops below 19.5% or goes above 23.5%, the level of airborne contaminants exceeds 10% LEL or the level of airborne contaminants exceeds the action level of the protection in use.

1.5.1 Role of the HSO for Low Hazard Spaces

The HSO can allow non-attendant entries into a low hazard space provided all of the following conditions are met and a permit is filled out:

- There is no danger of engulfment.

- The atmosphere can not become IDLH.

- There is no possibility of exceeding TLV levels.

- The atmosphere in the space is tested prior to entrance for oxygen level, combustible gases and organic vapors and meets the following criteria:

- Oxygen level 19.5% to 23.5%
- Combustible gas level <10% LEL
- Organic vapor level 0 or background

- Atmospheric testing for oxygen and combustibles continues for the entire duration of the entrance and the organic vapor level is monitored on a regular basis and does not exceed TLV levels.

- **An IH has approved and given permission to proceed without an attendant.**

CRA CONFINED SPACE ENTRY PERMIT

Site Name/Location/Ref. No.: _____

Work Activity: _____

Duration: _____ Issue Date: _____ Time: _____ Filled out by: _____

Potential Hazards:
(System Generated)

(Work Generated)

Air Monitoring: Pre-Entry _____ Periodic _____ Continuous _____

Date/Time	By (Init.)	$\%O_2$	ppm CO	%LEL	Other Test Type	Other Test Result

Isolation:

Purging Required: Yes _____ No _____ Purging Confirmed: _____

Safety Tags Required: Yes _____ No _____

Ventilation Required: Yes _____ No _____

Continuous _____ Other _____

Emergency Rescue Equipment Required:

_____	Communications Device	_____	Winch/Hoist
_____	First Aid Kit	_____	Harness with Lifeline
_____	Stretcher/Backboard		(type) _____
_____	Fire Extinguisher	_____	PPE (type) _____
_____	SCBA	_____	Lighting (type) _____
_____	Other _____		

Personal Protective Equipment Required:

_____	Hard Hat	_____	Harnesses
_____	Safety Glasses		(type) _____
_____	Face Shield	_____	Respiratory Protection
_____	Ear Plugs/Muffs		(type) _____
_____	Emergency Escape Pack	_____	Coveralls
_____	Lanyards	_____	Chemical Suits
_____	Gloves (type) _____	_____	Rain Suits
_____	Other _____	_____	Lifelines

Additional Work Instructions:

Emergency Contact Telephone Number: _____

Persons Entering Confined Space (Print Name)

_____	_____
_____	_____
_____	_____
_____	_____

Standby Person Required: Yes _____ No _____ (Print Name(s))

_____	_____

I have reviewed and met the requirements on this permit and expect that this work shall be done safely. Entrants have been instructed on the proper confined space entry procedures, requirements and conditions.

Entry Authorized By: _____ Date: _____

All work under this permit has been completed and all materials and entrants have been withdrawn from the confined space.

Attendant or Entrant: _____ Date: _____

TABLE 1

MAXIMUM CONCENTRATION OF SITE CONTAMINANTS IN SOIL
PONTIAC CENTRAL MANUFACTURING
FACILITY/CENTERPOINT BUSINESS CAMPUS

Substance	*Maximum Concentration (mg/kg)*
Lead	17,200
Benzene	15
Toluene	370
Ethylbenzene	170
Xylene	670
Cyanide	3.7
Chromium	68
Naphthalene	4.8
2-Methylnaphthalene	2
Acenaphthene	0.8
Dibenzofuran	0.7
Fluorene	0.8
Phenanthrene	2.4
Anthracene	0.4
Di-n-butylphthalate	2.6
Fluoranthene	1.6
Pyrene	2.9
Benzo(a)anthracene	0.9
Chrysene	1.2
Benzo(b)fluoranthene	1.4
Benzo(k)fluoranthene	0.6
Benzo(a)pyrene	0.6
Indeno(1,2,3-c,d)pyrene	0.7
Benzo(g,h,i)pyrene	0.9
Trans-1,2-Dichloroethane	0.18
Vinyl Chloride	0.56
Methylene Chloride	0.25
Acetone	0.62
cis-1,2-Dichloroethene	5.2
Tetrachloroethylene	0.23
Trichloroethylene	1.2
Chloroform	0.18
Carbon Disulfide	0.21
4-Methylphenol	3.1
Dibenzo(a,h)anthracene	0.74
Arsenic	0.15
Berylium	0.0007
Cadmium	0.07
Copper	3.4
Nickel	0.34

APPENDIX D

REGIONAL GEOLOGIC INFORMATION

APPENDIX D.1

REGIONAL WELL LOGS

(1) GEOLOGICAL SURVEY NO #1

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PERMIT NUMBER

1 LOCATION OF WELL

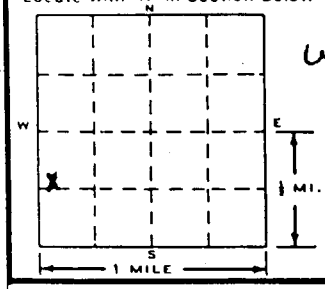
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	SW¼ NW¼ SW¼	3	2 N/S	10 E/W

Distance And Direction From Road Intersection
1616 Winthropp

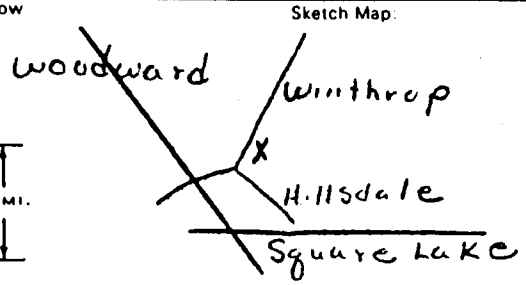
19-03-301-004-040 BLHL

Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map



3 OWNER OF WELL

Address: Mr. Fred Silverman
1616 Winthrop
Bloomfield Hills 48302

Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH: 245 FT. | Date Completed MO 9 DAY 18 YEAR 91 | [ ] New Well [X] Replacement Well

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ] _____

6 USE: [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ] _____

7 CASING Diameter [X] Steel [X] Threaded [ ] Plastic [ ] Welded
4 in. to 242 ft. depth
_____ in. to _____ ft. depth
Grouted Drill Hole Diameter
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth
Height Above/~~Below~~ Surface 2'2" ft.
Weight 11 lbs./ft.
Drive Shoe [X] Yes [ ] No

8 SCREEN Johnson [ ] Not Installed
Type stainless steel Diameter 4"
Slot/~~Gauze~~ 30 Length 5'
Set between 239'10" ft. and 245' ft.
FITTINGS [ ] K-Packer [ ] Lead Packer [ ] Bremer Check
[X] Blank above screen 20" ft. Other _____

9 STATIC WATER LEVEL
90 ft. below land surface [ ] Flow

10 PUMPING LEVEL: below land surface
97 ft. after 1 3/4 hrs. pumping at 20 G.P.M.
_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION [X] Pitless adapter [ ] 12" above grade [ ] Basement offset [ ] Approved pit

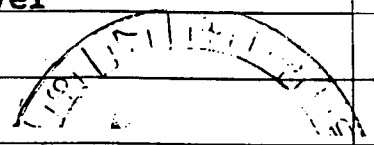
12 WELL GROUTED? [ ] No [X] Yes From _____ to _____ ft.
[ ] Neat cement [ ] Bentonite [X] Other casing seal
No. of bags of cement _____ Additives _____

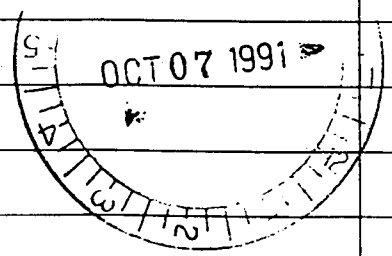
13 Nearest source of possible contamination
Type septic Distance 70 ft. Direction SW
Well disinfected upon completion? [X] Yes [ ] No
Was old well plugged? [ ] Yes [X] No

14 PUMP [ ] Not Installed [ ] Pump Installation Only
Manufacturer's name Red Jacket
Model number 150CN1-CN10G HP 1½ Volts 230
Length of Drop Pipe 126 ft. capacity 25 G.P.M.
TYPE [X] Submersible [ ] Jet
PRESSURE TANK
Manufacturer's name Wellrite
Model number WR-260 Capacity _____ Gallons

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gravel clay	17'	17'
Yellow gravel	23'	40'
Gravel hardpan	55'	95'
Boulder		95'
Gravel hardpan	55'	150'
Gravel clay & hardpan	30'	180'
Gravel w/clay	20'	200'
Clay w/gravel	30'	230'
Gravel	15'	245'

USE A 2ND SHEET IF NEEDED





15 Remarks, elevation, source of data, etc.
Old well kept as backup

16 WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

O.O. Corsaut, Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO

Address 15101 W. 11 Mile Oak Park, MI 48237

Signed _____ Date 10/7/91
AUTHORIZED REPRESENTATIVE

17 Rig Operator's Name
Wayne Hambell

D67d 2/89

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation

GEOLOGICAL SURVEY SAMPLE No. #2

(2)

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

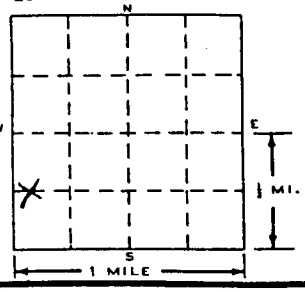
County	Township Name	Fraction	Section Number	Town Number	Range Number
OAKLAND	BLOOMFIELD	¼ ¼ ¼	3	N/S.	E/W

Distance And Direction from Road Intersections

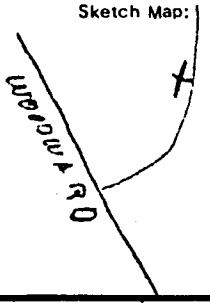
1628 WINTHROP

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: RICHARD SANDLERS

Address

4 WELL DEPTH: (completed) 169 ft. Date of Completion NOV 84

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☒ Jetted ☐ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☐ Welded ☒ Diam. 4 in. to ____ ft. Depth; ____ in. to ____ ft. Depth. Height: Above/Below Surface ____ ft. Weight ____ lbs./ft. Drive Shoe? Yes ☒ No ☐

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
RED CLAY		25
GRAVEL		32
BLUE CLAY ROCKS		135
GRAVEL SAND CLAY		159
WATER SAND	?	169

8 SCREEN: Type: S. S. Dia.: 4 Slot/Gauze 15 Length 8 Set between ____ ft. and ____ ft. Fittings: K

9 STATIC WATER LEVEL 87 ft. below land surface

10 PUMPING LEVEL below land surface 100 ft. after ____ hrs. pumping 20 g.p.m.

____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No ☐ Neat Cement ☒ Bentonite ☐ ____ Depth: From 0 ft. to 144 ft.

14 Nearest Source of possible contamination ____ feet ____ Direction ____ Type

Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not installed Manufacturer's Name WEIL Model Number ____ HP ½ Volts 230 Length of Drop Pipe ____ ft. capacity ____ G.P.M. Type: ☒ Submersible ☐ Jet ☐ Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

____ REGISTERED BUSINESS NAME 0613 REGISTRATION NO.

Address 10730 CHALK

Signed ____ AUTHORIZED REPRESENTATIVE Date 84

D67d 100M (Rev. 12-68)

(3) GEOLOGICAL SURVEY NO. #3

WATER WELL AND PUMP RECORD

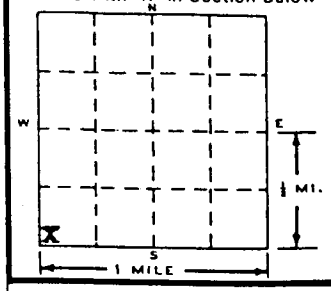
PERMIT NUMBER

1 LOCATION OF WELL

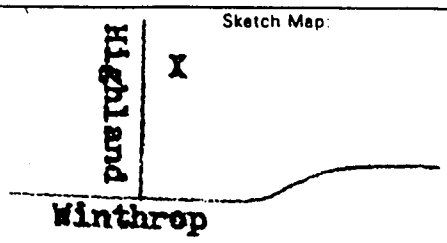
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	SW ¼ SW ¼ SW ¼	3	2 N/S	10 E/W

Distance And Direction From Road Intersection
500' N of Winthrop
210 E. Highland Ave.
Bloomfield Hills, MI
Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map:



3 OWNER OF WELL:
Ivan Kebosh
Address 210 E. Highland Ave.
Bloomfield Hills, MI 48013
Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH: 107 FT. | Date Completed MO. 7 DAY 29 YEAR 86 | [ ] New Well [X] Replacement Well

5 [ ] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ]

6 USE: [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ]

7 CASING: Diameter [ ] Steel [ ] Threaded [X] Plastic [ ] Welded
5 in. to 103 ft. depth
___ in. to ___ ft. depth
Grouted Drill Hole Diameter
8 in. to 103 ft. depth
___ in. to ___ ft. depth
Height Above/Below Surface ___ ft.
Weight ___ lbs./ft
Drive Shoe [ ] Yes [ ] No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	20	20
Gravel	10	30
Clay and gravel	10	40
Clay	30	70
Clay and gravel	20	90
Waterbearing gravel	17	107

USE A 2ND SHEET IF NEEDED

8 SCREEN: [ ] Not Installed
Type stainless Diameter 3"
Slot 15 Length 4'
Set between 103 ft. and 107 ft.
FITTINGS: [X] K-Packer [ ] Lead Packer [ ] Bremer Check
[ ] Blank above screen ___ ft. Other ___

9 STATIC WATER LEVEL:
50 ft. below land surface [ ] Flow

10 PUMPING LEVEL: below land surface
60 ft. after 2 hrs. pumping at 25 G.P.M.
___ ft. after ___ hrs. pumping at ___ G.P.M.

11 WELL HEAD COMPLETION: [X] Pitless adapter [ ] 12" above grade [ ] Basement offset [ ] Approved pit

12 WELL GROUTED? [ ] No [X] Yes From 0 to 103 ft.
[ ] Neat cement [X] Bentonite [ ] Other ___
No. of bags of cement ___ Additives ___

13 Nearest source of possible contamination
Type none Distance ___ ft. Direction ___
Well disinfected upon completion? [X] Yes [ ] No
Was old well plugged? [X] Yes [ ] No

14 PUMP: [ ] Not Installed [ ] Pump Installation Only
Manufacturer's name Red Jacket
Model number 75CNW1 HP 3/4 Volts 230
Length of Drop Pipe 90 ft. capacity 15 G.P.M.
TYPE: [X] Submersible [ ] Jet
PRESSURE TANK
Manufacturer's name Well-X-Trol
Model number 203 Capacity 9 Gallons

Oakland County
OCT 30 1986
Office

15 Remarks, elevation, source of data, etc.
Subcontract - Glenn Eagan 25-1876

17. Rig Operator's Name:
Dave Jory

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

Bellinger Well Drilling 44-1757
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 4020 S. Lapeer Rd. Metamora, MI 48455
Signed [signature] AUTHORIZED REPRESENTATIVE Date 8/12/86

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a [illegible]

D67d 12/85

(4) #4

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

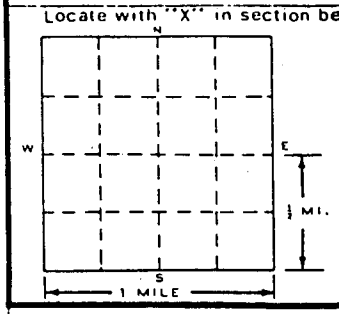
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Pontiac City	¼ ¼ ¼	27-33	3N N/S.	10E E/

Distance And Direction from Road Intersections

40' East of old well #4 - in Southwest corner of property approx. 1400' south of Bldg. No. 29

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:

3 OWNER OF WELL:
Address G.M.C. Truck & Coach Div.
660 South Blvd. East
Pontiac, Mich.

4 WELL DEPTH: (completed) 266 ft. Date of Completion 10-20-78

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☒ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☒ Diam. ____ in. to ____ ft. Depth ____ in. to ____ ft. Depth
Height: Above/Below Surface 1 ____ ft. Weight ____ lbs./ft. Drive Shoe? Yes ☒ No ☐

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Fill	0	5'
Clay	5'	9'
Sand	9'	11'
Clay	11'	49'
Hardpan	49'	119'
gravel & sand	119'	126'
Hardpan	126'	154'
Fine gravel	154'	175'
Hard pan	175'	205'
Clay & stones	205'	219'
Sand	219'	226'
Sand & Gravel	226'	266'

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type Stainless Steel Dia.: 18" & 16"
Slot/Gauze 150 & 60 Length 41'
Set between 266 ft. and 236 ft. &
Fittings: 126 & 116 Standard

9 STATIC WATER LEVEL 92 ft. below land surface

10 PUMPING LEVEL below land surface
106 ft. after 2 hrs. pumping 1000 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☐ Yes ☐ No ☒ ☐ Neat Cement ☐ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☒ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

NOV 20 1978

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Dunbar Drilling Inc. 0163
NAME OF DRILLING CONTRACTOR REGISTRATION NO.

Address 307 Broadway, Swanton, Ohio 43558

Signed ____ Date 10-31-78
AUTHORIZED REPRESENTATIVE
Dale R. Dunbar, President

D67d 100M (Rev. 12-68)

LOCAL HEALTH DEPT. COPY

(5) GEOLOGICAL SURVEY NO. #5

WATER WELL AND PUMP RECORD

PERMIT NUMBER

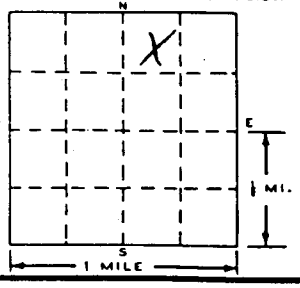
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	NW. NW NE¼	3	2 N/S	10 E/W

Distance And Direction From Road Intersection

Street Address & City of Well Location Plant #6 Trucks Bus.

Locate with "X" in Section Below



Sketch Map:

3 OWNER OF WELL

Name Utility Trailers Mfg.

Address 4900 Opdyke Rd. Auburn Hills 48057

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed) 80 ft — Date of Completion 1/85

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐ _____

6 USE ☐ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☒ Construction Other

7 CASING Diameter ☐ Steel ☐ Threaded ☒ Plastic ☒ Welded

5" in. to 75 ft. depth

_____ in. to _____ ft. depth

Grouted Drill Hole Diameter 7" in. to 75 ft. depth

_____ in. to _____ ft. depth

Height Above/Below Surface 1 ft.

Weight 50 lbs. / ft.

Drive Shoe ☐ Yes ☒ No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Brown Sand, Gravel.		
(Overburden)		4'
Blue Clay (Some Sands & Gravel)	9'	13'
Blue Clay	21'	34'
Blue Clay, Sand & Gravel.	15'	49'
Black Sand & Gravel.		
(Some Blue Clay)	13'	62'
Black Water Sand.		80'

USE A 2ND SHEET IF NEEDED

8 SCREEN ☐ Not Installed

Type Plastic Diameter 4"

Slot/Gauze #15 Length 5'

Set between 75 ft. and 80 ft

FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check ☒ Blank above screen 1 ft. Other _____

9 STATIC WATER LEVEL 46' ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

130 Ft. after ½ hrs. pumping at 25 G.P.M

_____ ft. after _____ hrs. pumping at _____ G.P.M

11 WELL HEAD COMPLETION ☐ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From 75 to Top ft.

☐ Neat cement ☐ Bentonite ☒ Other Cuttings

No of bags of cement _____ Additives Flush

13 Nearest source of possible contamination

Type Septic Distance _____ ft. Direction E

Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP ☐ Not Installed ☐ Pump Installation Only

Manufacturer's name Flint & Walling

Model number 4F10B/10 HP 1 Volts 230

Length of Drop Pipe 60 ft. capacity 10 G.P.M

TYPE ☒ Submersible ☐ Jet

PRESSURE TANK

Manufacturer's name Well X Trol

Model number WX 203 Capacity 80 Gallons

15 Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

S. Ward & Son Inc. 0058

REGISTERED BUSINESS NAME — REGISTRATION NO.

Address 6253 Clarkston, Clarkston

Signed R Ward Pres. Date 1/85

AUTHORIZED REPRESENTATIVE

D67d 2/84

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation

(6) #6

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Bloomfield	¼ ¼ ¼	2	N/S.	E/W.

Distance And Direction from Road Intersections — OWNER No.

S.E. corner of Epdyke & South blv'd.

Street address & City of Well Location

3 OWNER OF WELL: Mobil Oil Co.

Address

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand, gravel, clay	11	11
Muddy sand	2	13
Gravel & clay	19	32
Gravel & sand, hardpan	46	78
Coarse sand & clay	11	89
Clay & sand	69	158
Muddy sand & clay	5	163
Clay & coarse sand	40	203
Layer of gravel	1	204
Muddy water sand	3	207
Coarse clean water sand	6	213
Fine clean water ~~sand~~ CANVEL	6	219

4 WELL DEPTH: (completed) 219 ft. Date of Completion 9-24-69

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☒ Commercial ☐ Test Well ☐ ___

7 CASING: Diam. 4 in. to 219 ft. Depth — Threaded ☒ Welded ☐ — in. to ___ ft. Depth

Height: Above/Below surface ___ ft. Weight 11 lbs/ft. Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: Stainless Dia.: 4"

Slot Gauze 25 Length 4'

Set between 114 ft. and 119 ft.

Fittings: Std. w/hurlan packer

9 STATIC WATER LEVEL 65 ft. below land surface

10 PUMPING LEVEL below land surface

70 ft. after 3 hrs. pumping 30 g.p.m.

___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ___ Chlorides (Cl) ___

Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☒ 12" Above Grade

13 GROUTING:

Well Grouted? ☐ Yes ☒ No

Material: ☐ Neat Cement ☐ ___

Depth: From ___ ft. to ___ ft.

14 SANITARY:

Nearest Source of possible contamination

100 feet S Direction Holding TANK Type

Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:

Manufacturer's Name Red Jacket

Model Number 11 MAg HP 1

Length of Drop Pipe 105 ft. capacity 12 G.P.M.

Type: ☒ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

John Cameron & Son — REGISTERED BUSINESS NAME — 0414 — REGISTRATION NO.

Address 1800 Butterfield Rd., Troy

Signed ___ — AUTHORIZED REPRESENTATIVE — Date 4-30-69

D67D 100M 6-66

(7) LOGICAL SURVEY NO #7

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P.A. 1978

W8663V1697 PERMIT NUMBER

1 LOCATION OF WELL

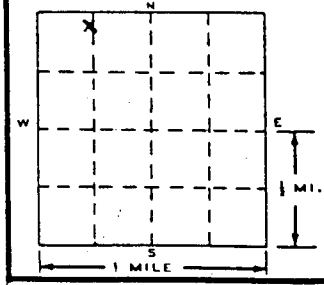
County	Township Name	Fraction	Section Number	Town Number	Range Number
OAKLAND	~~[illegible]~~ PONTIAC	NE¼ NW¼ NW¼	35	3 N/S	10 E/W

Distance And Direction From Road Intersection

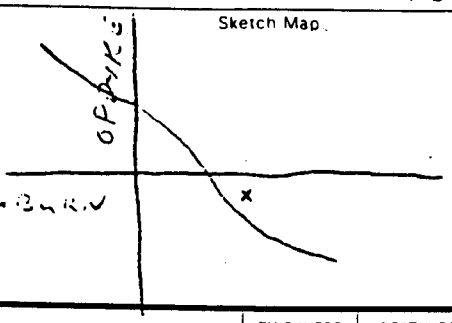
EAST SOUTH OF AUBURN RD
1/4 MI EAST OF OPDYKE

Street Address & City of Well Location 2370 AUBURN RD

Locate with "X" in Section Below



Sketch Map



3 OWNER OF WELL

ART CO CONTRACTING INC

Address 5966 CROOKS Rd
TROY, MICH

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed)

50 ft

Date of Completion MAY 13-86

5

☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐ _____

6 USE

☐ Domestic ☐ Type I Public ☐ Type III Public
☐ Irrigation ☒ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING

Diameter ☒ Steel ☒ Threaded
☐ Plastic ☐ Welded

4 in. to 46 ft. depth
_____ in. to _____ ft. depth

Grouted Drill Hole Diameter
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth

Height Above/~~Below~~
Surface 1 ft
Weight 11 lbs./ft.

Drive Shoe ☒ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
FILL	5	5
SAND	18	23
CLAY	16	39
SAND	13	52
FINE SAND & SILT	8	60

USE A 2ND SHEET IF NEEDED

8 SCREEN

☐ Not Installed

Type S.S. Diameter 4"
Slot/Gauze 25 Length 4'
Set between 48 ft. and 52 ft.
FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check
☒ Blank above screen 2 ft. Other _____

9 STATIC WATER LEVEL

8 ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

23 ft. after _____ hrs. pumping at 50 G.P.M.
_____ ft. after _____ hrs. pumping at _____ G.P.M.

11 WELL HEAD COMPLETION

☒ Pitless adapter ☒ 12" above grade
☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☒ No ☐ Yes From _____ to _____ ft.

☐ Neat cement ☐ Bentonite ☐ Other _____

No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination

Type _____ Distance _____ ft. Direction _____

Well disinfected upon completion? ☐ Yes ☐ No

14 PUMP

☐ Not Installed ☐ Pump Installation Only

Manufacturer's name RED JACKET
Model number 2 WIRE HP 1 Volts 230
Length of Drop Pipe 37 ft. capacity 18 G.P.M.
TYPE ☒ Submersible ☐ Jet _____
PRESSURE TANK
Manufacturer's name WELL X TROL
Model number WX 252 Capacity 86 Gallons

15 Remarks, elevation, source of data, etc.

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

ALERT PUMP & WELL SERVICE 1584
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 5635 COOLEY LK Rd

Signed Donald Cisl Date May 19-86
AUTHORIZED REPRESENTATIVE

D67d (Rev. 10-80)

(E) #8

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Pontiac Auburn Mills	¼ ¼ ¼	35	3 N	10 E

Distance And Direction from Road Intersections
Auburn Road
(SW Corner of Auburn E. of I-75)
Street address & City of Well Location

OWNER No.

3 OWNER OF WELL:
Clawson Concrete
Address 15231 Mc Michols
Detroit, Michigan 48235

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gray Sandy Clay	17'	17'
Soft Clay	20'	37'
Sandy Clay	11'	48'
Gravely Hardpan	15'	63'
Clay	6½'	69½'
Med. Sand	4½'	74'
Sandy Clay	6'	80'
Hardpan	11'	91'
Hard Clay (Gray)	12'	103'
Brown Clay	22'	125'
Gray Clay	6'	131'
Sandy Hardpan	29'	160'
Hard Clay	32'	192'
Sandy Rock	1'	193'
Coarse Gravel	4'	197'

4 WELL DEPTH: (completed) 197 ft. Date of Completion 2-9-70

5 ☒ Coble tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ Transit Mix

7 CASING: Diam. Threaded ☒ Welded ☐
6 in. to 195'-3" ft. Depth
___ in. to ___ ft. Depth
Height: Above/Below surface 3½ ft.
Weight 19.45 lbs/ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN: Johnson Stainless
Type: Steel Dia.: 6"
Slot/Gauge 80 Length: 5'
Set between 192 ft. and 197 ft.
Fittings: 5" x 18" Nipple

9 STATIC WATER LEVEL
9 ft. below land surface

10 PUMPING LEVEL below land surface
177 ft. after 8 hrs. pumping 37½ g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) 0.5 Chlorides (Cl) 102
Hardness 204

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐ ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination: UNKNOWN
___ feet ___ Direction ___ Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name ___
Model Number ___ HP ___
Length of Drop Pipe ___ ft. capacity ___ G.P.M.
Type: ☐ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

#1 No Pump to go in this well

17 WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

O. O. Corsaut Inc. (REGISTERED BUSINESS NAME) 0025 (REGISTRATION NO.)
Address 15101 W. 11 Mile Road, Oak Park 4 8237
Signed ___ (AUTHORIZED REPRESENTATIVE) Date June 5, 1970

D67D 100M 6-66

(9) #9.

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Pontiac Auburn Hills	¼ ¼ ¼	35	3 N/S	10 E/W

Distance And Direction from Road Intersections: S.W. Corner of I 75 and Auburn Road
Street address & City of Well Location

OWNER No.

3 OWNER OF WELL:
Address: Clawson Concrete Co.
15331 W. Mc Nichols Road
Detroit, Michigan 48235

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gray Clay	10'	10'
Fill (Wood, Rocks, Etc.)	8'	18'
Sandy Clay	16'	34'
Clay	5'	39'
Water Sand (Muddy)	3'	42'
Hard Clay	3'	45'
Medium Coarse Sand	6'	51'

4 WELL DEPTH: (completed) 51 ft. Date of Completion 3-18-70

5 [x] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ___

6 USE: [ ] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ] Transit mix

7 CASING: Diam. 6 in. 48'-9" ft. Depth; Threaded [x] Welded [ ]
___ in. to ___ ft. Depth
Height: Above surface 3 ft.
Weight 19.45 lbs/ft.
Drive Shoe? Yes [x] No [ ]

8 SCREEN: Johnson Stainless
Type: Steel Dia.: 6"
Slot/Gauge 35 Length 5'
Set between 46 ft. and 51 ft.
Fittings: 5" x 18" Nipple

9 STATIC WATER LEVEL
9 ft. below land surface

10 PUMPING LEVEL below land surface
37 ft. after 4 hrs. pumping 250 g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) 1.3 Chlorides (Cl) 34
Hardness 289

12 WELL HEAD COMPLETION: [ ] In Approved Pit [x] Pitless Adapter [ ] 12" Above Grade

13 GROUTING:
Well Grouted? [ ] Yes [x] No
Material: [ ] Neat Cement [ ] ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination: Unknown
___ feet ___ Direction ___ Type
Well disinfected upon completion [x] Yes [ ] No

15 PUMP:
Manufacturer's Name: Red Jacket
Model Number 1006R5-4HB6 HP 10
Length of Drop Pipe 31½ ft. capacity 190 G.P.M.
Type: [x] Submersible [ ] ___ [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

O. O. Corsaut Inc. — REGISTERED BUSINESS NAME
0025 — REGISTRATION NO.

Address 15101 W. 11 Mile Roadk, Oak Park 48237

Signed ___ — AUTHORIZED REPRESENTATIVE
Date June 5, 1970

D67D 100M 6-66

LOCAL HEALTH DEPT. COPY

(16) GEOLOGICAL SURVEY NO #10

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P A 1978

PERMIT NUMBER

1 LOCATION OF WELL

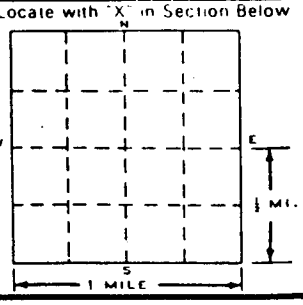
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	¼ ¼ ¼	2	N/S	10 E/W

Distance And Direction From Road Intersection

The Heathers
Square Lake at I-75

Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map

3 OWNER OF WELL

Robertson Brothers Co.
3883 Telegraph Rd. Suite 202
Address Blfd Hills, Mi 48013

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed)

253 ft

Date of Completion 6/16/88

5

☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐ ____

6 USE

☐ Domestic ☐ Type I Public ☐ Type III Public
☒ Irrigation ☐ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☐ ____

7 CASING

Diameter ☐ Steel ☒ Threaded
☐ Plastic ☐ Welded
6 in to 223 ft depth
____ in to ____ ft depth
Grouted Drill Hole Diameter
____ in to ____ ft depth
____ in to ____ ft depth

Height Above/~~Below~~ Surface 2 ft
Weight 1945 lbs /ft
Drive Shoe ☒ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Stony sand & gravel (dry)	10'	10'
Stony sand & gravel	2'	12'
Stony gravely clay	12'	24'
8 slot yellow sand (wet)	6'	30'
10 slot grey clay (wet)	21'	51'
Gravely clay	19'	70'
Hardpan	15'	85'
Dry hardpan & gravel (very firm)	18'	103'
Gravely hardpan (very firm)	17'	120'
Hardpan & seams of gravel (wet) set screen (n.g.)	14'	134'
hard clay	54'	188'
Brown clay	24'	212'
18 slot sand	2'	214'
Sand & hardpan	3'	217'
Very fine sand	24'	241'
Med. sand	7'	248'
Very fine sand	5'	253'
Putty sand		253'

USE ADDITIONAL SHEET IF NEEDED

8 SCREEN

Johnson stainless ☐ Not Installed
Type steel Diameter 6"
Slot/Gauze see below Length 30'
Set between 221 ft. and 253 ft
FITTINGS ☐ K-Packer ☐ Lead Packer ☐ Bremer Check
☐ Blank above screen 1'4" ft Other ____

9 STATIC WATER LEVEL

11 ft below land surface ☐ Flow

10 PUMPING LEVEL below land surface

217 ft after 4 hrs pumping at 80 GPM
____ ft after ____ hrs pumping at ____ GPM

11 WELL HEAD COMPLETION

☐ Pitless adapter ☒ 12" above grade
☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☒ No ☐ Yes-From ____ to ____ ft
☐ Neat cement ☐ Bentonite ☐ Other ____
No of bags of cement ____ Additives ____

13 Nearest source of possible contamination

unknown
Type ____ Distance ____ ft Direction ____
Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP

☐ Not Installed ☐ Pump Installation Only
Manufacturer's name Red Jacket
Model number 766B1-6MB6 HP 7½ Volts 230
Length of Drop Pipe 216 ft capacity 68 GPM
TYPE ☒ Submersible ☐ Jet ____
PRESSURE TANK
Manufacturer's name ____
Model number ____ Capacity ____ Gallons

15 Remarks, elevation, source of data, etc

1. top 7'
2. middle 3'
3. middle 7'
4. middle 7'
5. middle 18'
6. bottom 7'

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

O.O. Corsaut, Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO

Address 15101 W. 11 Mile Rd. Oak Park, Mi 48237

Signed [signature] Date 7/18/88
AUTHORIZED REPRESENTATIVE

D67d (Rev. 10-80)

APPENDIX D.2

MATHEMATICAL SIMULATION OF GROUNDWATER FLOW CONDITIONS UNDER GM'S TRUCK AND COACH DIVISION, PONTIAC MICHIGAN (CDM 1981)

Mathematical Simulation of the Ground-Water Flow Conditions Under GM's Truck and Coach Division, Pontiac, Michigan

October 1981

Prepared by
Camp Dresser & McKee Inc.
Milwaukee, Wisconsin 53218

Prepared for
General Motors Corporation
Truck & Coach Division
Pontiac, Michigan 48053

Mathematical Simulation of the Ground-Water Flow Conditions Under GM's Truck and Coach Division, Pontiac, Michigan

October 1981

Ross Overby
Project Manager

Charles T. Govin, Jr.
Associate

CDM
environmental engineers, scientists, planners, & management consultants

CAMP DRESSER & McKEE INC
8500 West Capitol Drive
Milwaukee, Wisconsin 53222
414 464-4150

October 20, 1981

Mr. Dan S. Harrett
Staff Engineer
GMC Truck & Coach Division
General Motors Corporation
660 South Blvd. East
Pontiac, Michigan 48053

Reference: Geohydrologic Study - P.O. TK000916

Dear Mr. Harrett:

Enclosed with this letter are three copies of our report on the geohydrologic study we performed for you at your main manufacturing complex.

The results of the study indicate a remote possibility for the off-site migration of any accidental loss of contaminants that may occur. Comparison of the analysis of GM well #6 with analyses of other GM wells, as well as from nearby subdivision wells, indicates a slight degree of water quality degradation due to sulfates and chlorides. These may have originated from GM operations, or from a nearby off-site illegal hazardous waste site. Location of the origin of this abnormality and its areal extent, as well as the determination of any local groundwater contaminants at individual locations of interest, would require the installation of monitoring wells specifically for this purpose.

We have tentatively planned to meet with you on Friday, October 30th, at 11:00 a.m., to discuss the findings of this study. If this date is not suitable, please let either Ross Overby or me know so that a new date may be made.

Very truly yours,

CAMP DRESSER & McKEE
A Partnership

Lloyd W. Curry
Regional Manager
Industrial Division

LWC/ep

Enclosures

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Figure 3 Lower Aquifer Flow Field Southeast of Boundary

1.0 Introduction

On Monday, August 28, 1981, CDM initiated an investigation of the groundwater system under and in the immediate vicinity of the General Motors Truck and Coach Division Plant in Pontiac, Michigan. This study was directed toward determining the ground-water flow directions and gradients induced by the utilization of a ground-water supply by GM and a nearby subdivision. Knowledge of ground-water flow directions is valuable in assisting in the preservation of the local and regional ground-water quality because most pollutants migrate in tandem with the groundwater. Additionally, CDM related the locations of potential ground-water pollution sources to the ground-water flow in the aquifer system to evaluate potential impact should containment of the materials ever fail.

Also, on the above date, CDM met with Mr. Dan Harrett at GM's Pontiac Plant to aquire and discuss the existing well and boring data and information concerning potential pollution point sources. Photocopies of the data were brought back to CDM's Milwaukee office for in-depth study. The well data consisted of logs from GM's active and discontinued water supply wells, test holes and the log from the north well servicing a subdivision located just south of the plant. Data for the south well servicing the subdivision was obtained over the phone from the Michigan Department of Health. Foundation borings were also reviewed for pertinent information. From the data, CDM was able to characterize the subsurface conditions, aquifer performance and important hydrologic factors which were utilized in a mathematical simulation of the effects on the groundwater system induced by GM's and the nearby subdivision's utilization of a groundwater supply. This report presents the results of the investigation. A glossary of hydrologic terms used in this report is contained in Appendix A.

2.0 Geologic Setting

The surficial materials under the Plant site are glacial deposits derived from the glacial periods concluding approximately 10,000 years ago. From the land surface down to an approximate depth of 150 feet, the materials are predominantly clay tills comprised of a mixture of clay,

silt, sand, and gravel. Clay till generally has a low to very low permeability. Within the clay till numerous sand lenses and/or glacial outwash channels are found. These sand deposits are potentially low to moderate capacity aquifers, however, the data reviewed for this study indicated only one of the lenses is being used as a water supply. The largest sand lense identified was found in the vicinity of Well #7 located near Building 43 (See Figure 1). The depth to this sand lense is 119 feet and the lense is approximately 7 feet thick. The extent of this lense is unknown, but the geologic data available indicates that it is of limited extent. There is some confusion on the well log whether or not this lense is being utilized for a water supply. Contradictory statements are made as to the screening of this aquifer. However for the purpose of this study, it was assumed that this lense is being utilized. In the vicinity of Buildings 48, 28, and 17 (Figure 1), east of the existing coal pile and west of Parking Lot G, the clay till deposits entend to depths greater than 150 feet. Data from Test Hole Number 3, located near the southwest corner of Building 13 (Figure 1), indicate that the clay till in this area extends to a depth of 350 feet or more. This clay till "Block" has important hydrologic characteristics and effects which are discussed in Section 3.2 of this report. A moderately thin, 10 to 25 foot thick medium sand to fine sand aquifer is located at an approximate depth of 150 feet. This aquifer is somewhat extensive, excluding the clay "Block" area, and is utilized as a water supply by GM and the subdivision south of the Plant. Underlying this aquifer, from an approximate depth of 175 feet down to approximately 230 feet, is a depositional sequence of clay till which would not be considered an aquifer. Underlying this second clay till sequence from a depth of approximately 230 feet to approximately 270 feet is another aquifer comprised of medium coarse sand and gravel. This aquifer is also utilized as a water supply by GM and the subdivision. This is the lowest aquifer utilized by GM and it is underlain by clay of an undetermined thickness.

The ground-water levels under the Plant site are highly variable and probably represent perched water. Typical ground-water levels obtained from foundation borings with a typical depth of 30 feet range from zero feet near the eastern part of the Plant to depths of 6 to 10 feet.

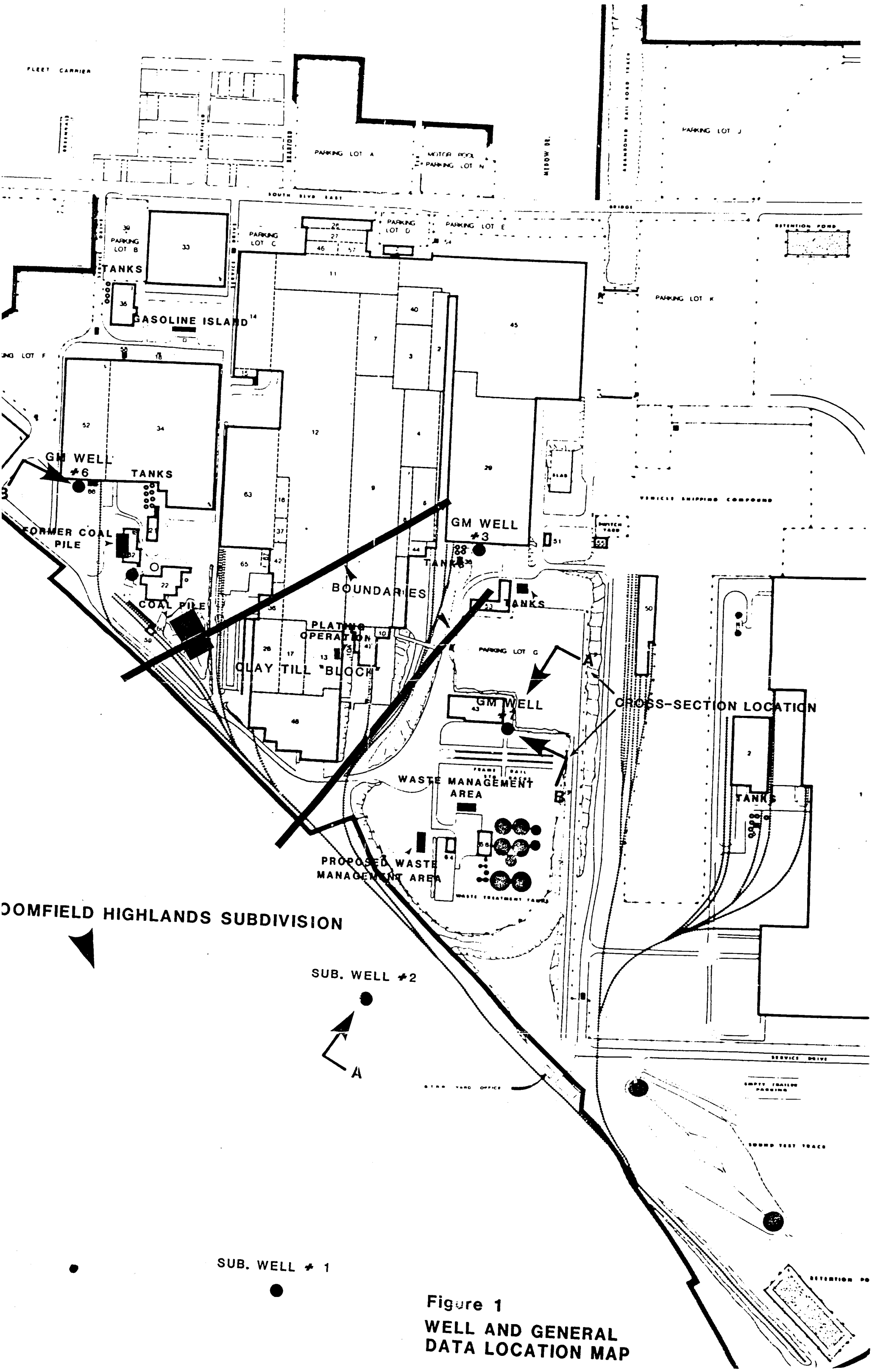


Figure 1
WELL AND GENERAL
DATA LOCATION MAP

The aquifers under the Plant site are considered confined aquifers due to the presence of the clay till overlying each water bearing unit. This clay most likely prevents a significant amount of water exchange between the aquifers and causes the water levels in the confined aquifers to differ from the groundwater table levels obtained from the foundation borings. Data indicates that the average potentiometric water levels (the static depth to water within each well) of the three aquifers are 68 feet below ground level. Actual potentiometric water levels for individual aquifers could not be determined from the existing data because many of the wells were screened in two of the aquifers. A few wells are screened exclusively in the 150 foot deep aquifer with resultant static water levels of 68 to 70 feet indicating that the lower 230 foot deep aquifer probably does not have a vastly different static water level. Cross-sections have been prepared and are presented in Appendix B of this report.

3.0 Hydrologic Evaluation

3.1 Determination of the Aquifer Parameters

The data obtained from GM was used to determine the following aquifer parameters: transmissivity, storage coefficient, and boundaries, which were input into a mathematical simulation of the two aquifers beneath the plant site.

To determine the aquifer parameters, the drilling logs were examined for aquifer type (sand, gravel, etc.), aquifer thickness, static water levels, and any aquifer testing data. Also those logs which indicated that no usable aquifer was present were noted.

From the well logs it was apparent that the aquifers underlying the plant are confined. Therefore, a storage coefficient of 1×10^{-4}, which lies within the average range for a confined aquifer (Freeze and Cherry, 1979) was assigned to these water bearing units. Available data does not allow the calculation of the actual storage coefficient.

The method used to determine the transmissivities was an approximation method developed by T.R. Hurr (Kruseman and DeRidder, 1976). This method was used because it provides an estimation of the aquifer transmissivity from a single drawdown observation measurement which was the only type of pumping data available from the drilling logs. The Hurr method requires that the drawdown used in the calculations be caused by the movement of water through the aquifer only excluding drawdowns caused by well inefficiencies or interference. Unfortunately all data was obtained from pumping wells and therefore includes some well loss (efficiency) components. Additionally, data from at least one pump test indicated that there is apparently some interference effects from other wells in the area. The limited data does not allow for the quantification of either the well losses or the interference caused by other wells; however, the relative magnitude of the transmissivity can be determined and was used to determine the flow field as proposed for this study.

The calculated transmissivities were cross checked by reviewing the well logs to determine if the transmissivity values calculated were reasonable for the types of materials in the aquifers and their thicknesses.

3.2 Determination of the Flow Field

The primary method used to determine the drawdown distribution is the "Principal of Superposition". This principal states that the drawdown at any point in an aquifer is equal to the arithmetic sum of the drawdown caused at that point by each individual well in the aquifer (Walton, 1970).

The till "block" as previously discussed acts as a hydrogeologic barrier, in that the extremely low permeability of the till, especially in relation to the aquifers, effectively prevents the movement of water across this area. The inability to draw water from this area increases the influence of pumping in directions where water is available.

To simulate the effect of the till "block" on the flow field, the image well theory was used. This theory states that a hydrogeologic barrier can be simulated by placing an imaginary pumping well opposite the pumping well and equidistant from the boundary (Walton, 1970). This theory assumes that the boundaries extend to infinity in both directions.

The pumping rates used for the sumulations were determined by examining the water use data and averaging this over the selected pumping time to obtain a constant pumping rate. A pumping time of one year was used to simulate the long term pumpage of the wells.

For the simulations, the plant site was considered to be underlain by two aquifers which are separated in the horizontal plane by the till "block", and form an upper and lower aquifer in the vertical plane.

The upper aquifer lies north and west of the till "block" and is tapped by GM wells #6 and #3.

The lower aquifer lies south and east of the till "block" and is tapped by GM well #7 and the subdivision wells. This aquifer actually consists of two aquifers separated by a layer of clay till. However, the wells are screened in both and therefore they are considered to act as a single aquifer for this simulation.

3.3 Results of the Mathematic Simulation of the Upper Aquifer

The upper aquifer is separated from the subdivision wells by the till "block" which is located south of GM well #6. Also the only wells screened in this aquifer are GM #6 and GM #3. The information obtained from GM indicates that Well #3 is pumped very intermittently. Therefore, for this simulation, only the effects of well #6 were considered.

The parameters used for this simulation were as follows:

- Pumping rate for well #6: 150 gpm for 1 year
- Transmissivity: 50,000 gpd/ft
- Storage coefficient: 10^{-4}
- One boundary running ENE - WSW and lying approximately 900 feet south of well #6 (Figure 2).

The results of the simulation indicate that the groundwater flow is basically radial with the till block giving the flow pattern a semi-circular configuration with no appreciable flow coming from the south toward well #6 (Figure 2). When well #3 is pumped, the drawdown effects in this aquifer would be increased probably increasing the drawdown influence beyond the limits induced by well #6 alone.

DRAWDOWN IN FEET FROM
AN ASSUMED HORIZONTAL
PIEZOMETRIC SURFACE

6.5

7.0

7.5

8.0

GM WELL #6

GM WELL #3

GM WELL #7

BOUNDARY

SOUTH BLOOMFIELD HIGHLANDS SUBDIVISION

SUB. WELL #2

SUB. WELL #1

PARKING LOT A

MOTOR POOL
PARKING LOT N

PARKING LOT B

PARKING LOT C

PARKING LOT D

PARKING LOT E

PARKING LOT F

PARKING LOT G

PARKING LOT K

SOUTH BLVD EAST

COAL STORAGE AREA

Figure 2
UPPER AQUIFER FLOW FIELD
NW OF BOUNDARY

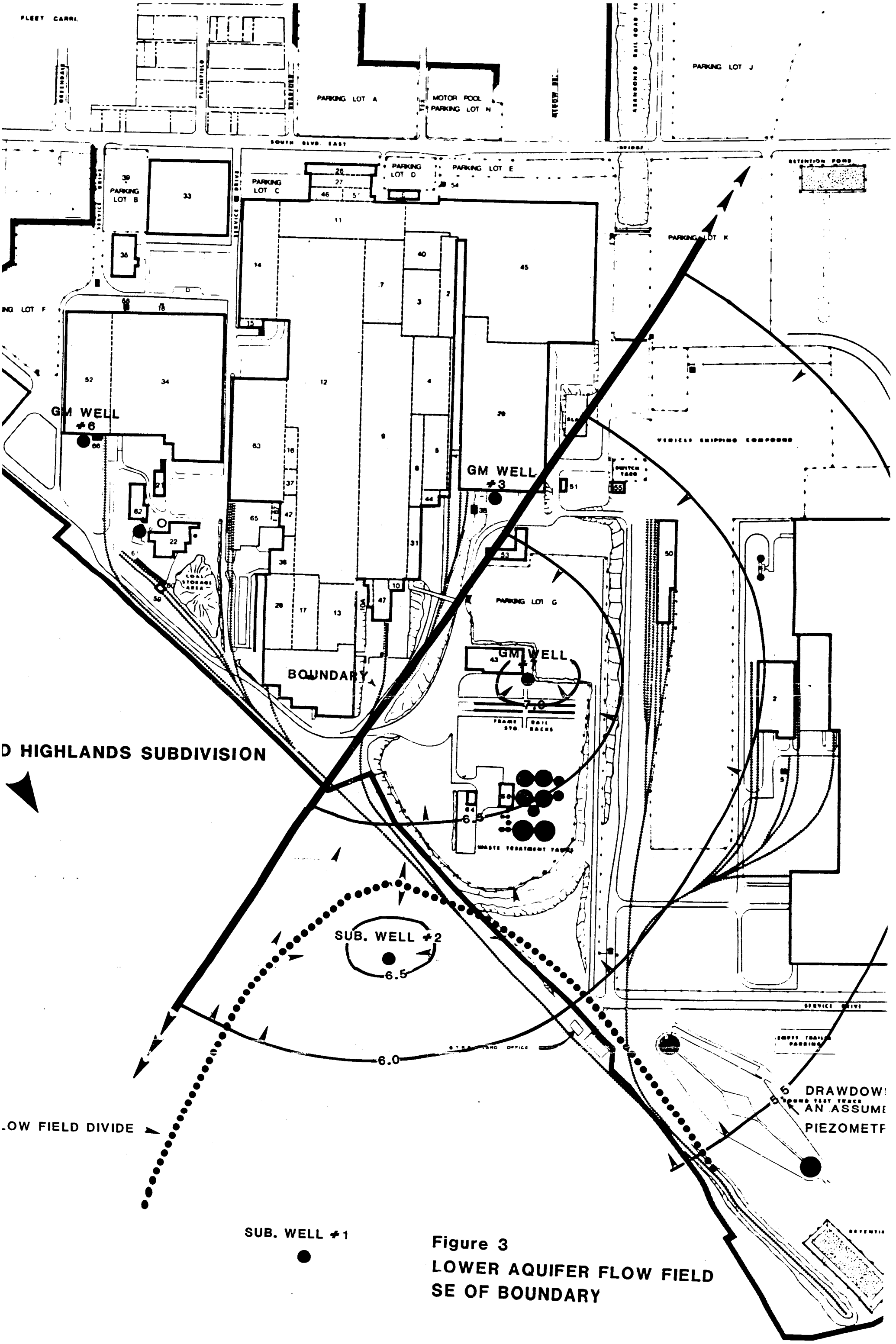


Figure 3
LOWER AQUIFER FLOW FIELD
SE OF BOUNDARY

3.4 Results of the Mathematical Simulation of the Lower Aquifer

The lower aquifer is tapped by both subdivision wells and GM well #7. Therefore the simulation of this aquifer included the subdivision wells #1 and #2 and GM well #7. The parameters used for this simulation were as follows:

- Pumping rates: GM #7 = 150 gpm, subdivision #2 = 75 gpm, subdivision #1 = 25 gpm
- Transmissivity: 100,000 gpd/ft
- Storage coefficient: 10^{-4}
- One Boundary running NE - SW and lying approximately 500 feet Northwest of well #7 (Figure 3)

The results of this simulation indicate that at some distance from GM #7 the flow is radial toward well #7 with a semicircular pattern similar to that discussed for the upper aquifer. The subdivision well #1 is too far away and pumps at too low of a rate to have much influence on the flow pattern under the plant. However the subdivision well #2 has significant effect on the flow pattern.

The effect of well #2 is that some of the flow from the south central part of the study area is diverted toward this well instead of moving toward well #7 (Figure 3).

This "area of capture" can be defined by a wide parabola which opens downward and has its apex approximately 300 feet north of subdivision well #2. The water, and any contaminants in it, which is inside this parabola will tend to move toward subdivision well #2 and not GM well #7. The water outside this parabola will tend to move toward GM well #7 and not toward the subdivision well #2.

The area of capture as shown on Figure 3 relates to the parameters used in this particular simulation and will shift position depending on the actual pumping rates of the production wells. However if the ratio of the pumping rates is kept constant, the position of the dividing line will not change significantly.

3.5 Simulation Limitations

The till "block" which is being simulated apparently terminates under the GM plant. Therefore, the flow field as shown in the northeast portion of Figures 2 and 3 would differ somewhat from the actual flow in this area. The differences are that the actual drawdown would be less than the calculated drawdown in this region and that some movement of groundwater would occur from the northern portion of the aquifer around the tip of the till block. It should also be noted that deep test drilling is not areally extensive and thus the existence of other boundaries or the actual extent of the till block is limited.

4.0 Potential Point Source Contamination

During our meeting with GM potential point sources of contamination were identified.

The types of point sources identified are:

- Tanks (fuel, oil, etc.)
- Coal storage area
- Former coal storage area
- Waste management area
- Gasoline island
- Plating areas

The location of each potential source is indicated on Figure 1. Should any of the potential pollution sources leak or produce a leachate, the resultant pollution would migrate downward into the groundwater system. The first area affected would be in the immediate vicinity of the source. As indicated previously, the upper 100-150 feet of subsurface materials is comprised of clay till with sand lenses or interbeds. The pollutant would probably continue to migrate downward and if any sand lenses were encountered the pollutant could possibly migrate laterally away from the point source. This occurrence is dependent on localized groundwater flow directions and head differences. Determining the localized groundwater

flow directions in this complex geology is not cost effective and should be conducted on a case by case basis. Over time the pollution may possibly continue to migrate downward and could enter the aquifer system described previously. As this study indicates, should such a situation occur, the contaminants should be drawn into General Motors' water supply wells.

5.0 Existing Groundwater Quality

Groundwater quality records were reviewed by CDM and there is very little difference between the quality of water obtained from GM's wells and water obtained from the subdivision wells. One exception to this is that sulfates and chlorides are higher in GM's well #6. The concentration of these substances is approximately two to three fold greater than determined in the other wells but is still below EPA standards for potable water. The source of the sulfate and chloride could not be determined within the scope of this project. The source may be background isolated from the other wells by the till "block" or may represent operations in the vicinity of well #6.

6.0 Conclusions

In evaluating the directions of groundwater movement in the vicinity of the GM plant site, assumptions had to be made based on the limited data available. Therefore the conclusions which follow should be viewed as qualitative and not quantitative in nature. To determine the actual drawdown and flow field would require an extensive and expensive test drilling and observation well installation program. The purpose of this project was to determine if such a program was required.

The conclusions based on the mathematical simulation of the aquifer in the vicinity of the plant site are as follow:

- Beneath the plant site the flow of groundwater in the primary aquifer system is radially inward toward GM wells #6 and #7. Therefore the potential for contaminant movement off the plant site via the main aquifers is low.

- Specifically the potential for contaminant movement to the subdivision wells is low and will remain low provided that the water use from the GM wells continues to be much greater than that of the subdivision wells.
- There appears to be no degradation of the groundwater quality in the aquifer system at the present time.

7.0 Recommendations

Except for a possible situation at GM's well #6, there appears to be no ground-water pollution problem in the aquifer system in the vicinity of GM's Pontiac Plant. However, General Motors may wish to consider initiating a small scale groundwater monitoring program focused on shallow deposits near critical potential point sources. One such source is the waste management area. A small scale monitoring program would consist of the installation of approximately four, two-inch diameter wels to approximate depths of 25 to 30 feet around each point source of concern. Quarterly monitoring of these wells would indicate any unusual occurrences or problems while such circumstances are still manageable.

8.0 References

Freeze, R.A., and Cherry, J.A. 1979. "Groundwater." Prentice-Hall. englewood Cliffs, New Jersey.

Krugeman, G.R. and Deridder, N.A. 1976. "Analysis and Evaluation of Pumping Test Data". International Institute for Land Reclamation and Improvement. bulletin II. Wageningen, Netherlands.

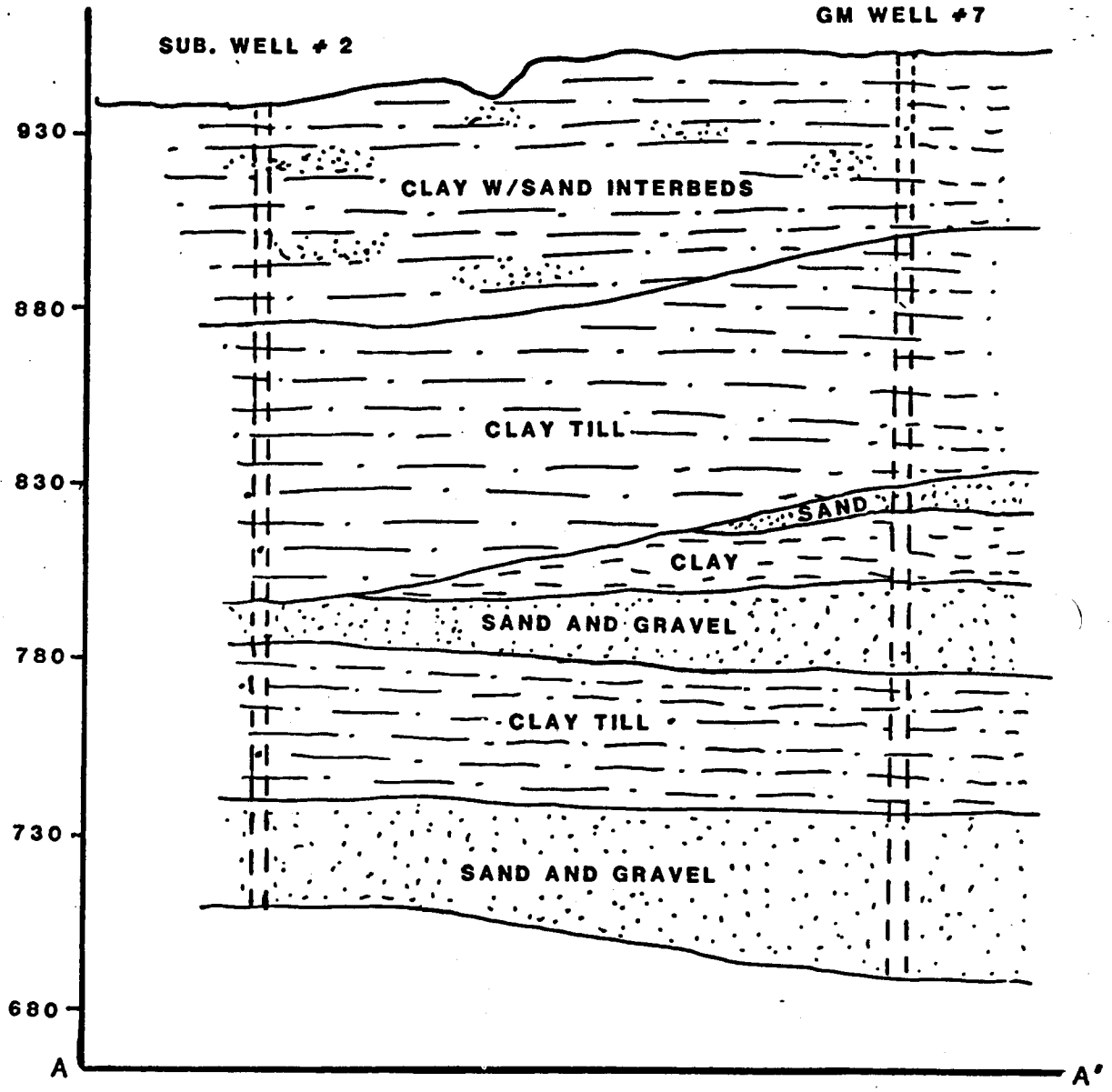
Walton, W.C. 1960. "Groundwater Resource Evaluation". McGraw-Hill. New York.

Appendix A

GLOSSARY OF HYDROLOGIC TERMS

Aquifer	An aquifer is a formation or group of formations that can yield water in sufficient, useable quantities
Confining Bed	A confining bed is a unit of material which does not freely transmit water usually because of very small pore spaces. Clay is a confining bed
Drawdown	Drawdown is the lowering of the water level caused by pumping
Permeability	This term is used to define a materials ability to transmit water. It is usually expressed in gallons per day per square foot of aquifer. A material with a high permeability transmits water easily.
Porosity	Porosity is a measure of a materials pore space. If a cubic foot of sand was drained of all its water and the water volume was found to be 1/4 of a cubic foot, the porosity of the sand would be 25%. Materials which are composed of generally the same size particles have a high porosity. A great variation in particle size decreases the porosity because small particles fill in the pores made by larger particles.
Specific Capacity	The specific capacity of a well is a measure of how much water can be pumped per minute for every one foot of drawdown.
Storage Coefficient	This term is unitless and defines the amount of water that is taken into or released from storage per cubic foot of aquifer. In an open aquifer with no confining bed the amount of water that can be stored or released per cubic foot is equal to the pore space (porosity). In aquifers with a confining bed the storage coefficient is dependent upon the compression of the water (water is partially compressable) and the compression of the aquifer. Through countless investigations and correlations made by hydrologists it has been determined that the storage coefficient of confined aquifers ranges from .001 to .00001 dependent upon the compressability of the aquifer.
Transmissivity	Transmissivity is the rate at which water is transmitted through the thickness of the aquifer. The number is arrived at by multiplying the permeability of the aquifer by the aquifer thickness.

Appendix B

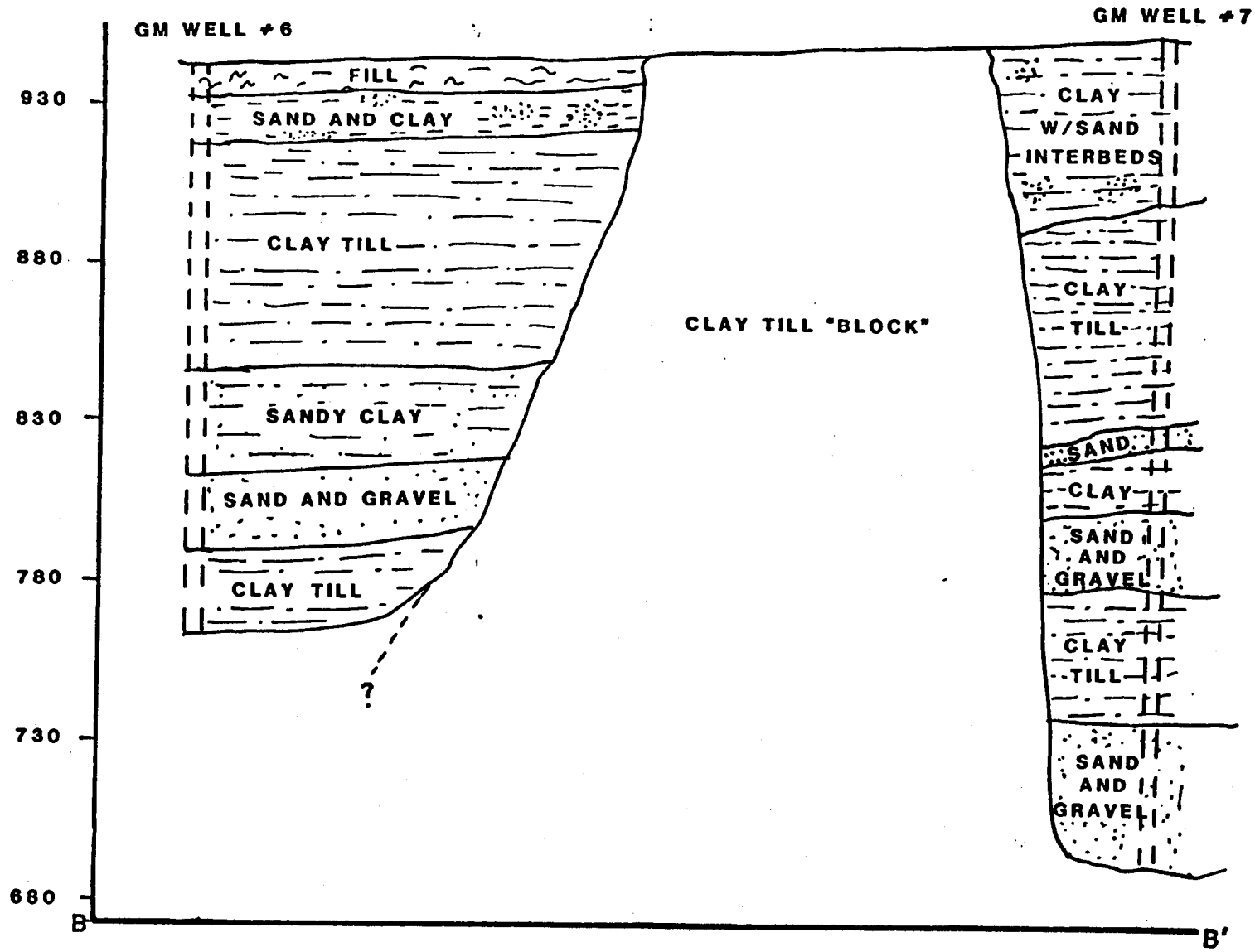


HORIZONTAL SCALE 1":400'

VERTICAL SCALE 1":50'

VERTICAL EXAGGERATION 8X

CROSS- SECTION A-A'



VERTICAL SCALE 1":50'

HORIZONTAL SCALE 1":400'

VERTICAL EXAGGERATION 8X

CROSS-SECTION B-B'

APPENDIX E

BUILDING 29 STUDY AREA

APPENDIX E.1

FINAL REPORT ON LOW TEMPERATURE THERMAL DESTRUCTION, BUILDING 29 AND DUCO STORES

FINAL REPORT

ON

LOW TEMPERATURE THERMAL DESTRUCTION

Presented to:

General Motors Corporation
Truck and Bus Central
Pontiac, Michigan

Prepared by:

M. L. Chartier, Inc.
9195 Marine City Highway
Fair Haven, Michigan 48023

Arlesa Taughinbaugh
Environmental Research

December 10, 1992

ENVIRONMENTAL SERVICES, INC.

INDEX

I	Report
II	ERD Correspondence-Analytical
III	Air Permit Request To Operate
IV	PID Readings
V	Strip Charts

The following is inclusive of all reporting which occurred during the thermal remediation of petroleum contaminated soil for General Motors Corporation Truck and Bus, Central, Pontiac, Michigan.

Processing began August 5, and continued through October 20, 1992. This report contains verification that thermal destruction was completed for the following sites:

Building 29
Duco Stores

Sampling:

Results for the processed material yielded non-detect results for BTEX <10 ppb and PNA's <330 ppb.

The sampling sequence called for discrete samples every 50 yards for the first 800 yards, and then, upon receiving clean results, continued every 200 yards. This sequence was described in a letter from Mr. Jim Coger of the MDNR, Southeast District Office, to Margie Sauter of the Truck and Bus Group. The sequence repeated at the onset of every new project, therefore, new intervals for Pontiac Central Building 29, and Duco Stores. Analytical results are submitted with this report.

Air Quality:

Application for permit to install at General Motors Central Building 29 location was approved on July 7, 1992 by Mr. Terry Wright, Air Quality Permit Section. A copy of permit conditions are enclosed. The following is a brief reply to these conditions.

REPLY TO PERMIT CONDITIONS

General Condition No. 1 stipulates application for permit to operate must be directed to Chief, Air Quality Division within 30 days of commencement. Processing began August 1, 1992, and the request for permit to operate was submitted August 18, 1992. A copy of this request is enclosed.

General conditions No. 2-13 constitutes compliance with corresponding federal regulations. The crew on site have been trained to suspect change which may require additional reporting and/or termination of processing. During the extent of the project, no events required such reports to be made.

Special conditions No.14-19 have proven complacent through a stack test conducted by WW Engineering August 18, 1992. The report has been submitted to State (G. Edward/T. Wright), and Southeast District (F. Reith/B. Sia) Air Quality Staff. Special Conditions 20 and 21 request daily measurements for percent contaminate of soil. This was tested daily before start-up using a

photoionization detector (PID) analyzer measuring the ppm. Daily logs of the levels measured are enclosed. Conditions 22 through 28 are monitored through a control center panel, and those which are required to be continuously documented are printed on a strip charts. These records are also enclosed. Condition No. 29 is satisfied by a 20 foot stack connected to base 14 feet above ground. No. 30 had a site specific plan in place including a roadway sweeper to clean the grounds daily.

BUILDING 29 UNDERGROUND STORAGE TANK STUDY AREA

FINAL REPORT

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

FEBRUARY 1995
REF. NO. 5770 (3)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

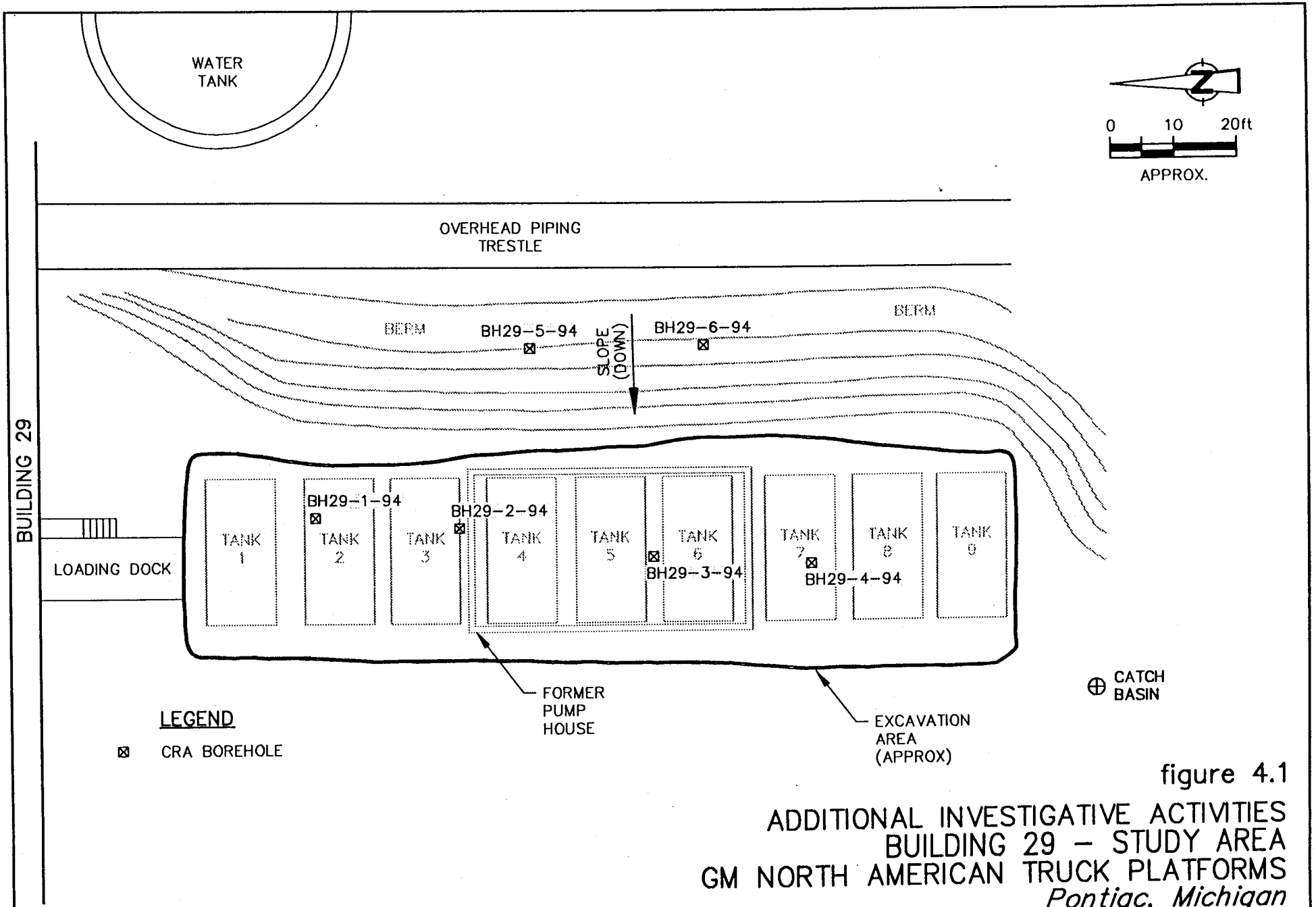


figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES
BUILDING 29 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (3) FEB 11/94(W) REV.0 (P-06)

TABLE 5.1

ACT 307 - TYPE A AND TYPE B CRITERIA
BUILDING 29 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Type B Criteria(1)(2)					
	Soil (µg/kg)			*GW (µg/L)*		
Parameter	*20X Drinking Water*	*20X GSI Value*	*Direct Contact*	*Health Based*	*Aesthetic*	*GSI Value*
BTEX						
Benzene	24	1,200	13,000	1.2	NA	60
Toluene	16,000	2,200	1.7E+07	1,500	790	110
Ethylbenzene	1,500	620	7.5E+06	680	74	31
Xylene	46,000	1,600	8.6E+07	2,300	5,000	81
PNAs						
Acenaphthene	24,000	--	4.50E+07	1,200	NA	--
Acenaphtylene	500	--	9.30E+05	25	NA	--
Anthracene	1.40E+05	2.20E+06	2.60E+08	7,000	NA	1.10E+05
Benzo(a)anthracene	N/A	N/A	1,800	0.049 (3)	NA	0.31 (3)
Benzo(a)pyrene	N/A	N/A	180 (3)	0.0049 (3)	NA	0.31 (3)
Benzo(b)fluoranthene	N/A	N/A	1,800	0.049 (3)	NA	0.31 (3)
Benzo(g,h,i)perylene	N/A	N/A	9.30E+05	25	NA	--
Benzo(k)fluoranthene	N/A	N/A	18,000	0.49 (3)	NA	0.31 (3)
Chrysene	N/A	N/A	180,000	4.9 (3)	NA	0.31 (3)
Dibenzo(a,h)anthracene	N/A	N/A	180 (3)	0.0049 (3)	NA	0.31 (3)
Fluoranthene	17,000	7,400	3.10E+07	840	NA	370
Flourene	17,000	2.80E+05	3.10E+07	840	NA	14,000
Indeno(1,2,3-cd)pyrene	N/A	N/A	1,800	0.049 (3)	NA	0.31 (3)
Naphthalene	5,000	580	9.30E+06	250	NA	29
Phenanthrene	500	--	9.30E+05	25	NA	--
Pyrene	10,000	2.20E+05	1.90E+07	520	NA	11,000

Notes:
NA = not available.
N/A = not applicable (i.e. direct contact value is considered to be protective).
- - = chemical has not yet been evaluated.
(1) MERA Operational Memorandum, Revision 3, dated February 4, 1994.
(2) Addendum to (1) dated June 21, 1994.
(3) The detection level is used as the cleanup standard where the identified cleanup level is below the detection limit.

TABLE 5.2

ANALYTICAL RESULTS - ADDITIONAL INVESTIGATIVE ACTIVITIES
BUILDING 29 STUDY AREA
PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Sample Concentration (µg/kg)											
Parameter	*BH29-1-94 (17'-18')*	*BH29-1-94 (21'-22')*	*BH29-2-94 (16.5'-17')*	*BH29-2-94 (21'-21.5')*	*BH29-3-94 (16'-18')*	*BH29-3-94 (20'-22')*	*BH29-4-94 (16'-18')*	*BH29-4-94 (20'-22')*	*BH29-5-94 (15'-17')*	*BH29-5-94 (20'-22')*	*BH29-6-94 (15'-17')*	*BH29-6-94 (20'-22')*
BTEX												
Benzene	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	ND (5)	--	--	--	--
Toluene	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	--	--	--	--
Ethylbenzene	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	--	--	--	--
Xylene	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	ND (10)	--	--	--	--
PNAs												
Acenaphthene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Acenaphtylene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Anthracene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)anthracene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**430**
Benzo(a)pyrene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(b)fluoranthene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(g,h,i)perylene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(k)fluoranthene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Chrysene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**480**
Dibenzo(a,h)anthracene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Fluoranthene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	**510**	ND (330)	ND (330)	ND (330)	ND (330)	**1,400**
Flourene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Indeno(1,2,3-cd)pyrene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Naphthalene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	**390**	ND (330)	ND (330)	ND (330)	ND (330)	**660**
Phenanthrene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**930**
Pyrene	ND (330) UJ	ND (330)	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330) UJ	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	

Notes:

-- - Not Analyzed.
ND ( ) - Compound not detected at method detection limit. The detection limit is indicated in parentheses.
UJ - The analyte was analyzed for, but not detected. The sample quantitation limit is an estimated quantity.

NATURAL RESOURCES COMMISSION
LARRY DEVUYST
PAUL EISELE
GORDON E. GUYER
P. HILL
HOLLI
STEWART MYERS
JOEY M. SPANO

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

ROLAND HARMES, Director

SOUTHEAST MICHIGAN DISTRICT OFFICE
ENVIRONMENTAL RESPONSE DIVISION
38980 West Seven Mile Road
Livonia, Michigan 48152

June 28, 1992

92 JUN 31 A 9:05
CENTRAL PLANT ENG.

Ms. Margie Sauter
Environmental Engineer
GM Truck Platforms
GM Truck & Bus Group

Re: GM Truck Platforms-Pontiac Central
660 South Boulevard, Building 29
Pontiac, MI 48341
Oakland County, LUST

Dear Ms. Sauter:

I have received your letter dated June 10, 1992 requesting Michigan Department of Natural Resources (MDNR) approval of the proposed soil remediation sampling plan. The Sampling and Analysis Plan as outlined in the 6/10/92 letter is acceptable.

Remediated soil samples will be collected for analytical testing at 50 cubic yard intervals for the first 800 cubic yards of processed soil. Subsequent sampling will be done every 200 cubic yards.

This sampling interval is contingent upon field documentation of operational parameters meeting manufacturers specifications for processing temperatures and feed/discharge rates. In the event the processing temperature drops below M.L. Chartier's recommended operating ranges, or processed soil fails to meet Type B criteria, verification of soil remediation sampling will be requested at the 50 cubic yard interval, until operational efficiency is re-established. All soils should be collected as discrete samples, composite sampling is unacceptable.

I will be out of the office the week of June 29, if you have questions or comments please contact my supervisor, Valerie Burgess-Byrd at (313) 953-0241.

Sincerely,

Jim Coger

Jim Coger, Geologist MDNR

cc: Valerie Burgess-Byrd, MDNR

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To TERESA TAUGHINBAUGH	From MARGIE SAUTER
Co.	Co.
Dept.	Phone #
Fax # 8-313-726-1450	Fax #

MAS #: 2102030

Midwest Analytical Services, Inc.
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Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201
Phone: (313) 964-3680
FAX No.: (313) 964-2339

IN: SJ

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 10/22/92

PROJECT: GM TRUCK & BUS DUCO SITE

SAMPLE IDENTIFICATION: 10-20-001 10/20/92 2:00PM STOCK PILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	120
	TOLUENE	N/D	µg/kg	10	115
	ETHYL BENZENE	N/D	µg/kg	10	110
	XYLENE (O, M, & P)	N/D	µg/kg	30	110
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	100
	ACENAPHTHYLENE	N/D	µg/kg	330	142
	ACENAPHTHENE	N/D	µg/kg	330	106
	FLUORENE	N/D	µg/kg	330	105
	PHENANTHRENE	N/D	µg/kg	330	102
	ANTHRACENE	N/D	µg/kg	330	112
	FLUORANTHENE	N/D	µg/kg	330	66
	PYRENE	N/D	µg/kg	330	112
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	96
	CHRYSENE	N/D	µg/kg	330	102
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	133
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	96

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

REPORT SHALL NOT BE REPRODUCED, EXCEPT IN FULL, WITHOUT WRITTEN APPROVAL OF MIDWEST ANALYTICAL SERVICES.
N/D = NOT DETECTED
ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)

MAS #: 2102029

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Detroit, Michigan 48201
Phone: (313) 964-3680
FAX No.: (313) 964-2339

IN: SJ

DATE COMPLETED: 10/22/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS DUCO SITE

SAMPLE IDENTIFICATION: 10-19-001 10/19/92 2:00PM STOCK PILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	120
	TOLUENE	N/D	µg/kg	10	115
	ETHYL BENZENE	N/D	µg/kg	10	110
	XYLENE (O, M, & P)	N/D	µg/kg	30	110
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	100
	ACENAPHTHYLENE	N/D	µg/kg	330	142
	ACENAPHTHENE	N/D	µg/kg	330	106
	FLUORENE	N/D	µg/kg	330	105
	PHENANTHRENE	N/D	µg/kg	330	102
	ANTHRACENE	N/D	µg/kg	330	112
	FLUORANTHENE	N/D	µg/kg	330	66
	PYRENE	N/D	µg/kg	330	112
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	96
	CHRYSENE	N/D	µg/kg	330	102
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	133
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	96

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2101503

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Detroit, Michigan 48201
Phone: (313) 964-3680
FAX No.: (313) 964-2339

IN: SJ

DATE COMPLETED: 10/16/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 10-14-01 10/14/92 2:00PM PILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	94
	TOLUENE	N/D	µg/kg	10	93
	ETHYL BENZENE	N/D	µg/kg	10	94
	XYLENE (O, M, & P)	N/D	µg/kg	30	96
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	116
	ACENAPHTHYLENE	N/D	µg/kg	330	115
	ACENAPHTHENE	N/D	µg/kg	330	114
	FLUORENE	N/D	µg/kg	330	121
	PHENANTHRENE	N/D	µg/kg	330	116
	ANTHRACENE	N/D	µg/kg	330	131
	FLUORANTHENE	N/D	µg/kg	330	117
	PYRENE	N/D	µg/kg	330	115
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	115
	CHRYSENE	N/D	µg/kg	330	125
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	147
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	122

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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N/D = NOT DETECTED
ppm = parts per million, mg/L, mg/kg or mg/kg (dry weight)

MAS #: 2101344

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2727 Second Avenue
Detroit, Michigan 48201

IN: SJ

Phone: (313) 964-3680
FAX No.: (313) 964-2339

DATE COMPLETED: 10/27/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: PONTIAC-DUCO SITE

SAMPLE IDENTIFICATION: 10-13-001 10/13/92 1:00PM STOCKPILE #2

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	99
	TOLUENE	N/D	µg/kg	10	94
	ETHYL BENZENE	N/D	µg/kg	10	105
	XYLENE (O, M, & P)	N/D	µg/kg	30	102
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	99
	ACENAPHTHYLENE	N/D	µg/kg	330	131
	ACENAPHTHENE	N/D	µg/kg	330	101
	FLUORENE	N/D	µg/kg	330	99
	PHENANTHRENE	N/D	µg/kg	330	92
	ANTHRACENE	N/D	µg/kg	330	111
	FLUORANTHENE	N/D	µg/kg	330	77
	PYRENE	N/D	µg/kg	330	108
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	75
	CHRYSENE	N/D	µg/kg	330	117
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	127
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	115

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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LABORATORY TESTS RESULTS

11/04/92

JOB NUMBER: 108951 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

CLIENT I.D.....: Sample ID: 10-08-1B
DATE SAMPLED.....: 11/02/92
TIME SAMPLED.....: 16:00
WORK DESCRIPTION...: Sample ID: 10-08-1B

LABORATORY I.D...: 108951-0003
DATE RECEIVED....: 11/03/92
TIME RECEIVED....: 09:10
REMARKS.....: 1x125 ml & 1x250 ml Containers

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	93	0.01	%		10/07/92	GES
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	11/03/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
Bromofluorobenzene	47	0	%	75-125 %		
Date Analyzed:	10/03/92	0	Month/Day/Year			
Polynuclear Aromatics in Soil		*1		EPA 8100 by 8270	10/27/92	RDC
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Anthracene	ND	330	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)anthracene	<330	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Naphthalene	<330	330	ug/kg			
Phenanthrene	ND	330	ug/kg			
Pyrene	Recovery	0	Percent	Control Limits		
SURROGATES	94	0	%	30-115 %		
2-Fluorobiphenyl	82	0	%	23-120 %		
Nitrobenzene-d5	102	0	%	18-137 %		
Terphenyl-d14	11/03/92	0	Month/Day/Year			
Date Analyzed:						
PNAs in Soil Extraction Date:	11/3/92		Month/Day/Year	EPA 3550	11/03/92	DMR

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/26/92

JOB NUMBER: 108889 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

CLIENT I.D.....: Sample ID: 100701
DATE SAMPLED.....: 10/07/92
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Sample ID: 100701

LABORATORY I.D...: 108889-0003
DATE RECEIVED....: 10/21/92
TIME RECEIVED....: 16:00
REMARKS.....: 1x250 ml Glass

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	93	0.01	%		10/23/92	SB
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	10/23/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	87	0	%	75-125 %		
Date Analyzed:	10/23/92	0	Month/Day/Year			

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(313) 462-3900

MAS #: 2101504

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Phone: (313) 964-3680
FAX No.: (313) 964-2339

IN: SJ

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 10/16/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 10-6-002 10/14/92 2:00PM

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	94
	TOLUENE	N/D	µg/kg	10	93
	ETHYL BENZENE	N/D	µg/kg	10	94
	XYLENE (O, M, & P)	N/D	µg/kg	30	96
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	116
	ACENAPHTHYLENE	N/D	µg/kg	330	115
	ACENAPHTHENE	N/D	µg/kg	330	114
	FLUORENE	N/D	µg/kg	330	121
	PHENANTHRENE	N/D	µg/kg	330	116
	ANTHRACENE	N/D	µg/kg	330	131
	FLUORANTHENE	N/D	µg/kg	330	117
	PYRENE	N/D	µg/kg	330	115
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	115
	CHRYSENE	N/D	µg/kg	330	125
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	147
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	122

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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N/D = NOT DETECTED
ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)
ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

LABORATORY TESTS RESULTS
11/04/92

OB NUMBER: 108951 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

:LIENT I.D.....: Sample ID: 10-06-1B
)ATE SAMPLED.....: 11/02/92
'IME SAMPLED.....: 11:00
)ORK DESCRIPTION...: Sample ID: 10-06-1B

LABORATORY I.D...: 108951-0004
DATE RECEIVED....: 11/03/92
TIME RECEIVED....: 09:10
REMARKS.....: 1x125 ml & 1x250 m. containers

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	93	0.01	%		10/0[illegible]	GES
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	11/0[illegible]	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
Bromofluorobenzene	38	0	%	75-125 %		
Date Analyzed:	10/03/92	0	Month/Day/Year			
Polynuclear Aromatics in Soil		*1		EPA 8100 by 8270	10/[illegible]	RDC
[illegible]aphthene	ND	330	ug/kg			
[illegible]naphthylene	ND	330	ug/kg			
Anthracene	ND	330	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)anthracene	ND	330	ug/kg			
Fluoranthene	<330	330	ug/kg			
Fluorene	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Phenanthrene	<330	330	ug/kg			
Pyrene	<330	330	ug/kg			
SURROGATES	Recovery	0	Percent	Control Limits		
2-Fluorobiphenyl	95	0	%	30-115 %		
Nitrobenzene-d5	79	0	%	23-120 %		
Terphenyl-d14	96	0	%	18-137 %		
Date Analyzed:	11/03/92	0	Month/Day/Year			
PNAs in Soil Extraction Date:	11/3/92		Month/Day/Year	EPA 3550	11/0[illegible]	DMR

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/27/92

JOB NUMBER: 108906 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

CLIENT I.D.....: Sample ID: 10-50-02 05
DATE SAMPLED.....: 10/23/92
TIME SAMPLED.....: 13:30 05
WORK DESCRIPTION...: Sample ID: 10-50-02

LABORATORY I.D...: 108906-0003
DATE RECEIVED....: 10/23/92
TIME RECEIVED....: 13:30
REMARKS.....: 1x250 ml Container

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	93	0.01	%		09/30/92	IML
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	10/26/92	RDC
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	75-125 %		
Date Analyzed:	10/26/92	0	Month/Day/Year			

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(313) 462-3900

LABORATORY TESTS RESULTS
10/26/92

JOB NUMBER: 108889 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

CLIENT I.D.....: Sample ID: 105001
DATE SAMPLED.....: 10/05/92
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Sample ID: 105001

LABORATORY I.D...: 108889-0002
DATE RECEIVED....: 10/21/92
TIME RECEIVED....: 16:00
REMARKS.....: 1x250 ml Glass

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	93	0.01	%		10/23/92	SB
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	10/23/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	62	0	%	75-125 %		
Date Analyzed:	10/23/92	0	Month/Day/Year			

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Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
11/04/92

OB NUMBER: 108951 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

LIENT I.D.....: Sample ID: 10-02-003
ATE SAMPLED.....: 11/02/92
IME SAMPLED.....: 16:00
ORK DESCRIPTION...: Sample ID: 10-02-003

LABORATORY I.D...: 108951-0002
DATE RECEIVED....: 11/03/92
TIME RECEIVED....: 09:10
REMARKS.....: 1x125 ml & 1x250 ml Containers

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	94	0.01	%		10/07/92	GES
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	11/03/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
Bromofluorobenzene	45	0	%	75-125 %		
Date Analyzed:	10/03/92	0	Month/Day/Year			
Polynuclear Aromatics in Soil		*1		EPA 8100 by 8270	10/27/92	RDC
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Anthracene	ND	330	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzo(k)fluoranthene	<330	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)anthracene	<330	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Naphthalene	<330	330	ug/kg			
Phenanthrene	<330	330	ug/kg			
Pyrene	Recovery	0	Percent	Control Limits		
SURROGATES	96	0	%	30-115 %		
2-Fluorobiphenyl	100	0	%	23-120 %		
Nitrobenzene-d5	86	0	%	18-137 %		
Terphenyl-d14	11/03/92	0	Month/Day/Year			
Date Analyzed:						
PNAs in Soil Extraction Date:	11/3/92		Month/Day/Year	EPA 3550	11/03/92	DMR

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
11/04/92

B NUMBER: 108951 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

IENT I.D.....: Sample ID: 10-01-003
TE SAMPLED.....: 11/02/92
ME SAMPLED.....: 16:00
RK DESCRIPTION...: Sample ID: 10-01-003

LABORATORY I.D...: 108951-0001
DATE RECEIVED....: 11/03/92
TIME RECEIVED....: 09:10
REMARKS.....: 1x125 ml & 1x250 ml Containers

ST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Solids	94	0.01	%		10/07/92	GES
)latile Aromatics (BTEX) in Soil		*1		EPA 8020	11/03/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
Bromofluorobenzene	45	0	%	75-125 %		
Date Analyzed:	10/03/92	0	Month/Day/Year			
olynuclear Aromatics in Soil		*1		EPA 8100 by 8270	10/27/92	RDC
A[illegible]naphthene	ND	330	ug/kg			
[illegible]phthylene	ND	330	ug/kg			
[illegible]racene	ND	330	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)anthracene	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Phenanthrene	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
SURROGATES	Recovery	0	Percent	Control Limits		
2-Fluorobiphenyl	102	0	%	30-115 %		
Nitrobenzene-d5	90	0	%	23-120 %		
Terphenyl-d14	102	0	%	18-137 %		
Date Analyzed:	11/03/92	0	Month/Day/Year			
PNAs in Soil Extraction Date:	11/3/92		Month/Day/Year	EPA 3550	11/03/92	DMR

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/26/92

JOB NUMBER: 108889 CUSTOMER: M. L. Chartier, Inc. ATTN: Mr. Dennis Heine

CLIENT I.D.....: Sample ID: 930001
DATE SAMPLED.....: 09/30/92
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Sample ID: 930001

LABORATORY I.D...: 108889-0001
DATE RECEIVED....: 10/21/92
TIME RECEIVED....: 16:00
REMARKS.....: 1x250 ml Glass

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	94	0.01	%		10/23/92	SB
Volatile Aromatics (BTEX) in Soil		*1		EPA 8020	10/23/92	SB
Benzene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	62	0	%	75-125 %		
Date Analyzed:	10/23/92	0	Month/Day/Year			

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MAS #: 2100109

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IN: SJ

DATE COMPLETED: 10/14/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS PONTIAC DUCO SITE

SAMPLE IDENTIFICATION: 9-29-001 09/29/92 2:00PM STOCK PILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	92
	TOLUENE	N/D	µg/kg	10	115
	ETHYL BENZENE	N/D	µg/kg	10	75
	XYLENE (O, M, & P)	N/D	µg/kg	30	136
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	53
	ACENAPHTHYLENE	N/D	µg/kg	330	56
	ACENAPHTHENE	N/D	µg/kg	330	58
	FLUORENE	N/D	µg/kg	330	60
	PHENANTHRENE	N/D	µg/kg	330	61
	ANTHRACENE	N/D	µg/kg	330	65
	FLUORANTHENE	N/D	µg/kg	330	88
	PYRENE	N/D	µg/kg	330	94
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	44
	CHRYSENE	N/D	µg/kg	330	44
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	76
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	52

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Reviewed

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MAS #: 2092898

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IN: SJ

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/29/92

PROJECT: GM TRUCK & BUS/DUCO

SAMPLE IDENTIFICATION: 9-28-001 09/28/92 1:30 PM STOCK PILE # 1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	63
	TOLUENE	N/D	µg/kg	10	59
	ETHYL BENZENE	N/D	µg/kg	10	53
	XYLENE (O, M, & P)	N/D	µg/kg	30	77
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	116
	ACENAPHTHYLENE	N/D	µg/kg	330	108
	ACENAPHTHENE	N/D	µg/kg	330	117
	FLUORENE	N/D	µg/kg	330	117
	PHENANTHRENE	N/D	µg/kg	330	103
	ANTHRACENE	N/D	µg/kg	330	107
	FLUORANTHENE	N/D	µg/kg	330	91
	PYRENE	N/D	µg/kg	330	94
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	104
	CHRYSENE	N/D	µg/kg	330	120
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	101
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	106

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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MAS #: 2092550

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IN: SJ

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/28/92

PROJECT: PONTIAC - DUCO SITE - GM TRUCK & BUS

SAMPLE IDENTIFICATION: 9-25-001 09/25/92 2:00 PM STOCK PILE # 1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	93
	TOLUENE	N/D	µg/kg	10	92
	ETHYL BENZENE	N/D	µg/kg	10	94
	XYLENE (O, M, & P)	N/D	µg/kg	30	95
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	114
	ACENAPHTHYLENE	N/D	µg/kg	330	110
	ACENAPHTHENE	N/D	µg/kg	330	117
	FLUORENE	N/D	µg/kg	330	117
	PHENANTHRENE	N/D	µg/kg	330	103
	ANTHRACENE	N/D	µg/kg	330	107
	FLUORANTHENE	N/D	µg/kg	330	86
	PYRENE	N/D	µg/kg	330	87
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	98
	CHRYSENE	N/D	µg/kg	330	113
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	91
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	96

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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MAS #: 2092420

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IN: SJ

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/25/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 9-24-001 09/23/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	93
	TOLUENE	N/D	µg/kg	10	92
	ETHYL BENZENE	N/D	µg/kg	10	94
	XYLENE (O, M, & P)	N/D	µg/kg	30	95
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	90
	ACENAPHTHYLENE	N/D	µg/kg	330	96
	ACENAPHTHENE	N/D	µg/kg	330	91
	FLUORENE	N/D	µg/kg	330	94
	PHENANTHRENE	N/D	µg/kg	330	95
	ANTHRACENE	N/D	µg/kg	330	106
	FLUORANTHENE	N/D	µg/kg	330	85
	PYRENE	N/D	µg/kg	330	87
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	90
	CHRYSENE	N/D	µg/kg	330	102
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	94
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	91

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

Nitin Barad

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

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MAS #: 2092369

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DATE COMPLETED: 09/24/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 9-23-001 09/23/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	95
	TOLUENE	N/D	µg/kg	10	96
	ETHYL BENZENE	N/D	µg/kg	10	94
	XYLENE (O, M, & P)	N/D	µg/kg	30	94
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	97
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	128
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2091829

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DATE COMPLETED: 09/21/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS (DUCO) - PONTIAC

SAMPLE IDENTIFICATION: 9-18-001 09/18/92 2:30PM STOCK PILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	72
	TOLUENE	N/D	µg/kg	10	77
	ETHYL BENZENE	N/D	µg/kg	10	83
	XYLENE (O, M, & P)	N/D	µg/kg	30	83
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	128
	ACENAPHTHYLENE	N/D	µg/kg	330	131
	ACENAPHTHENE	N/D	µg/kg	330	136
	FLUORENE	N/D	µg/kg	330	145
	PHENANTHRENE	N/D	µg/kg	330	117
	ANTHRACENE	N/D	µg/kg	330	119
	FLUORANTHENE	N/D	µg/kg	330	114
	PYRENE	N/D	µg/kg	330	117
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	114
	CHRYSENE	N/D	µg/kg	330	116
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	110
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	114

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2091727

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FAX No.: (313) 964-2339

DATE COMPLETED: 09/18/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS/DUCO

SAMPLE IDENTIFICATION: 9-17-001 09/17/92 11:30AM STOCK PILE

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	69
	TOLUENE	N/D	µg/kg	10	74
	ETHYL BENZENE	N/D	µg/kg	10	81
	XYLENE (O, M, & P)	N/D	µg/kg	30	88
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	93
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	92
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	70

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2091726

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IN: NW

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/18/92

PROJECT: GM TRUCK & BUS/DUCO

SAMPLE IDENTIFICATION: 9-16-001 09/17/92 11:30AM STOCK PILE

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	68
	TOLUENE	N/D	µg/kg	10	73
	ETHYL BENZENE	N/D	µg/kg	10	79
	XYLENE (O, M, & P)	N/D	µg/kg	30	78
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	93
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	92
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	70

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2091725

IN: NW

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/18/92

PROJECT: GM TRUCK & BUS/DUCO

SAMPLE IDENTIFICATION: 9-15-001 09/17/92 11:30AM STOCK PILE

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	72
	TOLUENE	N/D	µg/kg	10	77
	ETHYL BENZENE	N/D	µg/kg	10	83
	XYLENE (O, M, & P)	N/D	µg/kg	30	83
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	93
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	92
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	70

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2091486

IN: SJ

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FAX No.: (313) 964-2339

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/15/92

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-14-002 09/14/92 2:00 SP-2

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	108
	TOLUENE	N/D	µg/kg	10	94
	ETHYL BENZENE	N/D	µg/kg	10	92
	XYLENE (O, M, & P)	N/D	µg/kg	30	91
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	90
	ACENAPHTHYLENE	N/D	µg/kg	330	92
	ACENAPHTHENE	N/D	µg/kg	330	88
	FLUORENE	N/D	µg/kg	330	97
	PHENANTHRENE	N/D	µg/kg	330	108
	ANTHRACENE	N/D	µg/kg	330	104
	FLUORANTHENE	N/D	µg/kg	330	102
	PYRENE	N/D	µg/kg	330	110
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	92
	CHRYSENE	N/D	µg/kg	330	99
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	96
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	94

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, ug/l, ug/kg or ug/kg (dry weight)

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MAS #: 2091485

IN: SJ

Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/15/92

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-14-001 09/14/92 2:00 SP-1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	108
	TOLUENE	N/D	µg/kg	10	94
	ETHYL BENZENE	N/D	µg/kg	10	92
	XYLENE (O, M, & P)	N/D	µg/kg	30	91
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	90
	ACENAPHTHYLENE	N/D	µg/kg	330	92
	ACENAPHTHENE	N/D	µg/kg	330	88
	FLUORENE	N/D	µg/kg	330	97
	PHENANTHRENE	N/D	µg/kg	330	108
	ANTHRACENE	N/D	µg/kg	330	104
	FLUORANTHENE	N/D	µg/kg	330	102
	PYRENE	N/D	µg/kg	330	110
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	92
	CHRYSENE	N/D	µg/kg	330	99
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	96
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	94

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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IN: SJ

Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/14/92

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-11-004 09/11/92 1:30PM STOCK PILE 4

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	79
	TOLUENE	N/D	µg/kg	10	93
	ETHYL BENZENE	N/D	µg/kg	10	82
	XYLENE (O, M, & P)	N/D	µg/kg	30	72
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	96
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	119
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion. µg/l. µg/kg or µg/kg (dry weight)

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MAS #: 2091115

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Phone: (313) 964-3680
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DATE COMPLETED: 09/14/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-11-003 09/11/92 1:30PM STOCK PILE 3

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	98
	TOLUENE	N/D	µg/kg	10	90
	ETHYL BENZENE	N/D	µg/kg	10	87
	XYLENE (O, M, & P)	N/D	µg/kg	30	86
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	96
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	119
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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TO: MR. DENNIS HEINE
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9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/14/92

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-11-002 09/11/92 1:30PM STOCK PILE 2

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	79
	TOLUENE	N/D	µg/kg	10	93
	ETHYL BENZENE	N/D	µg/kg	10	82
	XYLENE (O, M, & P)	N/D	µg/kg	30	72
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	89
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	100
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	121
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2091113

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Phone: (313) 964-3680
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TO: MR. DENNIS HEINE
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9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/14/92

PROJECT: PONTIAC - DUCO

SAMPLE IDENTIFICATION: 9-11-001 09/11/92 1:30PM STOCK PILE 1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	79
	TOLUENE	N/D	µg/kg	10	93
	ETHYL BENZENE	N/D	µg/kg	10	82
	XYLENE (O, M, & P)	N/D	µg/kg	30	72
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	89
	ACENAPHTHYLENE	N/D	µg/kg	330	
	ACENAPHTHENE	N/D	µg/kg	330	
	FLUORENE	N/D	µg/kg	330	
	PHENANTHRENE	N/D	µg/kg	330	100
	ANTHRACENE	N/D	µg/kg	330	
	FLUORANTHENE	N/D	µg/kg	330	
	PYRENE	N/D	µg/kg	330	
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	
	CHRYSENE	N/D	µg/kg	330	
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	121
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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TO: MR. DENNIS HEINE
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9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/10/92

PROJECT: PONTIAC-DUCO

SAMPLE IDENTIFICATION: 9-4-003 9/8/92 4:00PM STOCKPILE #3

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	98
	TOLUENE	N/D	µg/kg	10	90
	ETHYL BENZENE	N/D	µg/kg	10	87
	XYLENE (O, M, & P)	N/D	µg/kg	30	86
8270	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	95
	ACENAPHTHENE	N/D	µg/kg	330	95
	FLUORENE	N/D	µg/kg	330	91
	PHENANTHRENE	N/D	µg/kg	330	101
	ANTHRACENE	N/D	µg/kg	330	98
	FLUORANTHENE	N/D	µg/kg	330	93
	PYRENE	N/D	µg/kg	330	95
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	92
	CHRYSENE	N/D	µg/kg	330	93
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	94
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	99

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2090947

IN: SJ

Phone: (313) 964-3680
FAX No.: (313) 964-2339

DATE COMPLETED: 09/10/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: PONTIAC-DUCO

SAMPLE IDENTIFICATION: 9-9-002 9/9/92 2:00PM

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	98
	TOLUENE	N/D	µg/kg	10	90
	ETHYL BENZENE	N/D	µg/kg	10	87
	XYLENE (O, M, & P)	N/D	µg/kg	30	86
8270	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	95
	ACENAPHTHENE	N/D	µg/kg	330	95
	FLUORENE	N/D	µg/kg	330	91
	PHENANTHRENE	N/D	µg/kg	330	101
	ANTHRACENE	N/D	µg/kg	330	98
	FLUORANTHENE	N/D	µg/kg	330	93
	PYRENE	N/D	µg/kg	330	95
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	92
	CHRYSENE	N/D	µg/kg	330	93
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	94
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	99

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2090946

IN: SJ /

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/10/92

PROJECT: PONTIAC-DUCO

SAMPLE IDENTIFICATION: 9-9-001 9/9/92 2:00PM

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	104
	TOLUENE	N/D	µg/kg	10	99
	ETHYL BENZENE	N/D	µg/kg	10	91
	XYLENE (O, M, & P)	N/D	µg/kg	30	92
8270	NAPHTHALENE	N/D	µg/kg	330	93
	ACENAPHTHYLENE	N/D	µg/kg	330	95
	ACENAPHTHENE	N/D	µg/kg	330	95
	FLUORENE	N/D	µg/kg	330	91
	PHENANTHRENE	N/D	µg/kg	330	101
	ANTHRACENE	N/D	µg/kg	330	98
	FLUORANTHENE	N/D	µg/kg	330	93
	PYRENE	N/D	µg/kg	330	95
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	92
	CHRYSENE	N/D	µg/kg	330	93
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	94
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	99

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2090888

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Phone: (313) 964-3680
FAX No.: (313) 964-2339

DATE COMPLETED: 09/09/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: PONTIAC DUCO STOCK PILE #2

SAMPLE IDENTIFICATION: 9-7-002 9/7/92 1:30

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	100
	TOLUENE	N/D	µg/kg	10	101
	ETHYL BENZENE	N/D	µg/kg	10	99
	XYLENE (O, M, & P)	N/D	µg/kg	30	93
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	70
	ACENAPHTHYLENE	N/D	µg/kg	330	80
	ACENAPHTHENE	N/D	µg/kg	330	75
	FLUORENE	N/D	µg/kg	330	73
	PHENANTHRENE	N/D	µg/kg	330	75
	ANTHRACENE	N/D	µg/kg	330	76
	FLUORANTHENE	N/D	µg/kg	330	75
	PYRENE	N/D	µg/kg	330	71
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	80
	CHRYSENE	N/D	µg/kg	330	70
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	91
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	84

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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ppb = parts per billion, µg/l, µg/kg or µg kg (dry weight)

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TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 09/09/92

PROJECT: PONTIAC DUCO STOCK PILE #1

SAMPLE IDENTIFICATION: 9-7-001 9/7/92 1:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	100
	TOLUENE	N/D	µg/kg	10	101
	ETHYL BENZENE	N/D	µg/kg	10	99
	XYLENE (O, M, & P)	N/D	µg/kg	30	93
8270 PNA	NAPHTHALENE	N/D	µg/kg	330	70
	ACENAPHTHYLENE	N/D	µg/kg	330	80
	ACENAPHTHENE	N/D	µg/kg	330	75
	FLUORENE	N/D	µg/kg	330	73
	PHENANTHRENE	N/D	µg/kg	330	75
	ANTHRACENE	N/D	µg/kg	330	76
	FLUORANTHENE	N/D	µg/kg	330	75
	PYRENE	N/D	µg/kg	330	71
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	80
	CHRYSENE	N/D	µg/kg	330	70
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	91
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	84

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)
ppb = parts per billion, ug/L, ug/kg or ug/kg (dry weight)

C:\PW\RP\XBTEX

MAS #: 2090208

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Phone: (313) 964-3680
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TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 09/03/92

PROJECT: GM TRUCK & BUS/PONTIAC

SAMPLE IDENTIFICATION: 9-2-001 09/02/92 1:30PM

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ug/kg	10	118
	TOLUENE	N/D	ug/kg	10	120
	ETHYL BENZENE	N/D	ug/kg	10	123
	XYLENE (o, m, & p)	N/D	ug/kg	30	124
8270 PNA	NAPHTHALENE	N/D	ug/kg	330	84
	ACENAPHTHYLENE	N/D	ug/kg	330	
	ACENAPHTHENE	N/D	ug/kg	330	
	FLUORENE	N/D	ug/kg	330	
	PHENANTHRENE	N/D	ug/kg	330	85
	ANTHRACENE	N/D	ug/kg	330	
	FLUORANTHENE	N/D	ug/kg	330	
	PYRENE	N/D	ug/kg	330	
	BENZO (a) ANTHRACENE	N/D	ug/kg	330	
	CHRYSENE	N/D	ug/kg	330	
	BENZO (b) FLUORANTHENE	N/D	ug/kg	330	114
	BENZO (k) FLUORANTHENE	N/D	ug/kg	330	

ug/kg = ppb or parts per billion

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)
ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

MAS #: 2090108

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 09/02/92

PROJECT: GM TRUCK & BUS/PONTIAC

SAMPLE IDENTIFICATION: 9-1-001 09/01/92 1:45PM

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ug/kg	10	100
	TOLUENE	N/D	ug/kg	10	101
	ETHYL BENZENE	N/D	ug/kg	10	99
	XYLENE (o, m, & p)	N/D	ug/kg	30	93
8270 PNA	NAPHTHALENE	N/D	ug/kg	330	103
	ACENAPHTHYLENE	N/D	ug/kg	330	93
	ACENAPHTHENE	N/D	ug/kg	330	96
	FLUORENE	N/D	ug/kg	330	96
	PHENANTHRENE	N/D	ug/kg	330	103
	ANTHRACENE	N/D	ug/kg	330	119
	FLUORANTHENE	N/D	ug/kg	330	100
	PYRENE	N/D	ug/kg	330	128
	BENZO (a) ANTHRACENE	N/D	ug/kg	330	124
	CHRYSENE	N/D	ug/kg	330	106
	BENZO (b) FLUORANTHENE	N/D	ug/kg	330	143
	BENZO (k) FLUORANTHENE	N/D	ug/kg	330	100

ug/kg = ppb or parts per billion

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2083116

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 09/01/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-31-001 1:45PM 8/31/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	101
	TOLUENE	N/D	ppb	10	102
	ETHYL BENZENE	N/D	ppb	10	92
	XYLENE (o, m, & p)	N/D	ppb	30	87
8270 PNA	NAPHTHALENE	N/D	ppb	330	105
	ACENAPHTHYLENE	N/D	ppb	330	95
	ACENAPHTHENE	N/D	ppb	330	102
	FLUORENE	N/D	ppb	330	103
	PHENANTHRENE	N/D	ppb	330	93
	ANTHRACENE	N/D	ppb	330	97
	FLUORANTHENE	N/D	ppb	330	80
	PYRENE	N/D	ppb	330	82
	BENZO (a) ANTHRACENE	N/D	ppb	330	84
	CHRYSENE	N/D	ppb	330	87
	BENZO (b) FLUORANTHENE	N/D	ppb	330	106
	BENZO (k) FLUORANTHENE	N/D	ppb	330	107

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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Detroit, Michigan 48201

MAS #: 2082851

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

DATE COMPLETED: 08/31/92

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-28-01 8/28/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	79
	TOLUENE	N/D	ppb	10	88
	ETHYL BENZENE	N/D	ppb	10	86
	XYLENE (o, m, & p)	N/D	ppb	30	102
8270 PNA	NAPHTHALENE	N/D	ppb	330	97
	ACENAPHTHYLENE	N/D	ppb	330	91
	ACENAPHTHENE	N/D	ppb	330	92
	FLUORENE	N/D	ppb	330	96
	PHENANTHRENE	N/D	ppb	330	107
	ANTHRACENE	N/D	ppb	330	131
	FLUORANTHENE	N/D	ppb	330	101
	PYRENE	N/D	ppb	330	107
	BENZO (a) ANTHRACENE	N/D	ppb	330	116
	CHRYSENE	N/D	ppb	330	109
	BENZO (b) FLUORANTHENE	N/D	ppb	330	65
	BENZO (k) FLUORANTHENE	N/D	ppb	330	92

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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Phone: (313) 964-3680
FAX No.: (313) 964-2339

MAS #: 2083104

IN: SJ

DATE COMPLETED: 09/09/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-27-02 8/29/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	94
	TOLUENE	N/D	µg/kg	10	90
	ETHYL BENZENE	N/D	µg/kg	10	84
	XYLENE (O, M, & P)	N/D	µg/kg	30	74

N/D = NOT DETECTED

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)
ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2083104

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 09/01/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-27-02

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8270 PNA	NAPHTHALENE	N/D	ppb	330	90
	ACENAPHTHYLENE	N/D	ppb	330	88
	ACENAPHTHENE	N/D	ppb	330	90
	FLUORENE	N/D	ppb	330	94
	PHENANTHRENE	N/D	ppb	330	90
	ANTHRACENE	N/D	ppb	330	101
	FLUORANTHENE	N/D	ppb	330	76
	PYRENE	N/D	ppb	330	76
	BENZO (a) ANTHRACENE	N/D	ppb	330	84
	CHRYSENE	N/D	ppb	330	103
	BENZO (b) FLUORANTHENE	N/D	ppb	330	84
	BENZO (k) FLUORANTHENE	N/D	ppb	330	85

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2083103

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/31/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-26-04

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8270 PNA	NAPHTHALENE	N/D	ppb	330	90
	ACENAPHTHYLENE	N/D	ppb	330	88
	ACENAPHTHENE	N/D	ppb	330	90
	FLUORENE	N/D	ppb	330	94
	PHENANTHRENE	N/D	ppb	330	90
	ANTHRACENE	N/D	ppb	330	101
	FLUORANTHENE	N/D	ppb	330	76
	PYRENE	N/D	ppb	330	76
	BENZO (a) ANTHRACENE	N/D	ppb	330	84
	CHRYSENE	N/D	ppb	330	103
	BENZO (b) FLUORANTHENE	N/D	ppb	330	84
	BENZO (k) FLUORANTHENE	N/D	ppb	330	85

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kevin J. O'Mara

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MAS #: 2083102

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FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 09/01/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-26-03

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8270 PNA	NAPHTHALENE	N/D	ppb	330	90
	ACENAPHTHYLENE	N/D	ppb	330	88
	ACENAPHTHENE	N/D	ppb	330	90
	FLUORENE	N/D	ppb	330	94
	PHENANTHRENE	N/D	ppb	330	90
	ANTHRACENE	N/D	ppb	330	101
	FLUORANTHENE	N/D	ppb	330	76
	PYRENE	N/D	ppb	330	76
	BENZO (a) ANTHRACENE	N/D	ppb	330	84
	CHRYSENE	N/D	ppb	330	103
	BENZO (b) FLUORANTHENE	N/D	ppb	330	84
	BENZO (k) FLUORANTHENE	N/D	ppb	330	85

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2083101

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TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/31/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-26-02

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8270 PNA	NAPHTHALENE	N/D	ppb	330	90
	ACENAPHTHYLENE	N/D	ppb	330	88
	ACENAPHTHENE	N/D	ppb	330	90
	FLUORENE	N/D	ppb	330	94
	PHENANTHRENE	N/D	ppb	330	90
	ANTHRACENE	N/D	ppb	330	101
	FLUORANTHENE	N/D	ppb	330	76
	PYRENE	N/D	ppb	330	76
	BENZO (a) ANTHRACENE	N/D	ppb	330	84
	CHRYSENE	N/D	ppb	330	103
	BENZO (b) FLUORANTHENE	N/D	ppb	330	84
	BENZO (k) FLUORANTHENE	N/D	ppb	330	85

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kevin J. O'Hara

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MAS #: 2082507

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IN:SJ
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FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/26/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-25-01 BUILDING 29 8/25/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	103
	TOLUENE	N/D	ppb	10	96
	ETHYL BENZENE	N/D	ppb	10	94
	XYLENE (o, m, & p)	N/D	ppb	30	96
8270 PNA	NAPHTHALENE	N/D	ppb	330	88
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	97
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	106
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED

ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS Inc.

MAS #: 2082418

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA
M.L. CI
9195 MI
P.O. BO
FAIR HI

ATE COMPLETED: 08/25/92

PROJECT: GI

SAMPLE IDEI

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	79
	TOLUENE	N/D	ppb	10	88
	ETHYL BENZENE	N/D	ppb	10	86
	XYLENE (o, m, & p)	N/D	ppb	30	102
8270 PNA	NAPHTHALENE	N/D	ppb	330	30
	ACENAPHTHYLENE	N/D	ppb	330	40
	ACENAPHTHENE	N/D	ppb	330	44
	FLUORENE	N/D	ppb	330	42
	PHENANTHRENE	N/D	ppb	330	64
	ANTHRACENE	N/D	ppb	330	68
	FLUORANTHENE	N/D	ppb	330	82
	PYRENE	N/D	ppb	330	84
	BENZO (a) ANTHRACENE	N/D	ppb	330	56
	CHRYSENE	N/D	ppb	330	132
	BENZO (b) FLUORANTHENE	N/D	ppb	330	56
	BENZO (k) FLUORANTHENE	N/D	ppb	330	86

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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MAS #: 2082126

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/21/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-21-01 2:30PM 8/21/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	106
	TOLUENE	N/D	ppb	10	99
	ETHYL BENZENE	N/D	ppb	10	99
	XYLENE (o, m, & p)	N/D	ppb	30	101
8270 PNA	NAPHTHALENE	N/D	ppb	330	84
	ACENAPHTHYLENE	N/D	ppb	330	81
	ACENAPHTHENE	N/D	ppb	330	86
	FLUORENE	N/D	ppb	330	85
	PHENANTHRENE	N/D	ppb	330	84
	ANTHRACENE	N/D	ppb	330	89
	FLUORANTHENE	N/D	ppb	330	91
	PYRENE	N/D	ppb	330	75
	BENZO (a) ANTHRACENE	N/D	ppb	330	85
	CHRYSENE	N/D	ppb	330	85
	BENZO (b) FLUORANTHENE	N/D	ppb	330	89
	BENZO (k) FLUORANTHENE	N/D	ppb	330	140

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2082015

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Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/21/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-20-01 8/20/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	106
	TOLUENE	N/D	ppb	10	99
	ETHYL BENZENE	N/D	ppb	10	99
	XYLENE (o, m, & p)	N/D	ppb	30	101
8270 PNA	NAPHTHALENE	N/D	ppb	330	84
	ACENAPHTHYLENE	N/D	ppb	330	81
	ACENAPHTHENE	N/D	ppb	330	86
	FLUORENE	N/D	ppb	330	85
	PHENANTHRENE	N/D	ppb	330	84
	ANTHRACENE	N/D	ppb	330	89
	FLUORANTHENE	N/D	ppb	330	91
	PYRENE	N/D	ppb	330	75
	BENZO (a) ANTHRACENE	N/D	ppb	330	85
	CHRYSENE	N/D	ppb	330	85
	BENZO (b) FLUORANTHENE	N/D	ppb	330	89
	BENZO (k) FLUORANTHENE	N/D	ppb	330	140

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad

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2727 Second Avenue
Detroit, Michigan 48201

MAS #: 2081930

IN: SJ

Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

DATE COMPLETED: 08/20/92

PROJECT: GM TRUCK AND BUS

SAMPLE IDENTIFICATION: 8-19-01 8/19/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	108
	TOLUENE	N/D	ppb	10	95
	ETHYL BENZENE	N/D	ppb	10	95
	XYLENE (O, M, & P)	N/D	ppb	30	89
8270 PNA	NAPHTHALENE	N/D	ppb	330	84
	ACENAPHTHYLENE	N/D	ppb	330	81
	ACENAPHTHENE	N/D	ppb	330	86
	FLUORENE	N/D	ppb	330	85
	PHENANTHRENE	N/D	ppb	330	84
	ANTHRACENE	N/D	ppb	330	89
	FLUORANTHENE	N/D	ppb	330	91
	PYRENE	N/D	ppb	330	75
	BENZO (a) ANTHRACENE	N/D	ppb	330	85
	CHRYSENE	N/D	ppb	330	85
	BENZO (b) FLUORANTHENE	N/D	ppb	330	89
	BENZO (k) FLUORANTHENE	N/D	ppb	330	140

N/D = NOT DETECTED ppb = µg/Kg or parts per billion. (DRY WEIGHT)

LAB MANAGER: NITIN BARAD ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2081819

Midwest Analytical Services, Inc.

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Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/19/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-18-01 8/18/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	115
	TOLUENE	N/D	ppb	10	112
	ETHYL BENZENE	N/D	ppb	10	110
	XYLENE (o, m, & p)	N/D	ppb	30	110
8270 PNA	NAPHTHALENE	N/D	ppb	330	101
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	110
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	116
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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MAS #: 2081734

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Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/18/92

PROJECT: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-17-001 STOCK PILE 8/17/92 1400

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	ppb	10	120
	TOLUENE	N/D	ppb	10	116
	ETHYL BENZENE	N/D	ppb	10	123
	XYLENE (o, m, & p)	N/D	ppb	30	128
8270 PNA	NAPHTHALENE	N/D	ppb	330	106
	ACENAPHTHYLENE	N/D	ppb	330	96
	ACENAPHTHENE	N/D	ppb	330	103
	FLUORENE	N/D	ppb	330	109
	PHENANTHRENE	N/D	ppb	330	92
	ANTHRACENE	N/D	ppb	330	109
	FLUORANTHENE	N/D	ppb	330	101
	PYRENE	N/D	ppb	330	72
	BENZO (a) ANTHRACENE	N/D	ppb	330	102
	CHRYSENE	N/D	ppb	330	108
	BENZO (b) FLUORANTHENE	N/D	ppb	330	89
	BENZO (k) FLUORANTHENE	N/D	ppb	330	91

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

MAS #: 2081444

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/14/92

PROJECT NAME: GM

SAMPLE IDENTIFICATION: 8-14-01 8/14/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	108
	TOLUENE	N/D	ppb	10	106
	ETHYL BENZENE	N/D	ppb	10	105
	XYLENE (o, m, & p)	N/D	ppb	30	99
8270 PNA	NAPHTHALENE	N/D	ppb	330	106
	ACENAPHTHYLENE	N/D	ppb	330	96
	ACENAPHTHENE	N/D	ppb	330	103
	FLUORENE	N/D	ppb	330	109
	PHENANTHRENE	N/D	ppb	330	92
	ANTHRACENE	N/D	ppb	330	109
	FLUORANTHENE	N/D	ppb	330	101
	PYRENE	N/D	ppb	330	72
	BENZO (a) ANTHRACENE	N/D	ppb	330	102
	CHRYSENE	N/D	ppb	330	108
	BENZO (b) FLUORANTHENE	N/D	ppb	330	89
	BENZO (k) FLUORANTHENE	N/D	ppb	330	91

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2081329

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2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/14/92

PROJECT NAME : GM

SAMPLE IDENTIFICATION: 8-13-01 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	122
	TOLUENE	N/D	ppb	10	127
	ETHYL BENZENE	N/D	ppb	10	131
	XYLENE (o, m, & p)	N/D	ppb	30	133
8270 PNA	NAPHTHALENE	N/D	ppb	330	102
	ACENAPHTHYLENE	N/D	ppb	330	99
	ACENAPHTHENE	N/D	ppb	330	103
	FLUORENE	N/D	ppb	330	108
	PHENANTHRENE	N/D	ppb	330	108
	ANTHRACENE	N/D	ppb	330	113
	FLUORANTHENE	N/D	ppb	330	120
	PYRENE	N/D	ppb	330	101
	BENZO (a) ANTHRACENE	N/D	ppb	330	104
	CHRYSENE	N/D	ppb	330	99
	BENZO (b) FLUORANTHENE	N/D	ppb	330	105
	BENZO (k) FLUORANTHENE	N/D	ppb	330	95

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2081207

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/13/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-12-1 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	102
	TOLUENE	N/D	ppb	10	96
	ETHYL BENZENE	N/D	ppb	10	93
	XYLENE (o, m, & p)	N/D	ppb	30	95
8270 PNA	NAPHTHALENE	N/D	ppb	330	105
	ACENAPHTHYLENE	N/D	ppb	330	95
	ACENAPHTHENE	N/D	ppb	330	100
	FLUORENE	N/D	ppb	330	105
	PHENANTHRENE	N/D	ppb	330	111
	ANTHRACENE	N/D	ppb	330	127
	FLUORANTHENE	N/D	ppb	330	111
	PYRENE	N/D	ppb	330	114
	BENZO (a) ANTHRACENE	N/D	ppb	330	109
	CHRYSENE	N/D	ppb	330	126
	BENZO (b) FLUORANTHENE	N/D	ppb	330	117
	BENZO (k) FLUORANTHENE	N/D	ppb	330	118

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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Detroit, Michigan 48201

Phone: (313) 964-3680
FAX No.: (313) 964-2339

MAS #: 2081141

IN:SJ

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/12/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-11-001 PILE 1 8/11/92 2:10

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	106
	TOLUENE	N/D	ppb	10	101
	ETHYL BENZENE	N/D	ppb	10	100
	XYLENE (o, m, & p)	N/D	ppb	30	102
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	67
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	103
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	160

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

MAS #: 2081042

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/11/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-10-004 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	72
	TOLUENE	N/D	ppb	10	69
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	67
8270 PNA	NAPHTHALENE	N/D	ppb	330	98
	ACENAPHTHYLENE	N/D	ppb	330	97
	ACENAPHTHENE	N/D	ppb	330	95
	FLUORENE	N/D	ppb	330	101
	PHENANTHRENE	N/D	ppb	330	87
	ANTHRACENE	N/D	ppb	330	104
	FLUORANTHENE	N/D	ppb	330	97
	PYRENE	N/D	ppb	330	92
	BENZO (a) ANTHRACENE	N/D	ppb	330	95
	CHRYSENE	N/D	ppb	330	102
	BENZO (b) FLUORANTHENE	N/D	ppb	330	91
	BENZO (k) FLUORANTHENE	N/D	ppb	330	92

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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IN:SJ
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FAX No.: (313) 964-2339

MAS #: 2081041

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/11/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-10-003 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	72
	TOLUENE	N/D	ppb	10	69
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	67
8270 PNA	NAPHTHALENE	N/D	ppb	330	98
	ACENAPHTHYLENE	N/D	ppb	330	97
	ACENAPHTHENE	N/D	ppb	330	95
	FLUORENE	N/D	ppb	330	101
	PHENANTHRENE	N/D	ppb	330	87
	ANTHRACENE	N/D	ppb	330	104
	FLUORANTHENE	N/D	ppb	330	97
	PYRENE	N/D	ppb	330	92
	BENZO (a) ANTHRACENE	N/D	ppb	330	95
	CHRYSENE	N/D	ppb	330	102
	BENZO (b) FLUORANTHENE	N/D	ppb	330	91
	BENZO (k) FLUORANTHENE	N/D	ppb	330	92

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2081040

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IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/11/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-10-002 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	72
	TOLUENE	N/D	ppb	10	69
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	67
8270 PNA	NAPHTHALENE	N/D	ppb	330	98
	ACENAPHTHYLENE	N/D	ppb	330	97
	ACENAPHTHENE	N/D	ppb	330	95
	FLUORENE	N/D	ppb	330	101
	PHENANTHRENE	N/D	ppb	330	87
	ANTHRACENE	N/D	ppb	330	104
	FLUORANTHENE	N/D	ppb	330	97
	PYRENE	N/D	ppb	330	92
	BENZO (a) ANTHRACENE	N/D	ppb	330	95
	CHRYSENE	N/D	ppb	330	102
	BENZO (b) FLUORANTHENE	N/D	ppb	330	91
	BENZO (k) FLUORANTHENE	N/D	ppb	330	92

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2081039

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IN:SJ
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FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/11/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-10-001 2:00

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	72
	TOLUENE	N/D	ppb	10	69
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	67
8270 PNA	NAPHTHALENE	N/D	ppb	330	98
	ACENAPHTHYLENE	N/D	ppb	330	97
	ACENAPHTHENE	N/D	ppb	330	95
	FLUORENE	N/D	ppb	330	101
	PHENANTHRENE	N/D	ppb	330	87
	ANTHRACENE	N/D	ppb	330	104
	FLUORANTHENE	N/D	ppb	330	97
	PYRENE	N/D	ppb	330	92
	BENZO (a) ANTHRACENE	N/D	ppb	330	95
	CHRYSENE	N/D	ppb	330	102
	BENZO (b) FLUORANTHENE	N/D	ppb	330	91
	BENZO (k) FLUORANTHENE	N/D	ppb	330	92

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2101343

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2727 Second Avenue
Detroit, Michigan 48201

Phone: (313) 964-3680
FAX No.: (313) 964-2339

IN: SJ

DATE COMPLETED: 10/27/92

TO: MR. DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
FAIR HAVEN, MI 48203

PROJECT: PONTIAC-DUCO SITE

SAMPLE IDENTIFICATION: 10-12-001 10/12/92 1:00PM STOCKPILE #1

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS (DRY WEIGHT)	DETECTION LIMIT	QA % RECOVERY
EPA 8020	BENZENE	N/D	µg/kg	10	100
	TOLUENE	N/D	µg/kg	10	101
	ETHYL BENZENE	N/D	µg/kg	10	100
	XYLENE (O, M, & P)	N/D	µg/kg	30	100
EPA 8270	NAPHTHALENE	N/D	µg/kg	330	99
	ACENAPHTHYLENE	N/D	µg/kg	330	131
	ACENAPHTHENE	N/D	µg/kg	330	101
	FLUORENE	N/D	µg/kg	330	99
	PHENANTHRENE	N/D	µg/kg	330	92
	ANTHRACENE	N/D	µg/kg	330	111
	FLUORANTHENE	N/D	µg/kg	330	77
	PYRENE	N/D	µg/kg	330	108
	BENZO (a) ANTHRACENE	N/D	µg/kg	330	75
	CHRYSENE	N/D	µg/kg	330	117
	BENZO (b) FLUORANTHENE	N/D	µg/kg	330	127
	BENZO (k) FLUORANTHENE	N/D	µg/kg	330	115

LAB MANAGER: NITIN BARAD

ASST. LAB. MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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N/D = NOT DETECTED

ppm = parts per million, mg/l, mg/kg or mg/kg (dry weight)
ppb = parts per billion, µg/l, µg/kg or µg/kg (dry weight)

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MAS #: 2080611

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2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/07/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-5-001 STOCK PILE 8/5/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	119
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	117
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	126
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

Nitin Barad

ASST. LAB MANAGER: KATHLEEN L. HAGAN

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MAS #: 2080740

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2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/10/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-7-004 STOCK PILE 8/7/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	85
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	113
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	152

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT WRITTEN APPROVAL OF MIDWEST ANALYTICAL SERVICES.

C:\PW\RP\XBTEX

MAS #: 2080739

Midwest Analytical Services, Inc.

"Where industry comes for answers."

Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/10/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-7-003 STOCK PILE 8/7/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	142
	TOLUENE	N/D	ppb	10	141
	ETHYL BENZENE	N/D	ppb	10	144
	XYLENE (o, m, & p)	N/D	ppb	30	135
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	103
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	99
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	112
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/10/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-7-002 STOCK PILE 8/7/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	103
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	99
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	112
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: DENNIS HEINE
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/10/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-7-001 STOCK PILE 8/7/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	85
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	113
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	152

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Kathleen L. Hagan

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MAS #: 2080610

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Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN:SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/07/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 86003 STOCK PILE 8/6/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	91
	ACENAPHTHYLENE	N/D	ppb	330	
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	
	PHENANTHRENE	N/D	ppb	330	97
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	119
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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MAS #: 2080609

Midwest Analytical Services, Inc.

"Where industry comes for answers."

Metropolitan Center for High Technology
2727 Second Avenue
Detroit, Michigan 48201

IN: SJ
Phone: (313) 964-3680
FAX No.: (313) 964-2339

TO: ARLESA TAUGHINBAUGH
M.L. CHARTIER
9195 MARINE CITY HWY.
P.O. BOX 230069
FAIR HAVEN, MI 48023

DATE COMPLETED: 08/07/92

PROJECT NAME: GM TRUCK & BUS

SAMPLE IDENTIFICATION: 8-6002 STOCK PILE 8/6/92

PHYSICAL DESCRIPTION: BROWN SOLID

METHOD #	PARAMETER	SAMPLE RESULT	UNITS	DETECTION LIMIT	QA % RECOVERY
8020 BTEX	BENZENE	N/D	ppb	10	73
	TOLUENE	N/D	ppb	10	71
	ETHYL BENZENE	N/D	ppb	10	68
	XYLENE (o, m, & p)	N/D	ppb	30	69
8270 PNA	NAPHTHALENE	N/D	ppb	330	
	ACENAPHTHYLENE	N/D	ppb	330	119
	ACENAPHTHENE	N/D	ppb	330	
	FLUORENE	N/D	ppb	330	121
	PHENANTHRENE	N/D	ppb	330	
	ANTHRACENE	N/D	ppb	330	
	FLUORANTHENE	N/D	ppb	330	98
	PYRENE	N/D	ppb	330	
	BENZO (a) ANTHRACENE	N/D	ppb	330	
	CHRYSENE	N/D	ppb	330	
	BENZO (b) FLUORANTHENE	N/D	ppb	330	
	BENZO (k) FLUORANTHENE	N/D	ppb	330	

N/D = NOT DETECTED ppb = ug/kg parts per billion (DRY WEIGHT)

LAB MANAGER: NITIN BARAD

ASST. LAB MANAGER: KATHLEEN L. HAGAN

Nitin Barad.

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URAL RESOURCES
CO SSION
VUYST
L EISELE
ROON E. GUYER
JAMES P. HILL
DAVID HOLLI
O. STEWART MYERS
JOEY M. SPANO

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

Stevens T. Mason Building, P.O. Box 30028, Lansing, MI 48909

ROLAND HARMES, Director

July 7, 1992

Ms. Margie Sauter
General Motors Corporation
31 Judson
(MailCode 2602-01)
Pontiac, Michigan 48432
48342

Arlesa Taughinbaugh
M.L. Chartier
9195 Marine City Hwy.
Fair Haven, Michigan 48023

Dear Ms. Sauter & Ms. Taughinbaugh:

This letter is in reference to your Permit to Install application for a thermal soil remediation unit with baghouse and afterburner control, located at 31 Judson, Pontiac, Michigan. This application, identified as No. 248-92B, has been evaluated and approved by the Air Quality Division, pursuant to the delegation of authority from the Michigan Air Pollution Control Commission.

This approval is based upon and subject to compliance with all administrative rules of the Commission and conditions stipulated in the attached supplement. Please review these conditions thoroughly so that you may plan for and take the actions necessary to ensure compliance with all of these conditions. Also note that Condition No. 1 requires you to apply, in writing, for a permit to operate within 30 days after completion of construction.

You are advised that contaminants discharged to the surface waters and/or groundwaters; materials disposed of on land; hazardous waste storage, treatment, and disposal; and resource recovery facilities must be approved by other divisions of the Department of Natural Resources. Additionally, your plant environment must be in compliance with all applicable requirements of the Departments of Public Health and Labor.

Approval of this permit does not constitute an agreement by the State of Michigan that the use of the proposed equipment will result in an acceptable remediation of the indicated site location.

Thank you for your cooperation. Please contact me if you have any questions regarding this permit.

Sincerely,

Terry Wright

Terry Wright, Engineer
Chemical Process Unit
Permit Section
Air Quality Division
517-373-7053

TW:cmb
Enclosure
cc: Fred Rieth

SUPPLEMENT TO PERMIT NO. 248-92B

General Motors Corporation
M.L. Chartier
Pontiac, Michigan

July 2, 1992

GENERAL CONDITIONS

1. Rule 208(2) - Not more than 30 days after completion of the installation, Applicant shall apply, in writing, for a Permit to Operate. Completion of the installation is deemed to occur not later than commencement of a trial operation pursuant to Rule 201(4). Written application should be sent to: Chief, Permit Unit, Air Quality Division, Department of Natural Resources, P.O. Box 30028, Lansing, Michigan 48909.

2. Rule 201(4) - Trial operation of the equipment is permitted until the Michigan Air Pollution Control Commission acts upon the Permit to Operate. Operation of the equipment shall permanently cease upon denial of the Permit to Operate by the Commission.

3. Rule 208(3)(a) and (c) - Applicant shall demonstrate compliance with all Commission rules and with all general and special conditions of this permit prior to issuance of the Permit to Operate.

4. Rule 201 - Applicant shall not reconstruct, alter, modify, expand, or relocate this equipment unless plans, specifications, and an application for a Permit to Install are submitted to and approved by the Commission.

5. Rule 901 - Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property.

6. Rule 208(3)(b) - Operation of this equipment shall not interfere with the attainment or maintenance of the air quality standard for any air contaminant.

7. Operation of this equipment shall not result in significant deterioration of air quality.

8. Rule 912 - Applicant shall provide notification of any abnormal conditions or malfunction of process or control equipment covered by this application, resulting in emissions in violation of the Commission rules or of any permit conditions for more than two hours, to the District Supervisor. Such notice shall be made as soon as reasonably possible, but not later than 9:00 a.m. of the next working day. Applicant shall also, within 10 days, submit to the District Supervisor, a written detailed report, including probable causes, duration of violation, remedial action taken, and the steps which are being undertaken to prevent a reoccurrence.

9. Approval of this application does not exempt the Applicant from complying with any future regulations which may be promulgated under Act 348, P.A. 1965, as amended.

10. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

11. Act No. 53 - Applicant shall notify any public utility of any excavation, tunneling and discharging of explosives or demolition of buildings which may affect said utility's facilities in accordance with Act 53 of the Public Acts of 1974, being sections 460.701 to 460.718 of the Michigan Compiled Laws and comply with each of the requirements of that Act.

12. The restrictions and conditions of this Permit to Install shall apply to any person or legal entity which now or shall hereafter own or operate the equipment for which this Permit to Install is issued. Any new owner or operator shall immediately notify the Chief of the Permit Unit, in writing, of such change in ownership or principal operator status of this equipment.

13. Rule 201(5) - If the installation, reconstruction, relocation, or alteration of the equipment for which this permit has been approved has not commenced within, or has been interrupted for, 18 months, this permit shall become void unless otherwise authorized by the Commission.

SPECIAL CONDITIONS

14. Visible emissions from the thermal soil remediation unit, hereinafter "unit", shall not exceed 5% opacity.

15. The volatile organic compound (VOC) emission rate from the unit shall not exceed 21.5 pounds per hour nor 7.9 tons per month.

16. The sulfur dioxide emission rate from the unit shall not exceed 12.9 pounds per hour nor 4.7 tons per month.

17. The nitrogen oxides emission rate from the unit shall not exceed 18 pounds per hour nor 6.57 tons per month.

18. Rule 331 - The particulate emission from the unit shall not exceed 0.1 pounds per 1,000 pounds of exhaust gases, nor 4.8 pounds per hour, nor 1.8 tons per month.

19. Rules 1001, 1003 and 1004 - Within 180 days after commencement of trail operation, verification of VOC, sulfur dioxide, nitrogen oxides and particulate emission rates from the unit by testing, at owner's expense, in accordance with Commission requirements, may be required for operating approval. Verification of emission rates includes the submittal of a complete report of the test results. If a test is required, stack testing procedures and the location of stack testing ports must have prior approval by the District Supervisor, Air Quality Division.

20. The soil processing rate and associated VOC conncentration listed in the following table shall be such that the influent VOC rate to the afterburner shall not exceed 430 pounds of VOC per hour.

Contamination of soil by VOC's	Process Feed Rate (Maximum) tons/hr	Estimated VOC's		
		Inlet*	Outlet*	Outlet**
2%	10.8	430	8.6	31.0
1%	21.5	430	8.6	31.0
0.5%	43.0	430	8.6	31.0
0.3%	77.0	430	8.6	31.0

* lbs/hr
** tons/year

21. Applicant shall test the soil daily prior to start-up of the unit for total hydrocarbon content by on-site hydrocarbon analyzer, and test results shall be kept on file for a period of at least two years and made available to the Air Quality Division upon request.

22. Applicant shall not process any soils in the unit which contain chlorinated compounds, waste oil, or other materials except for gasoline and fuel oils.

23. On and after August 1, 1992 applicant shall monitor and record the oxygen content, carbon monoxide content and temperature of the exhaust gases from the unit afterburner on a continuous basis in a manner and with instrumentation acceptable to the Air Quality Division. All data shall be kept on file for a period of at least two years and made available to the Air Quality Division upon request.

24. Applicant shall monitor and record the soil exit temperature from the unit dryer on a continuous basis in a manner and with instrumentation acceptable to the Air Quality Division. All data shall be kept on file for a period of at least two years and made available to the Air Quality Division upon request.

25. Applicant shall not operate the unit unless the baghouse and afterburner are installed and operating properly.

26. Applicant shall equip and maintain the baghouse with pressure drop indicator.

27. Applicant shall not operate the unit unless a minimum temperature of 1400°F and a minimum retention time of 0.5 seconds in the thermal oxidizer is maintained.

28. Applicant shall immediately cease input feed of soil to the unit, consistent with safe operating procedures, if the soil exit temperature from the unit dryer exceeds 1000°F. Input feed of soil to the unit shall not restart until the soil has been retested for hydrocarbon content, and mixed as necessary to ensure compliance with the conditions of this permit.

29. The exhaust gases from the unit shall be discharged unobstructed vertically upwards to the ambient air from a stack with a maximum diameter of 48 inches at an exit point not less than 34 feet above ground level.

30. Applicant shall not operate the unit unless a program for continuous fugitive emissions control for all plant roadways, the plant yard, all material storage piles, and all material handling operations is maintained, such that fugitive emissions do not exceed 5% opacity.

DEPARTMENT OF NATURAL RESOURCES
AIR QUALITY DIVISION
P.O. BOX 30028
LANSING, MICHIGAN 48909

STATE OF MICHIGAN

AIR USE PERMIT APPLICATION

APPLICATION NO.

FOR AUTHORITY TO INSTALL, CONSTRUCT, RECONSTRUCT, RELOCATE, OR ALTER, AND OPERATE PROCESS, FUEL-BURNING, OR REFUSE-BURNING EQUIPMENT AND/OR CONTROL EQUIPMENT (PERMITS TO INSTALL AND OPERATE ARE REQUIRED BY ADMINISTRATIVE RULES PURSUANT TO ACT 348, P.A. 1965, AS AMENDED).

AIR QUALITY DIVI

JUN 9 1992

PERMIT SECTION

1. APPLICANT: Business License Name of Corporation, Partnership, Individual Owner, Government Agency

2. MAILING ADDRESS: Number and Street; City or Village; State; Zip Code

3. EQUIPMENT OR PROCESS LOCATION: Number and Street; City, Village or Township | COUNTY | ZIP CODE

4. GENERAL NATURE OF BUSINESS:

5. EQUIPMENT OR PROCESS DESCRIPTION:

soil treatment unit designed to treat soil contaminated with gasoline at the site. Unit consists of a soil remediation unit, portable silencehouse, thermal oxidizer, control systems, and [illegible]

6. ESTIMATED COST:
Air Pollution Control Equipment $ [illegible] ; Total Project $ [illegible]

7. ACTION AND TIMING:

	ESTIMATED STARTING DATE	ESTIMATED COMPLETION DATE
☐ Installation, construction, reconstruction, or alteration		
☐ Relocation		
☐ Change of Ownership		

8. NAME OF PRIOR OWNER AS IN ITEM 1 ABOVE, AND PRIOR AIR USE PERMIT NUMBER, IF ANY:
NAME PERMIT NO.

9. NAME AND TITLE OF OWNER OR AUTHORIZED MEMBER OF FIRM
Name Ms. Arlesa Turgeabuth Signature
Title: Environmental Researcher Date: Phone No. (313) 753-[illegible]

10. CONTACT PERSON IF DIFFERENT THAN ITEM 9:
Name Phone No. ( )

11. DISPOSITION OF APPLICATION: FOR DNR USE ONLY

Receipt of all information required by Rule 203	6-1-92	
Permit to install approved * on	7-2-92	Signature Robert Miller
Permit to operate approved * on		Signature
Application/permit voided on		Signature
Application/permit denied on		Signature

*Subject to compliance with all Commission Rules and Conditions stipulated in the attached supplement.

AQ-1 INSTRUCTIONS FOR COMPLETING AND FILING ARE ON REVERSE SIDE PR 5

ENVIRONMENTAL SERVICES
9195 MARINE CITY HWY • P.O. BOX 230069 • FAIR HAVEN, MI 48023-0069 • PHONE (313) 725-8373 • FAX (313) 725-

August 18, 1992

Department of Natural Resources
Air Quality Division-Permit Unit
P. O. Box 30028
Lansing, MI 48909

Gentlemen:

This letter constitutes a formal request for a permit to operate as required pursuant to Rule 208 (2), delegated through condition No. 1 of M. L. Chartier, Inc./General Motors Corporation supplement to Permit No. 248-92B.

Commencement of trial operation for low temperature thermal remediation at the General Motors site began August 1, 1992. This request is within the thirty (30) day period required by the rule.

Please have someone within your department provide acknowledgement to the receipt of this request. Thank you for your immediate attention to this matter.

Sincerely,

M. L. CHARTIER, INC.

Arlesa Taughinbaugh

Arlesa Taughinbaugh

AT/jh

APPENDIX E.2

BUILDING 29 UNDERGROUND STORAGE TANK STUDY AREA REPORT

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding the soils associated with the former underground storage tank (UST) area near Building 29 (Study Area) at the GM Facility.

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for Building 29 is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the Building 29 UST area with regards to the outstanding environmental issues identified by the Michigan Department of Natural Resources (MDNR) in their letter to GM dated November 19, 1993, and to present the results of additional investigations conducted to resolve outstanding issues.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area were the result of the operation of an UST system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g. final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Following the Facility closure, USTs which were no longer in service were removed from the Facility. Benzene, toluene, ethylbenzene and xylene (BTEX) and polynuclear aromatic hydrocarbon (PNA) constituents were identified in the soils in the area of the UST farm removed at Building 29. The presence of these constituents was reported to the Michigan State Police - Fire Marshall Division (MSP - FMD) office, and remedial actions were initiated, in accordance with LUST requirements.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g. sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not expected to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This Section presents a summary of available information from GM files regarding the Building 29 UST Study Area.

3.1 HISTORY OF BUILDING 29 UST FARM

Nine 12,000-gallon steel USTs were installed near the south wall of Building 29 in 1946. The Building 29 tank farm was utilized for the storage of engine oil, transmission fluids, axle fluids and power steering fluids.

The tank farm was removed from service in the summer of 1991 and the tanks were excavated and removed in October 1991. BTEX and PNA constituents were identified in the soils surrounding the former tank farm in confirmatory samples taken at the time of UST removal. The tanks appeared undamaged during excavation. The soil contamination was, therefore, assumed to be due to routine filling operations.

The construction and contents of the tanks in the Building 29 tank farm is summarized below.

Building 29 Tank Contents/Construction

Tank No.	*Material*	*Tank Const.*	*Tank Size (gallons)*	*Year Inst.*	*Pipe Const.*	*Pipe Buried*
1	Eng Oil	Steel	12,000	1946	Steel	No
2	15w 40 Eng Oil	Steel	12,000	1946	Steel	No
3	10w 30 Eng Oil	Steel	12,000	1946	Steel	No
4	A90 Trans Oil	Steel	12,000	1946	Steel	No
5	P/S Fluid	Steel	12,000	1946	Steel	No
6	Axle Fluid	Steel	12,000	1946	Steel	No
7	Auto Tr Fluid	Steel	12,000	1946	Steel	No
8	Axle Fluid	Steel	12,000	1946	Steel	No
9	Eng Oil	Steel	12,000	1946	Steel	No

GM notified the Michigan State Police-Fire Marshal Division (MSP-FMD) office on October 16, 1991, that a confirmed release (i.e. residual soil contamination) had occurred at the former Building 29 tank farm. Notification of the release was made based on the analytical results of soil samples taken to satisfy the Fire Marshal's site assessment requirements.

Notification of the release was followed by 20-Day and 45-Day reports submitted to the MDNR Environmental Response Division (ERD) in accordance with LUST requirements. A Corrective Action Plan (CAP) was submitted to the MDNR-ERD on March 16, 1992. Revised pages for the CAP were submitted to the MDNR-ERD on April 30, 1992. The CAP was approved by the MDNR, with changes to the Sampling and Analysis Plan as proposed in GM's June 10, 1992 letter, on June 26, 1992.

3.2 PAST REMEDIAL ACTIVITIES

Approximately 3,000 cubic yards of soil were removed from the Building 29 tank farm excavation and stored west of the Study Area on the asphalt paved parking lot. The dimensions of the excavation were approximately 130 feet from north to south, 40 feet from east to west, and 17 feet deep. The perimeter of the base of the excavation was 340 feet and the surface area was 5,200 square feet. (Closure Report, Pontiac Central Building 29, Draft April 16, 1993)

During the corrective action (undertaken for GM by M. L. Chartier) in June 1992, contaminated soils were removed and thermally treated. Sidewall and excavation base verification samples were taken in accordance with the requirements for soil cleanup verification. Four water samples were collected from the base of the excavation in lieu of soil samples due to the presence of water in the excavation. The source of this water was from a water leak in the fire deluge tank (located to the north/east of the excavation). The collection of water samples was deemed unacceptable by MDNR in determining soil cleanup verification.

The soils excavated from the tank area were thermally treated on Site. All thermally treated soils were verified non-detect for BTEX and PNAs. The soil was then used as backfill for the tank excavation or stockpiled along the side of the access road to Building 29 which runs south from the building.

Verification samples could not be collected from the east and south sidewalls of the excavation due to bank stability concerns. Therefore, confirmatory sampling was performed through the installation of seven boreholes following backfilling of the excavation. Areas of PNA contamination above the Type B criteria were identified on the east side of the excavation in several boreholes installed by WW Engineering & Science (WWES) in December, 1992. The seven WWES boreholes are identified on Figure 1.3 as SB10 to SB16. Soil borings further east than those identified on Figure 1.3 could not be completed due to limitations imposed by the slope of the bank to the east of the Building 29 tanks.

Additional excavation was thought to be warranted at the time based on analytical results, however, was not performed at the time due to bank stability concerns on the east sidewall.

3.3 GEOLOGY

The geology in the Study area was initially defined based on borehole logs from the seven WWES boreholes installed in December 1992.

Based on the WWES borehole logs, the geology in the study area was described as consisting of 3 to 8 feet of gravel fill underlain in some areas by approximately 5 feet of silty brown sand and gravel. At a depth of approximately 8.5 feet bgs a layer of medium to stiff gray clay with occasional sand and gravel begins. This clay layer continues to a depth of at least 22 feet bgs. The excavation is now backfilled with a mixture of sand gravel.

3.4 HYDROGEOLOGY

As groundwater was not encountered during the excavation of the tanks, soil remediation activities, or the installation of soil borings, it has been verified that there are no hydrostratigraphic units in the vicinity of the stratigraphic zone of the former USTs.

3.5 MDNR REQUIREMENTS

A variety of outstanding environmental concerns were raised by the Michigan Department of Natural Resources (MDNR) in their letter dated November 19, 1993. A copy of this letter is presented as Appendix A. These requirements include:

- providing boring logs and sample depths for the December 1992 boreholes;
- providing the depth of excavation during remediation (approximately 17 feet) and a more detailed description of the geology;
- defining the vertical extent of contamination at the base of the excavation;
- providing the results and locations of additional verification samples collected from the excavation in mid-November 1991 and samples collected during the December 1992 sampling event; and
- preparing a limited hydrogeologic study to determine whether or not groundwater has been impacted.

The MDNR set a submittal date of April 18, 1994 for a 150-Day report containing sufficient information to address MDNR concerns.

The remainder of this section summarizes information obtained from GM files which satisfies the following MDNR requirements:

1) providing boring logs and sample depths for the December 1992 boreholes;

2) providing the depth of excavation; and

3) providing the results and locations of additional verification samples collected from the excavation in mid-November 1991 and samples collected during the December 1992 sampling event.

3.5.1 Verification Sampling Results (November 1991)

The 45-Day report (Maecorp, November 1991) and the Corrective Action Plan (CAP) (June 1992) both state that following receipt of initial verification sampling results, additional soil (approximately 10 cubic yards) was removed from the base of the excavation, and six additional verification samples collected and analyzed for PNAs. The analytical data for these six samples (non-detect for all PNAs) was presented as Appendix I to the CAP. These samples were taken from the locations of original verification sample locations 1C and 1D, as shown on Figure 4 of the 45-Day report. This figure and the analytical results are presented in Appendix B.

Five cubic yards of soil were removed from the excavations in the sidewall area of sample 8A (Figure 4 of 45-Day report) to address elevated benzene levels found in sample 8A. A second confirmatory sample (sample number 8A1) was obtained and analyzed for benzene. Benzene was not detected in the confirmatory sample. The analytical results for sample 8A1 are presented in Appendix B of this report.

3.5.2 Excavation Depth

The final depth of the excavation during remediation is presented in the "draft" Closure Report (April 1993) as being approximately 17 feet.

3.5.3 December 1992 Boreholes

WWES drilled 7 borings (SB-10 to SB-16) along the east and south side of the former Building 29 tank excavation (see Figure 1.3), in December 1992. These borehole logs are included in Appendix C. Eight samples from these borings were submitted for BTEX and PNA analysis. A summary of the analytical results is contained in Appendix D. The depths at which samples were obtained are summarized below.

Sample Depths - December 1992 Sampling Event

WWES Borehole	*Sample Number*	*Depth of Sample (feet bgs)*
SB-10	SS-1 and SS-3	5 and 10
SB-11	SS-3	10
SB-12	SS-2	7.5
SB-13	SS-3	10
SB-14	SS-1	5
SB-15	SS-2	7.5
SB-16	SS-1	5.0

4.0 ADDITIONAL BUILDING 29 UST INVESTIGATIVE ACTIVITIES

CRA installed six boreholes at the former Building 29 UST Study Area on January 3-4, 1994. The boreholes were installed by Mateco Drilling of Grand Rapids, Michigan.

Four boreholes (BH29-1, -2, -3 and -4-94) were installed to further define the vertical extent of contamination below the former UST area, in order to support UST closure requirements. Two additional boreholes (BH29-5-94 and BH29-6-94) were installed approximately 5 feet east of the boreholes installed by WWES in December 1992 to further define the horizontal extent of contamination along the east side of the excavation. It is not currently feasible to install boreholes further east of the excavation due to the slope which exists immediately to the east of the former UST farm. The locations of these boreholes are presented on Figure 4.1. Borehole logs are presented in Appendix E.

Soil samples were collected from BH29-1, -2, -3 and -4-94 from the base of the original excavation (at approximately 17 feet bgs) as well as two feet below the base of the excavation (19-21 feet bgs) using a standard 2-inch outside diameter split-spoon sampler. Soil removed using the split-spoon was sampled using clean sampling equipment and placed in laboratory supplied clean sample jars. Sample jars were shipped to IEA Laboratories in coolers at 4°C, and analyzed for BTEX and PNAs. Soil samples were also collected from BH29-5-94 and BH29-6-94 from the 15 to 17 feet bgs and 20 to 22 feet bgs intervals. These samples were analyzed for PNAs (based on the identification of PNA constituents at concentrations above regulatory levels in three WWES boreholes). Analytical results, a data validation memorandum and chain-of-custody forms are presented in Appendix F.

Section 5.0 provides an evaluation of the data obtained during the additional investigations.

5.0 EVALUATION OF RESULTS

5.1 GEOLOGY

The six boreholes installed by CRA confirmed the stratigraphic information presented in the WWES borehole stratigraphic logs. This information is summarized in Section 3.3. The excavation area in the vicinity of the former Building 29 USTs was identified to contain 16 to 19 feet of sand, clay and gravel backfill material which in turn is underlain by glacial clay till typical of the area.

BH29-5-94 and BH29-6-94 were installed part way up the slope approximately 15 feet east of the former UST area (east of the WWES boreholes). These boreholes identified gray clay till containing trace silt, sand and gravel which existed from near the ground surface to a depth of 22 feet bgs.

Groundwater was not encountered within the native glacial clay till soils.

5.2 ANALYTICAL RESULTS

All BTEX and PNA samples were non detect with the exception of the 16 to 18-foot bgs sample for BH29-4-94 and the 20 to 22 foot bgs sample at BH29-6-94.

Fluoranthene was identified at 510 µg/kg in the 16 to 18-foot bgs sample from BH29-4-94. Phenanthrene was identified at 390 µg/kg in the 16 to 18 foot bgs sample in BH29-4-94. The concentrations of fluoranthene and phenanthrene present in the BH29-4-94, 16 to 18-foot bgs sample are below Michigan Type B 20X Drinking Water Protection Values for soil.

The following analytes were detected in BH29-6-94 at the 20 to 22 foot bgs interval.

	Result µg/kg	*Type B 20X Drinking Water Protection Values for Soil*	*Type B Direct Contact Soil Cleanup Level (µg/kg)*
benzo(a)anthracene	430	N/A	1,800(1)
chrysene	480	N/A	180,000(1)
fluoranthene	1,400	17,000	31,000
naphthalene	540	5,000	9,300,000
phenanthrene	660	500	930,000
pyrene	930	10,000	19,000,000

Michigan Type B 20X Drinking Water Protection Values for soil were marginally exceeded for phenanthrene in the BH29-6-94, 20-22 foot bgs sample. There were no other exceedences of the Type B 20X Drinking Water Protection Values in the study area. There were no exceedences of the Type B Direct Contact Criteria at the study area. The Direct Contact Criteria are considered appropriate for the study area, as groundwater was not identified in the study area.

(N/A Not Applicable. The direct contact value is considered protective.

(1) Values based on June 21, 1994 "Addendum to MERA Operational Memorandum #8, Revision 3 - Type B Criteria Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713".

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented herein, the following conclusions may be made regarding the former Building 29 UST area:

- the area is underlain by glacial clay till;
- no groundwater hydrostratigraphic units (or groundwater) were identified in the vicinity of the former Building 29 USTs;
- nine 12,000-gallon USTs were removed in October 1991;
- approximately 3,000 cubic yards of soil were removed and thermally treated;
- verification samples were collected and the excavation was backfilled;
- six boreholes drilled in January 1994 identified that the former USTs have been successfully closed; and
- minor residual PNA contamination was identified in 1 of 12 additional verification samples (BH29-6-94 at 20 to 22 feet bgs) marginally above the Type B 20X Drinking Water Protection Value for phenanthrene in soils. The remaining level of phenanthrene associated with BH29-6-94 is not considered to be at a level of concern for the following reasons:

    1. as groundwater was not identified in the Building 29 Study area, Type B Direct Contact Criteria are more applicable;.
    2. the potential source (e.g. USTs) of the PNAs was removed in October 1991;
    3. remediation of contaminated soils was undertaken; and
    4. the remaining residual levels of PNAs would be expected to naturally degrade over time.

Based upon the results of the additional investigations, no additional investigation or remediation is required or warranted.

7.0 REFERENCES

1. Letter to Keith West (GM) from MDNR re: Building 29 USTs, November 19, 1993

2. Phase I Site Assessment Report, W. W. Engineering & Science, June 1993

3. Phase II Site Investigation Report, W. W. Engineering & Science, June 1993

4. Corrective Action Plan for Building 29 Tank Farm, approved June 1, 1992

5. Site Characterization Report and Work Plan, Gary Finkbeiner and Wayne MacPherson, November 22, 1991 (45-day report)

6. "Draft" Closure Report - Pontiac Central Building 29, April 16, 1993

7. Enrolled Senate Bill No. 645, State of Michigan, October 1993

8. Enrolled Senate Bill No. 644, State of Michigan, October 1993

9. Enrolled House Bill No. 4783, State of Michigan, October 1993

10. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

11. MERA Operational Memorandum #8, Revision 3 - Type B Criteria, February 4, 1994

12. Addendum to MERA Operational Memorandum #8, Revision 3 - Type B Criteria, June 21, 1994

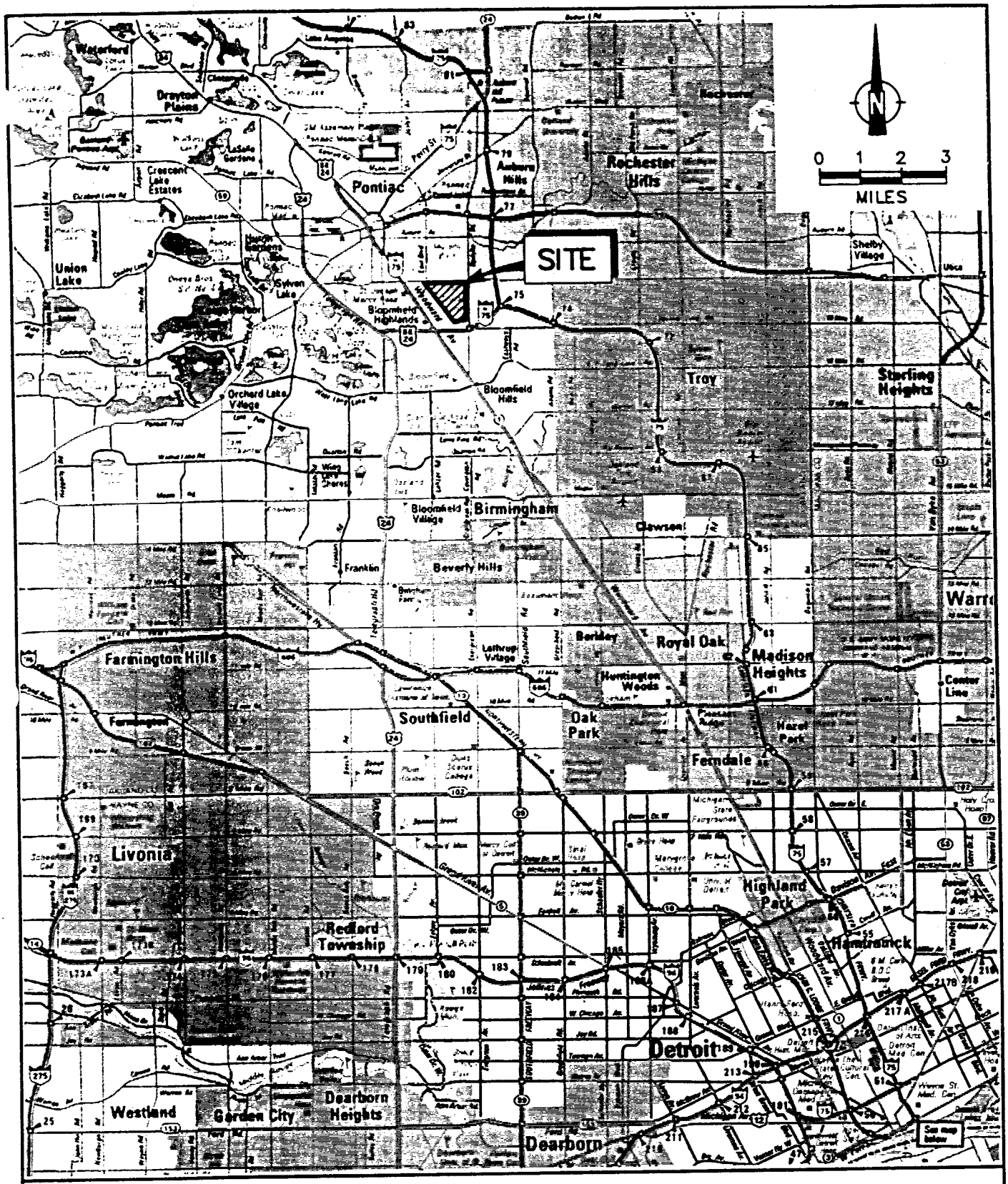
13. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

14. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

15. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

16. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

17. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



MICHIGAN

CRA

5770 (3) DEC 17/93 (W) REV.0

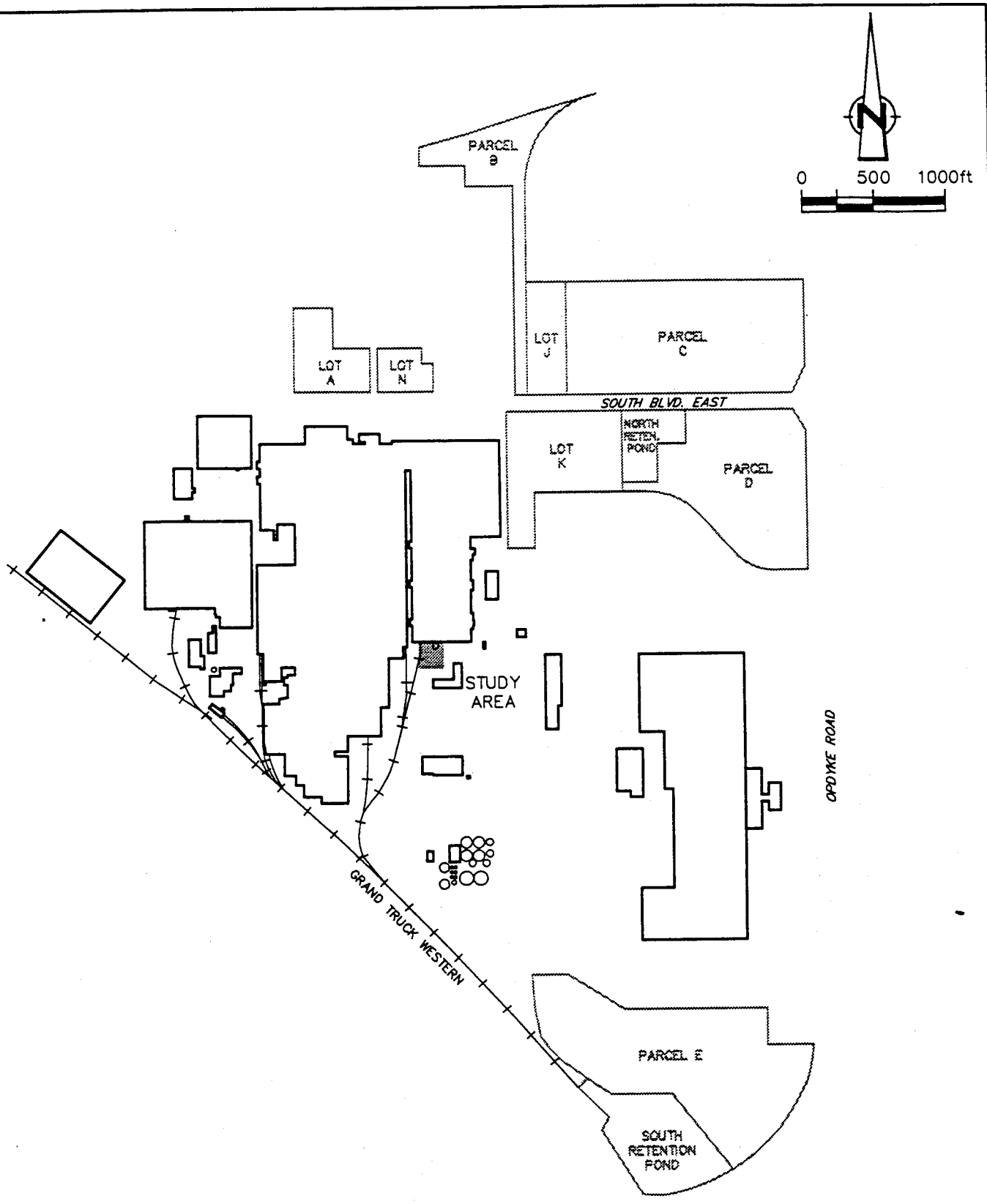


figure 1.2

SITE PLAN
BUILDING 29 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (3) JAN 07/94(W) REV.0 (P–10)

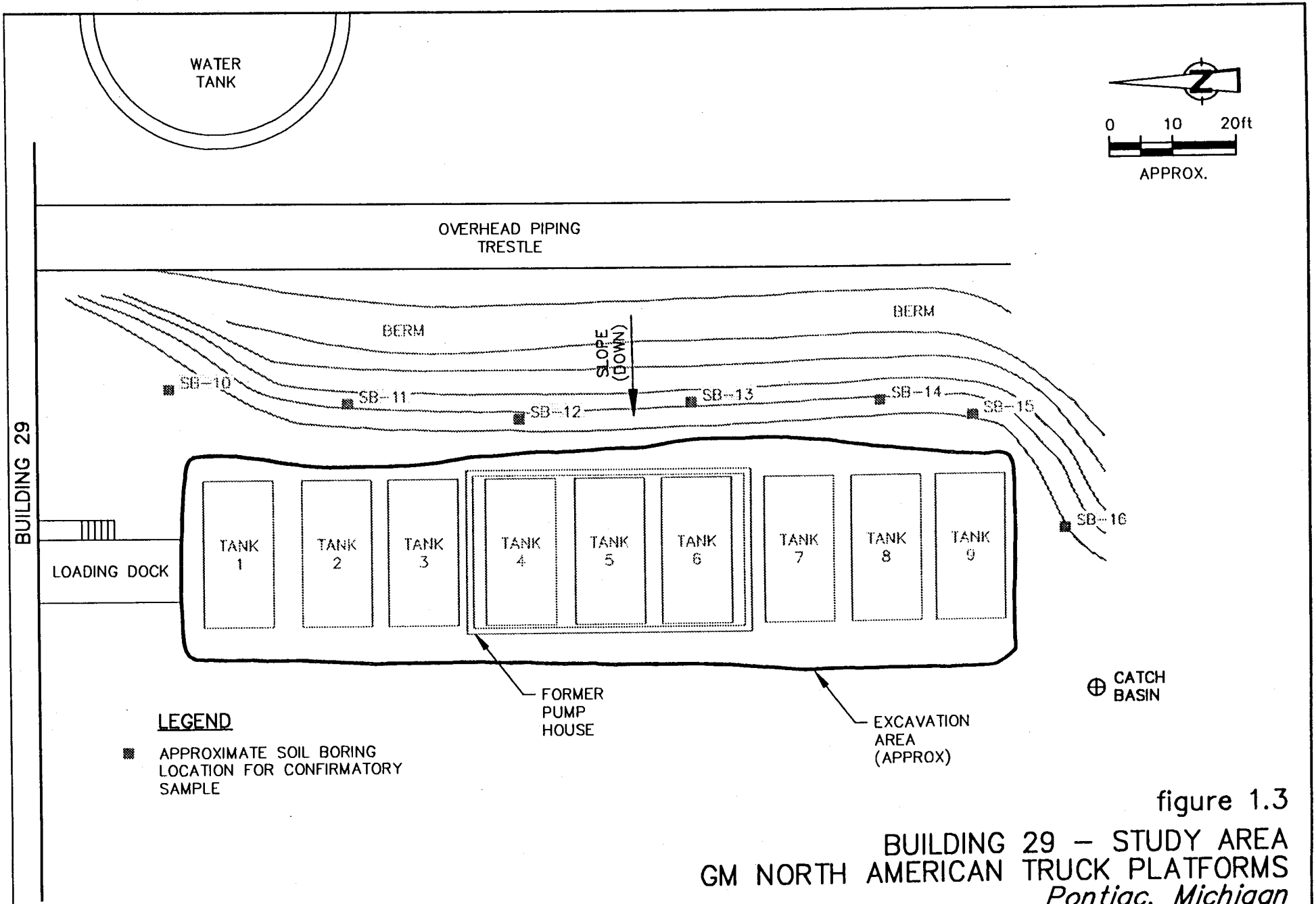


figure 1.3

BUILDING 29 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (3) JAN 07/94(W) REV.0 (P-05)

APPENDIX A

MDNR LETTER DATED NOVEMBER 19, 1993

NATURAL RESOURCES COMMISSION
JERRY C. BARTNIK
LARRY DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLLI
TEY M. SPANC
JOAN B. TATTER

JOHN ENGLER, Governor
DEPARTMENT OF NATURAL RESOURCES
ROLAND HARMES, Director
SOUTHEAST MICHIGAN DISTRICT OFFICE
ENVIRONMENTAL RESPONSE DIVISION
38980 West Seven Mile Road
Livonia, Michigan 48152

November 19, 1993

Mr. Keith West
General Motors Corporation
Remediation Group
2860 Clark Street
Detroit, MI 48232

Re: GM North American Truck Platforms, Pontiac Central Facility - Building #29, 660 South Blvd., Pontiac, MI, Facility #18277, Incident # C-2149-91

Dear Mr. West,

The Michigan Department of Natural Resources (MDNR) staff have completed the review of the file for the above referenced facility. The most recent document in the file was the Corrective Action Plan submitted in March of 1992. Based on the review of this file, additional information (and investigations) is needed in order to define the extent of contamination and eventually obtain closure.

The following items must be addressed in order for this site to be considered for closure:

1. Provide the soil boring logs and sample depths for soil borings #1 through #8 installed along the south and east slopes of the building #29 tank farm.

2. Provide the depth of the excavation. Also provide a more detailed description of the geology (site specific).

3. The vertical extent of contamination needs to be defined. Soil samples should be collected from the bottom of the former excavation. Groundwater samples were collected in lieu of soil samples during the excavation. The heavier PNA compounds are relatively insoluble, therefore soil samples are also required from this area.

4. According to the March, 1992 Corrective Action Plan, additional soils were removed from areas that were previously above Type-B criteria for PNA's and BTEX. The report also states that samples were collected to verify clean-up. Please provide the locations and results of these samples.

5. A limited hydrogeologic study is needed to determine whether or not groundwater has been impacted. If the results of this study indicate that groundwater has been impacted then additional investigations may be needed to determine the extent of contamination.

You have 150 days from the date of this letter to address the above items and perform a phase I hydrogeological investigation. A report should be submitted to this office at that time. Note: all work should be conducted by a certified consultant.

Please notify this office, in writing, seven days prior to initiating any work, to provide staff with the opportunity to monitor all site activities.

This should not be construed as a sign-off on all investigations or corrective actions that may be necessary at this site.

If you have any questions regarding this matter, please contact Paul Owens at (313) 953-1534.

Sincerely,

Oladipo Oyinsan
Southeast MI District Supervisor

cc: Tom Kohl, CIH, MDNR-ERD
Paul Owens, MDNR-ERD

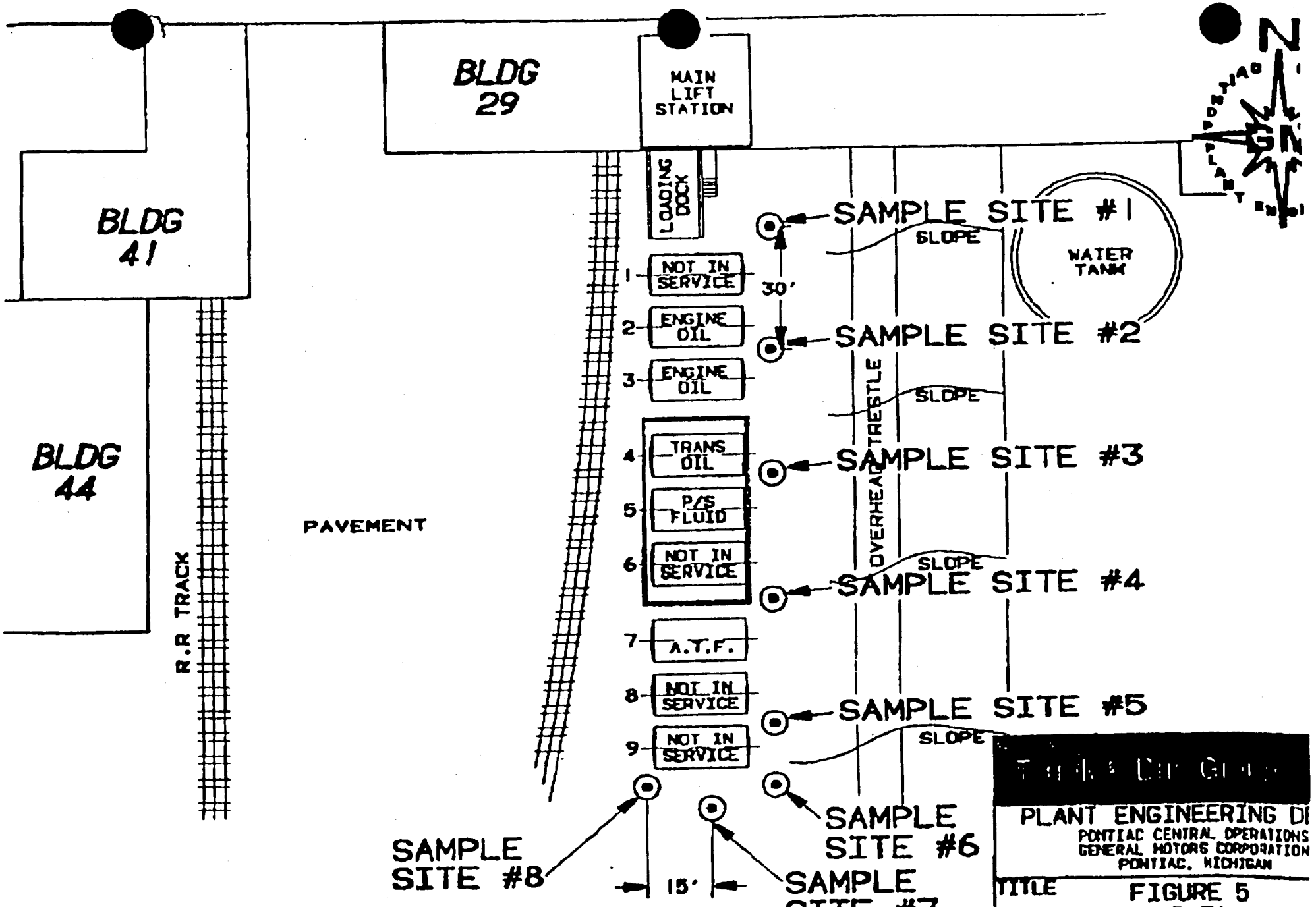
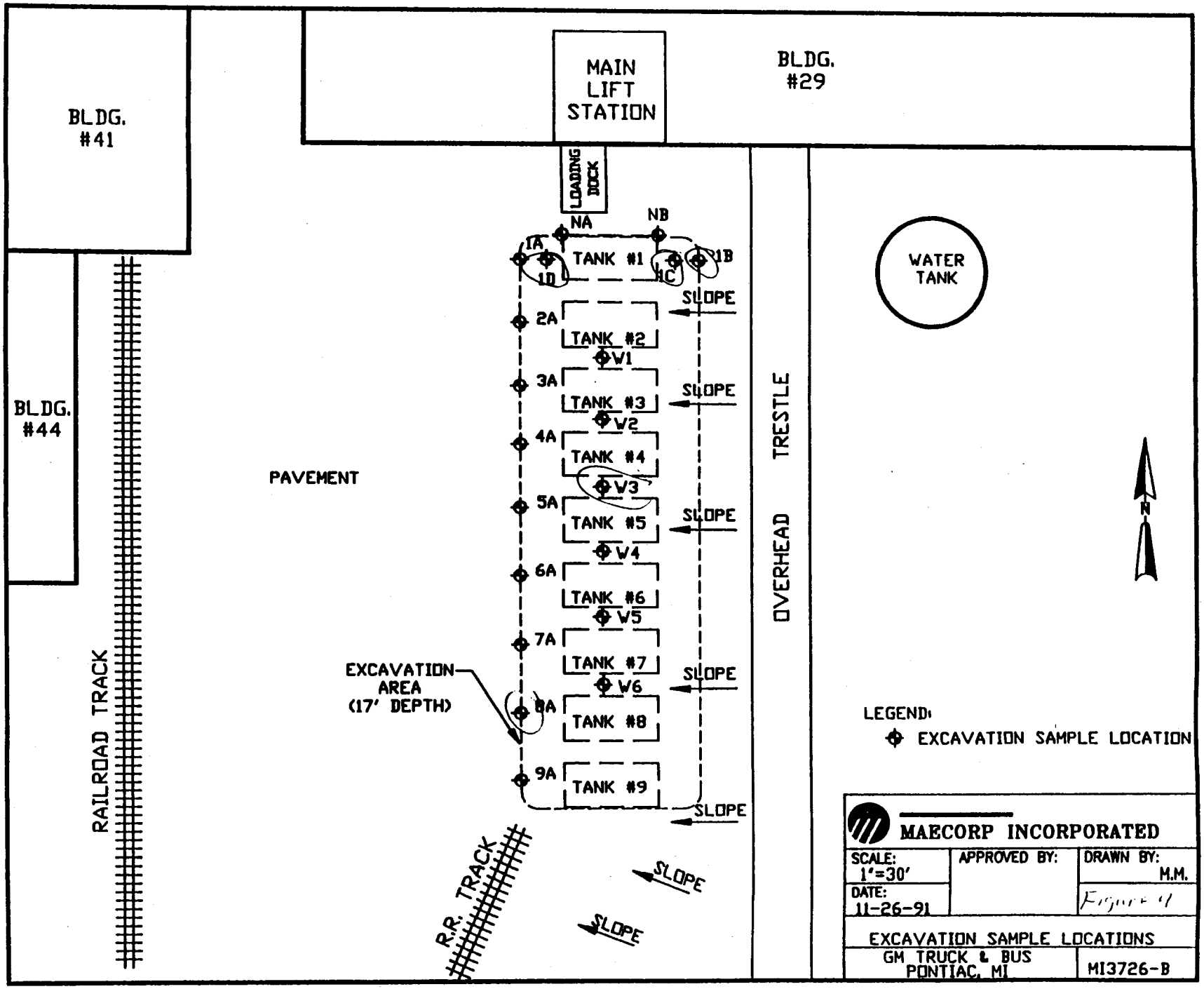


FIGURE 5
TANK FARM-PROPOSED SAMPLING

APPENDIX B

VERIFICATION SAMPLING RESULTS, NOVEMBER 1991


BLDG. #41
MAIN LIFT STATION
BLDG. #29
LOADING DOCK
NA
NB
1A
1B
1C
1D
TANK #1
SLOPE
2A
TANK #2
W1
3A
TANK #3
W2
4A
TANK #4
W3
5A
TANK #5
W4
6A
TANK #6
W5
7A
TANK #7
W6
8A
TANK #8
9A
TANK #9
BLDG. #44
PAVEMENT
RAILROAD TRACK
EXCAVATION AREA (17' DEPTH)
R.R. TRACK
OVERHEAD TRESTLE
WATER TANK
N
LEGEND:
EXCAVATION SAMPLE LOCATION
MAECORP INCORPORATED
SCALE: 1"=30'
APPROVED BY:
DRAWN BY: M.M.
DATE: 11-26-91
Figure 4
EXCAVATION SAMPLE LOCATIONS
GM TRUCK & BUS PONTIAC, MI
MI3726-B

INTRODUCTION

From August 30, 1991 through September 6, 1991 a total of nine Underground Storage Tanks (USTs) were removed from the "Building 29 Tank Farm" (Site) located at the Facility in Pontiac, Michigan.

The detailed information regarding tank size, construction, location, and contents can be found in the Site Characterization Report and Work Plan ("45-day Report") for the Site at the Facility. The information regarding the findings upon tank removal as well as analytical data can also be found in this document.

Upon removal, all of the tanks were structurally undamaged and there was no visible evidence that a release had occurred. Subsequent site assessment data, though, indicated the presence of specific constituents which were indicative that a release may have occurred, albeit likely from routine operations which typically results in overfills, etc.

The Michigan State Police - Fire Marshal Division (MSP-FMD) was notified that a confirmed release had occurred at the Site. An initial abatement report ("20-day Report") was submitted to the Michigan Department of Natural Resources Environmental Response Division's (MDNR-ERD) district office in Livonia on October 29, 1991. The previously referenced "45-day Report" was subsequently submitted to the MDNR-ERD on November 22, 1991.

Since the submission of the above two documents, additional excavation and sampling activities have occurred. The information derived from these activities can be found in the following section of this document.

ADDITIONAL INFORMATION

The initial sampling performed at the Site indicated the presence of specific constituents at levels which were, except for a few sampling locations, well below the MDNR Type B Cleanup Criteria for Soil (Type B Criteria). At the locations where these criteria were exceeded by specific constituents, additional excavation and sampling was performed.

The sampling locations indicated as 1C and 1D (See Figure 4 of the 45 day report) had levels of specific Polynuclear Aromatic Hydrocarbons (PNAs) which exceeded the Type B Criteria. A total of approximately ten cubic yards of soil was removed from these locations and their vicinity. This soil was added to the original soil pile resulting from the UST removal. Six samples were subsequently taken from these two original locations to verify the removal of remaining constituents. The results indicated the constituent levels were all below detection limit and thus, an adequate amount of soil had been removed.(See Appendix I, CAL Report # 16321)

The sampling location indicated as 8A (See Figure 4 of the 45 day report) had a level of Benzene which exceeded the Type B Criteria. A total of approximately five cubic yards of soil was removed from this location and its vicinity. This soil was also added to the original soil pile resulting from the UST removal. Samples were subsequently taken from this original location to verify the removal of Benzene. The results (See Appendix II, CAL Report # 16768) indicated the Benzene level was below detection limit and again, an adequate amount of soil had been removed.

Additionally, the water covering the floor of the excavation had originally indicated the presence of specific volatile constituents as well as specific PNAs at levels both above and below the Type B Criteria for Groundwater. The water entering the excavation is due to precipitation and run-off and is periodically pumped to the Pontiac East Industrial Wastewater Treatment Plant (WTP). A sample (referred to as W7) was taken of the water on the discharge side of the pump as the water enters the lift-station to the WTP. The results from this sample (See Appendix II, CAL Report # 16768) indicate the absence of the previously detected constituents.

HYDROGEOLOGIC CONDITIONS

In 1981 a hydrogeologic study was performed at the Facility by Camp, Dresser & McKee, Inc. (CDM) (See Appendix III). This study indicates that in the location of the Site a clay till block of low to very low permeability exists and, in fact, the former tank farm was contained within this clay till block. This is supported by the observance of very stiff clay on the limits of the current excavation.

This clay till block acts as a hydrogeologic barrier because of the low permeability. It effectively prevents the movement of water across it. So much so that the CDM study treated the clay till block as completely impermeable for groundwater modeling purposes. This situation indicates that any residual constituents resulting from the former tank farm operations would not have migrated through the clay but would have been confined to the engineering fill material surrounding the tanks.

GM TRUCK AND BUS GROUP
CAL REPORT# 16321

AMPLE RECEIVED 11/14/91

LAB# 1110792 NW 29 TANK FARM #1

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
Benzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

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)LE RECEIVED 11/14/91

LAB# 1110793 NW 29 TANK FARM #2

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
Benzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

GM TRUCK AND BUS GROUP
CAL REPORT# 16321

AMPLE RECEIVED 11/14/91 PAGE

LAB# 1110794 NE 29 TANK FARM #3

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
Benzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

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MPLE RECEIVED 11/14/91

LAB# 1110795 NE 29 TANK FARM #4

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
enzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

LAB# 1110796 SW 29 TANK FARM #5

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
Benzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

LAB# 1110797 SW 29 TANK FARM #6

	ANALYTICAL RESULTS mg/kg
8270 PNA, GC/MS	
Naphthalene	< 0.33
Acenaphthylene	< 0.33
Acenapthene	< 0.33
Fluorene	< 0.33
Phenanthrene	< 0.33
Anthracene	< 0.33
Fluoranthene	< 0.33
Pyrene	< 0.33
Benzo(a)anthracene	< 0.33
Chrysene	< 0.33
Benzo(b)fluoranthene	< 0.33
Benzo(k)fluoranthene	< 0.33
Benzo(a)pyrene	< 0.33
Dibenzo(a,h)anthracene	< 0.33
Benzo(ghi)perylene	< 0.33
Indeno(1,2,3-cd)pyrene	< 0.33

GM TRUCK AND BUS GROUP
CAL REPORT# 16768

MPLE RECEIVED 12/13/91

LAB# 1120778 8A1 BLDG. 29

	ANALYTICAL RESULTS mg/kg
Benzene	< 0.01

Canton Analytical Laboratory, Inc.
(313) 459-8484 FAX (313) 459-8262

APPENDIX C

WWES BOREHOLE STRATIGRAPHIC LOGS, DECEMBER 1992

WW Engineering & Science, Inc.
Environmental Services

Project No.: 83256.02

LOG OF BORING

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

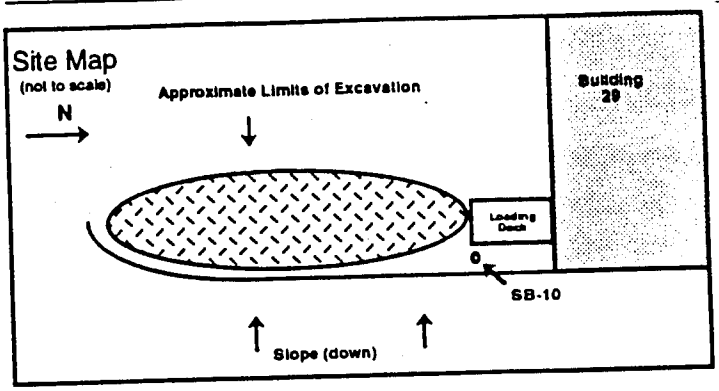
Boring Designation: SB-10
Start Date: 12/8/92 Completed: 12/8/92
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 3.5 feet below ground surface.

Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range** 0 to 20 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range** 3.5 to 20 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range** 0 to 20 feet

General Notes:
Soil Samples SS-1 and SS-3 were submitted for chemical analytical testing.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–4							0.0	BACKFILL: Grey GRAVEL, Moist
5	SS-1	5.0	13"	2, 3, 7	67		3.0	Stiff Grey SILTY CLAY, Little Fine Sand, Wet
6				3, 4, 4			(6.0)	Trace Fine Gravel
7–8	SS-2	7.5	11"		43		8.0	Stiff Grey SILTY CLAY, Trace Fine Sand, Wet
9–10	SS-3	10.0	10"	3, 4, 7	18			
11–12				2, 4, 6				
13	SS-4	12.5	9"		14			
14–15	SS-5	15.0	12"	3, 4, 20	11			
16–17				3, 4, 4				
18	SS-6	17.5	15"		16			
19				7, 25, 20			19.0	Compact Brown CLAYEY SAND, Little Fine to Coarse Gravel and Silt, Moist
20	SS-7	20.0	8"		11			END OF BORING AT 20 FEET

WW Engineering & Science, Inc.
Environmental Services

LOG OF BORING

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

Boring Designation: SB-11
Start Date: 12/8/92 **Completed:** 12/8/
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 6.0 feet below ground surface.

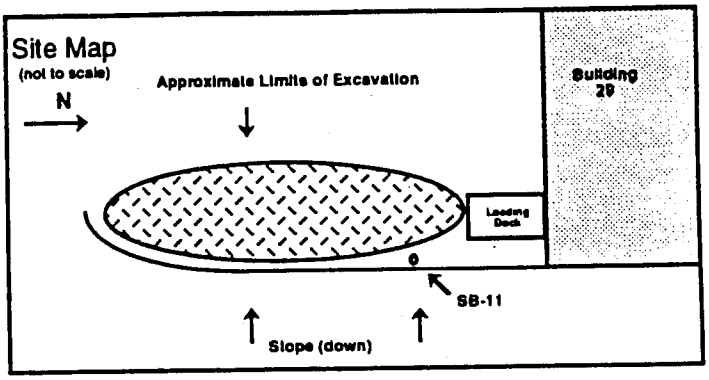
Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range** 0 to 13.5 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range** 3.5 to 15 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range** 0 to 15 feet

General Notes:
Soil Sample SS-3 was submitted for chemical analytical testing.

Site Map
(not to scale)



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)		PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–4								0.0	BACKFILL: Grey GRAVEL, Moist
5	SS-1	5.0	12"	8, 10, 15		27			
6–7				2, 2					
7–8	SS-2	7.5	2"	2		11			
8								8.0	Stiff to Medium Grey, SILTY CLAY, Trace Sand, occasional Gravel, Wet
9–10	SS-3	10.0	14"	3, 4, 5		6			(9.0) Sand lenses
11–12				4, 4, 7					
12–13	SS-4	12.5	12"			4			
14–15	SS-5	15.0	18"	4, 4, 4		4			END OF BORING AT 15 FEET
16–20									

WW Engineering & Science, Inc.
Environmental Services

LOG OF BORING

Project No.: 83256.02

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

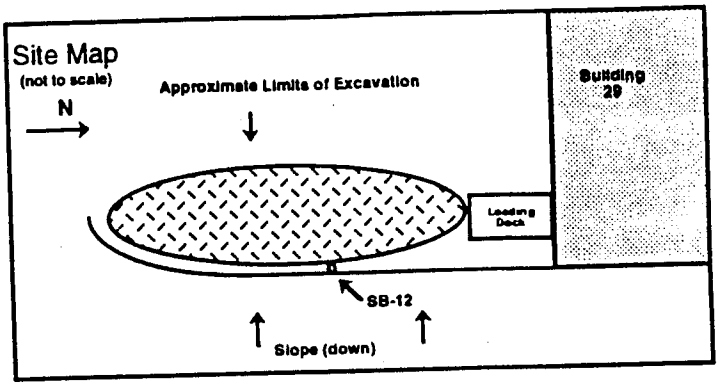
Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range** 0 to 13.5 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range** 3.5 to 15 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range** 0 to 15 feet

General Notes:
Soil Sample SS-2 was submitted for chemical analytical testing.

Boring Designation: SB-12
Start Date: 12/8/92 **Completed:** 12/8/92
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 3.5 feet below ground surface.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–3							0.0	BACKFILL: Grey GRAVEL, Moist
4	SS-1	5.0	10"	3, 3, 7	24		3.5	Loose Brown, Greyish-Black, Stained Fine SILTY SAND, Little Fine to Coarse Gravel, Wet
5–6				8				
7	SS-2	7.5	13"	10, 11	27		8.5	Stiff to Medium Grey, SILTY CLAY, Trace Sand, occasional Gravel, Wet
8–9				2, 2				
10	SS-3	10.0	10"	5	18			
11				2				
12	SS-4	12.5	12"	3, 5	16			
13–14				8, 10				
15	SS-5	14.6	8"	16/2"	10			END OF BORING AT 14.6 FEET
16–20								

WW Engineering & Science, Inc.
Environmental Services

Project No.: 83256.02

LOG OF BORING

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

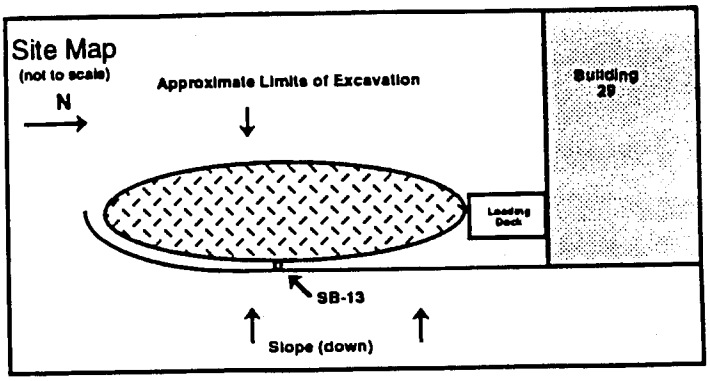
Boring Designation: SB-13
Start Date: 12/8/92 **Completed:** 12/8
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 3.5 feet below ground surface.

Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range:** 0 to 13.5 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range:** 3.5 to 15 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range:** 0 to 15 feet

General Notes:
Soil Sample SS-3 was submitted for chemical analytical testing.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–4							0.0	BACKFILL: Grey GRAVEL, Moist
5	SS-1	5.0	6"	25/6"	45		3.5	Medium Compact Brown-Black Stained Fine SILTY SAND, Little Fine to Coarse Gravel, Trace Clay, Wet
6–7				6, 10				
7–8	SS-2	7.5	5"	10	23		8.5	Stiff Grey SILTY CLAY, Trace Sand and Gravel, Wet
9				2, 4				
10	SS-3	10.0	8"	5	33			
11				4				
12				6				
13	SS-4	12.5	16"	7	31			
14				3, 6				
15	SS-5	15.0	18"	9	10			END OF BORING AT 15.0 FEET
16–20								

WW Engineering & Science, Inc.
Environmental Services

Project No.: 83256.02

LOG OF BORING

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

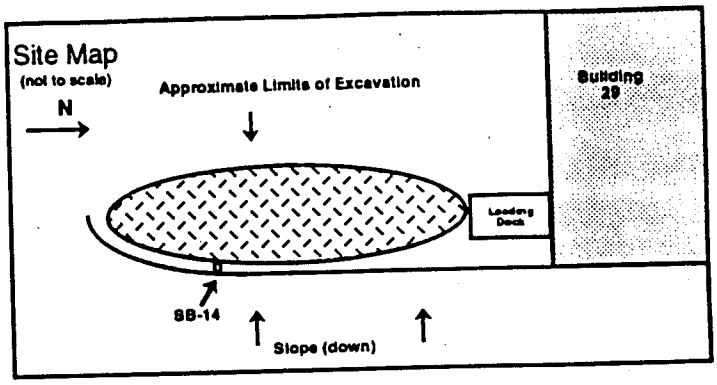
Boring Designation: SB-14
Start Date: 12/9/92 Completed: 12/9/92
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 11.0 feet below ground surface.

Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range:** 0 to 13.5 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range:** 3.5 to 15 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range:** 0 to 15 feet

General Notes:
Soil Sample SS-1 was submitted for chemical analytical testing.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–3							0.0	BACKFILL: Grey GRAVEL, Moist
4				8			3.5	Medium Compact Dark Brown SILTY SAND, Trace-Little Clay and Gravel, Moist
5	SS-1	5.0	8"	10 11	7			
6				14				
7				17				
8	SS-2	7.5	10"	14	7			
9				3			8.5	Medium to Stiff Grey SILTY CLAY Trace Sand and Gravel, Moist to Wet
10	SS-3	10.0	13"	3 4	5			
11				3				
12				3				
13	SS-4	12.5	18"	6	5			
14				2				
15	SS-5	15.0	16"	7 17	6			END OF BORING AT 15.0 FEET
16–20								

WW Engineering & Science, Inc.
Environmental Services

LOG OF BORING

Project No.: 83256.02

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

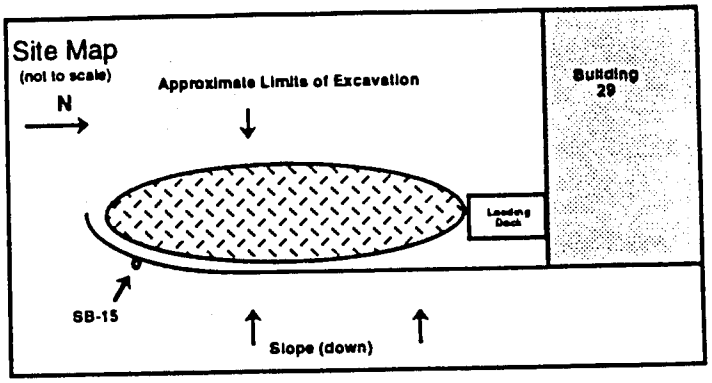
Boring Designation: SB-15
Start Date: 12/9/92 **Completed:** 12/9/
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 8.5 feet below ground surface.

Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range** 0 to 13.5 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range** 3.5 to 15 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range** 0 to 15 feet

General Notes:
Soil Sample SS-2 was submitted for chemical analytical testing.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–3							0.0	BACKFILL: Grey GRAVEL, Moist
4				10			3.5	Medium Compact Dark Brown Fine SILTY SAND, Little Clay and Gravel, Moist
5	SS-1	5.0	12"	10 14	8			
6				11				
7				11				
8	SS-2	7.5	16"	11	11			
9				10			8.5	Medium Compact Dark Brown SANDY GRAVEL, Some Clay, Wet
10	SS-3	10.0	2"	12 8	12			
11				3				
12				7				
13	SS-4	12.5	4"	5	7		13.5	Soft Grey SILTY CLAY, Little Sand, Trace Gravel, Wet
14				2				
15	SS-5	15.0	12"	2 2	7			END OF BORING AT 15.0 FEET
16–20								

WW Engineering & Science, Inc.
Environmental Services

Project No.: 83256.02

LOG OF BORING

Client: GM North American Truck Platform
Location: Plant 2 South of Building 29
Logged By: S. Tacy
Driller: R. Kroll
Contractor: CTI & Associates, Inc.

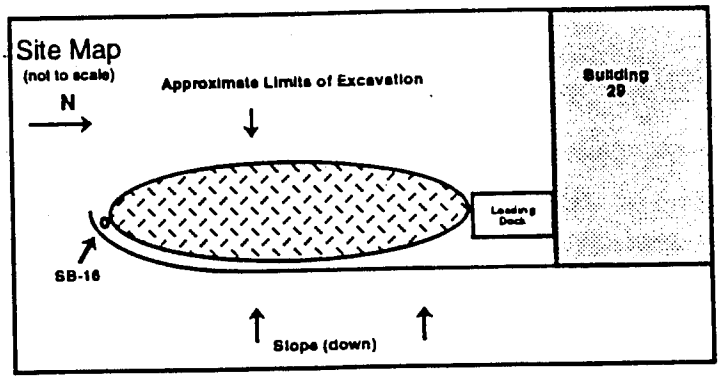
Boring Designation: SB-16
Start Date: 12/9/92 **Completed:** 12/9/92
Ground Surface Elevation: _____ feet msl
Ground-Water Data:
Saturated conditions were encountered at 4.0 feet below ground surface.

Drilling Method(s): 4.25-inch I.D. hollow stem augers — **Depth Range:** 0 to 11.0 feet

Sampling Method(s): 2-inch O.D. Split Spoon — **Depth Range:** 3.5 to 12.5 feet, 2.5 foot intervals

Grouting Material/Method: Granular Bentonite — **Depth Range:** 0 to 12.5 feet

General Notes:
Soil Sample SS-1 was submitted for chemical analytical testing.



Borehole Depth (feet)	Sample Type and Number	Depth of Sample Tip (feet)	Sample Recovered (inches)	Hammer Blows (6-inch Intervals)	PID Readings (ppm)	Graphic Log	Depth Below Ground Surface (feet)	Subsurface Description
1–4							0.0	BACKFILL: Grey GRAVEL, Moist
4–5	SS-1	5.0	12"	3, 6, 7	8		4.0	Stiff to Very Stiff Grey SILTY CLAY, Little Sand and Gravel, Wet
5–7				3, 5, 8				
7–8	SS-2	7.5	18"		7			(8.5) Pushing a piece of gravel
8–10				3, 5, 7				
10–11	SS-3	10.0	2"		6			
11–12				8, 11, 13				
12–13	SS-4	12.5	18"		6			END OF BORING AT 12.5 FEET
13–20								

APPENDIX D

SUMMARY OF WWES ANALYTICAL RESULTS

06-Jan-93

GM NA Truck Platforms Pontiac Central Building 29
Confirmation Soil Samples
Samples Taken December 9, 1992

Parameter	SB-10 SS-1 (ppb)	SB-10 SS-3 (ppb)	SB-11 SS-3 (ppb)	SB-12 SS-2 (ppb)	SB-13 SS-3 (ppb)	SB-14 SS-1 (ppb)	SB-15 SS-2 (ppb)	SB-16 SS-1 (ppb)	Type B Criteria Soil (1) (ppb)
Benzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	20
Ethylbenzene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	2.2	N.D.	1400
Toluene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	6.8	N.D.	16000
Xylenes	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	9.6	N.D.	6000
Polynuclear Aromatic Hydrocarbons (PNAs):									
Acenaphthene	N.D.	N.D.	N.D.	N.D.	N.D.	<50	N.D.	N.D.	8000
Acenaphtylene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	330
Anthracene	N.D.	<20	N.D.	N.D.	140	150	85	N.D.	40000
Benzo(a)anthracene	N.D.	N.D.	N.D.	1100	N.D.	240	370	N.D.	200
Benzo(a)pyrene	N.D.	72	N.D.	740	N.D.	230	550	N.D.	200
Benzo(b)fluoranthene	N.D.	73	N.D.	560	N.D.	240	550	<60	200
Benzo(ghi)perylene	N.D.	<30	N.D.	N.D.	N.D.	N.D.	500	N.D.	330
Benzo(k)fluoranthene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	200
Chrysene	N.D.	140	N.D.	N.D.	N.D.	370	580	94	200
Dibenzo(a,h)anthracene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	200
Fluoranthene	N.D.	120	110	840	34	970	810	<40	6000
Fluorene	N.D.	25	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	6000
Indeno(1,2,3-cd)pyrene	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.	280	N.D.	200
Naphthalene	N.D.	80	N.D.	<70	78	45	43	130	600
Phenanthrene	N.D.	170	N.D.	1100	120	770	450	160	330
Pyrene	96	91	170	780	47	530	450	<40	4000

NOTES:

1. After MDNR, MERA Operational Memorandum #8, Revision 1 -- March 16, 1992

[ ] Indicates that the concentration exceeds Regulatory Limit

N.D. Non Detect

E:\symph\pontcent\29conf.wr1

APPENDIX E

BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-01)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-1
DATE COMPLETED: JANUARY 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: R. PASQUALONI

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	SP/GP-SAND and GRAVEL(FILL), loose, gray, wet - brown			1SS		7
5.0		-5.0		2SS		54
	ML-SILT(FILL), some sand, dense, brown	-6.0				
7.5	SM/GM-SAND and GRAVEL(FILL), some silt, dense, dark brown		8"ø BOREHOLE	3SS		48
	SM-SAND(FILL), some silt and gravel, compact, dark brown, wet	-8.0		4SS		30
10.0	- no gravel, black			5SS		13
		-11.5	CUTTINGS			
12.5	SP/GP-SAND and GRAVEL(FILL), compact, brown, wet - loose - damp			6SS		13
15.0				7SS		6
		-16.7		8GR		
17.5	ML/CL-SILT and CLAY(TILL), some sand, gray, moist			9SS		22
20.0				10SS		28
	- sand seam, brown, dry (21.3 to 21.7 ft BGS) - brown	-22.0				
22.5	END OF HOLE @ 22.0 FT. BGS					
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-02)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-2
DATE COMPLETED: JANUARY 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: R. PASQUALONI

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	SP-SAND(FILL), brown, moist					
5.0						
7.5			8"ø BOREHOLE			
10.0	SM/GM-SAND and GRAVEL(FILL), some silt, brown, wet	-10.0	CUTTINGS	1SS		35
12.5	SM/ML-SAND and SILT(FILL), some gravel, brown, moist	-11.5 -12.0		2SS		18
	SP/GP-SAND and GRAVEL(FILL), dense, brown, wet			3SS		13
15.0		-16.0				
17.5	CL/ML-CLAY and SILT(TILL), some sand, stiff, gray, moist			4SS		30
				5SS		30
20.0		-21.0		6SS		28
22.5	SM/GM-SAND and GRAVEL(TILL), some silt, brown	-22.0				
	END OF HOLE @ 22.0 FT. BGS					
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-03)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-3
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. DANIEL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	SP-SAND(FILL), brown, moist					
5.0		-5.0				
7.5	SC/CL-SAND and CLAY(FILL), wet - very wet		8" ø BOREHOLE			
10.0	SP-SAND(FILL)	-10.0	CUTTINGS	1SS		56
12.5	SP/GP-SAND and GRAVEL(FILL)	-12.0		2SS		
15.0	GP-GRAVEL, some coarse grained sand, trace silt, compact, gray, wet	-14.0		3SS		16
17.5	CL-CLAY(TILL), some sand and gravel, stiff, gray, moist	-17.5		(4SS)		22
20.0	CL/SC-CLAY and SAND, compact, gray, moist	-20.0		5SS		
22.5	END OF HOLE @ 22.0 FT. BGS	-22.0		(6SS)		20
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-04)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-4
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: R. PASQUALONI

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	SP-SAND(FILL), brown, moist					
5.0						
7.5			8" ø BOREHOLE			
10.0	CL/SC-CLAY and SAND, some silt, little gravel, gray, saturated	-10.0	CUTTINGS	1SS		52
12.5	SP/GP-SAND and GRAVEL, little clay, saturated	-12.0		2SS		>50
	- gray					
15.0				3SS		5
17.5	CL-CLAY, stiff, gray	-17.0		(4SS)		21
	SP/GP-SAND and GRAVEL, gray, saturated	-18.0				
	CL/ML-CLAY and SILT, some sand, saturated	-19.0		5SS		11
20.0	SC/GC-SAND and GRAVEL, some clay, little silt, gray, saturated	-20.0		(6SS)		6
22.5	END OF HOLE @ 22.0 FT. BGS	-22.0				
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-05)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-5
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: R. PASQUALONI

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	SP-SAND(FILL), brown, moist					
5.0		-5.0				
	CL/ML-CLAY and SILT(TILL), trace sand and gravel, gray, moist			1SS	X	13
7.5			8" ø BOREHOLE			
10.0				2SS	X	6
12.5			CUTTINGS			
15.0		-15.0				
	CL-CLAY(TILL), some silt, trace sand, soft, gray, moist, slight odor			(3SS)	X	6
17.5						
20.0		-20.0				
	CL/ML-CLAY and SILT, some sand, stiff, gray, damp, slight odor			(4SS)	X	21
		-22.0				
22.5	END OF HOLE @ 22.0 FT. BGS					
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-06)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 29

HOLE DESIGNATION: BH29-6
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: R. PASQUALONI

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
0	FILL					
2.5						
5.0	ML/CL-SILT and CLAY(TILL), trace sand and gravel, gray, moist	-5.0		1SS		16
7.5			8"ø BOREHOLE			
10.0	- no sand or gravel, slight odor		CUTTINGS	2SS		7
12.5						
15.0				3SS		7
17.5						
20.0	CL/ML-CLAY and SILT, trace sand and gravel, stiff, gray	-20.0		4SS		23
22.5	END OF HOLE @ 22.0 FT. BGS	-22.0				
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX F

ANALYTICAL RESULTS

IEA
An Aquarion Company

IEA PROJECT#: ch940104
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BH 29-1 21'-22'	BH 29-1 17'-18'	BH 29-2 16.5'-17'	BH 29-2 21'-21.5'	BH 29-5 20'-22'	
LAB ID	940104 001	940104 002	940104 003	940104 004	940104 005	PQL
COMPOUNDS						
Naphthalene	U	U	U	U	U	330
Acenaphthylene	U	U	U	U	U	330
Acenaphthene	U	U	U	U	U	330
Fluorene	U	U	U	U	U	330
Phenanthrene	U	U	U	U	U	330
Anthracene	U	U	U	U	U	330
Fluoranthene	U	U	U	U	U	330
Pyrene	U	U	U	U	U	330
Benzo(a)anthracene	U	U	U	U	U	330
Chrysene	U	U	U	U	U	330
Benzo(b)fluoranthene	U	U	U	U	U	330
Benzo(k)fluoranthene	U	U	U	U	U	330
Benzo(a)pyrene	U	U	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	U	U	U	U	330
Dibenzo(a,h)anthracene	U	U	U	U	U	330
Benzo(g,h,i)perylene	U	U	U	U	U	330
DATE SAMPLED	01/03/94	01/03/94	01/04/94	01/04/94	01/04/94	
DATE EXTRACTED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94	
DATE ANALYZED	01/05/94	01/05/94	01/05/94	01/05/94	01/06/94	
DILUTION FACTOR	1	1	1	1	1	

IEA
An Aquarion Company

IEA PROJECT#: CH940104
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BH 29-5 15'-17'	BH 29-3 16'-18'	BH 29-3 20'-22'	BH 29-6 15'-17'	BH 29-6 20'-22'	PQL
LAB ID	940104 006	940104 007	940104 008	940104 009	940104 010	
COMPOUNDS						
Naphthalene	U	U	U	U	540	330
Acenaphthylene	U	U	U	U	U	330
Acenaphthene	U	U	U	U	U	330
Fluorene	U	U	U	U	U	330
Phenanthrene	U	U	U	U	660	330
Anthracene	U	U	U	U	U	330
Fluoranthene	U	U	U	U	1400	330
Pyrene	U	U	U	U	930	330
Benzo(a)anthracene	U	U	U	U	430	330
Chrysene	U	U	U	U	480	330
Benzo(b)fluoranthene	U	U	U	U	U	330
Benzo(k)fluoranthene	U	U	U	U	U	330
Benzo(a)pyrene	U	U	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	U	U	U	U	330
Dibenzo(a,h)anthracene	U	U	U	U	U	330
Benzo(g,h,i)perylene	U	U	U	U	U	330

DATE SAMPLED	01/04/94	01/04/94	01/04/94	01/04/94	01/04/94
DATE EXTRACTED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94
DATE ANALYZED	01/06/94	01/06/94	01/06/94	01/06/94	01/06/94
DILUTION FACTOR	1	1	1	1	1

IEA
An Aquarion Company

IEA PROJECT#: CH940104
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BH 29-4 16'-18'	BH 29-4 20'-22'	Method Blank			PQL
LAB ID	940104 011	940104 012	SS0105			
COMPOUNDS						
Naphthalene	U	U	U			330
Acenaphthylene	U	U	U			330
Acenaphthene	U	U	U			330
Fluorene	U	U	U			330
Phenanthrene	390	U	U			330
Anthracene	U	U	U			330
Fluoranthene	510	U	U			330
Pyrene	U	U	U			330
Benzo(a)anthracene	U	U	U			330
Chrysene	U	U	U			330
Benzo(b)fluoranthene	U	U	U			330
Benzo(k)fluoranthene	U	U	U			330
Benzo(a)pyrene	U	U	U			330
Indeno(1,2,3-cd)pyrene	U	U	U			330
Dibenzo(a,h)anthracene	U	U	U			330
Benzo(g,h,i)perylene	U	U	U			330
DATE SAMPLED	01/03/94	01/03/94	-			
DATE EXTRACTED	01/05/94	01/05/94	01/05/94			
DATE ANALYZED	01/06/94	01/06/94	01/05/94			
DILUTION FACTOR	1	1	1			

IEA
An Aquarion Company

IEA PROJECT#: CH940104
CLIENT PROJECT ID: 5770
MATRIX: SOIL

PURGEABLE AROMATICS
BTEX–MTBE EPA 602/8020
ug/kg
(Dry Weights)

CLIENT ID	BH 29–1 21'–22'	BH 29–1 17'–18'	BH 29–1 17'–18'	BH 29–2 16.5'–17'	BH 29–2 16.5'–17'	
LAB ID	40104 001	40104 002	40104 002R	40104 003	40104 003R	PQL
COMPOUNDS						
Benzene	< 5	< 5	< 5	< 5	< 5	5
Toluene	< 10	< 10	< 10	< 10	< 10	10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10	10
Xylene	< 10	< 10	< 10	< 10	< 10	10
MTBE	–	–	–	–	–	–
DATE SAMPLED	01/03/94	01/03/94	01/03/94	01/04/94	01/04/94	
DATE ANALYZED	01/06/94	01/05/94	01/06/94	01/05/94	01/06/94	
DILUTION FACTOR	1	1	1	1	1	

CLIENT ID	BH 29–2 21'–21.5'	BH 29–2 21'–21.5'	BH 29–3 16'–18'	BH 29–3 16'–18'	BH 29–3 20'–22'	
LAB ID	40104 004	40104 004R	40104 007	40104 007R	40104 008	PQL
COMPOUNDS						
Benzene	< 5	< 5	< 5	< 5	< 5	5
Toluene	< 10	< 10	< 10	< 10	< 10	10
Ethylbenzene	< 10	< 10	< 10	< 10	< 10	10
Xylene	< 10	< 10	< 10	< 10	< 10	10
MTBE	–	–	–	–	–	–
DATE SAMPLED	01/04/94	01/04/94	01/04/94	01/04/94	01/04/94	
DATE ANALYZED	01/05/94	01/06/94	01/05/94	01/06/94	01/05/94	
DILUTION FACTOR	1	1	1	1	1	

IEA
An Aquarion Company

IEA PROJECT#: CH940104
CLIENT PROJECT ID: 5770
MATRIX: SOIL

PURGEABLE AROMATICS
BTEX–MTBE EPA 602/8020
ug/kg
(Dry Weights)

CLIENT ID	BH 29–3 20'–22'	Method Blank	Method Blank	
LAB ID	40104 008R	VR0105	VR0106	PQL
COMPOUNDS				
Benzene	< 5	< 5	< 5	5
Toluene	< 10	< 10	< 10	10
Ethylbenzene	< 10	< 10	< 10	10
Xylene	< 10	< 10	< 10	10
MTBE	–	–	–	–
DATE SAMPLED	01/03/94	–	–	
DATE ANALYZED	01/06/94	01/05/94	01/06/94	
DILUTION FACTOR	1	1	1	

IEA
An Aquaterra Company

CLIENT PROJECT # 5770
IEA JOB # 611 94 0104
MATRIX = ~~WATER~~ Soil

DW

PURGEABLE AROMATICS
BTEX + MTBE EPA 602/8020
~~ug/L~~
ug/kg

CLIENT ID	29-4,16-18	29-4,20-22	method BLANK →			PQL
LAB ID	4 0104 011	4010402 12	VS 0111	VBlk12		
COMPOUNDS						
Benzene	5	<5	<5	<5		5 1
Toluene	<10	<10	<10	<10		10 2
Ethylbenzene	<10	<10	<10	<10		10 2
Xylene	<10	<10	<10	<10		10 2
MTBE	-	-	-	-		5
DATE SAMPLED	1-4-94 →		-	-		
DATE ANALYZED	1-12-94	1-11-94	1-11-94	1-12-94		
DILUTION FACTOR	1	1	1	1		

CLIENT ID						PQL
LAB ID						
COMPOUNDS						
Benzene						5 1
Toluene						10 2
Ethylbenzene						10 2
Xylene						10 2
MTBE						5
DATE SAMPLED						
DATE ANALYZED						
DILUTION FACTOR						

1-13-94

IEA
An Aquarion Company

Case Narrative: CH940104

Samples 002, 003, 004, 007 and 008 exhibited low surrogate recovery due to matrix effect. Samples were re-run to confirm this effect.

IEA
An Aquarion Company

SOIL VOLATILE SURROGATE RECOVERIES

PROJECT NO:CH940104

SAMPLE ID	SURR 1 (% RECOV.)
40104001	81
40104002	21
40104002R	27
40104003	38
40104003R	34
40104004	49
40104004R	45
40104007	41
40104007R	45
40104008	44
40104008R	49
VR0105	88
VR0106	94

S1 = Bromofluorobenzene

QC Limits
(65 – 130)

IEA
An Aquarion Company

GC SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: CH940104

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC	QC LIMITS REC
BENZENE	30	<1	24	80	70-130
TOLUENE	30	<2	22	73	70-130

C .MPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC	% RPD	QC LIMITS RPD REC
BENZENE	30	24	80	0	25 70-130
TOLUENE	30	22	73	0	25 70-130

Corresponding Samples:

40104001
40104002
40104003
40104004
40104007
40104008

IEA
An Aquarion Company

SOIL PNA SURROGATE RECOVERIES

SAMPLE ID	SURR 1 (% RECOV.)
SS0105	90
SS0105-BS	87
940104001	90
940104002	90
940104003	83
940104004	96
940104005	90
940104006	91
940104007	106
940104008	88
940104008MS	88
9401040MSD	92
940104009	89
940104010	102
940104011	100
940104012	102
SURR 1 = Carbozole	QC Limits (30-130%)

IEA
An Aquarion Company

PNA SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA Reference No.: CH940104008

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % RECOVERY	QC LIMITS
Naphthalene	670	0	560	84	40 – 120
Acenaphthene	670	0	490	73	40 – 120
Fluorene	670	0	560	83	40 – 120
Phenanthrene	670	0	640	95	40 – 120
Pyrene	670	0	670	100	40 – 120
Chrysene	670	0	580	87	40 – 120
Benzo(b)fluoranthene	670	0	570	85	40 – 120
Benzo(a)pyrene	670	0	590	87	40 – 120

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MS % RECOVERY	% RPD	QC LIMITS RPD	QC LIMITS REC
Naphthalene	670	580	87	3	35	40–120
Acenaphthene	670	540	81	10	35	40–120
Fluorene	670	590	88	6	35	40–120
Phenanthrene	670	660	98	3	35	40–120
P ne	670	690	103	3	35	40–120
C. sene	670	620	92	6	35	40–120
Benzo(b)fluoranthene	670	630	94	10	35	40–120
Benzo(a)pyrene	670	610	91	4	35	40–120

Comments:
BQL = Below Quantitation Limit

IEA
An Aquarion Company

SOIL QC CHECK SAMPLE RECOVERY

IEA Reference No.: SS0105-METHOD BLANK

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % RECOVERY	QC LIMITS
Naphthalene	670	0	600	89	40 - 120
Acenaphthene	670	0	500	74	40 - 120
Fluorene	670	0	490	74	40 - 120
Phenanthrene	670	0	570	86	40 - 120
Pyrene	670	0	670	100	40 - 120
Chrysene	670	0	610	91	40 - 120
Benzo(b)fluoranthene	670	0	640	95	40 - 120
Benzo(a)pyrene	670	0	570	86	40 - 120

Comments:
BQL = Below Quantitation Limit

MEMO

TO: Glenn Turchan REFERENCE NO: 5770

FROM: Jack Lindsay JL DATE: January 17, 1994

RE: Data Quality Assessment and Validation
for Twelve Soil Samples collected from the
General Motors Corporation Central Manufacturing Facility
Pontiac, Michigan (Report CH940104)

The following details an analytical data quality assessment and validation for data resulting from January 4, 1994 collection of twelve soil samples from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Surrogate Compund Percent Recoveries

Individual sample performance for the Benzene, Toluene, ethylbenzene and xylene (BTEX), and Polynuclear Aromatic Hydrocarbons (PNA) analyses were monitored using the percent recoveries of surrogate compound spikes.

The BTEX surrogate compound, bromofluorobenzene, for samples BH-29-1, 17'-18'; BH-29-2, 16.5'-17'; BH-29-2, 16.5'-17'; BH-29-2, 21'-21.5'; BH-29-3, 16'-18' and BH-29-3, 20'-22' were recovered outside of the control limits, therefore, the quantitation

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988.

limits should be qualified as estimated (UJ) for non-detected results. The remaining BTEX and all PNA surrogate data were found to be within the control limits.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and the relative percent difference (RFD) were determined. All data were found to be within the control limits indicating that the data achieved acceptable levels of accuracy and precision based on the information provided.

Laboratory Check Spike Recovery

Laboratory check spike recoveries were examined to assess the accuracy of the laboratory procedures for PNA analyses. The laboratory procedures for PNA analyses. The laboratory check spike samples were found to be within the control limits indicating that an acceptable level of accuracy had been achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information, and may be used with qualifications noted.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	SW-846[1] 8020
Polynuclear Aromatic Hydrocarbons (PNA)	SW-846 8310

1 SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
BETX	- 14 days from sample collection to completion of analysis
PNA	- 14 days from sample collection to extraction - 40 days from sample extraction to completion of analysis

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA, WEST SCHAUMBERG

REFERENCE NUMBER: 5770

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Jeff Daniel PRINTED NAME: JEFF DANIEL

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: PNA	REMARKS
1	1/3/94		BH 29-1, 21'-22' depth	soil	2	1	1	
2	1/3/94		BH 29-1, 17'-18' depth	soil	2	1	1	
3	1/4/94		BH 29-2, 16.5'-17' depth	soil	2	1	1	
4	1/4/94		BH 29-2, 21'-21.5' depth	soil	2	1	1	
5	1/4/94		BH 29-5, 20'-22' depth	soil	1		1	
6	1/4/94		BH 29-5, 15'-17' depth	soil	1		1	
7	1/4/94		BH 29-3, 16'-18' depth	soil	2	1	1	
8	1/4/94		BH 29-3, 20'-22' depth	soil	2	1	1	
9	1/4/94		BH 29-6, 15'-17' depth	soil	1		1	
10	1/4/94		BH 29-6, 20'-22' depth	soil	1		1	
11	1/4/94		BH 29-4, 16'-18' depth	soil	1		1	
12	1/4/94		BH 29-4, 20'-22' depth	soil	1		1	
13								
14								
TOTAL NUMBER OF CONTAINERS					18			

RELINQUISHED BY: 1. Jeff Daniel	DATE: 1/4/94 TIME: 4:15 pm	RECEIVED BY: 1. Vinod Vaghela	DATE: 1/5/94 TIME: 9:00 AM
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED X AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

No 0535

SAMPLE TEAM: G. Turchan, J. Daniels

RECEIVED FOR LABORATORY BY: Jim Druze
DATE: 1/5/94 TIME: 8:48

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX G

MDNR DRAFT MEMORANDUM DATED JUNE 13, 1994

RE: REVISED TYPE B STANDARDS

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

June 13, 1994

DRAFT

TO: Environmental Response Division Staff

FROM: Alan, J. Howard, Chief, Environmental Response Division

SUBJECT: Addendum to MERA Operational Memorandum #8, Revision 3 -- Type B Criteria Rules 299.5709, 299.5711(2), 299.5711(5) and 299.5713

The attached document is the technical justification for the revised Type B criteria for the carcinogenic polynuclear aromatic hydrocarbons (PAHs). Please replace the current criteria with the values listed below and attach this addendum to MERA Operational Memorandum #8.

Historically, MDNR policy has considered all carcinogenic PAHs to be equipotent to benzo[a]pyrene. However, current toxicological information suggests that many of the PAHs are less potent carcinogens than benzo[a]pyrene. The revised PAH criteria were developed using provisional guidance provided by the U.S. Environmental Protection Agency (EPA) which provides estimates of the potential potency (EPP) of 6 PAHs relative to benzo[a]pyrene. GSI values for these compounds will continue to be based on that of benzo[a]pyrene. Soil 20X drinking water and 20X GSI values are not provided since these chemicals are not expected leach through soils to groundwater under most conditions.

	EPP	DW	DCV
Benzo[a]pyrene	1.0	0.0049*	180*
Dibenz[a,h]anthracene	1.0	0.0049*	180*
Benzo[a]anthracene	0.1	0.049*	1800
Benzo[b]fluoranthene	0.1	0.049*	1800
Indeno[1,2,3-c,d]pyrene	0.1	0.049*	1800
Benzo[k]fluoranthene	0.01	0.49*	18,000
Chrysene	0.001	4.9*	180,000

* default to method detection limit of 5 ppb.
** default to method detection limit of 330 ppb.

Any Contact on EPD to please let me if you have questions or want further information.

-DRAFT-

Estimated Order of Potential Potency of Polycyclic Aromatic Hydrocarbons (PAHs)

June 7, 1994

Linda D. Larsen, ERD

Current Michigan Depatment of Natural Resources (MDNR), Environmental Response Division (ERD) policy assumes that all carcinogenic PAHs are equipotent to benzo[*a*]pyrene (BAP). Based on this assumption, the oral slope factor developed for BAP has been used to develop Michigan Environmental Response Act (MERA) 307 cleanup criteria. This policy was based on United States Environmental Protection Agency (EPA) recommendations at the time of its implementation. Advances in the toxicological data base, however, have led to the recognition that some of the carcinogenic PAHs are less carcingenic in animal studies than BAP. EPA quantitative risk estimates for PAHs have not been consistent across all federal programs, with some offices using the equipotency approach and others using comparative potencies from differing sources.

In July of 1993, in an effort to resolve the inconsistentcies in estimating the risks from PAHs, the EPA issued its "Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons". This document states that the equipotency approach results in an overestimation of the carcinogenic effects of PAHs and presents quantitative estimates of carcinogenic potency of seven polycyclic aromatic hydrocarbons (PAHs) relative to the potency of benzo[*a*]pyrene or B[*a*]P. Included are dibenz[*a,h*]anthracene, benzo[a]anthracene, benzo[*b*]fluoranthene, indeno[*1,2,3-c,d*]pyrene, benzo[*k*]fluoranthene, and chrysene. These compounds have been classified under the U.S. EPA weight of evidence classification system as B2, probable human carcinogens. However, the toxicological data base is insufficient to support the development of slope factors for each individual compound. Additionally, the interim approach presented in this document does not meet the requirements necessary for the development of toxic equivalency factors (TEF) similar to those used for assessment of risks from dioxin-like compounds. Therefore, the U.S. EPA has chosen to present this approach as an "estimated order of potential potency".

As stated above, the toxicological data base for carcinogenic PAHs other than BAP is not broad. The available information indicates that carcinogenicity is the most sensitive endpoint for PAH toxicity. Data for noncarcinogenic effects are generally lacking, however, immunotoxicty is considered to correlate roughly with carcinogenicity. Data are also lacking on the additivity of the carcinogenic effects of PAHs. The U.S. EPA has determined, however, that additivity assumptions will yield generally neutral risk estimates (neither conservative nor lenient) for compounds which are believed to induce similar effects at the same sites of action.

At this time the provisional guidance is undergoing internal EPA review. Several regions, including Region V, have accepted the guidance and are using the approach for risk assessments (RA). An advisory document has been written by Jeanine Dinan of the Toxics Integration Branch to provide regional risk assessors with direction in the use of the approach. In addition, an expert panel within the EPA, headed by Terry O'Brien, has reviewed and classified 104 PAH compounds as to their carcinogenicity and/or toxicity. The latter

document presents a qualitative approach rather than the quantitative methodology used in the EPA provisional guidance. Unfortunately, neither of these documents are available for dissemination outside the EPA. Regional staff have been requested to provide comments on the provisional guidance, the advisory document, and the qualitative review. Pending this review, the EPA expects to issue final guidance by early 1995. The Carcinogenic Risk Assessment Verification Endeavor (CRAVE) has determined that the interim guidance approach will not be used to develop slope factors for listing in the Integrated Risk Information System (IRIS) and the "review pending" message has been removed from the carcinogenic assessment section of relevant files. This decision was based on the failure of the provisional guidance to meet the requirements for the development of TEFs and the inadequacies of the existing toxicological data base. It is expected that the CRAVE work group will reopen their review following the internal EPA review of the documents listed above.

The MDNR Toxics Steering Group has the estimated order of potency approach under consideration. As part of this review, a literature search was done to identify toxicological studies which support the use of the estimated potency approach. Nisbet and LaGoy (1992) evaluated several relative potencies approaches for PAHs and presented a modified version which differs minimally from the U.S. EPA approach. Nisbet suggests a potential potency of 0.01 for chrysene as compared to EPA's 0.001. Additionally, Nisbet considers a potential potency of 5 more likely for dibenz[*a*,*h*]anthracene at the low doses expected to be encountered in the natural environment. EPA recommends a potential potency of 1 for dibenz[*a*,*h*]anthracene. Nisbet also suggests that many of the PAHs now considered to be non-carcinogenic may in fact exhibit some potency in mixtures of several PAHs. This possibility has been explored by other researchers, however, no quantitative estimates are available to predict the potency of PAH mixtures at this time (Schmahl et al, 1977; Pfeiffer, 1977) and there is insufficient evidence to classify these compounds as B2 carcinogens. The EPA review predates the Nisbet and Lagoy study and does not include a review of this information. However, both the EPA recommendations and those of Nisbet and Lagoy rely upon the same toxicological data base.

Based on the above discussion, ERD toxicologists are recommending that the estimated order of potential potency approach presented in the U.S. EPA provisional guidance be adopted for use in Act 307 risk assessments which includes the development of cleanup criteria. In part, this decision is based upon the desire to be consistent with EPA recommendations for risk assessments generated under federal programs. Therefore, the alternate relative potencies presented in Nisbet and Lagoy will not be adopted. However, if further information becomes available which indicates that the potency of dibenz[*a*,*h*]anthracene is greater than benzo[*a*]pyrene, the applicable criteria may be adjusted. Criteria may also be modified pending the results of the internal EPA review. The MERA Act 307 health-based cleanup criteria developed under this approach are expected to be protective of both carcinogenic and noncarcinogenic effects. As is the practice for risk assessments generated

under Act 307, the carcingenicity of the PAHs is assumed to be additive.

At this time, analytical techniques are not sufficiently sensitive to detect concentrations of PAHs at the current NERA Act 307 Type B criteria. ERD policy under these circumstances is to default to the method detection limit as the ultimate cleanup goal. Unless new analytical techniques become available, it is expected that the method detection limit would remain the default criteria in soils for both dibenz[*a,h*]anthracene and benzo[*a*]pyrene and in groundwater for all of the carcinogenic PAHs. Cleanup criteria for the remaining carcinogenic PAHs are calculated by multiplying the slope factor for benzo[*a*]pyrene by the recommended estimate of potential potency (EPP). The resulting Type B health-based drinking water values (DW) and direct contact values (DCV) are listed below in units of parts per billion (ppb).

	EPP	DW	DCV
Benzo[*a*]pyrene	1.0	0.0049*	180*
Dibenz[*a,h*]anthracene	1.0	0.0049*	180*
Benzo[*a*]anthracene	0.1	0.049*	1800
Benzo[*b*]fluoranthene	0.1	0.049*	1800
Indeno[*1,2,3-c,d*]pyrene	0.1	0.049*	1800
Benzo[*k*]fluoranthene	0.01	0.49*	18,000
Chrysene	0.001	4.9*	180,000

* default to method detection limit of 5 ppb.
** default to method detection limit of 330 ppb.

References

Dinan, Jeanine, Toxics Integration Branch, EPA. 1994. personal communication.

McGaugy, Robert, U.S. EPA. 1994. personal communication.

Nisbet, Ian C and Peter K. LaGoy. 1992. Toxic Equivalency Factors (TEF) for Polycyclic Aromatic Hydrocarbons (PAHs). Regulatory Toxicology and Pharmacology 16, 290-300.

Pfeifer, E.H. 1977. Oncogenic Interaction of Carcinogenic and Non-carcinogenic Polycyclic Aromatic Hydrocarbons. In Air Pollution and Cancer in Man. IARC (16).

O'Brien, Terry, Toxics Integration Branch, EPA. 1994. personal communication.

Schmahl, D. et al. 1977. Syncarcinogenic Action of Polycyclic Aromatic Hydrocarbons in Automobile Exhaust Gas Condensates. In Air Pollution and Cancer in Man. IARC (16).

U.S. EPA. 1993. Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons. (EPA/600/R-93/089).

Van Luen, Pat, U.S. EPA Region V. 1994. personal communication.

APPENDIX E.3

MDNR CLOSURE LETTER

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
JERRY C. BARTNIK
KEITH J. CHARTERS
LARRY DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLLI
JOEY M. SPANO

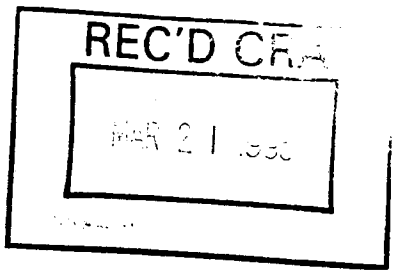
JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING, PO BOX 30028, LANSING MI 48909-7528

ROLAND HARMES, Director

5770
f.w.



March 17, 1995

Mr. Keith West
General Motors Corporation
Remediation Team
Argonaut "A" - 1004H
485 West Milwaukee Avenue
Detroit, Michigan 48202

Dear Mr. West:

SUBJECT: Closure Report dated February 10, 1995
Confirmed Release dated October 16, 1991 (release #7)
Location of Tank(s): Building #29
GM North American Truck Platforms
Pontiac Central Facility
660 South Blvd., Pontiac, MI
MERA Site ID #630415
Facility ID #18277

This is to acknowledge receipt of your closure report submitted for the subject site by Conestoga-Rovers & Associates (CRA) in accordance with section 6f.(3) of the Leaking Underground Storage Tank Act, 1988 PA 478, as amended (Act 478). The closure report concludes that the release has been remediated to Type-B cleanup levels.

Based on the conclusions of CRA, this portion of site has been removed from the list of contaminated sites in Michigan as published under the Michigan Environmental Response Act, 1982 PA 307, as amended. Under section 6h.(2) of Act 478, the Underground Storage Tank Division may audit the results of the investigation and corrective actions undertaken to confirm the results and conclusions indicated by CRA. If the audit does not confirm that corrective action is complete, additional information and/or corrective action may be required as set forth in Section 6h.(3).

If you have any questions, please contact Mr. Paul Owens at the Southeast Michigan District Office, Michigan Department of Natural Resources, Underground Storage Tank Division, 38980 W. Seven Mile Road, Livonia, Michigan 48152-1006, or at telephone number 313-953-1534.

Sincerely,

Mohammad Yusaf

Mohammad Yusaf, P.E., Chief
Field Operations Section
Underground Storage Tank Division
517-373-3135

cc: Mr. Glenn Turchan, Conestoga-Rovers & Associates
Sedgewick James of Michigan
Ms. Valerie Burgess-Byrd, MDNR
Mr. Thomas Kohl, MDNR
Mr. Paul Owens, MDNR

R 1026-E
REV. 02/95

APPENDIX F

BUILDING 43 STUDY AREA

APPENDIX F.1

FINAL REPORT, BUILDING 43 STUDY AREA

PRIVILEGED AND CONFIDENTIAL
PREPARED AT THE REQUEST OF
GENERAL MOTORS COUNSEL

REPORT
BUILDING 43 STUDY AREA

General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

APRIL 1995

REF. NO. 5770 (17)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

This document presents a Preliminary Report (Report) for the Building 43 Study Area (Study Area) located at the General Motors Pontiac Central Manufacturing Facility (Facility) in Pontiac, Michigan. Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) Truck and Bus Group to conduct an evaluation of the Study Area. The Facility location is presented on Figure 1.1. The Study Area location is presented on Figure 1.2.

The assessment of the Study Area included confirming the conditions reported by Cook & Associates, Inc. (Cook) and WW Engineering (WW) and evaluating the extent of affected materials potentially requiring excavation and removal. Due to stockpiled concrete, the physical investigation could not be extended sufficiently to develop a complete profile of the potentially affected material. However, based on the available information, an estimate of the volume of the potentially affected material has been developed. Actual material excavation and removal volumes will be determined during any remedial works that may be performed and will coincide with any necessary verification of removal sampling conducted.

The remainder of this Report is presented in the following sections:

2.0 Background
3.0 CRA subsurface Investigation
4.0 Investigation Results
5.0 Summary

2.0 BACKGROUND

The GM Pontiac Central Manufacturing Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles, and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

The Study Area is currently used to support re-development activities associated with the Centerpoint Business Campus Development.

2.1 FACILITY GEOLOGY

The Facility and Study Area are located in an area of glacial till and outwash deposits formed during the Wisconsin glacial stage of the Pleistocene Epoch. The glacial till is comprised of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins.

Shallow native soil materials underlying the Facility are predominantly comprised of glacial tills of low to very low permeability. the glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

2.2 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the GM Truck and Bus Group Pontiac Central Manufacturing Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan."

The CDM report identified three primary sand and sand/gravel aquifers in the area of the Property. These aquifers occur at depths of approximately 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25, and 50 feet thick, respectively. The "210-foot aquifer" is a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the Facility, generally at depths of 10 to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower water bearing zones.

2.3 PRIOR COOK & ASSOCIATES/WW ENGINEERING INVESTIGATION

In April of 1992, an investigation of the nature and extent of potentially affected soil in the vicinity of Building 43 was conducted by Cook/WW to provide a preliminary cost estimate for the removal and disposal of the affected soil. Trenches were excavated in select areas behind Building 43 adjacent to the frame rack storage area. Figure 2.1 presents the Cook/WW trenching locations. Excavated and exposed soils were visually inspected. The trenches were typically four feet wide and six feet deep and were excavated in a north-south or east-west alignment.

It was noted by Cook/WW that a layer of ash up to three feet thick was encountered approximately four feet bgs. Miscellaneous debris including steel banding, cured or burned paint sludge, and wood were also encountered in the ash layer. During the Cook/WW investigation, no soil samples were collected for chemical analysis. Figure 2.1 presents the Cook/WW test trenches and the extent of visually affected materials identified in the Cook/WW investigation. Photographs taken by Cook/WW during their investigation are presented in Appendix A.

3.0 CRA SUBSURFACE INVESTIGATION

In August, 1994, CRA was retained by GM to conduct an evaluation of the Study Area to further define the nature and extent of affected soils reported in the Cook/WW investigation report.

The CRA physical investigation was impeded at that time by large stockpiles of concrete materials placed in the area by Barton Malow (for the purpose of crushing the concrete to produce aggregate), and by Building 43. As a result, additional boreholes could not be installed further to the south or east.

A total of nine boreholes were advanced within the Study Area to depths ranging from 4 to 27 feet bgs. Boreholes were advanced using a 4 1/4-inch hollow stem augers. Decontamination of the augers was conducted between each borehole location and consisted of a high pressure, low volume steam cleaning to remove all visual soils and debris. On completion, each borehole was backfilled with its drill cuttings. Figure 3.1 presents the borehole locations. Borehole Stratigraphic Logs are presented in Appendix B.

Soil samples were collected on a continuous basis using 2-foot long, 2-inch inside diameter, stainless steel split-spoon samplers. Decontamination of the stainless steel split spoons consisted of the following:

1. Rinse with potable water;
2. Scrub with deionized water and Alconox; and
3. Final rinse with deionized water.

Each sample was carefully examined by a CRA field representative to identify soil type and any visible chemical staining, discoloration or odor. All soil samples were screened with a Photoionization Detector (PID) by the CRA field representative. The results of the PID screening are summarized on the stratigraphic logs presented in Appendix B. Field observations were recorded on the stratigraphic logs and utilized to select samples to be submitted for chemical analysis.

Eighteen soil samples were submitted to a laboratory and analyzed for Target Compound List (TCL) Volatile Organic Compounds (VOCs), Semi Volatile Organic Compounds (SVOCs), and Target Analyte List (TAL) metals.

4.0 INVESTIGATION RESULTS

The subsurface investigation presented in Section 3.0 identified the Study Area geology and hydrogeology and characterized the general nature and extent of potentially affected material at the Study Area. The potentially affected areas could not be fully characterized on the south and east sides or below Building 43.

The Study Area geology and hydrogeology are presented in Section 4.1. The chemical analytical results are presented in Section 4.2. The estimated extent of affected material is presented in Section 4.3.

4.1 GEOLOGIC/HYDROGEOLOGIC CONDITIONS

Nine boreholes were installed to identify the geologic and hydrogeologic conditions at the Study Area. Stratigraphic logs are presented in Appendix B.

The subsurface conditions encountered in the boreholes indicate that the Study Area is generally clay and silt fill soils. At some locations, the fill soils were found to contain miscellaneous debris including paint chips, wire and general debris. The underlying native clay/till identified in Section 2.0 was not identified in any of the Study Area boreholes because of their limited depth.

No significant water bearing zones were identified in any of the boreholes. Moist and wet silt and sand were identified in BH43-1, however, no saturated stratigraphic zones were encountered. As a result, no defined groundwater regime or aquifer has been identified in the shallow subsurface zone of the Study Area.

4.2 CHEMICAL ANALYTICAL RESULTS

A total of eighteen soil samples were collected and analyzed as presented on Table 4.1. Laboratory analytical data and Chain-of-Custody Records are presented in Appendix C. The Data Validation Report is presented in Appendix D.

A summary of detected compounds in soil compared to Michigan Type B 20 x Drinking Water and Type B and C Direct Contact Cleanup Criteria for soil is presented in Table 4.2.

Several compounds were detected above the Michigan Type B Direct Contact Criteria for soil. Vinyl Chloride was detected in BH43-4 at 12 to 14 feet bgs at 560 µg/kg. Several SVOCs (benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, indeno (1,2,3-cd)pyrene, and dibenzo(a,h)anthracene) were detected in BH43-3 at 2 to 4 feet bgs above Michigan Type B Direct Contact Cleanup Criteria. Several metals (aluminum, arsenic, lead, and manganese) were detected in BH43-1 at 7 to 9 feet bgs, in BH43-2 at 4 to 6, 10 to 12, and 16 to 18 feet bgs, in BH43-4 at 4 to 8 and 12 to 14 feet bgs, in BH43-7 at 13 to 15 feet bgs, in BH43-8 at 2 to 2.5 and 8 to 10 feet bgs, and in BH43-9 at 3 to 4, 8 to 10, and 10 to 12 feet bgs, above Michigan Type B Direct Contact Criteria.

Arsenic and lead were the only analytes detected above the Michigan Type C Generic Industrial Direct Contact Cleanup Criteria. Either lead or arsenic was detected above the Michigan Type C Generic Industrial Direct Cleanup Criteria in BH43-1 at 7 to 9 feet bgs, in BH43-2 at 4 to 6 and 10 to 12 feet bgs, in BH43-4 at 4 to 8 and 12 to 14 feet bgs, and in BH43-9 at 3 to 4 feet bgs.

4.3 EXTENT OF AFFECTED MATERIALS

The estimated extent of potentially affected material, based on both the visual observations presented in the Cook/WW report and on

the results of CRAs preliminary subsurface investigation, is presented on Figure 4.1.

The estimated extent of affected material is based on laboratory analytical results exceeding the Michigan Type C Generic Industrial Direct Contact Cleanup Criteria for soil, with the exception of arsenic identified at 13 mg/kg in BH43-1 at 7 to 9 feet bgs. The estimated extent of affected material was not expanded to contain this sample location because arsenic was the only analyte detected at this location above Michigan Type C Generic Industrial Direct Contact Cleanup Criteria. In addition, arsenic has been identified at a Site adjacent to the Facility at a background concentration of 12.5 mg/kg (Draft Extent of Contamination (EOC) Study, J-Lot, General Motors Pontiac Central Manufacturing Facility, Pontiac, Michigan).

Based upon the borehole stratigraphic logs, the affected material is overlain by approximately two feet of unaffected soil. The thickness of the affected material varies in each of the boreholes installed and ranges from three to twelve feet thick. The total estimated volume of affected material is approximately 5,000 cy. This estimate is based on the available information and an approximation of the extent of affected materials. Actual volumes will be determined during remedial excavation, if required, utilizing verification sampling as necessary. This report deals with the areas exterior of Building 43 only.

5.0 SUMMARY

The following summary has been prepared based on the information obtained during the Cook/WW and CRA subsurface investigations at the Study Area:

1. The general nature and extent of affected soil within the Study Area has been determined as presented in Section 4.0 of this report;

2. The affected soil is overlain by approximately two feet of unaffected soil;

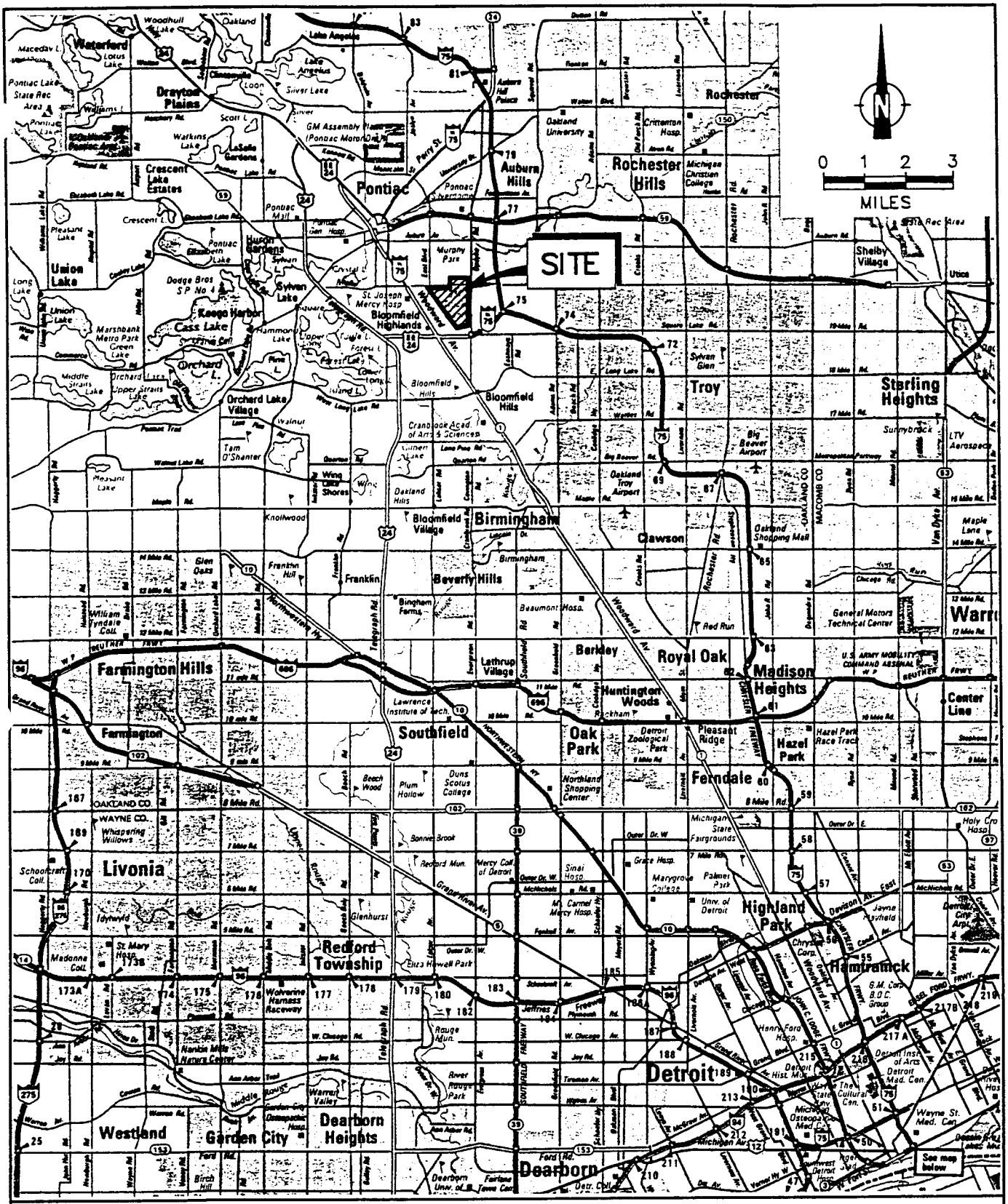
3. The affected soil ranges from 3 to 12 feet in thickness;

4. Samples collected from the affected soil indicate concentrations of VOCs, SVOCs, and metals above Michigan Type B Direct Contact Criteria and concentrations of lead and arsenic over Michigan Type C Generic Industrial Direct Contact Cleanup Criteria;

5. The estimated extent of affected soil is presented on Figure 4.1;

6. The estimated volume of affected soil is approximately 5000 cy; and

7. No significant groundwater exists at the Study Area.



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (17) JAN 25/95 (W) REV.0

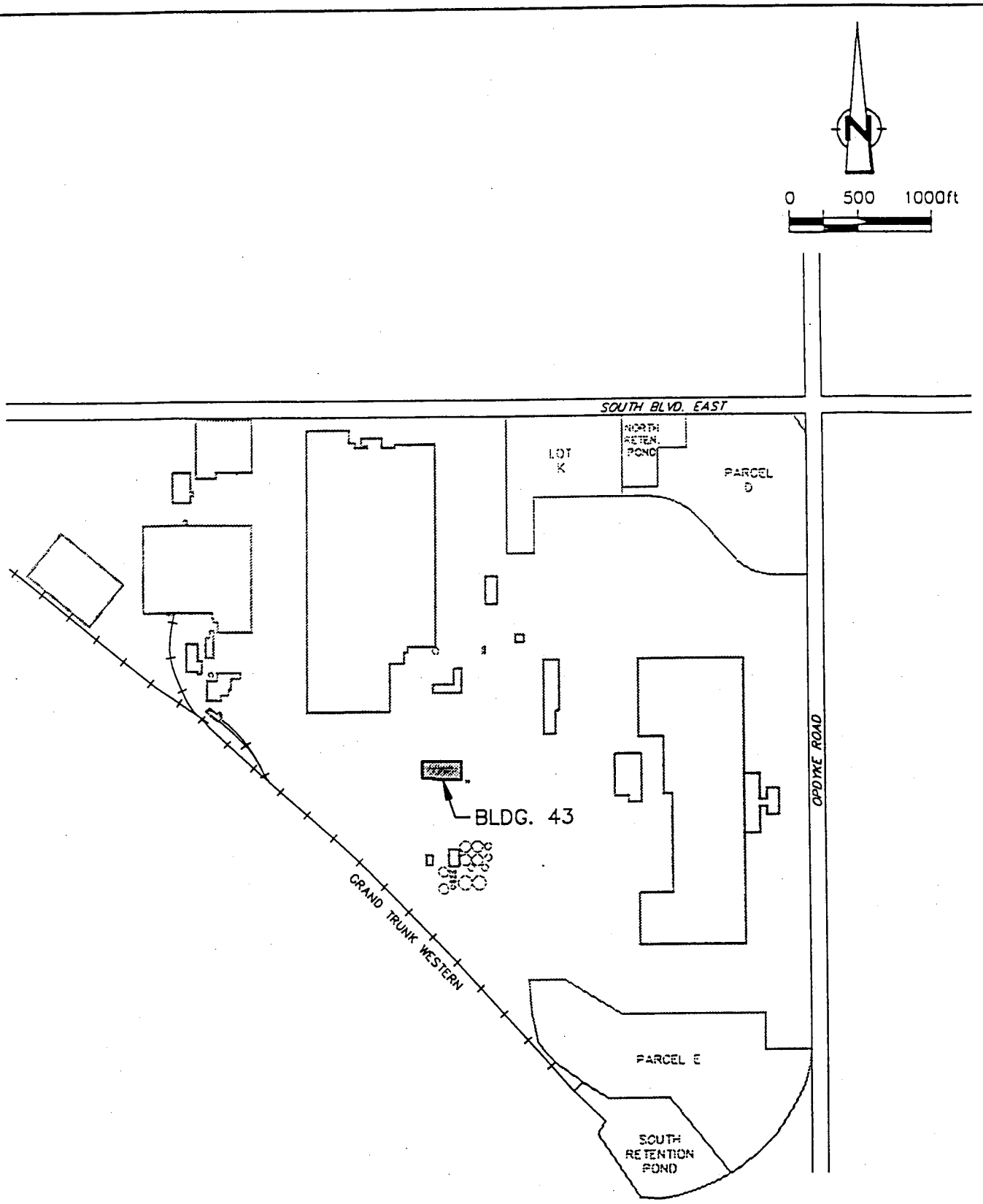


figure 1.2

BUILDING #43 STUDY AREA LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (17) JAN 26/95(W) REV.0 (P-66)

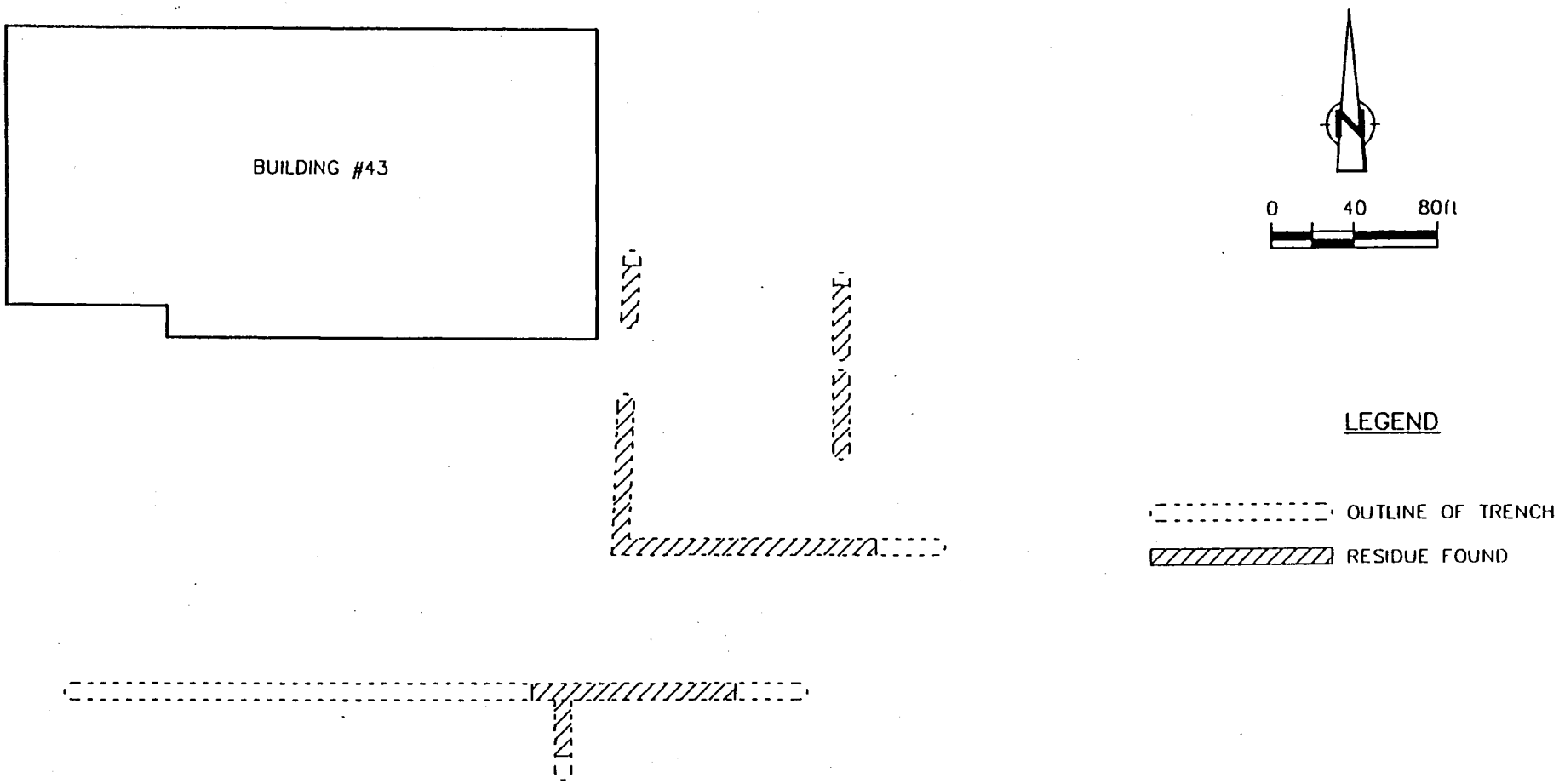


figure 2.1

LOCATIONS OF COOK & ASSOCIATES/WW ENGINEERING TEST TRENCHES
BUILDING #43 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (17) JAN 26/95(W) REV.0 (P-67)

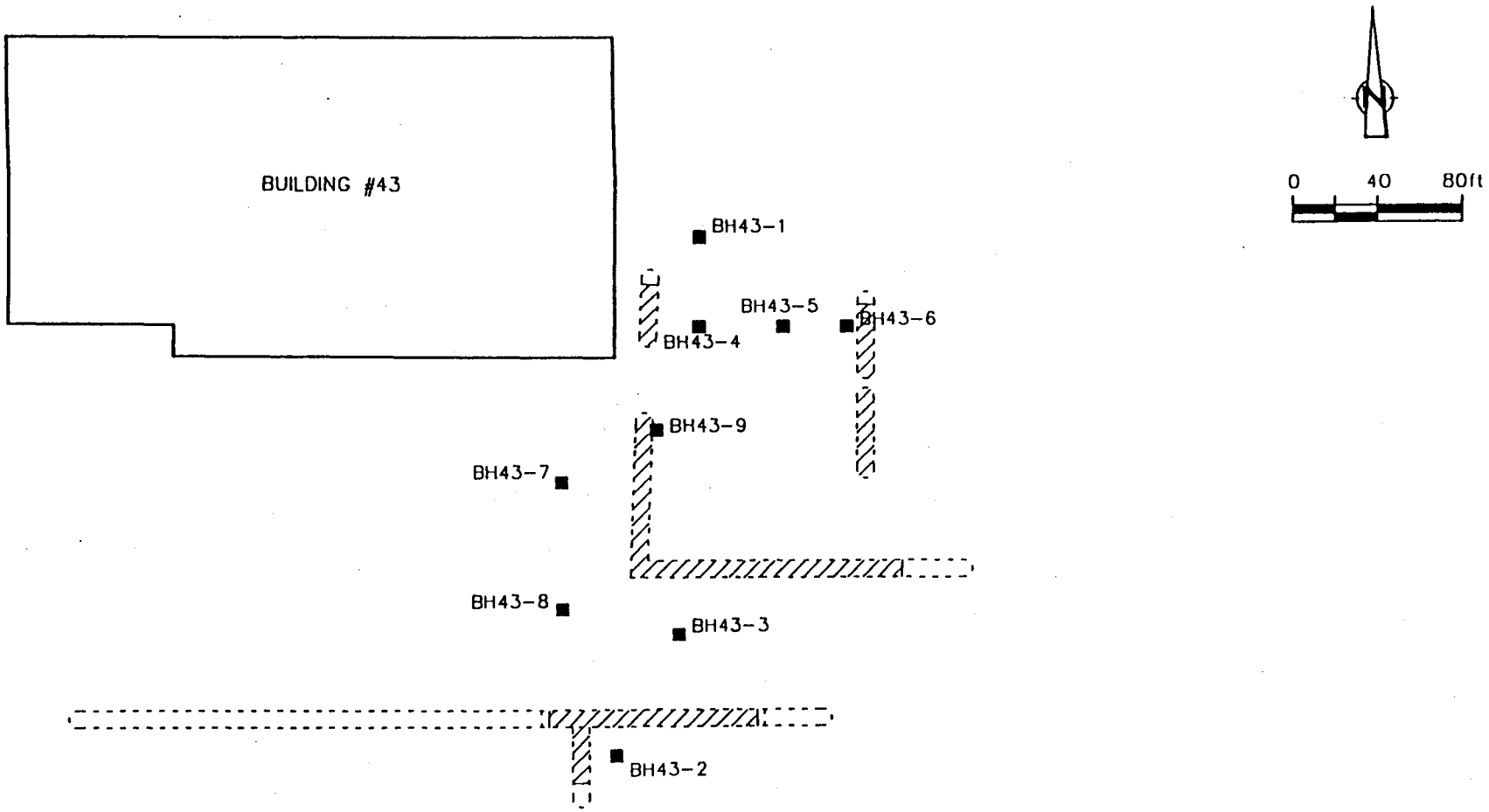


figure 3.1

BOREHOLE LOCATIONS
BUILDING #43 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (17) JAN 26/95(W) REV.0 (P-68)

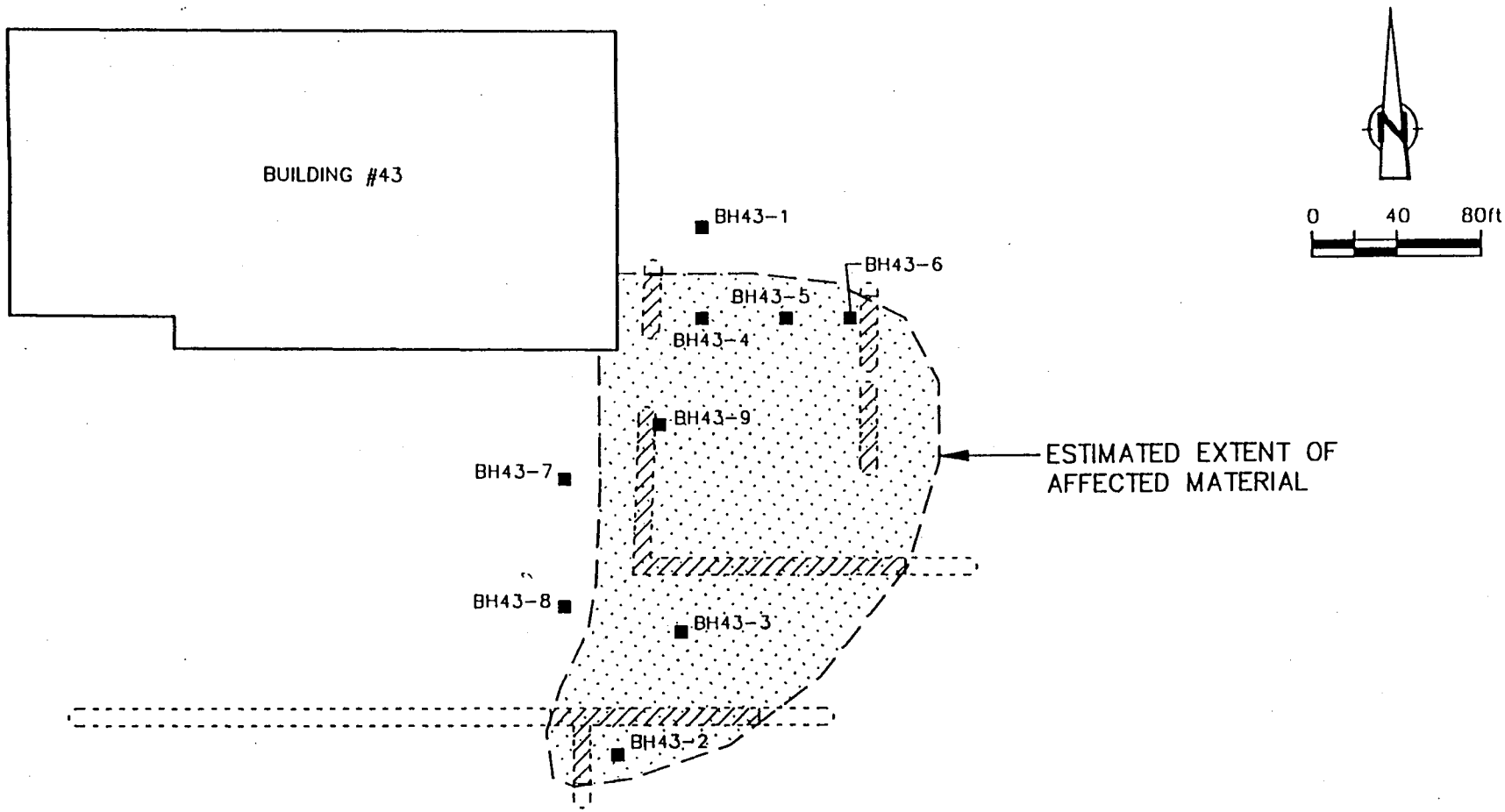


figure 4.1

ESTIMATED EXTENT OF AFFECTED MATERIAL
BUILDING #43 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (17) JAN 26/95(W) REV.0 (P-69)

TABLE 4.1

SOIL SAMPLE SUMMARY
BUILDING 43
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	SAMPLE LOCATION	DEPTH (feet below ground surface)	ANALYSIS
S-081994-FR-115	BH43-1	7-9'	VOC, SVOC, Metals
S-081994-FR-116	BH43-1	21-23'	VOC, SVOC, Metals
S-081994-FR-117	BH43-2	4-6'	VOC, SVOC, Metals
S-081994-FR-118	BH43-2	10-12'	VOC, SVOC, Metals
S-081994-FR-119	BH43-2	16-18'	VOC, SVOC, Metals
S-082094-FR-120	BH43-3	2-4'	VOC, SVOC, Metals
S-082094-FR-121	BH43-4	4-8'	VOC, SVOC, Metals
S-082094-FR-122	BH43-4	12-14'	VOC, SVOC, Metals
S-082094-FR-123	BH43-6	8-9'	VOC, SVOC, Metals
S-082094-FR-124	BH43-7	3-5'	VOC, SVOC, Metals
S-082094-FR-125	BH43-7	13-15'	VOC, SVOC, Metals
S-082094-FR-126	BH43-7	19-21'	VOC, SVOC, Metals
S-082094-FR-127	BH43-7	25-27'	VOC, SVOC, Metals
S-082194-FR-128	BH43-8	2-2.5'	VOC, SVOC, Metals
S-082194-FR-129	BH43-8	8-10'	VOC, SVOC, Metals
S-082194-FR-130	BH43-9	3-4'	VOC, SVOC, Metals
S-082194-FR-131	BH43-9	8-10'	VOC, SVOC, Metals
S-082194-FR-132	BH43-9	10-12'	VOC, SVOC, Metals

TABLE 4.2

SUMMARY OF DETECTED ANALYTES
BUILDING 43
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION				FR-115	FR-116	FR-117	FR-118	FR-119	FR-120
LOCATION				BH 43-1	BH 43-1	BH 43-2	BH 43-2	BH 43-2	BH 43-3
DEPTH (feet BGS)				7-9	21-23	4-6	10-12	16-18	2-4
	MICHIGAN CLEANUP CRITERIA								
	TYPE B 20 x DW (a)	TYPE B DCV (a)	TYPE C DCV (b)						
VOC (ug/kg)									
Trans-1,2-Dichloroethene	2400	1300000	2500000	ND (10)	ND (10)	ND (50)	ND (50)	ND (50)	ND (10)
Vinyl Chloride	10 (c)	180	1100	ND (10)	ND (10)	ND (50)	ND (50)	ND (50)	ND (10)
Methylene Chloride	92	51000	15000	ND (10)	ND (10)	ND (50)	ND (50)	ND (50)	ND (10)
Acetone	14000	7800000	15000000	ND (100)	ND (100)	ND (500)	ND (500)	150 (500)	ND (100)
Carbon Disulfide	1500	8600000	16000000	ND (100)	ND (100)	ND (500)	210 (500)	ND (500)	ND (100)
cis-1,2-Dichloroethene	1500	860000	1600000	ND (10)	ND (10)	ND (50)	79 (50)	150 (150)	ND (10)
Chloroform	110	62000	410000	ND (10)	ND (10)	ND (50)	ND (50)	180 (50)	ND (10)
Trichloroethylene	44	24000	150000	ND (10)	ND (10)	ND (50)	47 (50)	1200 (50)	ND (10)
Benzene	24	13000	85000	ND (10)	ND (10)	ND (50)	94 (50)	230 (50)	ND (10)
Tetrachloroethylene	14	7800	49000	ND (10)	ND (10)	ND (50)	55 (50)	230 (50)	ND (10)
Toluene	16000	17000000	33000000	ND (10)	ND (10)	ND (50)	190 (50)	99 (50)	ND (10)
Ethylbenzene	1500	7500000	14000000	ND (10)	ND (10)	ND (50)	6800 (50)	2400 (50)	ND (10)
Total Xylenes	5600	140000000	270000000	ND (30)	ND (30)	ND (150)	42000 (150)	16000 (150)	ND (30
SVOC (BNAs only) (ug/kg)									
4-Methlyphenol	700	1300000	4500000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (660)
Naphthalene	5000	9300000	32000000	ND (330)	ND (330)	ND (330)	640 (330)	ND (330)	ND (660)
2-Methylnaphthalene	-	-	-	ND (330)	ND (330)	ND (330)	770 (330)	ND (330)	ND (660)
Dibenzofuran	-	-	-	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (660)
Phenanthrene	500	930000	3200000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	1300 (660)
Fluoranthene	17000	31000000	110000000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	3200 (660)
Pyrene	10000	19000000	67000000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	4200 (660)
Benzo(a)anthracene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**2000 (660)**
hrysene	180000	180000	2100000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	1600 (660)
enzo(b)fluoranthene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**2700 (660)**
Benzo(k)fluoranthene	18000	18000	210000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	1200 (660)
Benzo(a)pyrene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**1300 (660)**
Indeno(1,2,3-c,d)pyrene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**2000 (660)**
Dibenzo(a,h)anthracene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	**740 (660)**
Benzo(g,h,i)perylene	930000	930000	3200000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (660)
INORGANICS (mg/kg)									
Aluminum	6900 (d)	6900 (d)	-	**8600 (2.5)**	6800 (2.5)	6200 (2.5)	**11000 (2.5)**	6200 (2.5)	6300 (2.5)
Antimony	0.5 (c)	91	310	<0.14 (0.125)	<0.13 (0.125)	36 (0.125)	0.26 (0.125)	<0.13 (0.125)	3.5 (0.125)
Arsenic	5.8 (d)	5.8 (d)	8.6	**13 (0.1)**	2.8 (0.1)	5.4 (0.1)	**8.6 (0.1)**	**6 (0.1)**	5 (0.1)
Barium	48	18000	63000	42 (1.25)	37 (1.25)	1000 (1.25)	41 (1.25)	32 (1.25)	96 (1.25)
Berylium	-	-	-	0.37 (0.125)	0.22 (0.125)	0.28 (0.125)	0.43 (0.125)	0.26 (0.125)	0.28 (0.125)
Cadmium	0.07	130	450	0.42 (0.02)	.21 (0.02)	7.3 (0.02)	0.35 (0.02)	.18 (0.02)	0.89 (0.02)
Calcium	-	-	-	65000 (5)	60000 (5)	47000 (5)	1600 (5)	58000 (5)	48000 (5)
Chromium	2.4	1200	4300	13 (0.25)	12 (0.25)	120 (0.25)	20 (0.25)	11 (0.25)	19 (0.25)
Cobalt	-	-	-	6.8 (1.25)	4.9 (1.25)	13 (1.25)	8.7 (1.25)	5.5 (1.25)	6.2 (1.25)
Copper	20	9800	34000	13 (0.625)	11 (0.625)	190 (0.625)	20 (0.625)	11 (0.625)	28 (0.625)
Iron	12000 (d)	12000 (d)	-	15000 (1.28)	12000 (1.25)	25000 (1.25)	20000 (1.25)	12000 (1.25)	13000 (1.25)
Lead	1 (c)	400	400	4.1 (0.15)	2.9(0.15)	**1000 (0.15)**	17 (0.15)	5.1 (0.15)	74 (0.15)
Magnesium	-	-	-	11000 (5)	22000 (5)	11000 (5)	3000 (5)	14000 (5)	13000 (5)
Manganese	1	1200	4300	540 (0.375)	250 (0.375)	370 (0.375)	210 (0.375)	300 (0.375)	340 (0.375)
Mercury	0.042	78	270	<0.021 (0.02)	<0.017 (0.02)	0.028 (0.02)	0.033(0.02)	<0.015 (0.02)	0.025 (0.02)
Nickel	11	20000	68000	17 (0.75)	13 (0.75)	28 (0.75)	20 (0.75)	14 (0.75)	35 (0.75)
Potassium	-	-	-	1200 (25)	1200 (25)	970 (25)	1400 (25)	1000 (25)	750 (25)
Silver	0.66	1200	4200	<0.19 (0.03)	<0.033 (0.03)	.49 (0.03)	<0.033 (0.03)	<0.024 (0.03)	.14 (0.03)
Sodium	3000	1000000	1000000	2000 (5)	860 (5)	540 (5)	400 (5)	240 (5)	1200 (5)
Vanadium	1.2	2200	7800	16 (1.25)	16 (1.25)	13 (1.25)	24 (1.25)	14 (1.25)	12 (1.25)
Zinc	46	86000	300000	45 (0.5)	29 (0.5)	740 (0.5)	50 (0.5)	30 (0.5)	1200 (0.5)

Notes:

(a) from MERA Op. Memo. #8, February 4, 1994 and addendum dated June 21, 1994.

(b) from MERA Op. Memo #14, June 21, 1994.

(c) the Michigan method detection limit has been substituted for the Type B criteria.

(d) Michigan Type A background levels from MERA Op. Memo. #15, September 30, 1993.

ND - analyte was not detected

DCV - direct contact value.

DW - drinking water

( ) - parenthesis indicate the method detection limit.

TABLE 4.2

SUMMARY OF DETECTED ANALYTES
BUILDING 43
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION				FR-121	FR-122	FR-123	FR-124	FR-125	FR-126
LOCATION				BH43-4	BH43-4	BH43-6	BH43-7	BH43-7	BH43-7
DEPTH (feet BGS)				4-8	12-14	8-9	3-5	13-15	19-21
	MICHIGAN CLEANUP CRITERIA								
	TYPE B 20 x DW (a)	TYPE B DCV (a)	TYPE C DCV (b)						
VOC (ug/kg)									
Trans-1,2-Dichloroethene	2400	1300000	2500000	22 (10)	180 (50)	ND (50)	ND (10)	ND (50)	ND (10)
Vinyl Chloride	10 (c)	180	1100	63 (10)	**560 (50)**	ND (50)	ND (10)	ND (50)	ND (10)
Methylene Chloride	92	51000	15000	ND (10)	ND (50)	ND (50)	ND (10)	ND (50)	ND (10)
Acetone	14000	7800000	15000000	ND (100)	ND (500)	ND (500)	ND (100)	ND (500)	120 (100)
Carbon Disulfide	1500	8600000	16000000	ND (100)	ND (500)	ND (500)	ND (100)	ND (500)	ND (100)
cis-1,2-Dichloroethene	1500	860000	1600000	50 (10)	120 (50)	ND (50)	ND (10)	ND (50)	ND (10)
Chloroform	110	62000	410000	ND (10)	ND (50)	ND (50)	ND (10)	ND (50)	ND (10)
Trichloroethylene	44	24000	150000	13 (10)	92 (50)	ND (50)	ND (10)	ND (50)	ND (10)
Benzene	24	13000	85000	15 (10)	59 (50)	ND (50)	54 (10)	210 (50)	4900 (10)
Tetrachloroethylene	14	7800	49000	ND (10)	ND (50)	ND (50)	ND (10)	ND (50)	ND (10)
Toluene	16000	17000000	33000000	ND (10)	14 (50)	ND (50)	19 (10)	ND (50)	800 (10)
Ethylbenzene	1500	7500000	14000000	ND (10)	14 (50)	ND (50)	37 (10)	510 (50)	160 (10)
Total Xylenes	5600	140000000	270000000	ND (30)	89 (150)	ND (150)	46 (30)	2300 (150)	9100 (30)
SVOC (BNAs only) (ug/kg)									
4-Methlyphenol	700	1300000	4500000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Naphthalene	5000	9300000	32000000	ND (330)	770 (330)	ND (330)	ND (330)	ND (330)	ND (330)
2-Methylnaphthalene	-	-	-	1300 (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Dibenzofuran	-	-	-	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Phenanthrene	500	930000	3200000	ND (330)	720 (330)	ND (330)	ND (330)	ND (330)	ND (330)
Fluoranthene	17000	31000000	110000000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Pyrene	10000	19000000	67000000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)anthracene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
'hrysene	180000	180000	2100000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
ɔenzo(b)fluoranthene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(k)fluoranthene	18000	18000	210000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)pyrene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Indeno(1,2,3-c,d)pyrene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Dibenzo(a,h)anthracene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(g,h,i)perylene	930000	930000	3200000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
INORGANICS (mg/kg)									
Aluminum	6900 (d)	6900 (d)	-	**7000 (2.5)**	**9500 (2.5)**	3600 (2.5)	6900 (2.5)	**10000 (2.5)**	6000 (2.5)
Antimony	0.5 (c)	91	310	3.8 (0.125)	65 (0.125)	<0.13 (0.125)	2.8 (0.125)	0.19 (0.125)	<0.14 (0.125)
Arsenic	5.8 (d)	5.8 (d)	8.6	**12 (0.1)**	**13 (0.1)**	3.3 (0.1)	5 (0.1)	**7.5 (0.1)**	2.8 (0.1)
Barium	48	18000	63000	710 (1.25)	670 (1.25)	1.6 (1.25)	30 (1.25)	52 (1.25)	29 (1.25)
Berylium	-	-	-	0.26 (0.125)	0.34 (0.125)	0.13 (0.125)	0.31 (0.125)	0.37 (0.125)	0.14 (0.125)
Cadmium	0.07	130	450	6.9 (0.02)	54 (0.02)	0.17 (0.02)	0.22 (0.02)	0.17 (0.02)	0.2 (0.02)
Calcium	-	-	-	19000 (5)	26000 (5)	66000 (5)	33000 (5)	2000 (5)	86000 (5)
Chromium	2.4	1200	4300	71 (0.25)	530 (0.25)	8.6 (0.25)	12 (0.25)	16 (0.25)	9.1 (0.25)
Cobalt	-	-	-	10 (1.25)	39 (1.25)	3.4 (1.25)	5.5 (1.25)	7.3 (1.25)	5.4 (1.25)
Copper	20	9800	34000	180 (0.625)	3400 (0.625)	9.8 (0.625)	12 (0.625)	17 (0.625)	12 (0.625)
Iron	12000 (d)	12000 (d)	-	26000 (1.25)	220000 (1.25)	8700 (1.25)	13000 (1.25)	18000 (1.25)	11000 (1.25)
Lead	1 (c)	400	400	**890 (0.15)**	**25000 (0.15)**	14 (0.15)	10 (0.15)	11.0 (0.15)	7.9 (0.15)
Magnesium	-	-	-	4500 (5)	5800 (5)	24000 (5)	8900 (5)	3200 (5)	12000 (5)
Manganese	1	1200	4300	360 (0.375)	**1300 (0.375)**	190 (0.375)	320 (0.375)	360 (0.375)	260 (0.375)
Mercury	0.042	78	270	.066 (0.02)	0.28 (0.02)	<0.017 (0.02)	<0.019 (0.02)	<0.02 (0.02)	<0.018 (0.02)
Nickel	11	20000	68000	37 (0.75)	190 (0.75)	8.8 (0.75)	13 (0.75)	20 (0.75)	13 (0.75)
Potassium	-	-	-	820 (25)	880 (25)	630 (25)	800 (25)	1300 (25)	1100 (25)
Silver	0.66	1200	4200	1 (0.03)	9.4 (0.03)	<0.029 (0.03)	0.029 (0.03)	0.054 (0.03)	0.028 (0.03)
Sodium	3000	1000000	1000000	1300 (5)	590 (5)	180 (5)	1100 (5)	780 (5)	560 (5)
Vanadium	1.2	2200	7800	13 (1.25)	9 (1.25)	13 (1.25)	18 (1.25)	22 (1.25)	12 (1.25)
Zinc	46	86000	300000	1300 (0.5)	4100 (0.5)	22 (0.5)	34 (0.5)	40 (0.5)	31 (0.5)

Notes:

(a) from MERA Op. Memo. #8, February 4, 1994 and addendum dated June 21, 1994.

(b) from MERA Op. Memo #14, June 21, 1994.

(c) the Michigan method detection limit has been substituted for the Type B criteria.

(d) Michigan Type A background levels from MERA Op. Memo. #15, September 30, 1993.

ND - analyte was not detected

DCV - direct contact value.

DW - drinking water

( ) - parenthesis indicate the method detection limit.

TABLE 4.2

SUMMARY OF DETECTED ANALYTES
BUILDING 43
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION				FR-127	FR-128	FR-129	FR-130	FR-131	FR-132
LOCATION				BH43-7	BH43-8	BH43-8	BH43-9	BH43-9	BH43-9
DEPTH (feet BGS)				25-27	2-2.5	8-10	3-4	8-10	10-12
	MICHIGAN CLEANUP CRITERIA								
	TYPE B 20 x DW (a)	TYPE B DCV (a)	TYPE C DCV (b)						
VOC (ug/kg)									
Trans-1,2-Dichloroethene	2400	1300000	2500000	ND (10)	ND (10)	ND (10)	ND (1250)	ND (10)	ND (10)
Vinyl Chloride	10 (c)	180	1100	ND (10)	ND (10)	ND (10)	ND (1250)	ND (10)	ND (10)
Methylene Chloride	92	51000	15000	ND (10)	ND (10)	250 (10)	ND (1250)	ND (10)	ND (10)
Acetone	14000	7800000	15000000	ND (100)	ND (100)	170 (100)	ND (12500)	210 (100)	ND (100)
Carbon Disulfide	1500	8600000	16000000	ND (100)	ND (100)	ND (100)	ND (12500)	ND (100)	ND (100)
cis-1,2-Dichloroethene	1500	860000	1600000	ND (10)	ND (10)	30 (10)	ND (1250)	ND (10)	18 (10)
Chloroform	110	62000	410000	ND (10)	ND (10)	ND (10)	ND (1250)	ND (10)	ND (10)
Trichloroethylene	44	24000	150000	ND (10)	ND (10)	ND (10)	ND (1250)	ND (10)	ND (10)
Benzene	24	13000	85000	ND (10)	ND (10)	13 (10)	ND (1250)	ND (10)	ND (10)
Tetrachloroethylene	14	7800	49000	ND (10)	ND (10)	ND (10)	ND (1250)	ND (10)	ND (10)
Toluene	16000	17000000	33000000	ND (10)	ND (10)	11 (10)	ND (1250)	ND (10)	ND (10)
Ethylbenzene	1500	7500000	14000000	ND (10)	ND (10)	ND (10)	9700 (1250)	12 (10)	ND (10)
Total Xylenes	5600	140000000	270000000	ND (30)	ND (30)	ND (30)	100000 (3750)	110 (30)	ND (30)
SVOC (BNAs only) (ug/kg)									
4-Methlyphenol	700	1300000	4500000	ND (330)	ND (330)	ND (330)	3100 (6600)	ND (330)	ND (330)
Naphthalene	5000	9300000	32000000	ND (330)	ND (330)	ND (330)	18000 (6600)	ND (330)	ND (330)
2-Methylnaphthalene	-	-	-	ND (330)	ND (330)	ND (330)	82000 (6600)	ND (330)	ND (330)
Dibenzofuran	-	-	-	ND (330)	ND (330)	ND (330)	1000 (6600)	ND (330)	ND (330)
Phenanthrene	500	930000	3200000	ND (330)	ND (330)	ND (330)	1800 (6600)	ND (330)	ND (330)
Fluoranthene	17000	31000000	110000000	ND (330)	ND (330)	ND (330)	870 (6600)	ND (330)	ND (330)
Pyrene	10000	19000000	67000000	ND (330)	ND (330)	ND (330)	990 (6600)	ND (330)	ND (330)
Benzo(a)anthracene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
'rysene	180000	180000	2100000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
enzo(b)fluoranthene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
Benzo(k)fluoranthene	18000	18000	210000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
Benzo(a)pyrene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
Indeno(1,2,3-c,d)pyrene	1800	1800	21000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
Dibenzo(a,h)anthracene	330 (c)	330 (c)	2100	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
Benzo(g,h,i)perylene	930000	930000	3200000	ND (330)	ND (330)	ND (330)	ND (6600)	ND (330)	ND (330)
INORGANICS (mg/kg)									
Aluminum	6900 (d)	6900 (d)	-	4200 (2.5)	**7100 (2.5)**	**10000 (2.5)**	**8200 (2.5)**	**9200 (2.5)**	**8400 (2.5)**
Antimony	0.5 (c)	91	310	<0.13 (0.125)	4.7 (0.125)	0.2 (0.125)	49 (0.125)	0.11 (0.125)	0.23 (0.125)
Arsenic	5.8 (d)	5.8 (d)	8.6	2.6 (0.1)	**7.1 (0.1)**	4.4 (0.1)	**19 (0.1)**	3.4 (0.1)	5.6 (0.1)
Barium	48	18000	63000	14 (1.25)	110 (1.25)	60 (1.25)	200 (1.25)	32 (1.25)	31 (1.25)
Berylium	-	-	-	0.13 (0.125)	0.27 (0.125)	0.31 (0.125)	0.8 (0.125)	0.32 (0.125)	0.3 (0.125)
Cadmium	0.07	130	450	0.15 (0.02)	0.78 (0.02)	0.29 (0.02)	49 (0.02)	0.15 (0.02)	0.47 (0.02)
Calcium	-	-	-	64000 (5)	24000 (5)	72000 (5)	32000 (5)	52000 (5)	73000 (5)
Chromium	2.4	1200	4300	7.7 (0.25)	22 (0.25)	14 (0.25)	800 (0.25)	13 (0.25)	12 (0.25)
Cobalt	-	-	-	3.4 (1.25)	5.2 (1.25)	7.1 (1.25)	53 (1.25)	6 (1.25)	6.9 (1.25)
Copper	20	9800	34000	8.7 (0.625)	25 (0.625)	14 (0.625)	1300 (0.625)	14 (0.625)	20 (0.625)
Iron	12000 (d)	12000 (d)	-	8200 (1.25)	12000 (1.25)	14000 (1.25)	11000 (1.25)	14000 (1.25)	16000 (1.25)
Lead	1 (c)	400	400	5.3 (0.15)	76 (0.15)	12 (0.15)	**7900 (0.15)**	4.1 (0.15)	12 (0.15)
Magnesium	-	-	-	17000 (5)	7300 (5)	15000 (5)	5200 (5)	9900 (5)	8700 (5)
Manganese	1	1200	4300	200 (0.375)	330 (0.375)	370 (0.375)	**1300 (0.375)**	460 (0.375)	400 (0.375)
Mercury	0.042	78	270	<0.019 (0.02)	<0.016 (0.02)	<0.016 (0.02)	0.043 (0.02)	<0.019 (0.02)	<0.023 (0.02)
Nickel	11	20000	68000	9 (0.75)	13 (0.75)	15 (0.75)	130 (0.75)	16 (0.75)	23 (0.75)
Potassium	-	-	-	770 (25)	1100 (25)	1800 (25)	1300 (25)	1600 (25)	1300 (25)
Silver	0.66	1200	4200	<0.029 (0.03)	0.1 (0.03)	<0.035 (0.03)	2.3 (0.03)	<0.027 (0.03)	<0.031 (0.03)
Sodium	3000	1000000	1000000	270 (5)	500 (5)	770 (5)	5300 (5)	1100 (5)	630 (5)
Vanadium	1.2	2200	7800	11 (1.25)	18 (1.25)	19 (1.25)	11 (1.25)	18 (1.25)	17 (1.25)
Zinc	46	86000	300000	26 (0.5)	94 (0.5)	36 (0.5)	3700 (0.5)	36 (0.5)	57 (0.5)

Notes:

(a) from MERA Op. Memo. #8, February 4, 1994 and addendum dated June 21, 1994.

(b) from MERA Op. Memo #14, June 21, 1994.

(c) the Michigan method detection limit has been substituted for the Type B criteria.

(d) Michigan Type A background levels from MERA Op. Memo. #15, September 30, 1993.

ND - analyte was not detected

DCV - direct contact value.

DW - drinking water

( ) - parenthesis indicate the method detection limit.

APPENDIX A

COOK/WW PHOTOGRAPHS OF POTENTIALLY AFFECTED MATERIAL



TRENCH # 1 (WEST)
CONTAMINATION



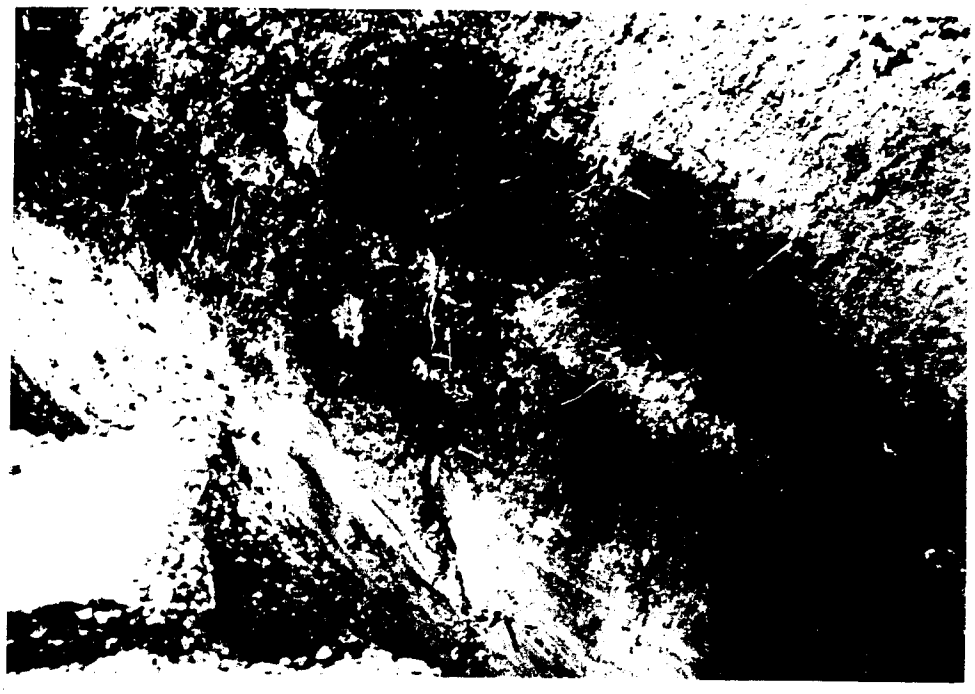
TRENCH # 1 (EAST)
CONTAMINATION

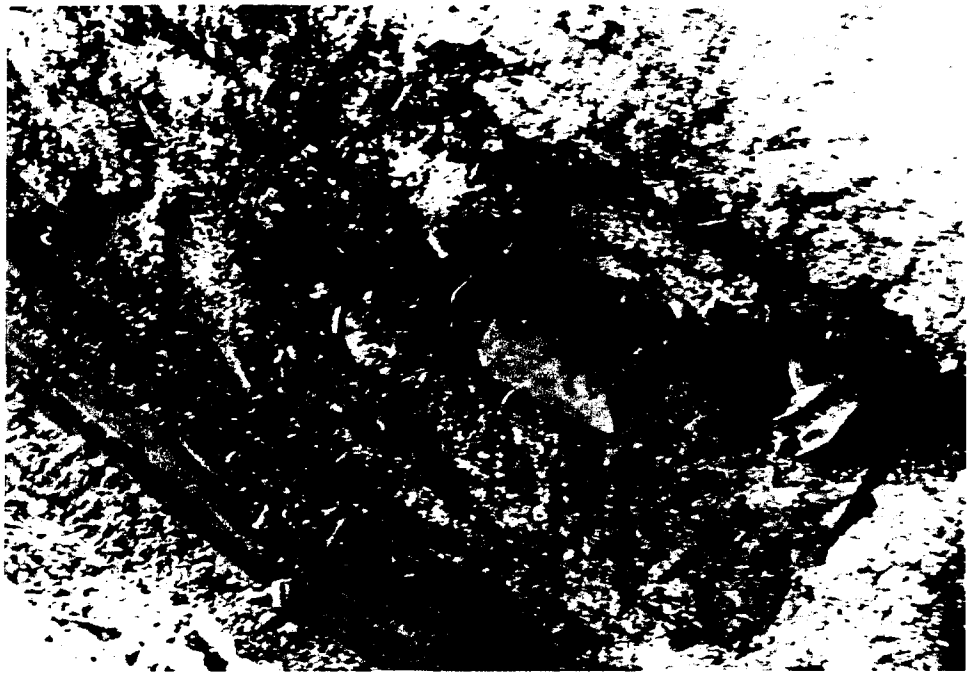
PHOTOGRAPHS OF THE TRENCHING EFFORT TO DETERMINE THE EXTENT OF THE ASH PIT BEHIND BUILDING # 43





DETAILED PHOTOGRAPHS OF THE CONTAMINATED LAYER IN TRENCH # 1





DETAILED PHOTOGRAPHS OF THE CONTAMINATED LAYER IN TRENCH # 2





OVERALL VIEW OF THE CONTAMINATION LAYER IN TRENCH # 2





PHOTOGRAPHS OF TRENCH # 3
SHOWING NO CONTAMINATION



VIEW OF THE CONTAMINATION LAYER IN TRENCH # 4



VIEW OF THE CONTAMINATION LAYER IN TRENCH # 4A



VIEW OF THE CONTAMINATED LAYER IN TRENCH # 5



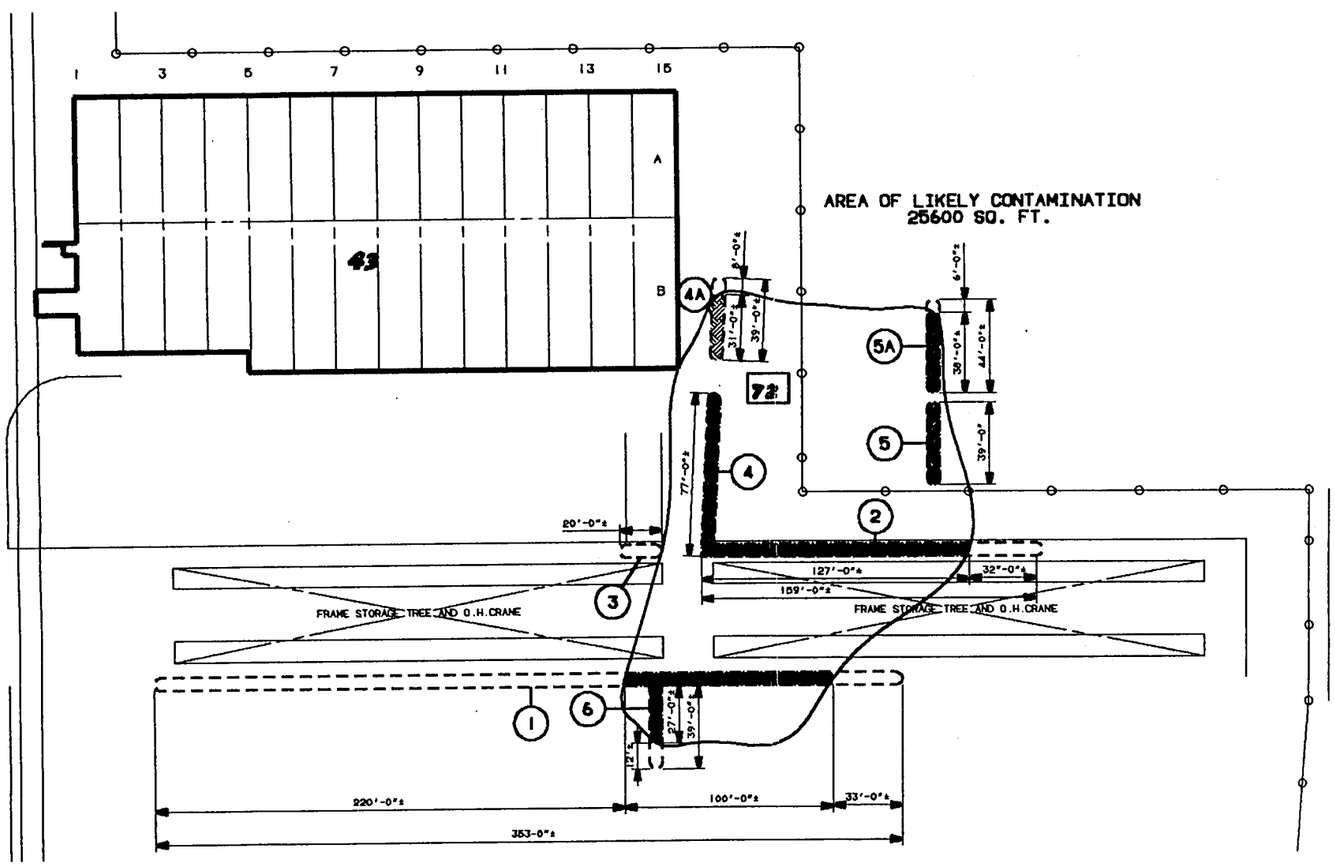
VIEW OF THE CONTAMINATED LAYER IN TRENCH # 6



VIEW OF THE CONTAMINATED LAYER IN TRENCH # 5A

DO NOT SCALE - WORK TO DIMENSIONS - REPORT ERRORS

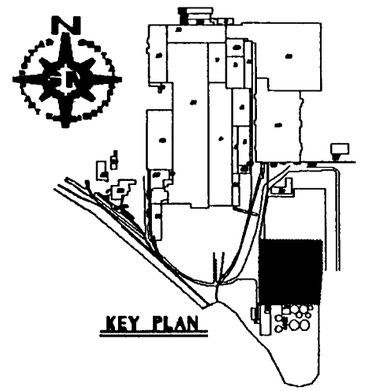
DATE	ISSUED FOR	APPROVAL	APPROVAL



LEGEND

OUTLINE OF TRENCH

RESIDUE FOUND



KEY PLAN

PLAN VIEW

SCALE: 1/32"=1'

TRENCH	TOTAL LGNTH	"DIRTY" LGNTH	COMMENTS
1	353'	100	1' TO 2' THICK WITH 6" TO 3' OVERBURDEN
2	159'	127	2' TO 3' THICK WITH VIRTUALLY NO OVERBURDEN
3	20'	0	NONE FOUND
4	77'	77'	2' TO 3' THICK WITH VIRTUALLY NO OVERBURDEN
4A	39'	31'	2' TO 3' THICK WITH VIRTUALLY NO OVERBURDEN
5	39'	39'	2' THICK WITH 1' TO 1'-6" OVERBURDEN
5A	44'	38'	2' THICK WITH 1' TO 1'-6" OVERBURDEN
6	39'	27'	1' TO 2' THICK WITH 6" TO 3' OVERBURDEN

COMPUTER RESTRICTED

COMPUTER GRAPHICS

SYM	CHANGE	AUTHORITY	BY	DATE

PLANT ENGINEERING DEPT.

PONTIAC CENTRAL MANUFACTURING & ASSEMBLY
GENERAL MOTORS CORPORATION
PONTIAC, MICHIGAN

TITLE
PONTIAC CENTRAL SITE
SOUTH YARD AREA
ADJACENT TO BUILDING 43
SURVEY OF FORMER DUMP SITE

W.O.NO.	BAY #	BLDG # YARD
DRAWN BY COOK/RBN	SCALE: 1/32"=1'	DATE 4/92
APPROVED BY		
SHEET #1 OF 1	DRAWING NO 2F 1899	

APPENDIX B

STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

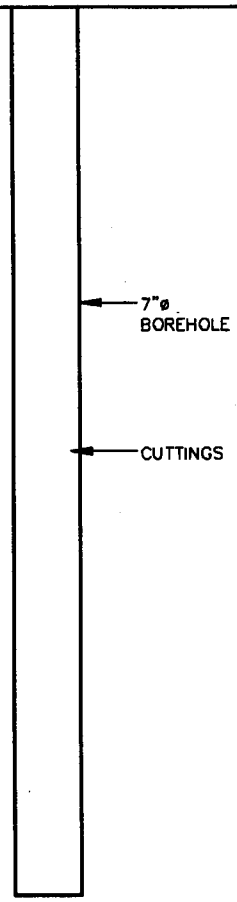
(L-61)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-1
DATE COMPLETED: AUGUST 19, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	Asphalt	-0.5
	Gravel	-1.0
2.5	ML-SILT, some clay, dark gray, moist	
5.0	CL-CLAY, some silt, soft, gray, moist, roots	-5.0
	- mottled, brown, dry	
7.5		
10.0	- 12" sand and silt seam	
		-12.0
12.5	ML-SILT, brown, wet	
	- dry	
15.0		
17.5		
		-19.0
	CL-CLAY, some silt, layered brown and gray, moist	-19.1
20.0	SW-SAND, well graded, gray, wet	-21.0
	ML-SILT, gray, moist	
22.5		-23.0
	END OF HOLE @ 23.0 FT. BGS	
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		11	0
2SS		5	0
3SS		4	0
4SS			0
5SS		10	0
6SS			0
7SS		10	0
8SS		16	0
9SS		11	0
10SS		25	0
11SS		15	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-62)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-2
DATE COMPLETED: AUGUST 19, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Hard pack sand and stones	-2.0		1SS		30	0
2.5	Asphalt	-2.5		2SS		18	4.5
	ML-SILT, some clay, mottled gray, dry						
5.0				3SS		6	64
	- moist	-6.0	7"ø BOREHOLE				
	GW-GRAVEL, some black sand, some asphalt - concrete chips			4SS		8	28
7.5		-8.0					
	CL-CLAY(FILL), some silt, trace gravel, gray green, black staining, moist		CUTTINGS	5SS		7	56
10.0				6SS		5	731
	- petroleum odor						
12.5	- no gravel, mottled, brown, dry, solvent odor			7SS		21	496
15.0				8SS		20	484
17.5				9SS		22	735
	END OF HOLE @ 18.0 FT. BGS	-18.0					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-63)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-3
DATE COMPLETED: AUGUST 20, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	FILL, stone, sand, debris, very hard		7"ø BOREHOLE; CUTTINGS	1SS		18	0.4
	Concrete	-3.0		2SS		52	
5.0	END OF HOLE @ 4.0 FT. BGS	-4.0					
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-64)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-4
DATE COMPLETED: AUGUST 20, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt for 6", gravel and sand base for 6"	-1.0		1SS			
	ML-SILT, brown						
2.5				2SS			
	- sand and clay, soft, black, wet, metal debris		7"ø BOREHOLE				
5.0			CUTTINGS	3SS		4	1.5
				4SS		5	0
7.5		-8.0					
	CL-CLAY, some silt, trace gravel, mottled, brown			5SS		12	0
10.0				6SS		15	
12.5				7SS		18	
	END OF HOLE @ 14.0 FT. BGS	-14.0					
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-65)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-5
DATE COMPLETED: AUGUST 20, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Asphalt	-0.7	7"ø BOREHOLE; CUTTINGS				
2.5	SW/GW-SAND and GRAVEL, black – kitchen fork, copper, and glass debris						
	SM/ML-SAND and SILT, soft, wet	-3.0		1SS		7	0
5.0							
	END OF HOLE @ 6.0 FT. BGS	-6.0					
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-66)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-6
DATE COMPLETED: AUGUST 20, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SW/GW-SAND and GRAVEL, very hard, stones	-1.0		1SS		2	0
	GW/SW-GRAVEL and SAND(FILL), some silt, black, wet						
2.5		-3.0		2SS		6	0
	SM/ML-SAND and SILT, soft, brown, wet		7"ø BOREHOLE				
5.0			CUTTINGS	3SS		3	0
				4SS		12	0
7.5		-8.0					
	SM-SAND, little silt, brown, dry						
10.0							
	END OF HOLE @ 11.5 FT. BGS	-11.5					
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-67)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-7
DATE COMPLETED: AUGUST 20, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GW/SW-GRAVEL and SAND, very hard			1SS		7	0.4
2.5							
	SM/ML-SAND and SILT, trace gravel, green gray, moist	-3.0		2SS		9	0.9
5.0	CL-CLAY, some silt, little sand, mottled, gray green, moist	-5.0		3SS		5	2.1
				4SS		4	7.5
7.5							
			7"ø BOREHOLE	5SS		7	2.5
10.0				6SS		8	7.3
12.5				7SS		7	85
			CUTTINGS				
15.0				8SS		24	25
	- dry			9SS		28	11.1
17.5	- trace gravel, hard, brown						
	- gray			10SS		13	0.6
20.0							
				11SS		17	0
	- 2" black sand seam						
22.5	- little sand			12SS		12	0
25.0							
		-27.0					
27.5	END OF HOLE @ 27.0 FT. BGS						
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-68)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-8
DATE COMPLETED: AUGUST 21, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SW/GW-SAND and GRAVEL, hard, stone			1SS		44	0
		-2.0					
2.5	Asphalt	-2.6		2SS		20	10.1
	CL-CLAY, some silt, little sand, gray green, moist		7"ø BOREHOLE				
5.0			CUTTINGS	3SS		9	0.2
	- mottled, brown and gray, dry			4SS		8	1
7.5							
				5SS		8	0.4
10.0	END OF HOLE @ 10.0 FT. BGS	-10.0					
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-69)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 43

HOLE DESIGNATION: BH43-9
DATE COMPLETED: AUGUST 21, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Stone, asphalt, debris - pieces of wood and firehose			1SS		86	0
		-2.0					
2.5	Asphalt, stone and gravel	-3.0		2SS		23	28
	ML-SILT(FILL), some gravel, red and green staining, ash, wood and metal debris, petroleum odor		7"ø BOREHOLE				
5.0				3SS		54	49
	CL-CLAY, some sand, some silt, mottled, gray green, moist	-6.0	CUTTINGS				
				4SS		11	4.4
7.5							
				5SS		8	8.4
10.0	- no sand, brown, dry						
				6SS		12	0.2
		-12.0					
12.5	END OF HOLE @ 12.0 FT. BGS						
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

LABORATORY ANALYTICAL DATA AND CHAIN-OF-CUSTODY RECORDS

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

JACK LINDSAY
-MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

September 22, 1994

BUILDING #43

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on August 23, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH941677	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

ies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Thomas M. Bauer
Laboratory Manager
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-081994-FR-115	941677001
S-081994-FR-116	941677002
S-081994-FR-117	941677003
S-081994-FR-118	941677004
S-081994-FR-119	941677005
S-082094-FR-120	941677006
S-082094-FR-121	941677007
S-082094-FR-122	941677008
S-082094-FR-123	941677009
S-082094-FR-124	941677010
S-082094-FR-125	941677011
S-082094-FR-126	941677012
S-082094-FR-127	941677013
S-082194-FR-128	941677014
S-082194-FR-129	941677015
S-082194-FR-130	941677016
S-082194-FR-131	941677017
S-082194-FR-132	941677018

IEA
An Aquarion Company

CASE NARRATIVE

VOLATILES

Sample S-082194-FR-129 was initially analyzed within holdtime. The sample was reanalyzed outside the holdtime to confirm the presence of ethyl benzene and xylenes. It was found that the initial hits for these two compounds were due to carryover. Both analyses have been reported.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Dilution Factor (DF)	1	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
Method Blank	SS0829	SS0829	SS0829	SS0829	SS0829	
Client ID	FR-115	FR-116	FR-117	FR-118	FR-119	
Analyte Lab ID	941677 001	941677 002	941677 003	941677 004	941677 005	
Phenol	U	U	U	U	U	330
Bis (2-Chloroethyl) ether	U	U	U	U	U	330
2-Chlorophenol	U	U	U	U	U	330
1,3-Dichlorobenzene	U	U	U	U	U	330
1,4-Dichlorobenzene	U	U	U	U	U	330
Benzyl Alcohol	U	U	U	U	U	330
1,2-Dichlorobenzene	U	U	U	U	U	330
2-Methylphenol	U	U	U	U	U	330
bis (2-Chloroisopropyl) ether	U	U	U	U	U	330
4-Methylphenol	U	U	U	U	U	330
N-Nitroso-di-n-propylamine	U	U	U	U	U	330
Hexachloroethane	U	U	U	U	U	330
Nitrobenzene	U	U	U	U	U	330
Isophorone	U	U	U	U	U	330
2-Nitrophenol	U	U	U	U	U	330
2,4-Dimethylphenol	U	U	U	U	U	330
Benzoic Acid	U	U	U	U	U	1700
bis (2-Chloroethoxy) methane	U	U	U	U	U	330
2,4-Dichlorophenol	U	U	U	U	U	330
1,2,4-Trichlorobenzene	U	U	U	U	U	330
Naphthalene	U	U	U	640	U	330
4 Chloroaniline	U	U	U	U	U	330
Hexachlorobutadiene	U	U	U	U	U	330
4 Chloro-3-methylphenol	U	U	U	U	U	660
2-Methylnaphthalene	U	U	U	770	U	330
Hexachlorocyclopentadiene	U	U	U	U	U	330
2,4,6-Trichlorophenol	U	U	U	U	U	330
2,4,5-Trichlorophenol	U	U	U	U	U	1700
2-Chloronaphthalene	U	U	U	U	U	330
2-Nitroaniline	U	U	U	U	U	1700
Dimethyphthalate	U	U	U	U	U	330
Acenaphthylene	U	U	U	U	U	330
2,6-Dinitrotoluene	U	U	U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Dilution Factor (DF)	1	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
Method Blank	SS0829	SS0829	SS0829	SS0829	SS0829	
Client ID	FR-115	FR-116	FR-117	FR-118	FR-119	
Analyte Lab ID	941677 001	941677 002	941677 003	941677 004	941677 005	
3-Nitroaniline	U	U	U	U	U	1700
Acenaphthene	U	U	U	U	U	330
2,4-Dinitrophenol	U	U	U	U	U	1700
4-Nitrophenol	U	U	U	U	U	1700
Dibenzofuran	U	U	U	U	U	330
2,4-Dinitrotoluene	U	U	U	U	U	330
Diethylphthalate	U	U	U	U	U	330
4-Chlorophenyl phenyl ether	U	U	U	U	U	330
Fluorene	U	U	U	U	U	330
4-Nitroaniline	U	U	U	U	U	1700
4,6-Dinitro-2-methylphenol	U	U	U	U	U	1700
N-Nitrosodiphenylamine (1)	U	U	U	U	U	330
4-Bromophenyl phenyl ether	U	U	U	U	U	330
Hexachlorobenzene	U	U	U	U	U	330
Pentachlorophenol	U	U	U	U	U	1700
Phenanthrene	U	U	U	U	U	330
Anthracene	U	U	U	U	U	330
Di-n-butylphthalate	U	U	U	U	U	330
Fluoranthene	U	U	U	U	U	330
Pyrene	U	U	U	U	U	330
Butyl benzyl phthalate	U	U	U	U	U	330
3,3'-Dichlorobenzidine	U	U	U	U	U	2000
Benzo (a) anthracene	U	U	U	U	U	330
Chrysene	U	U	U	U	U	330
bis (2-ethylhexyl) phthalate	U	U	U	U	U	330
Di-n-octylphthalate	U	U	U	U	U	330
Benzo (b) fluoranthene	U	U	U	U	U	330
Benzo (k) fluoranthene	U	U	U	U	U	330
Benzo (a) pyrene	U	U	U	U	U	330
Indeno (1,2,3-cd) pyrene	U	U	U	U	U	330
Dibenz (a,h) anthracene	U	U	U	U	U	330
Benzo (g,h,i) perylene	U	U	U	U	U	330
Date Extracted	8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	
Date Analyzed	8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Analyte	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	2	SS0829	FR-120	941677 006	
	1	SS0829	FR-121	941677 007	
	1	SS0829	FR-122	941677 008	
	1	SS0829	FR-123	941677 009	
	1	SS0829	FR-124	941677 010	
Phenol	UD	U	U	U	U	330
Bis (2-Chloroethyl) ether	UD	U	U	U	U	330
2-Chlorophenol	UD	U	U	U	U	330
1,3-Dichlorobenzene	UD	U	U	U	U	330
1,4-Dichlorobenzene	UD	U	U	U	U	330
Benzyl Alcohol	UD	U	U	U	U	330
1,2-Dichlorobenzene	UD	U	U	U	U	330
2-Methylphenol	UD	U	U	U	U	330
bis (2-Chloroisopropyl) ether	UD	U	U	U	U	330
4-Methylphenol	UD	U	U	U	U	330
N-Nitroso-di-n-propylamine	UD	U	U	U	U	330
Hexachloroethane	UD	U	U	U	U	330
Nitrobenzene	UD	U	U	U	U	330
Isophorone	UD	U	U	U	U	330
2-Nitrophenol	UD	U	U	U	U	330
2,4-Dimethylphenol	UD	U	U	U	U	330
Benzoic Acid	UD	U	U	U	U	1700
bis (2-Chloroethoxy) methane	UD	U	U	U	U	330
2,4-Dichlorophenol	UD	U	U	U	U	330
1,2,4-Trichlorobenzene	UD	U	U	U	U	330
Naphthalene	UD	U	770	U	U	330
4 Chloroaniline	UD	U	U	U	U	330
Hexachlorobutadiene	UD	U	U	U	U	330
4 Chloro-3-methylphenol	UD	U	U	U	U	660
2-Methylnaphthalene	UD	1300	U	U	U	330
Hexachlorocyclopentadiene	UD	U	U	U	U	330
2,4,6-Trichlorophenol	UD	U	U	U	U	330
2,4,5-Trichlorophenol	UD	U	U	U	U	1700
2-Chloronaphthalene	UD	U	U	U	U	330
2-Nitroaniline	UD	U	U	U	U	1700
Dimethyphthalate	UD	U	U	U	U	330
Acenaphthylene	UD	U	U	U	U	330
2,6-Dinitrotoluene	UD	U	U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Dilution Factor (DF)	2	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
Method Blank	SS0829	SS0829	SS0829	SS0829	SS0829	
Client ID	FR-120	FR-121	FR-122	FR-123	FR-124	
Analyte / Lab ID	941677 006	941677 007	941677 008	941677 009	941677 010	
3-Nitroaniline	UD	U	U	U	U	1700
Acenaphthene	UD	U	U	U	U	330
2,4-Dinitrophenol	UD	U	U	U	U	1700
4-Nitrophenol	UD	U	U	U	U	1700
Dibenzofuran	UD	U	U	U	U	330
2,4-Dinitrotoluene	UD	U	U	U	U	330
Diethylphthalate	UD	U	U	U	U	330
4-Chlorophenyl phenyl ether	UD	U	U	U	U	330
Fluorene	UD	U	U	U	U	330
4-Nitroaniline	UD	U	U	U	U	1700
4,6-Dinitro-2-methylphenol	UD	U	U	U	U	1700
N-Nitrosodiphenylamine (1)	UD	U	U	U	U	330
4-Bromophenyl phenyl ether	UD	U	U	U	U	330
Hexachlorobenzene	UD	U	U	U	U	330
Pentachlorophenol	UD	U	U	U	U	1700
Phenanthrene	1300	U	720	U	U	330
Anthracene	UD	U	U	U	U	330
Di-n-butylphthalate	UD	U	U	U	U	330
Fluoranthene	3200	U	U	U	U	330
Pyrene	4200	U	U	U	U	330
Butyl benzyl phthalate	UD	U	U	U	U	330
3,3'-Dichlorobenzidine	UD	U	U	U	U	2000
Benzo (a) anthracene	2000	U	U	U	U	330
Chrysene	1600	U	U	U	U	330
bis (2-ethylhexyl) phthalate	UD	U	U	U	U	330
Di-n-octylphthalate	UD	U	U	U	U	330
Benzo (b) fluoranthene	2700	U	U	U	U	330
Benzo (k) fluoranthene	1200	U	U	U	U	330
Benzo (a) pyrene	1300	U	U	U	U	330
Indeno (1,2,3-cd) pyrene	2000	U	U	U	U	330
Dibenz (a,h) anthracene	740	U	U	U	U	330
Benzo (g,h,i) perylene	1900	U	U	U	U	330
Date Extracted	8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	
Date Analyzed	8/30/94	8/30/94	8/30/94	8/30/94	8/30/94	

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Dilution Factor (DF)	1	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
Method Blank	SS0829	SS0829	SS0829	SS0829	SS0829	
Client ID	FR-125	FR-126	FR-127	FR-128	FR-129	
Analyte Lab ID	941677 011	941677 012	941677 013	941677 014	941677 015	
Phenol	U	U	U	U	U	330
Bis (2-Chloroethyl) ether	U	U	U	U	U	330
2-Chlorophenol	U	U	U	U	U	330
1,3-Dichlorobenzene	U	U	U	U	U	330
1,4-Dichlorobenzene	U	U	U	U	U	330
Benzyl Alcohol	U	U	U	U	U	330
1,2-Dichlorobenzene	U	U	U	U	U	330
2-Methylphenol	U	U	U	U	U	330
bis (2-Chloroisopropyl) ether	U	U	U	U	U	330
4-Methylphenol	U	U	U	U	U	330
N-Nitroso-di-n-propylamine	U	U	U	U	U	330
Hexachloroethane	U	U	U	U	U	330
Nitrobenzene	U	U	U	U	U	330
Isophorone	U	U	U	U	U	330
2-Nitrophenol	U	U	U	U	U	330
2,4-Dimethylphenol	U	U	U	U	U	330
Benzoic Acid	U	U	U	U	U	1700
bis (2-Chloroethoxy) methane	U	U	U	U	U	330
2,4-Dichlorophenol	U	U	U	U	U	330
1,2,4-Trichlorobenzene	U	U	U	U	U	330
Naphthalene	U	U	U	U	U	330
4 Chloroaniline	U	U	U	U	U	330
Hexachlorobutadiene	U	U	U	U	U	330
4 Chloro-3-methylphenol	U	U	U	U	U	660
2-Methylnaphthalene	U	U	U	U	U	330
Hexachlorocyclopentadiene	U	U	U	U	U	330
2,4,6-Trichlorophenol	U	U	U	U	U	330
2,4,5-Trichlorophenol	U	U	U	U	U	1700
2-Chloronaphthalene	U	U	U	U	U	330
2-Nitroaniline	U	U	U	U	U	1700
Dimethyphthalate	U	U	U	U	U	330
Acenaphthylene	U	U	U	U	U	330
2,6-Dinitrotoluene	U	U	U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug / kg (dry weight)

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID				Lower Limits Quantitation (LLD) with no Dilution*
	1	SS0829	FR-125	FR-126	FR-127	FR-128	FR-129	
			941677	941677	941677	941677	941677	
			011	012	013	014	015	
3-Nitroaniline		U	U	U	U	U	U	1700
Acenaphthene		U	U	U	U	U	U	330
2,4-Dinitrophenol		U	U	U	U	U	U	1700
4-Nitrophenol		U	U	U	U	U	U	1700
Dibenzofuran		U	U	U	U	U	U	330
2,4-Dinitrotoluene		U	U	U	U	U	U	330
Diethylphthalate		U	U	U	U	U	U	330
4-Chlorophenyl phenyl ether		U	U	U	U	U	U	330
Fluorene		U	U	U	U	U	U	330
4-Nitroaniline		U	U	U	U	U	U	1700
4,6-Dinitro-2-methylphenol		U	U	U	U	U	U	1700
N-Nitrosodiphenylamine (1)		U	U	U	U	U	U	330
4-Bromophenyl phenyl ether		U	U	U	U	U	U	330
Hexachlorobenzene		U	U	U	U	U	U	330
Pentachlorophenol		U	U	U	U	U	U	1700
Phenanthrene		U	U	U	U	U	U	330
Anthracene		U	U	U	U	U	U	330
Di-n-butylphthalate		U	U	U	U	U	U	330
Fluoranthene		U	U	U	U	U	U	330
Pyrene		U	U	U	U	U	U	330
Butyl benzyl phthalate		U	U	U	U	U	U	330
3,3'-Dichlorobenzidine		U	U	U	U	U	U	2000
Benzo (a) anthracene		U	U	U	U	U	U	330
Chrysene		U	U	U	U	U	U	330
bis (2-ethylhexyl) phthalate		U	U	U	U	U	U	330
Di-n-octylphthalate		U	U	U	U	U	U	330
Benzo (b) fluoranthene		U	U	U	U	U	U	330
Benzo (k) fluoranthene		U	U	U	U	U	U	330
Benzo (a) pyrene		U	U	U	U	U	U	330
Indeno (1,2,3-cd) pyrene		U	U	U	U	U	U	330
Dibenz (a,h) anthracene		U	U	U	U	U	U	330
Benzo (g,h,i) perylene		U	U	U	U	U	U	330
Date Extracted		8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	
Date Analyzed		8/30/94	8/30/94	8/30/94	8/30/94	8/30/94	8/30/94	

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug / kg DRY WEIGHT

SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID				Lower Limits Quantitation (LLD) with no Dilution*
		2	SS0829	FR-130	FR-130	FR-131	FR-132	METHOD BLANK	
		941677 016			941677 016 DL	941677 017	941677 018	SS0829	
Phenol		UD		UD		U	U	U	330
Bis (2-Chloroethyl) ether		UD		UD		U	U	U	330
2-Chlorophenol		UD		UD		U	U	U	330
1,3-Dichlorobenzene		UD		UD		U	U	U	330
1,4-Dichlorobenzene		UD		UD		U	U	U	330
Benzyl Alcohol		UD		UD		U	U	U	330
1,2-Dichlorobenzene		UD		UD		U	U	U	330
2-Methylphenol		UD		UD		U	U	U	330
bis (2-Chloroisopropyl) ether		UD		UD		U	U	U	330
4-Methylphenol		3100		UD		U	U	U	330
N-Nitroso-di-n-propylamine		UD		UD		U	U	U	330
Hexachloroethane		UD		UD		U	U	U	330
Nitrobenzene		UD		UD		U	U	U	330
Isophorone		UD		UD		U	U	U	330
2-Nitrophenol		UD		UD		U	U	U	330
2,4-Dimethylphenol		UD		UD		U	U	U	330
Benzoic Acid		UD		UD		U	U	U	1700
bis (2-Chloroethoxy) methane		UD		UD		U	U	U	330
2,4-Dichlorophenol		UD		UD		U	U	U	330
1,2,4-Trichlorobenzene		UD		UD		U	U	U	330
Naphthalene		1800E		18000		U	U	U	330
4 Chloroaniline		UD		UD		U	U	U	330
Hexachlorobutadiene		UD		UD		U	U	U	330
4 Chloro-3-methylphenol		UD		UD		U	U	U	660
2-Methylnaphthalene		70000E		82000		U	U	U	330
Hexachlorocyclopentadiene		UD		UD		U	U	U	330
2,4,6-Trichlorophenol		UD		UD		U	U	U	330
2,4,5-Trichlorophenol		UD		UD		U	U	U	1700
2-Chloronaphthalene		UD		UD		U	U	U	330
2-Nitroaniline		UD		UD		U	U	U	1700
Dimethyphthalate		UD		UD		U	U	U	330
Acenaphthylene		UD		UD		U	U	U	330
2,6-Dinitrotoluene		UD		UD		U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg DRY WEIGHT

SOIL
Method: 8270

Dilution Factor (DF)	2	20	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
Method Blank	SS0829	SS0829	SS0829	SS0829	SS0829	
Client ID	FR-1130	FR-130	FR-131	FR-132	METHOD BLANK	
Analyte Lab ID	941677 016	941677 016 DL	941677 017	941677 018	SS0829	
3-Nitroaniline	UD	UD	U	U	U	1700
Acenaphthene	UD	UD	U	U	U	330
2,4-Dinitrophenol	UD	UD	U	U	U	1700
4-Nitrophenol	UD	UD	U	U	U	1700
Dibenzofuran	1000	UD	U	U	U	330
2,4-Dinitrotoluene	UD	UD	U	U	U	330
Diethylphthalate	UD	UD	U	U	U	330
4-Chlorophenyl phenyl ether	UD	UD	U	U	U	330
Fluorene	UD	UD	U	U	U	330
4-Nitroaniline	UD	UD	U	U	U	1700
4,6-Dinitro-2-methylphenol	UD	UD	U	U	U	1700
N-Nitrosodiphenylamine (1)	UD	UD	U	U	U	330
4-Bromophenyl phenyl ether	UD	UD	U	U	U	330
Hexachlorobenzene	UD	UD	U	U	U	330
Pentachlorophenol	UD	UD	U	U	U	1700
Phenanthrene	1800	UD	U	U	U	330
Anthracene	UD	UD	U	U	U	330
Di-n-butylphthalate	UD	UD	U	U	U	330
Fluoranthene	870	UD	U	U	U	330
Pyrene	990	UD	U	U	U	330
Butyl benzyl phthalate	UD	UD	U	U	U	330
3,3'-Dichlorobenzidine	UD	UD	U	U	U	2000
Benzo (a) anthracene	UD	UD	U	U	U	330
Chrysene	UD	UD	U	U	U	330
bis (2-ethylhexyl) phthalate	UD	UD	U	U	U	330
Di-n-octylphthalate	UD	UD	U	U	U	330
Benzo (b) fluoranthene	UD	UD	U	U	U	330
Benzo (k) fluoranthene	UD	UD	U	U	U	330
Benzo (a) pyrene	UD	UD	U	U	U	330
Indeno (1,2,3-cd) pyrene	UD	UD	U	U	U	330
Dibenz (a,h) anthracene	UD	UD	U	U	U	330
Benzo (g,h,i) perylene	UD	UD	U	U	U	330
Date Extracted	8/29/94	8/29/94	8/29/94	8/29/94	8/29/94	
Date Analyzed	8/30/94	8/31/94	8/30/94	8/31/94	8/29/94	

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg dry weight

Matrix: SOIL
Method: 8240

Analyte / Lab ID	Dilution Factor (DF)	1	1	1	1	1	PQL
	Method Blank	VS 082694	VS 083094	VS 083194	VS 090194	VS 090294	
	Client ID	METHOD BLANK	METHOD BLANK	METHOD BLANK	METHOD BLANK	METHOD BLANK	
	Lab ID	VS 082694	VS 083094	VS 083194	VS 090194	VS 090294	
Trans-1,2-Dichloroethene		U	U	U	U	U	10
Chloromethane		U	U	U	U	U	10
Bromomethane		U	U	U	U	U	10
Vinyl Chloride		U	U	U	U	U	10
Chloroethane		U	U	U	U	U	10
Methylene Chloride		U	U	U	U	U	10
Acetone		U	U	U	U	U	100
Carbon Disulfide		U	U	U	U	U	100
1,1-Dichloroethene		U	U	U	U	U	10
1,1-Dichloroethane		U	U	U	U	U	10
cis-1,2-Dichloroethene		U	U	U	U	U	10
Chloroform		U	U	U	U	U	10
1,2-Dichloroethane		U	U	U	U	U	10
2-Butanone		U	U	U	U	U	100
1,1 1-Trichlorethane		U	U	U	U	U	10
Carbon Tetrachloride		U	U	U	U	U	10
Vinyl Acetate		U	U	U	U	U	10
Bromodichloromethane		U	U	U	U	U	10
1,2-Dichloropropane		U	U	U	U	U	10
Trans-1,3-dichloropropene		U	U	U	U	U	10
Trichloroethylene		U	U	U	U	U	10
Dibromochloromethane		U	U	U	U	U	10
1,1,2-Trichloroethane		U	U	U	U	U	10
Benzene		U	U	U	U	U	10
cis-1,3-Dichloropropene		U	U	U	U	U	10
2-Chloroethylvinylether		U	U	U	U	U	10
Bromoform		U	U	U	U	U	10
4-Methyl-2-Pentanone		U	U	U	U	U	100
2-Hexanone		U	U	U	U	U	100
Tetrachloroethylene		U	U	U	U	U	10
1,1,2,2-Tetrachloroethane		U	U	U	U	U	10
Toluene		U	U	U	U	U	10
Chlorobenzene		U	U	U	U	U	10
Ethylbenzene		U	U	U	U	U	10
Styrene		U	U	U	U	U	10
Total Xylenes		U	U	U	U	U	30
DATE ANALYZED		8/26/94	8/30/94	8/31/94	9/1/94	9/2/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg DRY WEIGHT

Matrix: SOIL
Method: 8240

Analyte / Dilution Factor (DF)	1	1	1	5	5	PQL
Method Blank	VS 090694	VS 082694	VS 082694	VS 083194	VS 082694	
Client ID	METHOD BLANK	FR-115	FR-116	FR-117	FR-118	
Lab ID	VS 090694	941677 001	941677 002	941677 003	941677 004	
Trans-1,2-Dichloroethene	U	U	U	UD	UD	10
Chloromethane	U	U	U	UD	UD	10
Bromomethane	U	U	U	UD	UD	10
Vinyl Chloride	U	U	U	UD	UD	10
Chloroethane	U	U	U	UD	UD	10
Methylene Chloride	U	U	U	UD	UD	10
Acetone	U	U	U	UD	UD	100
Carbon Disulfide	U	U	U	UD	210	100
1,1-Dichloroethene	U	U	U	UD	UD	10
1,1-Dichloroethane	U	U	U	UD	UD	10
cis-1,2-Dichloroethene	U	U	U	UD	79	10
Chloroform	U	U	U	UD	UD	10
1,2-Dichloroethane	U	U	U	UD	UD	10
2-Butanone	U	U	U	UD	UD	100
1,1 1-Trichlorethane	U	U	U	UD	UD	10
Carbon Tetrachloride	U	U	U	UD	UD	10
Vinyl Acetate	U	U	U	UD	UD	10
Bromodichloromethane	U	U	U	UD	UD	10
1,2-Dichloropropane	U	U	U	UD	UD	10
Trans-1,3-dichloropropene	U	U	U	UD	UD	10
Trichloroethylene	U	U	U	UD	47	10
Dibromochloromethane	U	U	U	UD	UD	10
1,1,2-Trichloroethane	U	U	U	UD	UD	10
Benzene	U	U	U	UD	94	10
cis-1,3-Dichloropropene	U	U	U	UD	UD	10
2-Chloroethylvinylether	U	U	U	UD	UD	10
Bromoform	U	U	U	UD	UD	10
4-Methyl-2-Pentanone	U	U	U	UD	UD	100
2-Hexanone	U	U	U	UD	UD	100
Tetrachloroethylene	U	U	U	UD	55	10
1,1,2,2-Tetrachloroethane	U	U	U	UD	UD	10
Toluene	U	U	U	UD	190	10
Chlorobenzene	U	U	U	UD	UD	10
Ethylbenzene	U	U	U	UD	6800	10
Styrene	U	U	U	UD	UD	10
Total Xylenes	U	U	U	UD	42000	30
DATE ANALYZED	9/6/94	8/26/94	8/26/94	8/31/94	8/26/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg DRY WEIGHT

Matrix: SOIL
Method: 8240

Analyte / Lab ID	Dilution Factor (DF)	5	1	1	5	5	PQL
	Method Blank	VS 082694	VS 083194	VS 082694	VS 082694	VS 082694	
	Client ID	FR-119	FR-120	FR-121	FR-122	FR-123	
	Lab ID	941677 005	941677 006	941677 007	941677 008	941677 009	
Trans-1,2-Dichloroethene		UD	U	22	180	U	10
Chloromethane		UD	U	U	U	U	10
Bromomethane		UD	U	U	U	U	10
Vinyl Chloride		UD	U	63	560	U	10
Chloroethane		UD	U	U	U	U	10
Methylene Chloride		UD	U	U	U	U	10
Acetone		150	U	U	U	U	100
Carbon Disulfide		UD	U	U	U	U	100
1,1-Dichloroethene		UD	U	U	U	U	10
1,1-Dichloroethane		UD	U	U	U	U	10
cis-1,2-Dichloroethene		150	U	50	120	U	10
Chloroform		180	U	U	U	U	10
1,2-Dichloroethane		UD	U	U	U	U	10
2-Butanone		UD	U	U	U	U	100
1,1 1-Trichlorethane		UD	U	U	U	U	10
Carbon Tetrachloride		UD	U	U	U	U	10
Vinyl Acetate		UD	U	U	U	U	10
Bromodichloromethane		UD	U	U	U	U	10
1,2-Dichloropropane		UD	U	U	U	U	10
Trans-1,3-dichloropropene		UD	U	U	U	U	10
Trichloroethylene		1200	U	13	92	U	10
Dibromochloromethane		UD	U	U	U	U	10
1,1,2-Trichloroethane		UD	U	U	U	U	10
Benzene		230	U	15	59	U	10
cis-1,3-Dichloropropene		UD	U	U	U	U	10
2-Chloroethylvinylether		UD	U	U	U	U	10
Bromoform		UD	U	U	U	U	10
4-Methyl-2-Pentanone		UD	U	U	U	U	100
2-Hexanone		UD	U	U	U	U	100
Tetrachloroethylene		230	U	U	U	U	10
1,1,2,2-Tetrachloroethane		UD	U	U	U	U	10
Toluene		99	U	U	14	U	10
Chlorobenzene		UD	U	U	U	U	10
Ethylbenzene		2400	U	U	14	U	10
Styrene		UD	U	U	U	U	10
Total Xylenes		16000	U	U	89	U	30
DATE ANALYZED		8/26/94		8/26/94	8/26/94	8/26/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg DRY WEIGHT

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	5	1	1	1	PQL
	Method Blank	VS 082694	VS 083194	VS 083194	VS 090194	VS 090194	
	Client ID	FR-124	FR-125	FR-126	FR-127	FR-128	
	Lab ID	941677 010	941677 011	941677 012	941677 013	941677 014	
Trans-1,2-Dichloroethene		U	UD	U	U	U	10
Chloromethane		U	UD	U	U	U	10
Bromomethane		U	UD	U	U	U	10
Vinyl Chloride		U	UD	U	U	U	10
Chloroethane		U	UD	U	U	U	10
Methylene Chloride		U	UD	U	U	U	10
Acetone		U	UD	120	U	U	100
Carbon Disulfide		U	UD	U	U	U	100
1,1-Dichloroethene		U	UD	U	U	U	10
1,1-Dichloroethane		U	UD	U	U	U	10
cis-1,2-Dichloroethene		U	UD	U	U	U	10
Chloroform		U	UD	U	U	U	10
1,2-Dichloroethane		U	UD	U	U	U	10
2-Butanone		U	UD	U	U	U	100
1,1 1-Trichlorethane		U	UD	U	U	U	10
Carbon Tetrachloride		U	UD	U	U	U	10
Vinyl Acetate		U	UD	U	U	U	10
Bromodichloromethane		U	UD	U	U	U	10
1,2-Dichloropropane		U	UD	U	U	U	10
Trans-1,3-dichloropropene		U	UD	U	U	U	10
Trichloroethylene		U	UD	U	U	U	10
Dibromochloromethane		U	UD	U	U	U	10
1,1,2-Trichloroethane		U	UD	U	U	U	10
Benzene		54	210	4900	U	U	10
cis-1,3-Dichloropropene		U	UD	U	U	U	10
2-Chloroethylvinylether		U	UD	U	U	U	10
Bromoform		U	UD	U	U	U	10
4-Methyl-2-Pentanone		U	UD	U	U	U	100
2-Hexanone		U	UD	U	U	U	100
Tetrachloroethylene		U	UD	U	U	U	10
1,1,2,2-Tetrachloroethane		U	UD	U	U	U	10
Toluene		19	UD	800	U	U	10
Chlorobenzene		U	UD	U	U	U	10
Ethylbenzene		37	510	160	U	U	10
Styrene		U	UD	U	U	U	10
Total Xylenes		46	2300	9100	U	U	30
DATE ANALYZED		8/26/94	8/31/94	8/31/94	9/1/94	9/1/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941677
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg DRY WEIGHT

Matrix: SOIL
Method: 8240

Dilution Factor (DF)	1	125	1	1		PQL
Method Blank	VS 090694	VS 090294	VS 090194	VS 090194		
Client ID	FR-129	FR-130	FR-131	FR-132		
Analyte Lab ID	941677 015	941677 016	941677 017	941677 018		
Trans-1,2-Dichloroethene	U	UD	U	U		10
Chloromethane	U	UD	U	U		10
Bromomethane	U	UD	U	U		10
Vinyl Chloride	U	UD	U	U		10
Chloroethane	U	UD	U	U		10
Methylene Chloride	250	UD	U	U		10
Acetone	170	UD	210	U		100
Carbon Disulfide	U	UD	U	U		100
1,1-Dichloroethene	U	UD	U	U		10
1,1-Dichloroethane	U	UD	U	U		10
cis-1,2-Dichloroethene	30	UD	U	18		10
Chloroform	U	UD	U	U		10
1,2-Dichloroethane	U	UD	U	U		10
2-Butanone	U	UD	U	U		100
1,1 1-Trichlorethane	U	UD	U	U		10
Carbon Tetrachloride	U	UD	U	U		10
Vinyl Acetate	U	UD	U	U		10
Bromodichloromethane	U	UD	U	U		10
1,2-Dichloropropane	U	UD	U	U		10
Trans-1,3-dichloropropene	U	UD	U	U		10
Trichloroethylene	U	UD	U	U		10
Dibromochloromethane	U	UD	U	U		10
1,1,2-Trichloroethane	U	UD	U	U		10
Benzene	13	UD	U	U		10
cis-1,3-Dichloropropene	U	UD	U	U		10
2-Chloroethylvinylether	U	UD	U	U		10
Bromoform	U	UD	U	U		10
4-Methyl-2-Pentanone	U	UD	U	U		100
2-Hexanone	U	UD	U	U		100
Tetrachloroethylene	U	UD	U	U		10
1,1,2,2-Tetrachloroethane	U	UD	U	U		10
Toluene	11	UD	U	U		10
Chlorobenzene	U	UD	U	U		10
Ethylbenzene	U	9700	12	U		10
Styrene	U	UD	U	U		10
Total Xylenes	U	100000	110	U		30
DATE ANALYZED	9/7/94	9/2/94	9/1/94	9/1/94		

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

TARGET ANALYTE LIST
mg / kg (dry weight)

Matrix: SOIL

Analyte / Client ID / Lab ID	S-081994 FR-115 941677 001	S-081994 FR-116 941677 002	S-081994 FR-117 941677 003	S-081994 FR-118 941677 004	S-081994 FR-119 941677 005	PQL
Aluminum – 6010	8600	6800	6200	11000	6200	2.5
Antimony – 7041	<0.14	<0.13	36*	0.26	<0.13	0.125
Arsenic – 7060	13	2.8	5.4	8.6	6.0	0.1
Barium – 6010	42	37	1000	41	32	1.25
Beryllium – 6010	0.37	0.22	0.28	0.43	0.26	0.125
Cadmium – 7131	0.42	0.21	7.3	0.35	0.18	0.02
Calcium – 6010	65000	60000	47000	1600	58000	5
Chromium – 6010	13	12	120	20	11	0.25
Cobalt – 6010	6.8	4.9	13	8.7	5.5	1.25
Copper – 6010	13	11	190	20	11	0.625
Iron – 6010	15000	12000	25000	20000	12000	1.25
Lead – 6010	4.1	2.9	1000	17	5.1	0.15
Magnesium – 6010	11000	22000	11000	3000	14000	5
Manganese – 6010	540	250	370	210	300	0.375
Mercury – 7471	<0.021	<0.017	0.028	0.033	<0.015	0.02
Nickel – 6010	17	13	28	20	14	0.75
Potassium – 6010	1200	1200	970	1400	1000	25
Selenium – 7740	<0.09	<0.11	<0.10	<0.11	<0.08	0.15
Silver – 6010	<0.19	<0.033	0.49	<0.033	<0.024	0.03
Sodium – 6010	2000	860	540	400	240	5
Thallium – 7841	<0.11	<0.11	<0.10	<0.10	<0.08	0.1
Vanadium – 6010	16	16	13	24	14	1.25
Zinc – 6010	45	29	740	50	30	0.5

PQL = Practical Quantitation Limit, varies with weight and percent ratios
*Analysis by 6010 (1.5 PQL)

Date Analyzed:
ICP Metals 8/31/94
Selenium 9/06/94
Arsenic 9/08/94
Lead 9/09/94
Mercury 9/07/94
Thallium 9/10/94
Antimony 8/29/94
Silver 9/09/94
Cadmium 9/09/94

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

TARGET ANALYTE LIST
mg / kg (dry weight)

Matrix: SOIL

Analyte	Client ID / Lab ID	S-082094 FR-120 941677 006	S-082094 FR-121 941677 007	S-082094 FR-122 941677 008	S-082094 FR-123 941677 009	S-082094 FR-124 941677 010	PQL
Aluminum – 6010		6300	7000	9500	3600	6900	2.5
Antimony – 7041		3.5*	3.8*	65*	<0.13	2.8*	0.125
Arsenic – 7060		5.0	12	13	3.3	5.0	0.1
Barium – 6010		96	710	670	1.6	30	1.25
Beryllium – 6010		0.28	0.26	0.34	0.13	0.31	0.125
Cadmium – 7131		0.89	6.9	54	0.17*	0.22**	0.02
Calcium – 6010		48000	19000	26000	66000	33000	5
Chromium – 6010		19	71	530	8.6	12	0.25
Cobalt – 6010		6.2	10	39	3.4	5.5	1.25
Copper – 6010		28	180	3400	9.8	12	0.625
Iron – 6010		13000	27000	220000	8700	13000	1.25
Lead – 6010		74	890	25000	14	10	0.15
Magnesium – 6010		13000	4500	5800	24000	8900	5
Manganese – 6010		340	360	1300	190	320	0.375
Mercury – 7471		0.025	0.066	0.28	<0.017	<0.019	0.02
Nickel – 6010		35	37	190	8.8	13	0.75
Potassium – 6010		750	820	880	630	800	25
Selenium – 7740		<0.10	<0.11	<0.11	<0.09	<0.09	0.15
Silver – 6010		0.14	1.0	9.4	<0.029	0.029	0.03
Sodium – 6010		1200	1300	590	180	1100	5
Thallium – 7841		<0.11	<0.11	<0.11	<0.10	<0.09	0.1
Vanadium – 6010		12	13	9.0	13	18	1.25
Zinc – 6010		1200	1300	4100	22	34	0.5

PQL = Practical Quantitation Limit, varies with weight and percent ratios
*Analysis by 6010 (1.5 PQL)
**Analysis by (PQL 0.02)

Date Analyzed: ICP Metals 8/31/94
Selenium 9/06/94
Arsenic 9/08/94
Lead 9/09/94
Mercury 9/07/94
Thallium 9/10/94
Antimony 8/29/94
Silver 9/09/94
Cadmium 9/09/94

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

TARGET ANALYTE LIST
mg / kg (dry weight)

Matrix: SOIL

Analyte	Client ID / Lab ID	S-082094 FR-125 941677 011	S-082094 FR-126 941677 012	S-082094 FR-127 941677 013	S-082194 FR-128 941677 014	S-082194 FR-129 941677 015	PQL
Aluminum – 6010		10000	6000	4200	7100	10000	2.5
Antimony – 7041		0.19	<0.14	<0.13	4.7*	0.20	0.125
Arsenic – 7060		7.5	2.8	2.6	7.1	4.4	0.1
Barium – 6010		52	29	14	110	60	1.25
Beryllium – 6010		0.37	0.14	0.13	0.27	0.31	0.125
Cadmium – 7131		0.17	0.20	0.15	0.78	0.29	0.02
Calcium – 6010		2000	86000	64000	24000	72000	5
Chromium – 6010		16	9.1	7.7	22	14	0.25
Cobalt – 6010		7.3	5.4	3.4	5.2	7.1	1.25
Copper – 6010		17	12	8.7	25	14	0.625
Iron – 6010		18000	11000	8200	12000	14000	1.25
Lead – 6010		11	7.9	5.3	76	12	0.15
Magnesium – 6010		3200	12000	17000	7300	15000	5
Manganese – 6010		360	260	200	330	370	0.375
Mercury – 7471		<0.02	<0.018	<0.019	<0.016	<0.016	0.02
Nickel – 6010		20	13	9.0	13	15	0.75
Potassium – 6010		1300	1100	770	1100	1800	25
Selenium – 7740		<0.09	<0.09	<0.10	<0.09	<0.11	0.15
Silver – 6010		0.054	0.028	<0.029	0.10	<0.035	0.03
Sodium – 6010		780	560	270	500	770	5
Thallium – 7841		<0.09	<0.09	<0.09	<0.09	<0.11	0.1
Vanadium – 6010		22	12	11	18	19	1.25
Zinc – 6010		40	31	26	94	36	0.5

PQL = Practical Quantitation Limit, varies with weight and percent ratios
*Analysis by 6010 (1.5 PQL)

Date Analyzed:
ICP Metals 8/31/94
Selenium 9/06/94
Arsenic 9/08/94
Lead 9/09/94
Mercury 9/07/94
Thallium 9/09/94
Antimony 9/11/94
Silver 9/09/94
Cadmium 9/09/94

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941677
Project #: 5770

TARGET ANALYTE LIST
mg / kg (dry weight)

Matrix: SOIL

Analyte / Client ID / Lab ID	S-082194 FR-130 941677 016	S-082194 FR-131 941677 017	S-082194 FR-132 941677 018			PQL
Aluminum – 6010	8200	9200	8400			2.5
Antimony – 7041	49*	0.11	0.23			0.125
Arsenic – 7060	19	3.4	5.6			0.1
Barium – 6010	200	32	31			1.25
Beryllium – 6010	0.80	0.32	0.30			0.125
Cadmium – 7131	49	0.15	0.47			0.02
Calcium – 6010	32000	52000	73000			5
Chromium – 6010	800	13	12			0.25
Cobalt – 6010	53	6.0	6.9			1.25
Copper – 6010	1300	14	20			0.625
Iron – 6010	11000	14000	16000			1.25
Lead – 6010	7900	4.1	12			0.15
Magnesium – 6010	5200	9900	8700			5
Manganese – 6010	1300	460	400			0.375
Mercury – 7471	0.043	<0.019	<0.023			0.02
Nickel – 6010	130	16	23			0.75
Potassium – 6010	1300	1600	1300			25
Selenium – 7740	<0.1	<0.09	<0.10			0.15
Silver – 6010	2.3	<0.027	<0.031			0.03
Sodium – 6010	5300	1100	630			5
Thallium – 7841	<0.13	<0.09	<0.10			0.1
Vanadium – 6010	11	18	17			1.25
Zinc – 6010	3700	36	57			0.5

PQL = Practical Quantitation Limit, varies with weight and percent ratios
*Analysis by 6010 (1.5 PQL)

Date Analyzed:
ICP Metals 8/31/94
Selenium 9/06/94
Arsenic 9/08/94
Lead 9/09/94
Mercury 9/07/94
Thallium 9/09/94
Antimony 8/29/94
Silver 9/09/94
Cadmium 9/09/94

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

ANALYTE LIST

Matrix: SOIL

	Client ID	S-081994 FR-115	S-081994 FR-116	S-081994 FR-117	S-081994 FR-118	S-081994 FR-119		
	Lab ID	941677 001	941677 002	941677 003	941677 004	941677 005	Date Analyzed	PQL
Analyte	Method							
Total Solids	mod 160.3	87	88	87	86	88	9/6/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

ANALYTE LIST

Matrix: SOIL

	Client ID	S-082094 FR-120	S-082094 FR-121	S-082094 FR-122	S-082094 FR-123	S-082094 FR-124		
	Lab ID	941677 006	941677 007	941677 008	941677 009	941677 010	Date Analyzed	PQL
Analyte	Method							
Total Solids	mod 160.3	91	84	81	85	91	9/6/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

ANALYTE LIST
mg/kg dry wght

Matrix: SOIL

	Client ID	S-092094 FR-125	S-092094 FR-126	S-092094 FR-127	S-092094 FR-128	S-092094 FR-128		
	Lab ID	941677 011	941677 012	941677 013	941677 014	941677 015	Date Analyzed	PQL
Analyte	Method							
TOTAL SOLIDS	MOD 160.3	86	89	90	91	85	9/6/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941677
Project #: 5770

ANALYTE LIST

Matrix: SOIL

	Client ID	S-082194 FR-130	S-082194 FR-131	S-082194 FR-132			Date Analyzed	PQL
	Lab ID	941677 016	941677 017	941677 018				
Analyte	Method							
Total Solids	mod 160.3	78	88	86			9/6/94	%

PQL = Practical Quantitation Limit

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TCL SVOC	TAL Metals	REMARKS
15			S-082194-FR-129	Soil	2	✓	✓	✓	
16			-130			✓	✓	✓	
17			-131			✓	✓	✓	
18			-132			✓	✓	✓	

TOTAL NUMBER OF CONTAINERS: 36

RELINQUISHED BY: 1. Frank W. Ring	DATE: 8/22/94 TIME: 1900	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

1081

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY: Paula Sharrino
DATE: 8-23-94 TIME: 9:20

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX D

DATA VALIDATION REPORT

MEMO

TO: Frank Ring REFERENCE NO: 5770

FROM: Lou Almeida/pmck/7 DATE: January 26, 1995

RE: Analytical Data and Quality Assurance Review
Site Investigation, Building 43
General Motors Pontiac Manufacturing Facility
Pontiac, Michigan

1.0 OVERVIEW

Eighteen soil samples were collected at the General Motors Pontiac Manufacturing Facility Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); and metals.

This memo presents an analytical assessment and validation of results obtained in one analytical report from IEA Inc. (IEA) located in Schaumburg, Illinois resulting from the analysis of the soil and water samples collected from the Site.

Analytical results were received in a report provided by IEA and were reviewed to determine conformance with the requirements stipulated in the relevant methods and each laboratories quality control criteria. IEA completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (Revised 1994), and "National Functional Guidelines for Inorganic Data Review", (Revised 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries and matrix spike/matrix spike duplicate (MS/MSD) recoveries.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by IEA. Analytical methods and holding time criteria are presented in Table 1.

Samples submitted for analysis were analyzed prior to expiration of the prescribed holding time with one exception. Sample S-082194-FR-129 was analyzed for VOCs outside of the sample holding time criterion. Therefore, the results obtained from the analysis of this sample are qualified as estimated. Qualifications are presented in Table 2.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene, and 1,2-dichloroethane-d_4. Samples submitted for SVOC analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5 and terphenyl-d_{14}, 2-fluorophenol, phenol-d_6, and 2,4,6-tribromophenol surrogate compounds. Surrogate recovery limits, as established by the laboratory, are summarized in Table 3.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with some exceptions. Unacceptable surrogate recoveries are presented in Table 4. In cases where the recovery for terphenyl-d_{14} fell outside control limits, qualifications were not required as the other two base neutral surrogate recoveries for each sample were acceptable. Qualifications for sample S-082194-FR-129 were previously based on a holding time exceedance.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants. Consequently, data qualifications were not necessary.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. IEA prepared and analyzed check samples with the investigative samples for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology for organic analyses. No action is normally taken on MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE INORGANIC ANALYSES

Matrix spike MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

All MS recoveries fell within review limits (75-125 percent). Qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by IEA is acceptable for use noting the qualifications resulting from an unacceptable holding time.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIMES
SITE INVESTIGATION, BUILDING 43
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Method*	*Holding Time Criteria* *Solid Matrix (days)*
VOCs	SW-846 8240	14
SVOCS	SW-846 8270	7/40
Metals	SW-846 6010	6 months

Notes:

VOCs	-	Volatile Organic Compounds
SVOCs	-	Semi-volatile Organic Compounds
SW-846	-	USEPA's document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, September 1986.
14/40	-	14 days from the sample collection date to the sample extraction date, 40 days from the sample extraction date to the sample analysis date
14	-	14 days from the sample collection date to the sample analysis date

TABLE 2

SUMMARY OF DATA QUALIFICATIONS
SITE INVESTIGATION, BUILDING 43
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Matrix*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-082194-FR-129	VOCs	Water	Trans-1,2-Dichloroethene	10U	10UJ	2.1
			Chloromethane	10U	10UJ	2.1
			Bromomethane	10U	10UJ	2.1
			Vinyl Chloride	10U	10UJ	2.1
			Chloroethane	10U	10UJ	2.1
			Methylene Chloride	250	250J	2.1
			Acetone	170	170J	2.1
			Carbon Disulfide	10U	100UJ	2.1
			1,1-Dichloroethene	10U	10UJ	2.1
			1,1-Dichloroethane	10U	10UJ	2.1
			cis-1,2-Dichloroethene	30	30J	2.1
			Chloroform	10U	10UJ	2.1
			1,2-Dichloroethane	10U	10UJ	2.1
			2-Butanone	100U	100UJ	2.1
			1,1,1-Trichloroethane	10U	10UJ	2.1
			Carbon Tetrachloride	10U	10UJ	2.1
			Vinyl Acetate	10U	10UJ	2.1
			Bromodichloromethane	10U	10UJ	2.1
			1,2-Dichloropropane	10U	10UJ	2.1
			Trans-1,3-dichloropropene	10U	10UJ	2.1
			Trichloroethylene	10U	10UJ	2.1
			Dibromochloromethane	10U	10UJ	2.1
			1,1,2-Trichloroethane	10U	10UJ	2.1
			Benzene	13	13J	2.1
			cis-1,3-Dichloropropene	10U	10UJ	2.1
			2-Chloroethylvinylether	10U	10UJ	2.1
			Bromoform	10U	10UJ	2.1
			4-Methyl-2-Pentanone	100U	100UJ	2.1
			2-Hexanone	100U	100UJ	2.1
			Tetrachloroethylene	10U	10UJ	2.1
			1,1,2,2-Tetrachloroethane	10U	10UJ	2.1
			Toluene	11	11J	2.1
			Chlorobenzene	10U	10UJ	2.1
			Ethylbenzene	10U	10UJ	2.1
			Styrene	10U	10UJ	2.1
			Total Xylenes	30U	30UJ	2.1

Notes:

VOCs - Volatile Organic Compounds.
J - The reported results is estimated.
U - The parameter was not detected above the sample reporting limit.
UJ - The parameter was not detected above the sample reporting limit. The sample reporting limit is an estimated reporting limit.

TABLE 3

SUMMARY OF SURROGATE CONTROL LIMITS
SITE INVESTIGATION, BUILDING 43
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits* *Solid Matrix*
VOCs	Bromofluorobenzene	74-121
	1,2-Dichloroethane-d_4	70-121
	Toluene-d_8	81-117
SVOCs	2-Fluorobiphenyl	43-116
	Nitrobenzene-d_5	35-114
	Terphenyl-d_{14}	33-141
	2-Fluorophenol	21-100
	Phenol-d_6	10-94
	2,4,6-Tribromophenol	10-123

Notes:

SVOCs - Semi-volatile Organic Compounds
VOCs - Volatile Organic Compounds

TABLE 4

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
SITE INVESTIGATION, BUILDING 43
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
S-081994-FR-118	SVOCs	Terphenyl-d14	143	18 - 137
S-082094-FR-123	SVOCs	Terphenyl-d14	163	18 - 137
S-082094-FR-124	SVOCs	Terphenyl-d14	147	18 - 137
S-082094-FR-125	SVOCs	Terphenyl-d14	155	18 - 137
S-082194-FR-129	VOCs	1,2-Dichloroethane-d4	130	70 - 121

Notes:

SVOCs - Semi-volatile Organic Compounds
VOCs - Volatile Organic Compounds

APPENDIX F.2

PROJECT SPECIFICATIONS, EXCAVATION OF CONTAMINATED MATERIAL AT BUILDING 43

PROJECT SPECIFICATIONS

EXCAVATION OF CONTAMINATED MATERIAL AT BUILDING 43
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SECTION 01010

SUMMARY OF WORK

1.1 SECTION INCLUDES

A. Scope of work.

B. Location.

C. Access to Site.

D. Description of work.

E. Work not included.

F. Contract schedule.

G. Drawings.

1.2 SCOPE OF WORK

A. Works to be performed under this Contract consist of the excavation of contaminated material at Building 43 and associated work at the General Motors Pontiac Central Manufacturing Facility (Site), Pontiac, Michigan.

1.3 LOCATION

A. The Site is located on South Boulevard between Opdyke Road and Dr. Martin Luther King Jr. Boulevard, Pontiac, Michigan.

1.4 ACCESS TO SITE

A. Access to Site is available from South Boulevard at the contractors entrance.

B. Make arrangements with the authorities having jurisdiction for the movement of material and equipment to and from Site over public roadways.

1.5 DESCRIPTION OF WORK

A. Work includes but is not limited to the following:

1. Mobilization and startup.

2. Development, implementation, and maintenance of a Site-specific Health and Safety Plan.

3. Provision and maintenance of construction facilities and temporary controls.

4. Excavation and segregation of materials.

5. Stockpiling excavated materials.

6. Loading, transporting and disposing of contaminated soils.

7. Backfilling and compaction of excavation.

8. Support of buildings adjacent to the excavation which may be damaged by Works.

9. Demobilization and closeout.

1.6 WORK NOT INCLUDED

A. The following items of work associated with the project do not form part of this Contract:

1. Sampling and analysis of soils.

1.7 CONTRACT SCHEDULE

A. Perform Works in accordance with the following Contract Schedule:

1. Commence Works at Site within 7 days after the date of Notice to Proceed.

2. Complete Works within 28 days after the date of Notice to Proceed.

1.8 DRAWINGS

A. Drawings issued with and forming part of Contract Documents are listed below:

Drawing No.	*Rev. No.*	*Date of Drawing or Latest Revision*	*Title*
Figure 1	0	April 3, 1995	Facility location
Figure 2	0	April 3, 1995	Site plan
Figure 3	0	June 6, 1995	Excavation area

B. Perform Works in accordance with Drawings issued "Approved for Construction" by Engineer. Such Drawings will be issued to Contractor after Notice of Award and will consist of bid Drawings revised as required by Engineer and additional Drawings if required by Engineer. Revised Drawings may be issued from time to time and such Drawings will supersede previous revisions.

1.9 CONTRACTOR USE OF SITE

A. Limit use of Site to allow:

1. Owner occupancy.

2. Work by Others and Work by Owner.

B. Site Security: Complete all activities in a manner which complies with Owner's Site security requirements, including, but not limited to, sign in /sign out procedures.

C. Construction Operations: Do not unreasonably encumber Site with plant, equipment, or materials. Do not obstruct vehicle passage, use, or otherwise interfere with properties outside of Site unless otherwise specified.

D. Hours of Operation: Limit on-Site hours of operation to the hours of 7:00 am to 9:00 pm, unless prior arrangements are made with Engineer.

E. When unfavorable weather, soil, drainage, or other unsuitable construction conditions exist, continue operations to work which will not be adversely affected by such conditions. Do not construct or cause to be constructed any portion of Works under conditions which would adversely affect the quality of Works, unless special means or precautions are taken to perform Works in a safe, proper, and satisfactory manner.

END OF SECTION

SECTION 01015

GENERAL REQUIREMENTS

1.1 SECTION INCLUDES

A. Mobilization and startup.

B. Superintendence.

C. Related Sections.

D. Specification language.

E. Definitions

F. Coordination.

G. Field surveying.

H. Site mobilization meeting.

I. Examination.

J. Restoration.

K. Measurement and payment.

1.2 MOBILIZATION AND STARTUP

A. Do not mobilize to Site without Engineer's prior written authorization. Ensure insurance as required by Contract Documents is in full force.

B. Perform planning and scheduling activities as required for the performance of Works.

C. Purchase materials and mobilize equipment, supplies, and incidentals to Site.

D. Use the existing Site access roads to the designated work areas during mobilization. Complete improvements to roads as required.

E. Site temporary construction facilities in areas designated by Engineer. Obtain Engineer's approval prior to changing locations of temporary construction facilities. No other areas shall be used by Contractor without Engineer's prior approval. Relocate construction equipment or other materials or equipment as required for the performance of Works.

F. Do not commence work involving contact with potentially contaminated materials until decontamination facilities are operational and approved by Engineer.

G. Perform work that must be performed before beginning work on the various items for which payment is provided elsewhere in these Specifications.

H. Furnish submittals as required and described in these Specifications.

I. Obtain permits required specifically for commencement of the Works.

J. Confine equipment, storage of materials and equipment, and the operations of workers to the Site and areas identified in and permitted by Contract Documents and other land and areas permitted by laws and regulations, rights-of-way, permits, and easements. Do not unreasonably encumber Site with construction equipment or other materials or equipment.

1.3 SUPERINTENDENCE

A. Provide all necessary superintendence during execution of Works. Employ and assign to Works a competent and authorized representative satisfactory to Owner herein referred to as the Superintendent and who shall be responsible for supervision, inspection, and direction of Works and who shall be empowered to act on behalf of Contractor in all matters pertaining to the Contract. All instructions given such representative by Owner or Engineer shall be binding as if given to Contractor. Instructions will be confirmed by Engineer in writing upon request. The Superintendent shall be constantly on Works at Site and give his whole time to the superintendence of the same. Do not remove Superintendent from Works unless (a) Owner requests removal, (b) the Superintendent ceases to be employed by Contractor, or (c) otherwise agreed by Owner and Contractor.

B. Within 7 days after the date of Notice to Proceed, furnish name of Superintendent, in writing, to Engineer.

1.4 RELATED SECTIONS

A. When related Sections are listed in individual specification Sections, other Sections of the Project Specifications not referenced in the list of related Sections shall also apply to the extent required for the proper performance of Works.

1.5 SPECIFICATION LANGUAGE

A. These Project Specifications are written in imperative mood and are in the abbreviated or streamlined form and include incomplete sentences. This imperative language is directed to Contractor, unless specifically noted otherwise. Omission of words or phrases, such as "the Contractor shall", "shall be", "a", "the", and "all" are intentional. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on Drawings.

1.6 DEFINITIONS

A. In the Contract, the following words and phrases shall have the following meanings:

1. "Contract" means the agreement covering the performance of the Works including the supply of any and all work, labor, equipment, plant and materials that could reasonably be required to properly and satisfactorily complete the Works to be performed and any written supplementary agreements that may be made in order to ensure the completion of the Works in an acceptable manner.

2. "Works" means the services and associated work to be supplied by the Contractor.

3. "Contractor" means the party to whom the Contract for the Works has been awarded and in the context of the Contract means the Corporation named as Contractor in the Agreement.

4. "Owner" means General Motors Truck and Bus Group.

5. "Payment" means the amount to be paid to the Contractor for the satisfactory performance of the Works.

6. "Engineer" means Conestoga-Rovers & Associates and its duly authorized agents.

7. "Site" means the project site, which consists of the lands and structures made available to the Contractor by the Owner.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and work of the various Sections of Project Specifications and other requirements of Contract Documents.

B. Do not deliver material or equipment of any kind to Site until approval in writing has been applied for and obtained by Contractor from Engineer.

C. Coordinate delivery of material and equipment to Site with work sequence; schedule deliveries to limit requirement for storage at Site to the practical minimum; limit on-Site storage of materials to areas approved by Engineer.

1.8 FIELD SURVEYING

A. Unless otherwise specified, Engineer will establish reference bench marks and base lines adjacent to Works.

B. Notify Engineer in writing at least 5 working days in advance of commencing work on any part of the construction to enable Engineer to establish bench marks and base lines.

C. Locate, preserve, and protect survey control and reference points as set or established by Engineer. Promptly report to Engineer the loss or destruction of any reference point or relocation required because of changes in grades or other reasons. Make good any errors entering into Works through Contractor failure to notify Engineer concerning lack of preservation of such survey reference points. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to and approval of Engineer.

1.9 SITE MOBILIZATION MEETING

A. Engineer will schedule and administer a Site mobilization meeting at Site within 7 days prior to Contractor occupancy of Site.

B. Attendance Required: Owner, Engineer, Contractor's Health and Safety Officer and Superintendent, and major Subcontractors.

C. Agenda:

1. Use of Site by Owner and Contractor.

2. Owner's requirements.
3. Construction facilities and controls provided by Owner.
4. Temporary utilities provided by Owner.
5. Survey and excavation layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining Record Documents.
10. Health and safety.
11. Procedures for processing of field decisions, submittals, substitutions, progress payments, Field Orders, Requests for Quotation, Work Change Directives, Change Orders, and Contract closeout procedures.

D. Engineer will record minutes and distribute copies to participants and those affected by decisions made.

1.10 EXAMINATION

A. Prior to commencement of work at Site, inspect Site with Engineer to review and establish the condition of surface features including existing buildings, wells, fencing, service poles, wires, paving, and survey bench marks or monuments on or adjacent to Site which may be affected by Works. This inventory shall be mutually agreed between Engineer and Contractor and shall not thereafter be subject to dispute. Such inventory as may be amended, from time to time, will be used by Engineer to check compliance by Contractor with the requirements of Contract Documents.

B. Provide ongoing review, inspection, and attendance during performance of Works to properly document conditions. Promptly inform Engineer of any existing condition at Site affected by Works which may require restoration, repair, or replacement. Do not cover up any of Works without prior approval from Engineer.

C. Maintain and protect existing Site structures and facilities from damage which may be affected by Works while work is in progress. Repair or replace any damage resulting from Works to Engineer's approval.

D. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance by Contractor of existing conditions.

E. Examine and verify specific conditions described in individual specification Sections.

F. Verify that utility services are available, of the correct characteristics, and in the correct location.

1.11 RESTORATION

A. As a minimum, restoration shall mean replacement, repairs, or reconstruction to a condition at least as good as or better than the condition prior to commencement of Works.

B. Except where specifically required otherwise by other specification Sections, restore areas of Works and areas affected by the performance of Works to conditions that existed prior to commencement of Works and to match condition of similar adjacent, undisturbed areas.

C. Ensure that restored areas match existing grade and surface drainage characteristics, except as otherwise specified, and ensure a smooth transition from restored surfaces to existing surfaces.

D. Do not alter original conditions without prior written approval from Engineer.

E. Without limiting the generality of the foregoing or other requirements of the Contract, preserve and protect any existing feature encountered at Site during the performance of Works including, but not limited to buildings, wells, structures, curbs and gutters, fences, pavement, manholes and catch basins, utilities, roads, and other graded or improved areas.

F. Utilize construction methods and procedures during the performance of Works which keeps disturbance and damage of whatever nature to existing conditions to the practical minimum.

G. Ensure that quality, grades, elevations, and extent of bedding, cover, and other backfill materials including subgrades, finish grades, thickness of pavements for roadways, and parking areas are properly documented during their removal to ensure reconstruction to at least their original and functional condition.

H. Restoration Material: New, except as otherwise specified, not damaged or defective and of the best quality for the purpose intended. Furnish evidence as to type, source, and quality of materials or products provided when requested by Engineer or specified in other specification Sections.

I. Should any dispute arise as to the quality or fitness of materials, whether obtained on Site or off Site, whether previously inspected by Engineer prior to use or not, the decision to use any material or product in the finished Works will rest solely with Engineer.

J. Handle and store products and materials in a manner to prevent damage, adulteration, deterioration, and soiling and in accordance with manufacturer's instructions when applicable.

K. Prior to commencement of restoration work, inform Engineer of proposed material, methods, and procedures to repair, replace, or reconstruct any disturbed, damaged, or suspected damage to Works.

1.12 MEASUREMENT AND PAYMENT

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

B. Insurance:

1. Schedule of Prices Item No. A-1i) and A-1ii).

2. Payment Basis: Lump sum price. Includes furnishing and maintaining Contractor's Pollution Liability insurance required by Contract Documents for Item A-1i) and all other insurance required by Contract Documents for Item A-1ii).

C. Mobilization and Startup:

1. Schedule of Prices Item No. A-2.

2. Payment Basis: Lump sum price. Includes Contractor's planning and scheduling activities, mobilization of equipment to Site; material purchasing; project startup; work area preparations; preparation of miscellaneous submittals; procurement activities;

procure permits; meetings to coordinate key interface points and communication channels between Owner and Engineer.

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

1.1 SECTION INCLUDES

A. Payment.

B. Change procedures.

C. Alternatives.

1.2 PAYMENT

A. Payment requirements are delineated in the individual specification Sections and complement the criteria of this Article.

B. Engineer will measure or quantify the amount of work eligible for progress payment purposes. Items will be measured by weight, volume, area, or linear means, or combination as appropriate. Such measurements will serve as a basis for estimating percentage payments for partially completed work. Notify Engineer sufficiently in advance of operations to permit required measurements for payment. Assist by providing necessary equipment, workers, and survey personnel as required. Provide reasonable and necessary opportunities and facilities in making measurements.

C. Measurement Devices:

1. Weigh Scales: Inspected, tested, and certified by the applicable state Weights and Measures department within the past year.

2. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.

3. Metering Devices: Inspected, tested, and certified by the applicable state department within the past year.

D. Payment for Each Item Includes: Full compensation for all required labor, supervision, material, tools, equipment, plant, transportation, services, and incidentals for completion of Works in complete accordance with Contract Documents; erection, application, installation, or construction of an item of Works; overhead and profit; and all other miscellaneous items for which separate payment is not provided under other Items of the Schedule of Prices. All work not specifically set forth as a separate pay Item in the Schedule of Prices shall be considered as a subsidiary obligations of Contractor and all costs in connection therewith shall be included in the amounts and prices stipulated in the Schedule of Prices. Contractor shall properly and fairly distribute indirect costs to each pay Item. Final payment for work will be made on the basis of the applicable lump sum prices stipulated in the Schedule of Prices.

E. Defect Assessment: Replace Works, or portions of Works, not conforming to specified requirements. If, in the opinion of Engineer, it is not practical to remove and replace the defective work, Engineer will direct one of the following remedies:

1. The defective work may remain, but the price will be adjusted to a new price at the discretion of Engineer.

2. The defective work will be partially repaired to the instructions of Engineer, and the price will be adjusted to a new price at the discretion of Engineer.

F. Non-Payment for Rejected Products: Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.

2. Products determined as unacceptable before or after placement.

3. Products not completely unloaded from the transporting vehicle.

4. Products placed beyond the lines and levels of the required Works.

5. Products remaining on hand after completion of Works.

6. Loading, hauling and disposing of rejected products.

1.3 CHANGE PROCEDURES

A. Field Order: Engineer will advise of minor changes in Works and issue supplemental instructions not involving an adjustment to Contract Price or Contract Schedule as authorized by Contract Documents by issuing a Field Order. Promptly execute such minor changes and supplemental instructions.

B. Request For Quotation: Engineer may issue a Request for Quotation, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and schedule for executing the change in Works. Contractor shall prepare and submit a quotation within the due date stipulated in the Request for Quotation with sufficient data to allow evaluation by Engineer. When requested by Engineer, provide additional data to support computations:

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Overhead and profit.

4. Justification for any change in Contract Schedule.

5. Credit for deletions from Contract, similarly documented.

C. Work Change Directive: Engineer may issue a directive on behalf of Owner instructing Contractor to proceed with a change in Works, for subsequent inclusion in a Change Order. Document will describe change in Works, and designate method of determining any change in Contract Price or Contract Schedule. Promptly execute the change in Works.

D. Change Order: Based on the requirements of the Request for Quotation or the Work Change Directive and prepared as follows:

1. Lump sum price Change Order will be executed on Contractor's fixed lump sum price quotation as approved by Engineer.

2. A unit price Change Order will be executed on a fixed unit price basis for pre-determined unit prices and quantities. For unit costs or quantities of units of work which are not pre-determined, execute Works under a Work Change Directive.

3. A time and material Change Order will be executed on time and material rates approved by Engineer on a case-by-case basis. Submit an itemized account and supporting data after completion of change, within time limits indicated in Contract Documents. Engineer will determine the change allowable in Contract Price and Contract Schedule as provided in Contract Documents. Maintain detailed records of work done on time and material basis in accordance with Contract Documents. Provide full information required to substantiate costs for changes in Works.

E. Engineer will prepare and issue Field Orders, Request for Quotation, Work Change Directives, and Change Orders, as required, for signatures of parties.

F. When requested by Engineer, support each claim for work done on a time and material basis, with additional information:

1. Origin and date of claim.

2. Dates and times work was performed, and by whom.

3. Time records and wage rates paid.

4. Invoices and receipts for products, equipment, and subcontracts, similarly documented.

G. Promptly revise progress schedules to reflect any approved change in Contract Schedule, revise sub-schedules to adjust times for other items of work affected by the change, and promptly resubmit.

H. Promptly enter changes in Record Documents.

1.4 ALTERNATIVES

A. Alternatives specified in Contract Documents will be reviewed and accepted or rejected at Owner's Option. Accepted Alternatives will be identified in the Schedule of Prices.

B. Coordinate related work and modify surrounding work to integrate the work of each alternative.

C. Schedule of Alternatives:

1. Alternative No. 1: Excavate, stockpile, backfill, load, transport, off-site disposal of excavated material and off-site disposal of wastewater.

Base Bid Item: Sections 01010, 01015, 01019, 01111, 01300, 01400, 01500, 01700, 02222, 02223, and 02759.

2. Alternative No. 2: Excavate, stockpile, backfill, load excavated material into owner supplied haulage units for disposal, and off-sitedisposal of wastewater.

Base Bid Item: Sections 01010, 01015, 01019, 01111, 01300,01400, 01500, 01700, 02222, and 02223.

END OF SECTION

SECTION 01111

HEALTH AND SAFETY

1.1 SECTION INCLUDES

A. General requirements.

B. Basis of program.

C. Site characterization.

D. Submittals for review.

E. Health and safety officer.

F. Personnel health, safety, and hygiene.

G. Air monitoring.

H. Contingency and emergency response plans.

I. Site health and safety.

J. Measurement and payment.

1.2 GENERAL REQUIREMENTS

A. Develop a written Site-specific Health and Safety Plan prior to commencing any on-Site work and continue to implement, maintain, and enforce the plan until final demobilization from Site. The development, implementation, and maintenance of the Site-specific Health and Safety Plan is Contractor's sole responsibility. Contractor's Site-specific Health and Safety Plan, as a minimum, shall address the specifications contained herein.

B. The health and safety guidelines contained herein are intended to provide for a safe and minimal risk working environment for on-Site personnel and to minimize the impact of activities involving contact with any hazardous materials or hazardous wastes on the general public and the surrounding environment.

C. Should Contractor seek relief from or substitution for any portion or provision of the minimum health and safety guidelines specified herein or the reviewed Site-specific Health and Safety Plan, such relief or substitution shall be requested of Engineer in writing, and if accepted by Engineer, will be authorized in writing.

D. Responsibility: Be responsible for the safety of persons and property on Site and for the protection of persons off Site and the environment to the extent that they may be affected by the conduct of Works. Comply with and enforce compliance by Contractor employees and the employees of Subcontractors, agents, and invitees, with safety requirements of Contract Documents, applicable federal, state, and local statutes, regulations, and ordinances, and with Contractor's Site-specific Health and Safety Plan. Contractor acknowledges that safety and environment protection obligations are of paramount importance regarding all of the work to be performed under Contract Documents.

E. Hazard Communication Requirements:

1. Comply with the requirements of OSHA's "Hazard Communication" rule, 29 CFR 1910.1200. Contractor shall be responsible for obtaining information of any hazardous chemical or harmful physical agent to which his personnel and visitors have potential exposure while on the premises.

2. Contractor shall provide Engineer with MSDS (Material Safety Data Sheet) documentation on any "hazardous" chemicals that Contractor plans to bring onto Site. In addition, Contractor is responsible for meeting container warning label requirements of the OSHA rule.

F. Work Stoppage: Contractor shall give precedence to the safety and health of the public and on-Site personnel and the protection of the environment over cost and schedule considerations for all project work. The Health and Safety Officer shall be responsible for decisions regarding when work will be stopped or started for health or safety considerations and shall have the authority to stop or start the work for health or safety considerations. Contractor shall assign the responsibility and obligation to the Health and Safety Officer to stop or start the work when, in the Health and Safety Officer's discretion, it is necessary or advisable for reasons of health or safety. Engineer shall have the right to stop work for health and safety considerations.

G. Unforeseen Hazards: Should any unforeseen or Site-peculiar safety-related factor, hazard, or condition become evident during the performance of Works at Site, bring such to the attention of Engineer verbally and in writing as quickly as possible, for resolution. In the interim, take prudent action to establish and maintain safe working conditions and to safeguard Contractor employees and employees of Subcontractors, agents and invitees, the public, Owner, Engineer, and the environment.

H. Work Zone Restrictions: Do not work in the Exclusion Zone or in the Contaminant Reduction Zone (including any areas expected to become an Exclusion Zone or Contaminant Reduction Zone), including work relating to the designation or establishment of an Exclusion Zone or Contaminant Reduction Zone, until Contractor's Site-specific Health and Safety Plan is reviewed by Engineer. Other on-Site work may be conducted after the submittal of the Site-specific Health and Safety Plan to, and prior to, its review by Engineer, but conduct any such work only with the prior approval of Engineer. Implement the proposed Site-specific Health and Safety Plan, as submitted to Engineer, during the conduct of any work performed prior to the review of the Site-specific Health and Safety Plan.

1.3 BASIS OF PROGRAM

A. The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) provide the basis for the health and safety program. The program also reflects the position of the USEPA and NIOSH regarding procedures recommended or required to ensure safe operations at sites containing hazardous or toxic materials.

1.4 SITE CHARACTERIZATION

A. Work at Site will involve contact with materials containing varying levels of Vinyl Chloride, SVOC's (benzo (a) anthracene, benzo (b) fluoranthene, benzo (a) pyrene, Indeno (1, 2, 3) pyrene, and Dibenzo (A,H) anthracene) and inorganics (aluminum, arsenic, lead, and manganese).

1.5 SUBMITTALS

A. Contractor's Site-Specific Health and Safety Plan:

1. Within 7 days after the date of Notice to Proceed and prior to mobilization to Site, submit a Site-specific Health and Safety Plan. As a minimum, address aspects of worker protection and measures designed to prevent migration of hazardous or contaminated material to the environment, including but not limited to the provisions and guidelines contained herein, and the following specific topics:

1. Worker medical surveillance.

2. Worker training.

3. A detailed description of the planned movement of labor, equipment, and materials from and between work areas as work progresses, including measures to be employed to prevent recontamination of previously cleaned areas and contamination of areas that do not now contain hazardous materials.

4. A detailed description of the wash down area for decontamination of vehicles and equipment and the methods to be used to collect, store, treat, and ultimately dispose of wash down decontamination waters and sediments.

5. Personal protective equipment types to be used.

6. Personal hygiene and personnel decontamination procedures.

7. Respirator protection program and procedures.

8. Emergency and first-aid equipment and supply.

9. Dust and particulate emission control.

10. Monitoring and mitigation of worker heat and cold stress.

11. On-Site and off-Site Contingency and Emergency Response Plans.

2. Engineer will review Contractor's Site-specific Health and Safety Plan and provide comments to Contractor within 5 days after receipt of the plan. Revise the plan as appropriate and resubmit the plan to Engineer within 2 days after receipt of comments from Engineer.

B. Proof of OSHA Training: Within 7 days after the date of Notice to Proceed and prior to mobilization to Site, submit a list of all personnel that will be employed at Site. For each of the listed personnel, provide proof of training as required under OSHA 29 CFR 1910.120. Submit proof of training for any additional personnel, at least 1 day prior to the individual's arrival on Site.

C. Medical Surveillance:

1. Within 7 days after the date of Notice to Proceed and prior to mobilization to Site, submit a report for medical examination conducted within the last 12 months as part of compliance with OSHA medical surveillance requirements for each of Contractor's personnel that will be employed at Site. As a minimum, submit the following information for each Contractor personnel:

    1. Name and Social Security Number and date of exam.

    2. Physician's statement that the worker is approved to wear and use the types of respiratory protection proposed for the project and is able to work safely in hazardous environments capable of producing heat stress in the worker.

2. Submit reports on medical examination for any additional personnel at least 7 days prior to the individual's arrival on Site.

3. Submit the name of the physician and evidence of examination of on-Site personnel prior to assigning personnel on-Site work activities in the Exclusion Zone or Contaminant Reduction Zone.

1.6 HEALTH AND SAFETY OFFICER

A. Employ and assign to Works a competent and authorized representative herein referred to as Health and Safety Officer. Health and Safety Officer shall be on Site during the execution of work and report directly to and be under the direction of a Certified Industrial Hygienist provided by Contractor.

B. Certified Industrial Hygienist Responsibilities:

1. Oversee operations as necessary to ensure Works is performed in accordance with the Site-specific Health and Safety Plan.

2. Oversee and be present during the Health and Safety Training Session and, as a minimum, complete qualitative respirator fit testing.

3. Oversee the Health and Safety Officer's activities on a part-time basis.

4. Be available on an as-needed basis for emergency situations.

C. Health and Safety Officer Experience and Responsibilities:

1. Have a minimum of 2 years Site-related working experience specific to the activities associated with excavation of contaminated materials.

2. Have a basic working knowledge of state and federal occupational safety and health regulations.

3. Have formal education and/or training in occupational safety and health.

4. Be responsible for completing the health and safety training session and ensuring that personnel not successfully completing the required training are not permitted to enter Site to perform work in the Exclusion Zone or Contaminant Reduction Zone.

5. Be responsible for implementing and daily enforcing and monitoring the Site-specific Health and Safety Plan.

6. Be responsible for ensuring reusable personal protective equipment is decontaminated before being reissued.

7. Be responsible for performing air monitoring.

8. Ensure that on-Site personnel have obtained the required medical examinations prior to arrival at Site and at the termination of their assignment as required by this Contract Documents.

9. Be responsible for the pre-construction indoctrination of on-Site Contractor personnel with regard to the Site-specific Health and Safety Plan and other safety requirements to be observed during performance of Works, including:

    1. Potential hazards.

    2. Personal hygiene principles.

    3. Use of personal protective equipment and respiratory protection, including fit testing.

    4. Emergency procedures for dealing with fire and medical situations.

10. Be responsible for incorporating the provisions of both on-Site and off-Site Contingency and Emergency Response Plans in the Site-specific Health and Safety Plan and maintaining a state of readiness to enact the provisions.

11. Be responsible for alerting appropriate on-Site and/or off-Site emergency services and Engineer before starting any particularly hazardous work.

12. Assist Engineer in contacting and advising local authorities of Works to be performed.

13. Have the authority and obligation to stop all, or any part of Works if, in his sole discretion, stoppage of Works is necessary or advisable for considerations of health or safety.

1.7 PERSONNEL HEALTH, SAFETY, AND HYGIENE

A. Medical Surveillance:

1. Conduct medical surveillance of personnel as required by 29 CFR 1910.120 and 29 CFR 1910.134.

2. Retain the services of a licensed occupational physician or physician's group to provide the medical examinations and surveillance required. Furnish pertinent Site characterization data, a copy of 29 CFR 1910.120, and a description of the intended personal protective equipment to the occupational physician prior to completing medical

surveillance. Maintain Contractor personnel medical approvals at Contractor's Site office for the duration of Works performed at Site.

3. Medical surveillance protocol shall be the occupational physician's responsibility but shall meet the requirements of 29 CFR 1910.120 and 29 CFR 1910.134 for all personnel. This exam may include:

    1. Medical/occupation questionnaire with work history.

    2. Full physical examination.

    3. Screening audio metric test with otoscopic exam for occlusion or perforation.

    4. Visual acuity measurement, including color perception.

    5. Pulmonary function test (Spirometry - FVC and FEV-1.0 second).

    6. Resting EKG.

    7. Chest x-ray.

    8. Blood chemistry profile as deemed appropriate by the attending physician for hazardous waste work.

    9. Complete blood count with differential and platelet evaluation, including WBC, RBC, HGB, hematocrit.

    10. Urinalysis with microscopic examination.

    11. Other Site-specific medical monitoring as required by Site-specific conditions.

4. Provide on-Site personnel requiring full medical surveillance with medical surveillance within the 12-month period prior to entering Site, and at any time there is suspected to be excessive exposure to toxic chemicals or physical agents. Remove on-Site personnel who become due for an annual physical examination from the work force immediately until medical requirements are met in accordance with 29 CFR 1910.120 and 29 CFR 1910.134.

5. Maintain medical surveillance records in accordance with 29 CFR 1910.120 and 29 CFR 1910.134.

6. Conduct medical surveillance of personnel as required by Site operations management with compliance of NIDA 10 drug screening Test E.

B. Training:

1. Provide and require that personnel assigned to or entering Site, complete Site-specific training or refresher sessions. Site-specific training and refresher sessions shall ensure that personnel are capable of and familiar with the use of safety, health, respiratory, and protective equipment and with the safety and security procedures required for Site. The training session shall be completed by Contractor's Health and Safety Officer.

2. As a minimum, include the following items in the training program:

    1. Names and personnel responsible for Site health and safety.

2. Site-specific potential hazards.

3. Use of personal protective equipment (PPE), including proper donning and doffing procedures.

4. Work practices by which the employee can minimize risks from these potential hazards.

5. Safe use of engineering controls and on-Site equipment.

6. Discussion and completion of medical surveillance requirements and recognition of symptoms associated with exposure to hazards.

7. Site control methods.

8. On-Site and off-Site Contingency and Emergency Response Plans.

9. Decontamination procedures.

10. Site-specific standard operating procedures.

11. Delineation between work zones.

12. Use of the buddy system.

13. Scope of the intended work for the Contract.

14. Review on-Site communications and appropriate hand signals between personnel working in the Exclusion Zone and/or Contaminant Reduction Zone.

15. The content of the OSHA standards, including the Appendices.

3. In accordance with 29 CFR 1910.120, provide training to all employees assigned to or entering the Exclusion Zone or Contaminant Reduction Zone excluding truck drivers transporting waste material including a minimum of 40 hours instruction off Site and 3 days of actual field experience under direct supervision of a trained and experienced supervisor and an 8-hour annual refresher. Provide documentation stating that all on-Site personnel expected to enter potentially contaminated work areas have complied with this regulation. Include each individual's name on this confirmatory letter.

4. Implement a hazard communication ("Right-to-Know") program in accordance with 29 CFR 1910.1200.

C. Levels of Protection:

1. Establish levels of protection for each work area based on planned activity, location of activity, and air monitoring results. Monitor potential exposures to hazardous materials with a photoionization device and a dust monitor.

2. Furnish minimum Level C personal protective equipment (PPE) in the Exclusion Zone until initial air monitoring results are available. After the air monitoring results are available, increase or decrease the level of PPE, but to not less than Level C for waste

handling activities. The anticipated levels of personal protection based on work activity are as follows:

	Work Activity	*Anticipated Level of Personal Protection*
1.	Excavation of soils	Level C and Modified Level C
2.	General non-intrusive activities	Modified Level C and Level D

D. Personal Protective Equipment:

1. Furnish on-Site Contractor personnel with appropriate PPE. Ensure that safety equipment and protective clothing is kept clean and well maintained. As a minimum, supply each worker entering or expected to enter the Exclusion Zone or Contaminant Reduction Zone with:

    1. Disposable coveralls, liquid resistant, splash resistant, full coverage.

    2. Individually assigned half- or full-face piece air purifying respirators (NIOSH approved) with appropriate dual organic vapor/high-efficiency particulate filters. Respirators shall be available for on-Site personnel at all times.

    3. Disposable outer gloves, chemical resistant (nitrile).

    4. Disposable inner gloves, thin nitrile or latex.

    5. Steel-toed, steel-shank, chemical-resistant safety boots.

    6. Disposable rubber, chemical-resistant overboots, butyl rubber or neoprene.

    7. Work clothing (full-length pants, long-sleeve shirt).

    8. Hard-hats.

    9. Safety glasses with side shields.

2. Based on the work activity and the anticipated level of personal protection as specified in Section 01111, Article 1.7C, furnish on-Site Contractor personnel with appropriate PPE. Ensure that safety equipment and protective clothing is kept clean and well maintained. As a minimum, supply each worker entering or expected to enter the Exclusion Zone or Contaminant Reduction Zone with protection as specified in Section 01111, Article 1.7C. The following are the minimum PPE required for each level of protection as applicable:

    1. Level C:

        1. Individually assigned half- or full-face piece air-purifying respirators (NIOSH-approved) with appropriate cartridges for organic vapors and particulates.

2. Chemical-resistant disposable coveralls (tyvek).

3. Latex and/or cotton inner gloves.

4. Nitrile outer gloves.

5. Work boots with steel toe and shank.

6. Chemical-resistant overboots or booties, butyl rubber or neoprene.

7. Hard hat.

8. Safety glasses with side shields and/or chemical-resistant goggles.

2. Modified Level C:

1. Individually assigned half- or full-face piece air-purifying respirators (NIOSH approved), with appropriate cartridges for organic vapors and particulates. Respirators shall be available at all times and donned when required as indicated by air monitoring.

2. Chemical-resistant disposable coveralls (tyvek).

3. Latex and/or cotton inner gloves.

4. Nitrile outer gloves.

5. Work boots with steel toe and shank.

6. Chemical-resistant overboots or booties, butyl rubber or neoprene.

7. Hard hat.

8. Safety glasses with side shields and/or chemical-resistant goggles.

3. Level D:

1. Hard hat.

2. Safety glasses with side shields or goggles.

3. Long pants and long-sleeve shirt.

4. Safety boots.

5. Any personal protective equipment necessary for specialized tasks (for example, welding goggles).

3. Develop protective equipment usage procedures and ensure that procedures are strictly followed by on-Site personnel; include the following procedures as a minimum:

1. Do not permit prescription eyeglasses to be worn that are not safety glasses. Do not permit contact lenses on Site within the Exclusion Zone or Contaminant Reduction Zone.

2. Change respirator cartridges/filters daily during periods of respirator usage or upon breakthrough, whichever occurs first.

3. Do not permit footwear to be worn that is not steel-toed safety shoes or boots. Cover footwear by rubber overshoes when entering or working in the Exclusion Zone.

4. Dispose of or decontaminate PPE worn on Site at the end of the work day.

5. Decontaminate reusable PPE before reissuing.

6. Do not permit on-Site personnel who have not passed a respirator fit test to enter potentially contaminated work areas and/or the Contaminant Reduction Zone. Do not permit personnel to have facial hair that interferes with a proper fit of the respirator.

7. As a minimum, require on-Site personnel within potentially contaminated work areas to wear approved PPE including, but not necessarily limited to, hard-hats and safety boots.

E. Respiratory Protection:

1. Provide on-Site personnel with extensive training in the usage and limitations of, and qualitative fit testing for, half- and full-face piece respirators in accordance with 29 CFR 1910.134; include both air-purifying and supplied-air type respirators.

2. Develop, implement, and maintain the respirator program. Incorporate or attach a copy of the respirator program to Contractor's Site-specific Health and Safety Plan.

3. Monitor, evaluate, and provide respiratory protection for on-Site personnel.

4. Levels of respiratory protection as listed in Section 01111, Article 1.7C, have been chosen to be consistent with Site-specific potential airborne hazards associated with the major contaminants identified at Site. The selection of appropriate protection is based upon the potential presence of compounds with the lowest recommended threshold limit value.

5. In the absence of additional air monitoring information or substance identification, the following minimum levels of respiratory protection will be required:

Sustained Total Organic Vapor Concentration Above Background (ppm)	*Level of Respiratory Protection Required*
0 - 5	Half- or full-face piece respirator available
5 - 10	Full- or half-face piece air-purifying respirator, Level C
> 10	Shut down activities, evaluate the need for Level B or higher respiratory protection

6. Immediately notify Engineer when level of respiratory protection required increases from Level D to Level C or from Level C to Level B.

7. Be responsible for appropriate respiratory protection during work activities. As a minimum, ensure that persons entering the Exclusion Zone or Contaminant Reduction Zone are supplied with and use appropriate respiratory protection.

8. Be responsible for assessing the ability for on-Site personnel to wear respiratory protection. Cardiopulmonary system examination and pulmonary function testing are minimum requirements as specified in Section 01111, Article 1.7A.

9. Do not permit on-Site personnel unable to pass a respirator fit test to enter the Exclusion Zone or Contaminant Reduction Zone. Furnish proof of such fit testing to Engineer prior to commencing work.

F. Heat Stress/Cold Stress:

1. Implement a heat stress and/or cold stress monitoring program as applicable; include as a minimum the following specific components:

    1. Training of personnel to recognize and mitigate heat/cold stress situations and symptoms.

    2. Target conditions which will initiate monitoring of personnel.

    3. Monitoring methods.

    4. The means and methods by which Contractor will mitigate such conditions.

2. Base the heat stress/cold stress program on recommendations by ACGIH, NIOSH, and other recognized authorities.

G. Personnel Hygiene and Personnel Decontamination Procedures:

1. Ensure that on-Site personnel observe and adhere to the personal hygiene-related provisions of this Section.

2. Issue a written notice of violation to on-Site personnel found to be disregarding the personal hygiene-related provisions of the Site-specific Health and Safety Plan or the Project Specifications (including but not limited to the requirements concerning PPE specified in Section 01111, Article 1.7D, respiratory protection specified in Section 01111, Article 1.7E, and personnel hygiene and personnel decontamination procedures specified in Section 01111, Article 1.7G. The notice may be issued by Engineer, the Health and Safety Officer, or any supervisory personnel of Contractor. Give a copy of the notice to the offending worker, to his immediate supervisor, to Contractor's Superintendent, and to Engineer. Upon issuance of a second written notice of such violation, terminate the worker from employment at Site.

3. Failure of Contractor's supervisory personnel to implement this warning/termination provision shall be deemed a material breach of the Contract.

4. Provide, as a minimum, the following:

    1. Suitable containers for storage and disposal of used disposable PPE.

5. Enforce the following provisions:

1. Require on-Site personnel to wear appropriate PPE at all times when entering or working in the Exclusion Zone or Contaminant Reduction Zone.

2. Do not permit used disposable PPE to be reused, and when removed, place PPE inside appropriate containers provided for that purpose.

3. Prohibit smoking, chewing nicotine products, eating, and drinking, in the Exclusion Zone or Contaminant Reduction Zone.

6. Place discarded disposable outerwear, gloves, and outer footwear in sealable containers. Prior to placement, segregate discarded articles of clothing and secure in plastic bags. Place articles which are soiled, stained, or have been in contact with contaminated materials in separate Contractor-supplied sealable containers. Place remaining clean articles of clothing in Contractor-supplied general refuse containers.

H. Emergency and First-Aid Equipment:

1. Locate and maintain emergency and first-aid equipment in appropriate locations on Site. Include the following equipment as a minimum:

1. First-aid kit to accommodate the numbers of on-Site personnel.

2. Two ABC type dry chemical fire extinguishers.

2. As a minimum, provide one certified first-aid technician on Site at all times that on-Site work activities are in progress. This person may perform other duties but shall be immediately available to render first aid when needed.

I. Site Communications:

1. Ensure that personnel work under the use of a "buddy" system and develop a hand signal system appropriate for Site activities.

2. Provide selected personnel with two-way radios.

J. Safety Meetings: Conduct safety meetings, mandatory for on-Site personnel, on a daily basis and additionally as required by special or work-related conditions.

1.8 AIR MONITORING

A. Air Monitoring Program:

1. During the progress of work activities, monitor air quality in and around the Exclusion Zone. Conduct monitoring on a regular periodic basis, and additionally as required by special or work-related conditions. Report any departures from general background to Engineer who will, in conjunction with the Health and Safety Officer, determine when operations should be shut down and restarted.

2. Provide the required instruments for air monitoring including, as a minimum, an organic vapor photoionizer or organic vapor analyzer and if confined space work is to occur, an

oxygen level meter and an explosimeter. Additionally, personnel sampling pumps and dust monitors may be required if Site conditions warrant. Provide sufficient numbers of each instrument to monitor the active work location and to provide backup equipment in cases of equipment malfunction.

3. Operate air monitoring equipment with personnel trained in the use of the specific equipment provided and under the control of the Health and Safety Officer. Monitoring equipment used within the potentially contaminated work areas with combustible gases shall be intrinsically safe.

4. Conduct air monitoring for organic vapors on a routine basis around active work locations. Perform monitoring as a minimum on an hourly basis and additionally as dictated by Site activities.

B. Air Monitoring Reporting:

1. Report the results of air monitoring program to Engineer on an hourly basis and additionally as dictated by Site activities.

2. In addition, record daily air monitoring activities in a hard cover log book; maintain log book on Site at all times.

1.9 CONTINGENCY AND EMERGENCY RESPONSE PLANS

A. General: Prior to mobilization to Site prepare both on-Site and off-Site Contingency and Emergency Response Plans to ensure the safety of on-Site and off-Site personnel. Incorporate the on-Site and off-Site Contingency and Emergency Response Plans into Contractor's Site-specific Health and Safety Plan.

B. On-Site Contingency and Emergency Response Plan: Address the standard operating procedures to be implemented during emergency situations. Include and address the following emergency situations and responses as a minimum:

1. In the event of injury to on-Site personnel or contact with hazardous materials requiring immediate medical attention, implement the following protocol:

    1. Notify the Health and Safety Officer and Engineer.
    2. Phone the hospital previously identified to be closest to Site and describe injury.
    3. Decontaminate personnel and administer appropriate first aid.
    4. Transport personnel to the specified hospital along the most direct route which shall be predefined prior to commencing Site work.

2. In the event that barrels or canisters are encountered during Works, immediately cease work and notify Engineer and Health and Safety Officer; determine appropriate modifications to the Site-specific Health and Safety Plan in conjunction with Engineer and Health and Safety Officer.

3. In the event that excessive gases or vapors are detected during Works, take the following actions:

    1. Evacuate workers to an area upwind from the affected area.

2. Identify the contaminant and monitor contaminant concentrations to determine the type of respiratory protection and/or engineering controls required before workers re-enter the area.

4. In the event of a fire during Works, quickly use earth moving equipment to backfill the area and smother the fire if possible and if the presence of noxious gases prohibits this, employ proper evacuation procedures.

5. In the highly unlikely event of a major leak of toxic gas, such as might occur if a compressed gas cylinder were encountered and ruptured during Works, evacuate on-Site personnel to a safe distance, and notify the Police and Fire Department and local hospital if deemed necessary by Engineer or the Health and Safety Officer. Police and Fire Department Officials will assume responsibility for coordinating with Engineer and the Health and Safety Officer for the proper emergency response strategy upon arrival.

C. Off-Site Contingency and Emergency Response Plan:

1. Prior to commencing work involving the handling of hazardous materials, develop an off-Site Contingency and Emergency Response Plan. This plan is intended to provide immediate response to a serious Site occurrence such as explosion, fire, or migration of significant quantities of toxic or hazardous material from Site which could affect or endanger the public or adjacent public or private areas.

2. Engineer will be responsible for coordination of meetings with local officials, issuing minutes of meeting and preparation of the off-Site Contingency and Emergency Response Plan for distribution.

3. Attend a coordination meeting to be held with appropriate authorities including the City, Fire, Hospital, State and City Police, State Department of Transportation, the County Health Department, and the Community Emergency Coordinator; meeting will identify the off-Site Emergency Response Coordinator through whom all information and coordination will occur in the event of an incident. Develop plans and procedures, or adopt existing plans and procedures, for:

    1. Evacuation of Site-adjacent areas.
    2. Fire-fighting procedures.
    3. Transport of injured personnel to medical facilities.
    4. Priority transportation routes.
    5. Coordination and/or modification of highway operations.

4. Develop techniques and recommended procedure for immediate first-aid emergency response with local medical facilities.

1.10 SITE HEALTH AND SAFETY

A. Work Areas: Clearly lay out and identify work areas in the field and limit equipment, operations and personnel in the areas as defined below. Establish work areas as temporary or permanent, depending on the work activity and the sequence in which it is performed. These areas are:

1. The Exclusion Zone: Includes areas where hazardous or potentially contaminated (soils, debris, and other materials) are being, or may be contacted, disturbed, or handled and areas where contaminated equipment or personnel travel. Establish temporary Exclusion

Zones around remote work areas beyond the limits of the Exclusion Zone located within Site fence; clearly delineate temporary Exclusion Zones in the field by temporary snow fencing and/or barricades and warning signs provided by Contractor.

2. The Contaminant Reduction Zone: Occurs at the interface of the Exclusion Zone and Clean Zone and provides for the prevailing upwind transfer of construction materials from clean to Site-dedicated equipment, the decontamination of equipment and vehicles prior to entering the Clean Zone from the Exclusion Zone, the decontamination of personnel and clothing prior to entering the Clean Zone from the Exclusion Zone, and for the physical segregation of the Clean and Exclusion Zones.

3. The Clean Zone: Defined as a clearly delineated predominantly upwind area outside the Exclusion Zone(s) and Contaminant Reduction Zone(s), which functions include:

    1. An entry area for personnel, material, and equipment to the Contaminant Reduction Zone.

    2. An exit area for decontaminated personnel, material, and equipment from the Contaminant Reduction Zone.

    3. A storage area for clean safety and work equipment.

B. Temporary Fencing:

1. Erect temporary fencing on Site to delineate work areas in accordance with the Site-specific Health and Safety Plan.

2. Construct temporary fencing of standard snow fence or construction fence supported by posts with yellow warning tape.

3. Coordinate the erection of temporary fencing with the work specified under other Sections of the Project Specifications. Prior to or during mobilization erect fencing to enclose the Exclusion Zone.

4. Reuse existing temporary fencing; decontaminate temporary fencing prior to reuse at another location.

C. Contaminant Migration Control:

1. Take appropriate measures to prevent contaminant tracking on and off Site. Decontaminate vehicles, equipment, and personnel leaving areas of potential contamination, as determined by the Health and Safety Officer, prior to entry into Clean Zones. Locate decontamination facilities and sequence work activities to prevent contaminant tracking.

2. Personnel engaged in vehicle decontamination shall wear protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.11 SCHEDULES

A. Manhours for maintaining personal protective equipment are as follows:

PPE Level	*Manhours*
Level C	24
Modified Level C	120

1.12 MEASUREMENT AND PAYMENT

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

B. Development, Implementation, and Maintenance of Site-Specific Health and Safety Plan:

1. Schedule of Prices Item No. B-1.

2. Payment Basis: Lump sum price. Includes development, implementation, and maintenance of a Site-specific Health and Safety Plan; provision of all required training; provision of emergency first-aid facilities; designation and maintenance of work areas; air monitoring for volatile organics, explosive gases, and respirable dust; services of Health and Safety Officer and Certified Industrial Hygienist including salary, wages, taxes, and benefits.

3. As Contractors selected to bid on this particular job are considered to be involved in hazardous waste activities on a full-time basis, Contractor shall provide personnel who have already complied with the medical requirements as specified herein. Preliminary medicals for Contractor personnel shall not be included as a pay item. Additional medical surveillance required during the progress of Works due to excessive exposure to toxic chemicals or physical agents shall be considered as an extra.

C. Health and Safety and Personal Protective Equipment - Level C:

1. Schedule of Prices Item No. B-2.

2. Payment Basis: Lump sum price. Includes furnishing and maintaining personal protective equipment for Level C for all Contractor personnel required to work in the potentially contaminated work areas.

D. Health and Safety and Personal Protective Equipment - Modified Level C:

1. Schedule of Prices Item No. B-3.

2. Payment Basis: Lump sum price. Includes furnishing and maintaining personal protective equipment for Modified Level C for all Contractor personnel required to work in the potentially contaminated work areas.

END OF SECTION

SECTION 01400

QUALITY CONTROL

1.1 SECTION INCLUDES

A. Quality assurance - control of installation.

B. References.

1.2 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, products, services, Site conditions, and workmanship, to produce Works of specified quality.

B. Comply with specified standards as minimum quality for Works except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform work by persons qualified to produce workmanship of specified quality.

1.3 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Notice of Award, except where a specific date is established by code or by individual specification Section.

C. The contractual relationship, duties, and responsibilities of the parties in Contract nor those of Engineer shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

D. Publications referred in these Specifications form part of the Specifications to the extent specified in individual specification Sections.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

1.1 SECTION INCLUDES

A. Temporary Controls: Fencing, water control, dewatering, erosion and sediment control, dust and particulate control, and equipment decontamination.

B. Construction Facilities: Temporary facilities including equipment decontamination facility, Storage/stockpiling facilities.

C. Measurement and payment.

1.2 TEMPORARY FENCING

A. Construction: Standard snow fence and yellow safety ribbon.

B. Provide fencing around construction Site including but not limited to excavation, stockpile areas and decontamination facility.

C. Enforce and require that workers observe and respect the limits marked with temporary fencing.

1.3 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect Site from puddling or running water. Provide water barriers as required to protect Site from soil erosion.

C. Prevent surface water runoff from leaving work areas.

D. Contain and collect waste waters and transfer such collected waste waters to wastewater storage tanks.

E. Do not discharge decontamination water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off Site or to municipal sewers.

F. Provide, operate, and maintain necessary equipment appropriately sized to keep work areas free from water.

G. At all times have on hand sufficient pumping equipment, machinery and tankage in good working condition and have available at all times competent workers for the operation of the pumping equipment.

H. Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of work stoppage including at the end of each working day and as directed by Engineer.

I. Contain water from stockpiled potentially contaminated materials and transfer the collected water to the wastewater storage tanks.

J. Direct surface waters that have not contacted potentially contaminated materials to surface drainage systems.

K. Control surface drainage including ensuring that gutters are kept open at all times, water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs and runoff from unstabilized areas is intercepted and diverted to a suitable outlet.

L. Dispose of water in a manner not injurious to public health or safety, to property or to any part of Works completed or under construction.

M. Contain and collect surface water runoff from potentially contaminated materials.

N. Contain and collect any groundwater encountered during excavation activities.

1.4 DEWATERING

A. Dewater the various parts of Works including excavation and work areas.

B. Employ construction methods, procedures, and precautions that will ensure Works, including excavations, are stable, free from disturbance, and dry.

C. Construction Methods: Includes sheeting and shoring; groundwater control systems; surface or free water control systems employing ditches, diversions, drains, pipes and/or pumps; and any other measures necessary to enable the whole of Works to be carried out in the dry.

D. Provide sufficient and appropriate labor and equipment necessary to keep Works free of water including standby equipment necessary to ensure continuous operation of dewatering system.

E. .Take precautions necessary to prevent uplift of any structure or pipeline and protect excavations from flooding and damage due to surface runoff.

1.5 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.

B. Provide and maintain temporary measures such as silt fences, hay bales, ditches, drains, berms, dikes required to trap and contain sediments to prevent sediment migration and to prevent water flow. Make sediment control measures available at all times during construction. Place silt fences and/or hay bales in ditches to prevent sediments from escaping from the ditch termination.

C. Do not disturb existing embankments or embankment protection.

D. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.6 DUST AND PARTICULATE CONTROL

A. Provide and maintain dust and particulate control measures such as a water misting system as required to prevent the generation of dust and particulate during the performance of Works.

B. Implement dust and particulate control measures as determined necessary by Engineer during construction.

C. Use potable water for dust control.

D. Do not use chemical means for dust and particulate control without Engineer's prior written approval.

E. As a minimum, use appropriate covers on trucks hauling fine or dusty material and use watertight vehicles to haul wet materials.

1.7 EQUIPMENT DECONTAMINATION

A. Do not commence work involving equipment contact with potentially contaminated material until the equipment decontamination facility is operational.

B. Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.

C. Perform equipment decontamination on Contractor-constructed equipment decontamination pad.

D. At a minimum, perform the following steps during equipment decontamination:

1. Mechanically remove packed dirt, grit and debris by scraping and brushing without the use of steam or high-pressure water to reduce the amount of water needed and to reduce the amount of contaminated rinsate generated.

2. Use high-pressure, low-volume, hot water or steam supplemented by detergents or solvents as appropriate and as approved by Engineer.

3. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages.

4. Scrub surfaces with long handle scrub brushes and a cleaning agent as appropriate.

5. Rinse off cleaning agent.

6. Air dry equipment in the Clean Zone before removing from Site or travel on clean areas.

7. Perform an assessment to determine the effectiveness of the decontamination as directed by Engineer.

E. Each piece of equipment will be inspected by Engineer after decontamination and prior to removal from Site and/or travel on clean areas. Engineer will have right to require additional decontamination to be completed if deemed necessary.

F. Take appropriate measures necessary to minimize the drift of mist and spray during decontamination including the provision of wind screens.

G. Collect decontamination waste waters and sediments which accumulate on the equipment decontamination pad. Transfer waste waters to designated wastewater storage tank.

H. Transfer sediments to appropriate location as determined by Engineer.

I. Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.

1.8 EQUIPMENT DECONTAMINATION FACILITY

A. Prior to commencing work involving equipment contact with potentially contaminated materials, construct an equipment decontamination pad to accommodate the largest piece of on-Site potentially contaminated equipment.

B. Submit equipment decontamination pad design for review prior to commencing construction.

C. Provide, operate, and maintain suitable, portable, high-pressure, low-volume decontamination wash unit equipped with self-contained water storage tank and pressurizing system.

D. Wash Unit: Capable of heating and maintaining wash waters to 180 degrees F and providing a nozzle pressure of 150 psi.

E. Provide, operate, and maintain necessary equipment, pumps, and piping required to collect and contain equipment decontamination waste waters.

F. Provide, operate, and maintain necessary equipment required to transfer decontamination wastewater and sediment accumulating on equipment decontamination pad to approved storage facilities.

1.9 STORAGE/STOCKPILING FACILITIES

A. Construct storage/stockpiling facilities as required. Install liner below all proposed stockpile locations, to prevent contact between the stockpile material and the ground. Equip facility with tarps which are capable of covering the stockpiled material until Engineer advises Contractor to dispose of the material off Site or reuse as applicable.

B. Each storage/stockpile facility shall be to sufficient size to accomodate the estimated volume of material which it is to contain:

Stockpile	*Estimated Volume*
Stockpile 1 - overburden	2600 cubic yards
Stockpile 2 - contaminated material	6500 cubic yards

C. Liner installed below stockpiled material shall be 12-mil polyethylene sheeting or an alternate material approved by Engineer.

D. Construct stockpile facilities so that they are level, well drained, free of foreign materials, and of adequate bearing capacity to support the weight of the materials to be placed thereon.

E. Provide and maintain access to stockpiles.

F. Separate differing materials with substantial dividers or stockpile apart to prevent mixing.

G. Prevent intermixing of soil types or contamination or segregation.

H. Direct surface water away from stockpile facility to prevent erosion or deterioration of materials.

I. Maintain stockpile slopes not steeper than 1.5 horizontal to 1 vertical. In no instance shall stockpiles be greater than 10 feet in height above original surrounding grade. Place hay bales or soil erosion and sediment control fencing at the base of and around each temporary stockpile to contain soil that may be washed off the stockpile.

J. Maintain area surrounding stockpiles in neat and tidy condition.

K. Cover stockpiled material with approved reinforced polyethylene sheeting of minimum 12-mil thickness to withstand adverse weather, wind and other detrimental forces. Provide total protection of stockpiled material from rain and other adverse weather effects.

1.10 MEASUREMENT AND PAYMENT

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

B. Decontamination Facility:

1. Schedule of Prices Item No. C-1.

2. Payment Basis: Lump sum prices. Includes supply, install, and maintain decontamination facility.

C. Storage/Stockpiling Facilities:

1. Schedule of Prices Item No. C-2.

2. Payment Basis: Lump sum price. Includes supply, install, and maintain stockpile areas; 12-mil polyethylene liners and covers; berms.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Final decontamination.

D. Demobilization.

E. Final wastewater removal and disposal.

F. Final grading.

G. Measurement and payment.

1.2 CLOSEOUT PROCEDURES

A. Submit written notice to Engineer that the entire Works or an agreed portion thereof is complete and ready for Engineer's inspection prior to Preliminary Acceptance of Works.

B. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Engineer's review.

C. Complete and furnish all submittals to Engineer that are required by governing or other authorities and by these Contract Documents. Final payment shall not become due and payable until all submittals have been made acceptable to Engineer.

1.3 FINAL CLEANING

A. Execute final cleaning prior to Preliminary Acceptance of Works.

B. Remove surplus materials from Site.

C. Dispose of non-contaminated litter and rubbish at a sanitary landfill.

1.4 FINAL DECONTAMINATION

A. Perform final decontamination of equipment and materials which may have come in contact with potentially contaminated materials prior to removal from Site.

B. Perform decontamination as specified in Section 01500 to the satisfaction of Engineer. Engineer will have right to direct Contractor to perform additional decontamination if required.

1.5 DEMOBILIZATION

A. Following decontamination, remove temporary construction and support facilities provided by Contractor.

1.6 FINAL WASTEWATER REMOVAL AND DISPOSAL

A. Sample and analyze any stored wastewater for disposal purposes prior to removal from Site. The results of the analyses will determine the appropriate methods of disposal. Upon receipt of the analytical results, transfer tank contents to liquid waste transportable tankers as necessary and dispose of at an appropriate off-Site facility as identified by Contractor and approved by Engineer. Following emptying of the wastewater tank, decontaminate the tank interior with a steam or high-pressure water wash supplemented by detergent (Alconox). Dispose of rinse water generated as part of this cleaning as wastewater to an off-Site facility identified by Contractor and approved by Engineer.

1.7 FINAL GRADING

A. Perform final grading prior to Preliminary Acceptance of Works.

1.8 SCHEDULES

A. Volumes of wastewater for disposal are as follows:

Type	*Volume*
non-hazardous wastewater	200 gallons

1.9 MEASUREMENT AND PAYMENT

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

B. Demobilization and Closeout:

1. Schedule of Prices Item No. D-1.

2. Payment Basis: Lump sum price. Includes final decontamination of equipment, construction facilities, and materials to be removed from Site; final removal of temporary construction and support facilities provided by Contractor for the performance of Works; final Site cleanup; final non-contaminated waste removal and disposal; all disposal costs charged by the disposal facility; full compliance with applicable federal, state and local regulations; removal and disposal of any stored wastewater including decontamination water; final grading.

END OF SECTION

SECTION 02222

EXCAVATING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for removing and stockpiling of overburden fill material.

B. Excavating for removing of contaminated material and associated debris.

1.2 RELATED SECTIONS

A. Section 02223 - Backfilling.

1.3 DEFINITIONS

A. Excavation: Removal of all materials of whatever nature encountered, whether wet, frozen, or otherwise, including dense tills, hardpan, frozen materials, cemented materials, concrete and asphalt pavement, boulders or rock fragments, and weathered rock which can be removed by ripping or excavating with heavy duty mechanical construction equipment without drilling and blasting.

B. Excavation Limits: Areal excavation limits shown on Drawings to the specified depth or as directed by Engineer and does not include areas shown as being on hold pending further sampling and analysis by Engineer.

C. Additional Excavation: Excavation beyond the initial excavation limits either areally or in depth, as directed by Engineer following sampling and analysis (and including trench excavations).

D. Clean Soil: Soils containing less than Michigan Type B Clean up Criteria concentrations for Target Compound List (TCL) and Target Analyte List (TAL) contamination.

E. Rock: Material from solid masses of igneous, sedimentary, or metamorphic rock which, prior to its removal, was integral with its parent mass, and boulders or rock fragments having individual volume in excess of 1 cubic yard.

1.4 SUBMITTALS

A. Excavation Plan: Prior to mobilization to Site, submit a detailed Excavation Plan demonstrating compliance with specified requirements and to permit Engineer to schedule testing and measurement activities. Include written procedures, schedules, and drawings as applicable and, as a minimum, address each of the following items:

1. Methods and procedures which will be used to perform excavation and stockpiling of clean material in excavation areas.

2. Sequencing and scheduling of excavation and backfilling in excavation areas including allowances for time required for sampling and analysis by Engineer.

3. Sequencing and scheduling of shoring installation and removal if needed.

4. Locations and sequencing of constructed and relocated temporary decontamination facilities.

5. Sequencing and layout of access routes to and from excavation areas.

6. Methods and procedures which will be implemented to prevent contaminant tracking and cross-contamination.

7. Methods and procedures which will be used to perform additional excavation in open excavations.

8. Sequencing and scheduling of stockpiling operations.

9. Anticipated crew sizes, manhours, types of equipment and equipment hours on a weekly basis.

10. Dust control measures to be employed during excavation.

11. Air monitoring and Health and Safety requirements to be employed during excavation and soil handling.

B. Shoring Plan and Design: Prior to commencing excavation, submit a detailed Shoring Plan and Design. Include existing conditions, written procedures, schedules, design calculations, design assumptions and design drawings. Shoring drawings shall be reviewed and stamped by a Professional Engineer registered in the State of Michigan. Provide a copy of all required shoring permits.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01500 - Construction Facilities and Temporary Controls: Requirements for temporary controls.

B. Protect open excavations against damage due to surface runoff and runon. Take necessary precautions to prevent erosion of excavated or disturbed surfaces.

C. Suspend operations whenever climatic conditions, as determined by Engineer, are unsatisfactory for placing fill to the requirements of this Section.

D. After occurrence of heavy rains, do not operate equipment on approved excavations until the material has dried sufficiently to prevent occurrence of excessive rutting.

E. Where excavations have been softened or eroded, remove soft and yielding material or otherwise objectionable or damaged areas and replace with fill as specified by Engineer.

F. Decontaminate equipment involved in excavation activities which may have come in contact with potentially contaminated material before being removed from Site or being relocated to clean areas of Site.

1.6 SEQUENCING AND SCHEDULING

A. Do not commence excavation operations until the Site-specific Health and Safety Plan has been reviewed by Engineer and implemented, the decontamination facilities have been constructed and stockpiling locations have been identified by the Engineer.

B. Coordinate interruptions of utility services to existing and adjacent buildings or facilities which become necessary either directly or indirectly due to work required under this Contract through Engineer. Down time for service disruptions may be limited as to duration and time (weekend, nights, or holidays). Perform Works during the period designated.

C. Coordinate and sequence excavation operations to minimize the need for temporary stockpiling excavated materials until required for backfilling. Make every effort to balance cut and fill operations and to ensure that any excavated material designated for backfill is immediately placed as backfill in Works. Keep the time during which excavations remain open to the practicable minimum.

D. Do not allow or cause any of work performed to be covered up or enclosed prior to required inspections, tests, or approvals.

PART 2 (NOT USED)

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01015 - General Requirements: Verification of existing conditions before starting work.

B. Excavation Areas: Engineer will define the boundaries of contaminated soil excavation as shown on Drawings, and as determined in the field by Engineer, based on visual observations and the analytical results of soil samples collected from the base and walls of the excavations.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect all utilities in the area of excavation. Confirm locations of buried utilities and structures with Engineer.

C. Notify appropriate utility company or owner to remove or relocate interfering utilities.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Maintain and protect from damage utilities, and structures encountered, and not designated for demolition or removal including buildings and building foundations. In the event of disturbance of or damage to any utility or structure immediately notify Engineer. Repair or replace any utility or structure damaged by Contractor operations.

F. Protect existing buildings and surface features which may be affected while work is in progress.

G. Protect existing buildings and structures where temporary unbalanced earth pressures are liable to develop on walls or other structures utilizing bracing, shoring, or other approved methods to counteract unbalance.

H. Protect monitoring wells and any other structures and pipelines from any uplift and displacement or disturbance during excavation operations.

I. Employ procedures for excavation such that disturbance of utilities, structures, and their foundations is avoided.

J. Protect excavations from cross contamination.

K. Obtain direction from Engineer before moving or otherwise disturbing utilities or structures.

3.3 EXCAVATING

A. Underpin adjacent structures which may be damaged by excavating work.

B. Excavate to lines, grades, elevations, and dimensions shown on Drawings or as directed by Engineer.

C. Slope banks with machine to angle of repose or less until shored as directed by the Engineer.

D. Do not interfere with 45-degree bearing splay of foundations.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Remove debris and other obstructions encountered.

G. Remove lumped soil, boulders, and rock up to 1 cu yd measured by volume.

H. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.

I. Remove excavated material including boulders, debris, brush, brush, roots or other perishable matter from Site to approved landfill site as determined by the Engineer.

J. Hand trim, make firm, and remove loose material and debris from excavations. Where natural or fill material at bottom of excavation is disturbed, compact disturbed soil to density at least equal to undisturbed soil or to the density specified for the succeeding layer of backfill, whichever is greater, or remove disturbed soil and refill the space as directed by Engineer.

K. Leave excavations open pending sampling and analysis by Engineer. Engineer may direct additional excavation or backfilling based on the analytical results.

L. Open excavations shall be Contractor's sole responsibility.

3.4 OVER-EXCAVATING

A. Correct areas over-excavated in accordance with Section 02223.

B. Notify Engineer when soil at bottom of the excavation appears unsuitable and proceed as directed by Engineer. Where, in Engineer's opinion, the undisturbed condition of the soils is inadequate for the support of installations, over-excavate to adequate supporting soils as directed by Engineer and refill the excavated space with approved material to the proper elevation in accordance with the procedure specified for backfill. Where so directed by Engineer and except as otherwise specified, the excavation and removal of inadequate material as specified, supply and installation of such material in excess of the quantities shown on Drawings will be paid for under the appropriate item of the Schedule of Additional Unit Prices. Use such over-excavated material in Works or stockpile on Site as approved by Engineer.

C. Should unauthorized excavation be carried below the lines and grades indicated on Drawings and in excess of the specified limits and tolerance because of Contractor's operations including errors, methods of construction or to suit his convenience, correct unauthorized excavation as follows:

1. Fill under concrete structures with concrete.

2. Fill under unauthorized over-excavation areas by extending the indicated bottom elevation of the base of the material specified to be placed to the unauthorized excavation bottom without altering the required top elevation and compact as specified unless otherwise directed by Engineer.

D. Additional excavation to remove weakened or disturbed soil caused by Contractor's error, unsuitable construction methods or procedures or to suit Contractor's convenience and subsequent additional backfill and compaction to correct deficiencies shall be to Contractor's sole account at no additional cost to Owner.

3.5 PROTECTING CLEAN SOIL FROM CONTAMINATION

A. Notify Engineer when soil at the bottom of excavation appears contaminated and proceed as directed by Engineer.

B. Prevent contamination of adjacent clean soil.

C. Place plastic sheeting and plywood under excavation equipment and alongside the excavation to prevent contaminated soil from being mixed with surrounding clean soil. Use other means of preventing contamination subject to approval by Engineer. Do not mix excavated soil with imported materials unless otherwise directed by Engineer. Place excavated soil adjacent to excavation in compliance with OSHA requirements.

D. Clean stockpiled excavated soils will be considered native fill for the purpose of backfilling.

E. Decontaminate excavation equipment after handling contaminated materials and prior to handling clean overburden. Decontaminate shoring or falsework prior to reuse. Engineer will direct additional decontamination as necessary in the opinion of Engineer.

3.6 EXCAVATING CONTAMINATED SOILS

A. Excavate soils to depths and dimensions as indicated on Drawings and as directed by Engineer. Discontinue excavation if excessive groundwater is encountered.

B. Stockpile potentially clean overburden soil in area designated by the Engineer for use as backfill material if it is confirmed to be suitable as specified in Section 02223 and as determined by Engineer.

C. Identify contaminated areas by survey stakes. Excavate each area identified to be contaminated to remove all soil, sediments and other solid materials determined to be contaminated. Representative samples will be collected of the excavated soils for waste disposal acceptance analysis by Engineer.

D. Develop staging/stockpile facilities to prevent contact between clean and contaminated material as specified in Section 01500, or directed by the Engineer. Perform loading to minimize contamination of the exterior of the stockpile facility and the loading area.

E. Perform excavation in such a manner that only the excavation bucket contacts contaminated materials.

F. Upon completion of excavation as shown on Drawings, Engineer will obtain confirmatory soil samples from the base of the excavation.

G. Keep limits of excavation undisturbed and free of loose, soft, or organic matter.

H. Maintain excavation depth tolerances. Unless directed by Engineer, excavation in excess of the specified limits shall be considered over-excavation.

I. Should unauthorized excavation be carried below the lines and grades indicated on Drawings and in excess of the specified limits and tolerance because of Contractor's operations including errors, methods of construction or to suit his convenience, correct unauthorized excavation as follows:

1. Fill under concrete structures with concrete.

2. Fill under other unauthorized over-excavation areas by extending the indicated bottom elevation of the base of the material specified to be placed to the unauthorized excavation bottom without altering the required top elevation and compact as specified unless otherwise directed by Engineer.

J. Keep excavations open until directed to be backfilled by Engineer pending receipt and review of analytical results of samples collected from the excavated surface. Following receipt of analytical results, Engineer may direct Contractor to horizontally extend the limits of the excavation, excavate an additional depth of soil or direct Contractor to commence backfilling. For the duration of an open excavation, maintain the excavation free from water and adequately mark the open excavation with temporary fencing to restrict access until the excavation is properly backfilled.

K. Schedule excavation activities in such a manner that access is available to any excavation area for additional excavation as directed by Engineer. In returning to an area for additional excavation, comply with the previously specified access route restrictions. Make due allowance in scheduling excavation activities for the time required for sample collection and analysis and for analytical results to be forwarded to Engineer. Allow for a laboratory turnaround time of 24 hours (not including weekends or holidays) commencing on the day following sample collection.

L. Decontaminate excavation equipment periodically and as directed by Engineer. Decontaminate equipment when visibly contaminated or when moving from a significantly contaminated area

to one of lesser contamination for excavation work. Decontaminate equipment prior to performing additional excavation in an excavation previously left open pending sampling and analysis by Engineer. Engineer will direct additional decontamination when required in the opinion of Engineer.

3.7 SHORING

A. Submittal of Shoring Plan as specified in Section 02222, 1.4, B.

B. Prior to installation of shoring, perform careful test excavations to determine the exact extent of foundations, such that shoring installation does not damage footings.

C. Provide shoring and bracing necessary to safely support soil to prevent movement, loss of soil or other activity that would cause damage to existing on- and off-Site structures. Construct shoring to be rigid and suitable to prevent excessive movement of or damage to the supported structure during excavation and following backfilling.

D. Initially install shoring to allow for three (2) additional feet of excavation below excavation design limits shown on Drawings, should such additional excavation be required by Engineer. Install shoring as close to buildings to remain as possible to facilitate maximum removal of contaminated soils.

E. Horizontal or vertical movement of buildings (top of foundation wall or base of footing) or shoring next to a building of more than 1/8 inch would be considered excessive and require immediate stabilizing measures by contractor until the cause of the excess movement is determined and new design details are implemented by Contractor.

F. Implement and pay for stabilizing measures, consultation to identify and correct the problem, all miscellaneous activities associated with correcting the problem, and any damage caused to the building by any movement whether or not the movement exceeded 1/8 inch.

G. Decontaminate sheeting and shoring prior to removal from Site.

3.8 TEMPORARY STOCKPILING

A. Obtain Engineer's approval for locations of temporary stockpiles. Obtain Engineer's approval prior to placing material in such stockpiles.

B. Stockpile materials on Site at locations designated by Engineer.

C. Construct stockpile facilities as specified in Section 01500.

3.9 CLEANING

A. Section 01700 - Contract Closeout: Requirements for cleaning installed work.

B. Clean and reinstate work areas and areas affected by equipment outside areas specified to be excavated, to specified grade and restoration condition as determined by the Engineer.

3.10 SCHEDULES

A. Volumes and depth of in place material to be excavated are as follows:

Soil	*Volume*	*Depth Below Ground Surface*
clean soil	2000 cubic yards	0-4 feet
contaminated material	5000 cubic yards	2-15 feet

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

4.2 EXCAVATING CLEAN SOILS

A. Schedule of Prices Item No. E-1.

B. Payment Basis: Lump sum price. Includes excavating to required elevations, handling, and placing materials in a temporary stockpile.

4.3 EXCAVATING CONTAMINATED SOILS

A. Schedule of Prices Item No. E-2.

B. Payment Basis: Lump sum price. Includes excavating to required elevations, handling, placing materials in a temporary stockpile, and loading materials into haulage units for off-Site disposal.

4.4 OVER-EXCAVATING

A. Payment Basis: No separate payment will be made. Included under Items No. E-1 and E-2 of Section 02222.

END OF SECTION

SECTION 02223

BACKFILLING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Site filling and backfilling.

B. Fill for over-excavation.

C. Consolidation and compaction as scheduled.

1.2 RELATED SECTIONS

A. Section 02222 - Excavating.

1.3 REFERENCES

A. Section 01400 - Quality Control: Requirements for references.

B. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

C. ASTM D698 - Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

D. ASTM D1140 - Standard Test Method for Amount of Material in Soils Finer Than the No. 200 (75-µm) Sieve.

E. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

F. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

G. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

H. ASTM D3017 - Standard Test Method for Water Content of Rock in Place by Nuclear Methods (Shallow Depth).

I. ASTM D4253 - Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.4 DEFINITIONS

A. Standard Proctor Density (SPD) means the maximum dry density of a soil material determined in accordance with ASTM D698.

B. Unsuitable materials means the following materials:

1. Material containing loam, roots or organic matter.

2. Frozen material or material containing snow or ice.

3. Clays which are classified as inorganic clays of high plasticity in accordance with ASTM D2487.

4. Soft and/or organic clays and silts of low strength.

5. Frost susceptible silts or clays.

6. Swelling clays.

7. Rock and lumps of material with dimensions greater than 1 inch, measured through any axis specified layer thickness before compaction.

8. Trees, stumps, branches and any other wood or lumber.

9. Wire, steel, cast iron, cans, drums or any other foreign material.

10. Chemical substances or soils containing hazardous chemical substances including PCB, CDD, CDF, herbicides/pesticides and other chemicals.

1.5 SUBMITTALS

A. Materials Source: Submit name of proposed imported soil material source at least 7 days prior to commencing transport of materials to Site. Submit evidence for each material source, in the form of chemical analysis, that the material is free of any hazardous substances, to Engineer at least 7 days prior to transporting the material to Site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and transport fill materials at all times in a manner and with equipment that will prevent segregation and contamination.

B. When necessary, as approved by Engineer, stockpile fill materials on Site in locations approved by Engineer.

C. Minimize stockpiling requirements. Transport material from source directly to final position where possible.

PART 2 PRODUCTS

2.1 COMMON FILL

A. Imported borrow.

B. Graded.

C. Free of lumps larger than 1 inch or fine uniform sands that may be difficult to compact.

D. Conforming to ASTM D2487 Group Symbol.

2.2 SOURCE QUALITY CONTROL

A. Section 01400 - Quality Control: Requirements for source testing and analysis of soil material.

B. Testing and Analysis of Common Fill:

1. Maximum Dry Density, ASTM D698: One sample per 4,000 cubic yards of material required.

2. Grain Size, ASTM D422: One sample per 4,000 cubic yards of material required.

3. Moisture Content, ASTM D3017: One sample per 4,000 cubic yards of material required.

4. Atterberg Limits, ASTM D4318: One sample per 4,000 cubic yards of material required.

5. Soil Classification, ASTM D2487: One sample per 3,000 cubic yards of material required.

C. If tests indicate materials do not meet specified requirements, change material or material source and retest.

D. In the event of changes to approved sources of materials during performance of Works, immediately advise Engineer of revised locations and obtain approval of such locations and materials prior to use in Works.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01015 - General Requirements: Verification of existing conditions before starting work.

B. Do not allow or cause any of the work performed or installed to be covered up or enclosed by work of this Section prior to required inspections, measurements, tests, or approvals.

C. Obtain approval from Engineer for completed excavations and previously placed material prior to placement of successive lifts.

D. Obtain approval from Engineer prior to placing fill against structures or around exposed buried utilities.

E. Do not proceed with backfilling operations within a specific excavation area until the excavation area is approved as complete by Engineer. Do not cause excavations to be backfilled until Engineer has approved excavation as complete and completed field measurements for payment purposes, and sampling and testing for analytical purposes.

F. Ensure areas to be backfilled are free from debris snow, ice, water, or frozen ground.

3.2 PREPARATION

A. Compact subgrade to density requirements for subsequent backfill materials.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with common fill and compact to density equal to or greater than requirements for subsequent fill material.

C. Remove debris, snow, ice, water, or frozen ground from areas to be backfilled.

D. Scarify and proof roll subgrade surface to a depth of 1/2 inch to identify soft spots; fill and compact to density equal to or greater than requirements for subsequent fill material.

E. Decontaminate equipment which has handled contaminated or potentially contaminated material at the decontamination area prior to being used for backfilling operations.

3.3 BACKFILLING

A. Backfill areas to previously existing grades and elevations.

B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Common Fill: Place and compact materials in equal continuous layers not exceeding 12 inches compacted depth within 12 inches of existing grade.

D. Maintain optimum moisture content of backfill materials to attain required compaction density.

E. Slope grade away from building minimum 2 inches in 10 feet, unless noted otherwise.

F. Make gradual grade changes. Blend slope into level areas.

G. Remove surplus backfill materials from Site.

H. Leave fill material stockpile areas free of excess fill materials.

I. Use fill types as specified. Completely use clean excavated overburden soil approved for backfilling before using imported fill.

J. Do not use backfill material which is determined unsuitable by Engineer.

K. Backfill around exposed utilities by placing layers simultaneously on all sides to equalize loading. Do not dump directly against monitoring wells, utilities, or foundations.

L. Do not operate heavy compaction equipment closer than 3 feet to foundations or underground utilities.

M. Remove sheeting and shoring required during excavation during the backfilling operations. Do not remove bracing until backfilling has reached the respective level of such bracing. Pull sheeting in increments that will ensure compacted backfill is maintained at an appropriate elevation at least 20 inches above toe of sheeting.

N. Decontaminate or dispose of sheeting and shoring used during Works as directed by Engineer.

O. Do not backfill around or over cast-in-place concrete within 72 hours of concrete placing.

P. Except as specified otherwise, place backfill continuously and in uniform layers not exceeding specified compacted thickness up to grades as specified by the Engineer.

Q. Compact each layer to the specified density before placing succeeding layers as specified in Article 3.4.

3.4 COMPACTION

A. Compact to 95 percent SPD or as directed by Engineer.

B. Apply potable water as necessary during compaction to obtain the specified density. If the material to be compacted is excessively moist, aerate with suitable equipment and methods until the moisture content is corrected. In areas not accessible to rolling equipment, compact material to specified density with mechanical tampers approved by Engineer.

C. When granular material is wetted by sprinkling, after being spread on material in place, sprinkling shall be done by method approved by Engineer. Do not direct jets of water at fill with such force that finer materials will be washed out.

D. Compaction Equipment: The type, size, and efficiency of compaction equipment shall be capable of achieving specified degree of compaction. When operating equipment adjacent to and immediately above structures, exercise care so as not to cause damage or displacement of the structure.

3.5 FIELD QUALITY CONTROL

A. Section 01400 - Quality Control: Field inspection and testing.

B. Testing by Engineer:

1. Engineer may select samples of uncompacted fill intended for Works and samples of compacted fill in Works to perform field or laboratory test to determine if materials meet specifications.

2. Testing by Engineer will in no way relieve Contractor of his responsibility to test all material prior to notifying Engineer of the materials' suitability for the work involved.

C. Methods of Testing:

1. Maximum dry density will be determined in the laboratory in accordance with ASTM D698.

2. Moisture content in laboratory will be determined in accordance with ASTM D2216.

3. Bulk wet density will be determined in the field in accordance with ASTM D2922 or with ASTM D1556 whichever is most suitable to obtain representative density of soil tested.

4. Moisture content will be determined in the field in accordance with ASTM D3017.

5. Particle size analysis will be performed in accordance with ASTM D422 or ASTM D1140, whichever is appropriate to material being tested.

6. Permeability will be determined in accordance with ASTM D2434 on a representative sample compacted in the laboratory to the field bulk wet density and moisture.

7. Chemical characterization will be performed in the laboratory in accordance with the following methods:

Parameter	*Extraction/Preparation*(1)	*Analysis*(1)
TCL(2) Volatile Organic Compound	5050	8260 and 8240
TCL Base, Neutral and Acid Extractable	3540/3550	8270
Pesticide/PCB	3540/3550	8080
TAL(3) Metals	3050	6010/7000 Series

Notes:

(1) Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", EPA SW-846, 3rd Edition, September 1986.
(2) TCL - Target Compound List.
(3) TAL - Target Analyte List.

D. Failure to Meet Specified Requirements: If tests indicate that material specifications have not been achieved or cannot be obtained with equipment in use, the procedure being followed, or the material being incorporated, remove and replace work and modify operations so that the equipment, procedures, and materials will produce the required results. Additional testing required by Engineer will be to Contractor's account.

3.6 ADJUSTING

A. Finish compacted surfaces to within one (1) inch of established grades but not uniformly high or low. Correct surface irregularities by loosening and adding or removing material until the surface is within specified grade.

B. Leave work areas in a properly graded condition sloped as required to permit proper drainage and free of depressions that will pond or collect water or debris that will restrict flow.

3.7 CLEANING

A. Section 01700 - Contract Closeout: Requirements for cleaning installed work.

B. Clean and reinstate work areas and areas affected by equipment outside areas specified to be excavated, to specified restoration condition.

C. Upon completion of backfilling, remove excess material and debris from work areas and travel routes.

3.8 PROTECTION OF FINISHED WORK

A. Section 01500 - Construction Facilities and Temporary Controls: Requirements for protecting installed work.

B. Reshape and recompact fills subjected to vehicular traffic.

3.9 SCHEDULES

A. In place volume of material backfilled are as follows:

Type	*Volume*
previously excavated clean soil	2000 cubic yards
imported common fill	5000 cubic yards

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

4.2 COMMON FILL

A. Schedule of Prices Item No. F-1.

B. Payment Basis: Lump sum price. Includes supplying necessary fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting.

END OF SECTION

SECTION 02759

TRANSPORTATION AND OFF-SITE DISPOSAL

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Supply, operation, and maintenance of transport vehicles/containers.

B. Preparing transport vehicles/containers for off-Site transportation.

C. Loading and securing soil materials in transport vehicles/containers.

D. Weighing transport vehicles/containers.

E. Decontaminating vehicles/containers prior to leaving Site.

F. Transporting the following soil and associated waste water materials from Site to approved off-Site disposal facilities.

G. Preparation of shipping and manifesting documents including waste profiles, manifests and bills of lading.

1.2 DEFINITIONS

A. Hazardous means material exhibiting the properties of a hazardous material as defined in 40 CFR 261 Subpart C, failing TCLP analysis.

B. Non-hazardous means material passing TCLP analysis.

1.3 SUBMITTALS

A. Section 01300 - Submittals: Requirements for submittals.

B. Transportation and Disposal Proposal: A proposal for transportation and disposal of the materials 14 days prior to transportation and disposal of materials from Site. Include relevant transporter and disposal facility identifications and status, methods of transportation and disposal, contingency plans for spills during transportation, and schedule for transportation and disposal.

C. Letters of Commitment:

1. Include copy of the letter of commitment from each proposed disposal facility prior to shipping material to the facility. State in each letter:

1. That the facility is in compliance with its current and valid permit.

2. That the facility can and will accept the materials contingent upon acceptance of waste profile, proposed for disposal at the facility.

3. Any disposal facility restrictions which may cause rejection of transported materials.

4. Any additional sampling and analysis of materials which are required prior to delivery to the facility.

5. Any restrictions on delivery schedules.

2. Each facility shall disclose information concerning any existing corrective action programs which may impact the ability of the disposal facility to accept materials from Site.

D. Agency Approvals: Letters of approval from USEPA, MDNR and applicable state agencies which approve the disposal of materials from Site at each proposed disposal facility 7 days prior to off-Site transportation of hazardous material.

E. Operating Licenses and Permits:

1. Include copies of valid operating licenses and permits for each proposed disposal facility 7 days prior to commencing transportation of materials from Site.

2. Include copies of valid operating licenses and permits from each transporter for each proposed transport vehicle/container 7 days prior to entry to Site.

F. Transportation Routes: Submit detailed plans showing the transportation routes or any alternate routes which will be used to transport materials to each incineration facility 7 days prior to commencing transportation of materials from Site. Comply with applicable federal, state, and local regulations.

G. Shipping and Disposal Documents:

1. Include blank sample forms of proposed shipping and disposal documents at least 7 days prior to use.

2. Include completed copies of shipping and disposal documents including manifests, bill of lading, waste profiles on standard approved forms including a copy of each form signed by the transporter prior to leaving Site and a copy of each form signed by the disposal facility accepting the shipment.

3. Include completed certificates of disposal/destruction/treatment/recycle as applicable and issued by the facility following acceptance and final disposition of the shipment.

H. Weigh Scales:

1. Include calibration certificates for both on-Site and off-Site weigh scales.

2. Include copies of weigh scale tickets on approved forms signed by an authorized weigh scale operator including the following:

1. Location, date, and time of weighing.

2. Measured weights.

3. Vehicle and container identification.

4. Shipment identification number.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Section 01500 - Construction Facilities and Temporary Controls: Requirements for temporary controls.

B. Do not spill, leak, or otherwise release materials from transport vehicles and containers during loading and unloading operations or while in transit from Site to the disposal facility.

PART 2 PRODUCTS

2.1 POLYETHYLENE SHEETING

A. Continuous sheeting of minimum 0.006-inch (6-mil) thickness fabricated from a single ply of construction grade polyethylene plastic.

2.2 CONTAINERS, PACKING MATERIAL AND LABELS

A. Comply with DOT, federal, state, and local regulations.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01015 - General Requirements: Verification of existing conditions before starting work.

B. Notify Engineer sufficiently in advance of intention to commence activities at Site that require attendance by Engineer as provided hereinafter.

C. Activities requiring attendance by Engineer include:

1. Placement of polyethylene sheeting in transport vehicles/containers.

2. Final securement of loaded materials prior to transport from Site.

3. Decontamination of transport vehicles/containers prior to leaving Site.

D. Do not cover up any loaded material prior to Engineer's inspection.

3.2 PREPARATION

A. Engineer may perform confirmatory sampling and/or analysis. Such sampling and/or analysis or failure to perform such sampling and/or analysis by Engineer shall not release or reduce Contractor's obligation to perform Works in accordance with the requirements of the Contract Documents. Do not remove materials from Site which have been sampled by Engineer and are

awaiting analytical results. Engineer will provide copies of Engineer's analytical results to Contractor upon request.

B. Return to Site any transported material delivered to a facility which is rejected by the facility.

3.3 SEGREGATION OF MATERIALS

A. Segregate and prepare materials for transportation and disposal in accordance with the delivery acceptance requirements of the transporter and disposal facility and governing regulations.

3.4 PREPARATION AND SECUREMENT OF TRANSPORT VEHICLES/CONTAINERS

A. Comply with applicable federal, state, and local regulations concerning shipping materials.

B. Visibly display number for each transport vehicle/container.

C. Clean the receiving box of the transport vehicle/container of any loose debris or foreign material. Line the receiving box or container with minimum one layer of 6-mil polyethylene sheeting continuous along the bottom and sides. Place the sheeting on the floor, run up the sides, and drape over the sideboards. Neatly push the polyethylene sheeting into corners to prevent tearing during loading and transport.

D. Secure materials in transport vehicles/containers in accordance with the regulations governing transportation of these materials.

E. Load materials into transport vehicles or containers in a manner which will not damage the properly placed polyethylene sheeting. Limit the freefall of bulk materials being loaded. Place cushioning materials under and around each container for shipments of drummed/containerized materials.

F. Replace damaged sheeting which is incapable of providing containment.

G. Following loading, fold the tub liner over the loaded materials and place an over liner of polyethylene sheeting over the materials prior to securing with an approved tarpaulin in such a way to prevent loss of materials or fugitive dust emissions.

H. Engineer will waive the box or container lining requirements where Contractor can demonstrate, to the satisfaction of Engineer, that all of the following conditions are met:

1. The receiving box or container is of leak-proof construction and capable of maintaining a leak proof condition.

2. The cover to be placed over the receiving box or container is impermeable and will totally enclose the materials within.

3. The cover to be placed over the receiving box or container will prevent fugitive dust emissions.

4. The receiving box or container is constructed of materials which can be decontaminated.

3.5 DECONTAMINATION

A. Decontaminate transport vehicles and containers at on-Site truck decontamination pad after loading and prior to leaving Site. Remove material on the tires and axles of trucks and material on the vehicle resulting from loading operations.

3.6 DOCUMENTATION FOR THE TRANSPORTATION OF HAZARDOUS AND NON-HAZARDOUS MATERIALS

A. Document transportation and disposal of hazardous materials to off-Site facilities on appropriate state and/or federal hazardous waste manifests as required. Prepare and maintain manifests and/or other records for each shipment of hazardous materials from Site. Maintain manifests from the time the hazardous materials leave Site to the time of release to the disposal facilities. Manifests for the transportation and disposal of hazardous materials will be signed by Owner or an agent for Owner, except for materials brought on Site by Contractor.

B. Document the transport and disposal of non-hazardous materials to off-Site disposal facilities on appropriate state and/or federal manifests or bills of lading. Prepare and provide Engineer with copies of manifests, waste profiles, and/or bills of lading, for each shipment of non-hazardous materials from Site. Be responsible for maintaining manifests or bills of lading, from the time the non-hazardous materials leave Site to the time of release to the disposal facility. All manifests or bills of lading, for the transportation and disposal of non-hazardous material shall be signed by Contractor.

3.7 NOTIFICATION

A. Notify applicable local representatives of authorities having jurisdiction over the route and mode of transport in advance of commencing transportation.

3.8 PRE-TRANSPORT WEIGHING

A Weigh transport vehicles with and without loaded materials at a certified off-Site weigh scale facility approved by Engineer. Perform weighing operations in such a manner that the net weight of loaded materials can be determined to the satisfaction of Engineer.

B. Submit written weigh scale receipts to Engineer within 24 hours of weighing; ensure weigh scale receipts agree with any verbally reported quantity.

3.9 TRANSPORTATION

A. Transport material removed from Site directly to the disposal facility approved by Engineer. Do not change either the route or mode of transport after commencing off-Site operations without Engineer's prior written approval.

B. Comply with the applicable requirements of regulatory publications which include:

1. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste.

2. 40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste.

3. 49 CFR 171 - General Information, Regulations, and Definitions.

4. 49 CFR 172 - Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements.

5. 49 CFR 173 - Shippers General Requirements for Shipments and Packaging.

6. 49 CFR 177 - Carriage by Highway.

C. Employ transport vehicle operators trained in conformance with federal, state, and local Laws and Regulations for hazardous materials haulers.

D. Regardless of whether the material is determined to be hazardous or non-hazardous it shall be transported using vehicles licensed to transport hazardous waste.

3.10 DISPOSAL

A. Make arrangements with disposal facilities for the receipt and acceptance of materials removed from Site.

B. Be responsible for and do work necessary to ensure that materials removed from Site are properly prepared and will be accepted by the disposal facility. Dispose of materials in disposal facilities approved by Engineer, which are in compliance with applicable regulations and permitted to receive materials from Site.

C. Weigh transport vehicles/containers at approved off-Site disposal facility weigh scales both before and after discharging their contents.

D. Such measurements will be used by Engineer to verify proper delivery of materials which have been removed from Site and for payment purposes. Transportation to an off-Site facility will be suspended in the event of discrepancy between the net weight as recorded by the state certified scale and the disposal facility scale.

3.11 DISPOSITION OF MATERIALS

A. Dispose of non-hazardous, non-contaminated and decontaminated materials at a sanitary landfill or scrap yard.

B. Do not load materials for transport for disposal without Engineer's approval. Do not cover or otherwise obstruct access to materials to be sampled and analyzed by Engineer to confirm its appropriate disposition. Engineer will provide the analytical results of such sampling and analysis to Contractor upon request.

3.12 OFF-SITE WASTEWATER TREATMENT FACILITY

A. Dispose of waste waters at an industrial waste water treatment facility approved by Engineer.

3.13 SANITARY LANDFILL

A. Dispose of non-hazardous materials at a sanitary landfill approved by Engineer.

3.14 CLEANING

A. Clean up any and all spills or leaks in transit.

PART 4 MEASUREMENT AND PAYMENT

4.1 GENERAL

A. Section 01019 - Contract Considerations: Requirements for measurement and payment.

4.2 TRANSPORTATION AND LANDFILL OF CONTAMINATED NON-HAZARDOUS SOLID WASTES

A. Schedule of Prices Item No. G-1.

B. Payment Basis: Lump sum price. Includes loading and decontaminating the haul unit as required prior to being released from Site; supply of haul unit licensed to haul hazardous waste; ensuring all units are placarded during transport; transporting to the approved landfill facility; fuel costs, licenses, and permitting fees; payment of any penalties or fines charged as a result of any vehicle overloadings or otherwise; cleaning up any spilled waste along haul roads; acceptance and disposal of waste materials by the landfill facility; all taxes; all disposal costs charged by the landfill facility; full compliance with applicable federal, state, and local regulations; unloading and decontamination of unloaded transport haul units; weighing each haulage unit at the approved landfill facility weigh scales.

END OF SECTION

APPENDIX A

DRAWINGS



SOURCE: RAND McNALLY ROAD ATLAS

figure 1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (18) APR 3/95 (D) REV.0

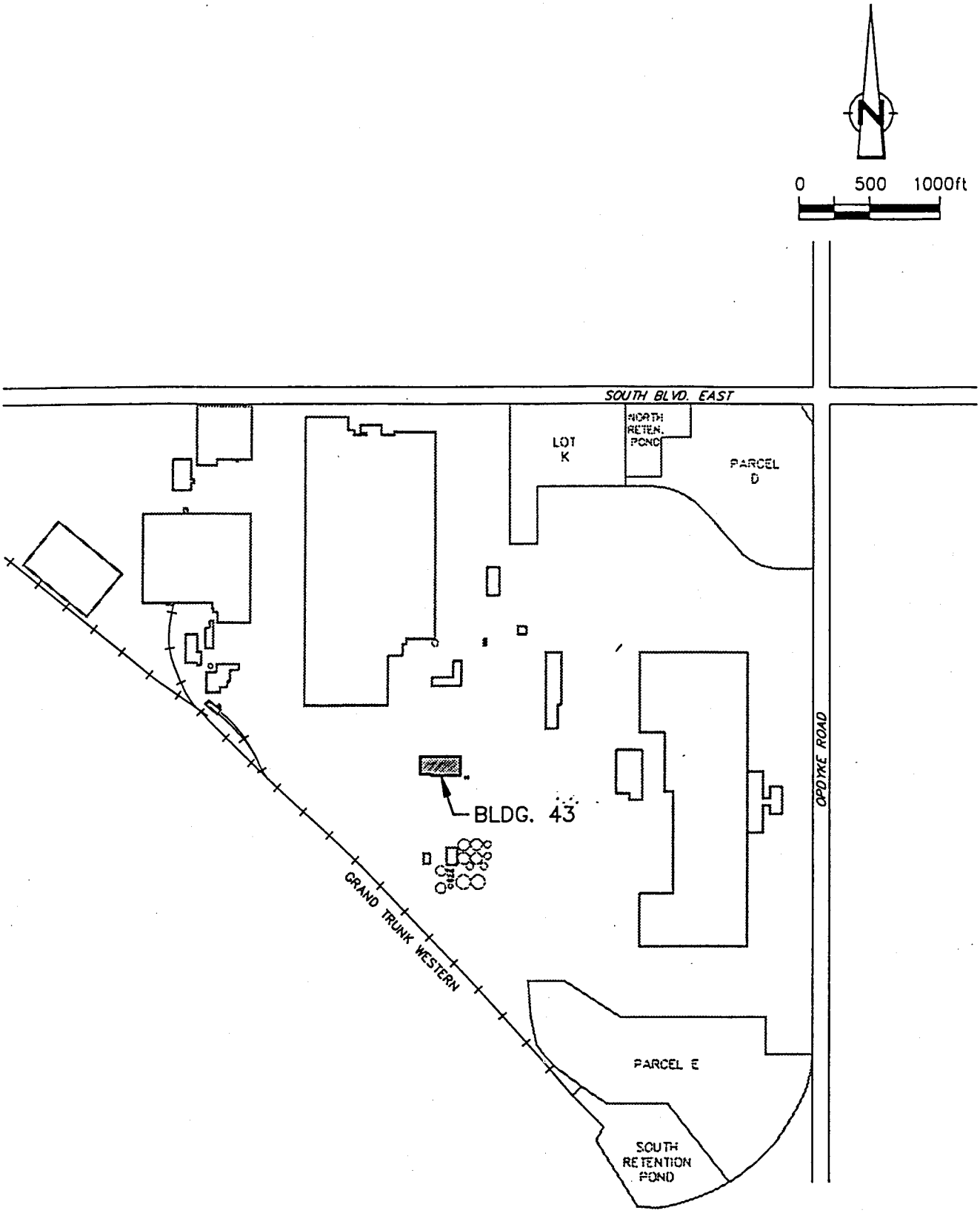
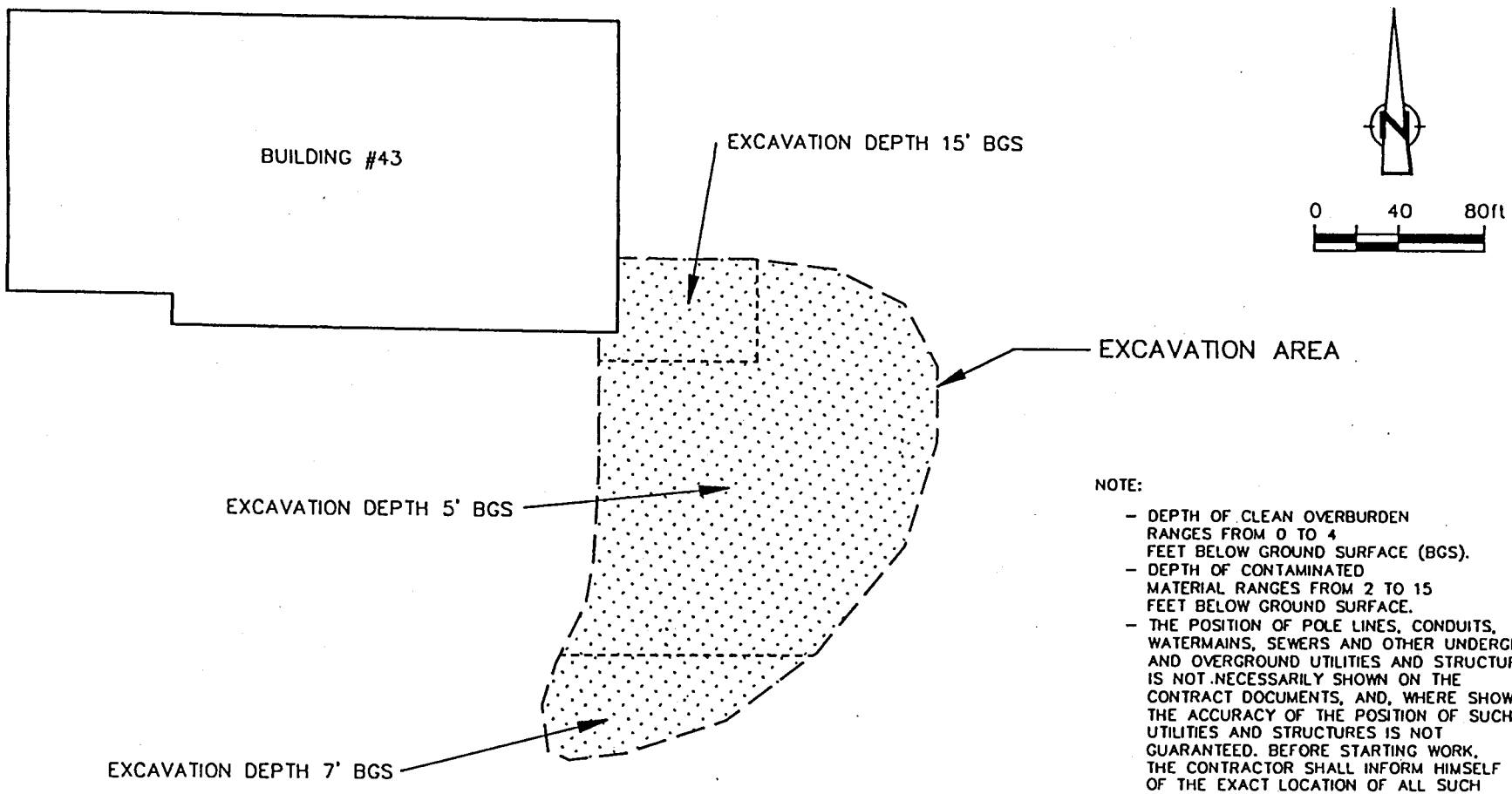


figure 2

BUILDING #43 STUDY AREA LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (18) APR 3/95(D) REV.0 (P-13)



NOTE:

- DEPTH OF CLEAN OVERBURDEN RANGES FROM 0 TO 4 FEET BELOW GROUND SURFACE (BGS).
- DEPTH OF CONTAMINATED MATERIAL RANGES FROM 2 TO 15 FEET BELOW GROUND SURFACE.
- THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DOCUMENTS, AND, WHERE SHOWN THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

figure 3

EXCAVATION AREA
BUILDING #43 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (18) JUNE 06/95(D) REV.0 (P-14)

REVIEW OF EXISTING CONDITIONS REPORT

GM TRUCK GROUP
PONTIAC EAST ASSEMBLY/FORMER PONTIAC CENTRAL MANUFACTURING AND ASSEMBLY PLANTS

MID 005356902

A "Brownfield" Redevelopment Project

Pontiac, Michigan

VOLUME III OF IV - APPENDICES G TO K

OCTOBER 1995
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CONESTOGA-ROVERS & ASSOCIATES

APPENDIX G

BUILDING 53 STUDY AREA

APPENDIX G.1

SITE CHARACTERIZATION REPORT AND WORK PLAN FOR BUILDING 53 WASTE OIL TANK

SITE CHARACTERIZATION REPORT AND WORK PLAN

FOR

GENERAL MOTORS CORPORATION
TRUCK AND BUS DIVISION
"BUILDING 53 WASTE OIL TANK"
PONTIAC, MI 48053

PRESENTED TO:

GENERAL MOTORS CORPORATION
TRUCK AND BUS GROUP - PONTIAC CENTRAL

SUBMITTED BY:

MAECORP INCORPORATED
CALEDONIA, MICHIGAN
DECEMBER 2, 1991

MAECORP PROJECT #MI-3726

Gary Finkbeiner
Hydrogeologist

Wayne MacPherson
Technical Services Manager

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A. Excavation Sample Analytical Data
B. Soil Pile Analytical Data
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Plate I. General Motors Facilities Site Map

I. INTRODUCTION

On August 30, 1991, a 1,000 gallon underground storage tank (UST) was removed from the "Building 53" tank area located at General Motors (GM) Corporation's Truck and Bus Division in Pontiac, Michigan. The areal location of the Truck and Bus Division is highlighted on the map of Figure 1, while the basic layout of the plant is shown on Plate I. The former UST under investigation is situated near the northeastern corner of Building 53 and was used for storing waste oil. On-site location and available information for the former UST situated near Building 53 can be found in Figure 2 and Table I, respectively.

TABLE I

Building 53 UST Data

Tank No.	Material	Tank Const.	Tank Size	Year Inst.	Pipe Const.	Pipe Buried
1	Waste Oil	Steel	1000	1972	Steel	Yes

The "Building 53" UST was observed to be in excellent condition at the time of removal. Also, no visible evidence of a release was observed within the excavation area. Therefore, the UST excavation was sampled using Michigan Department of Natural Resources, Environmental Response Division's (MDNR - ERD) soil sampling guidelines (Truchan, 1990) which satisfy the site assessment requirements of the Michigan State Police, Fire Marshal Divisions (MSP-FMD) rules for permanent UST Closures (State Fire Safety Board, 1991). The results of the site assessment will be discussed in this report.

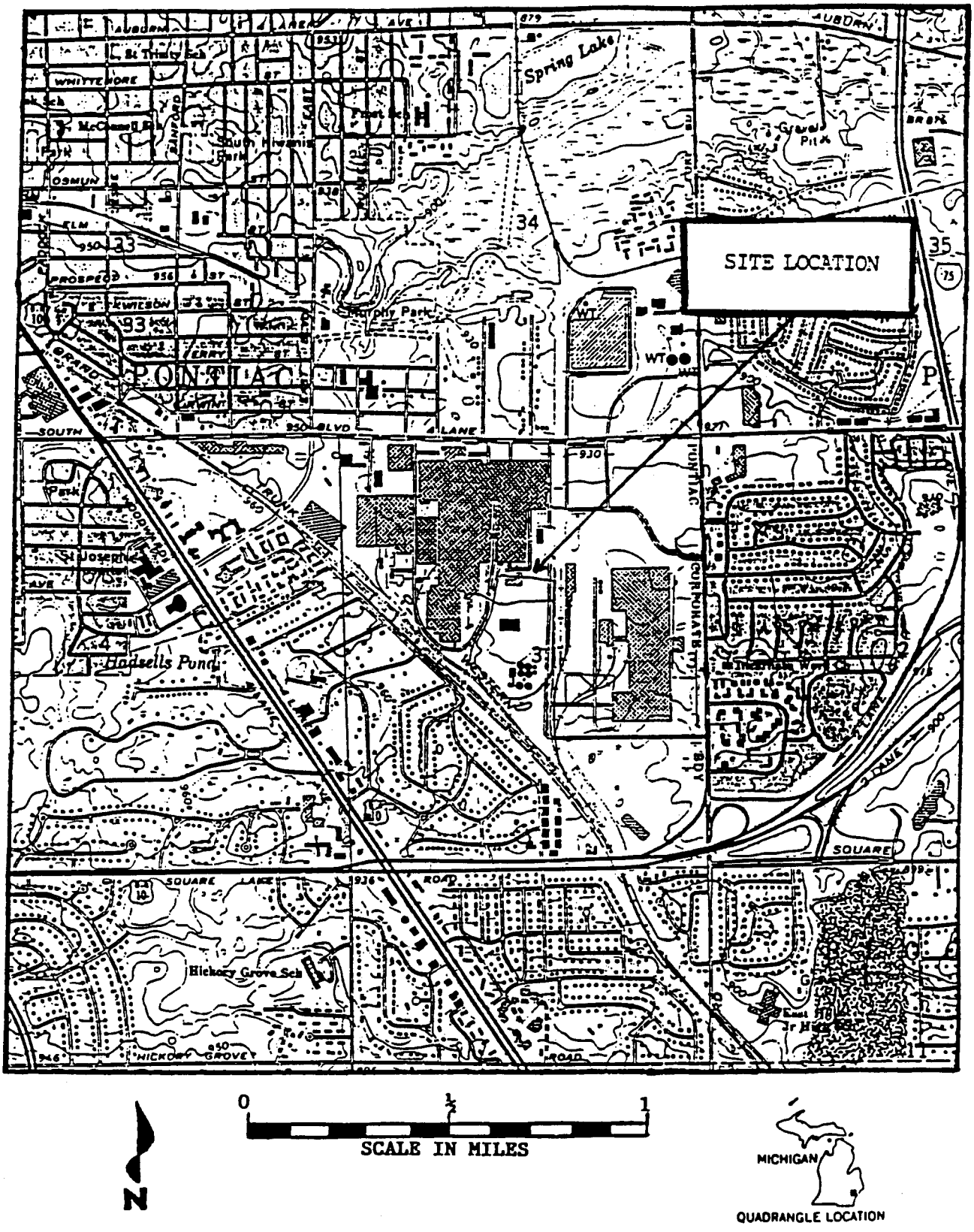
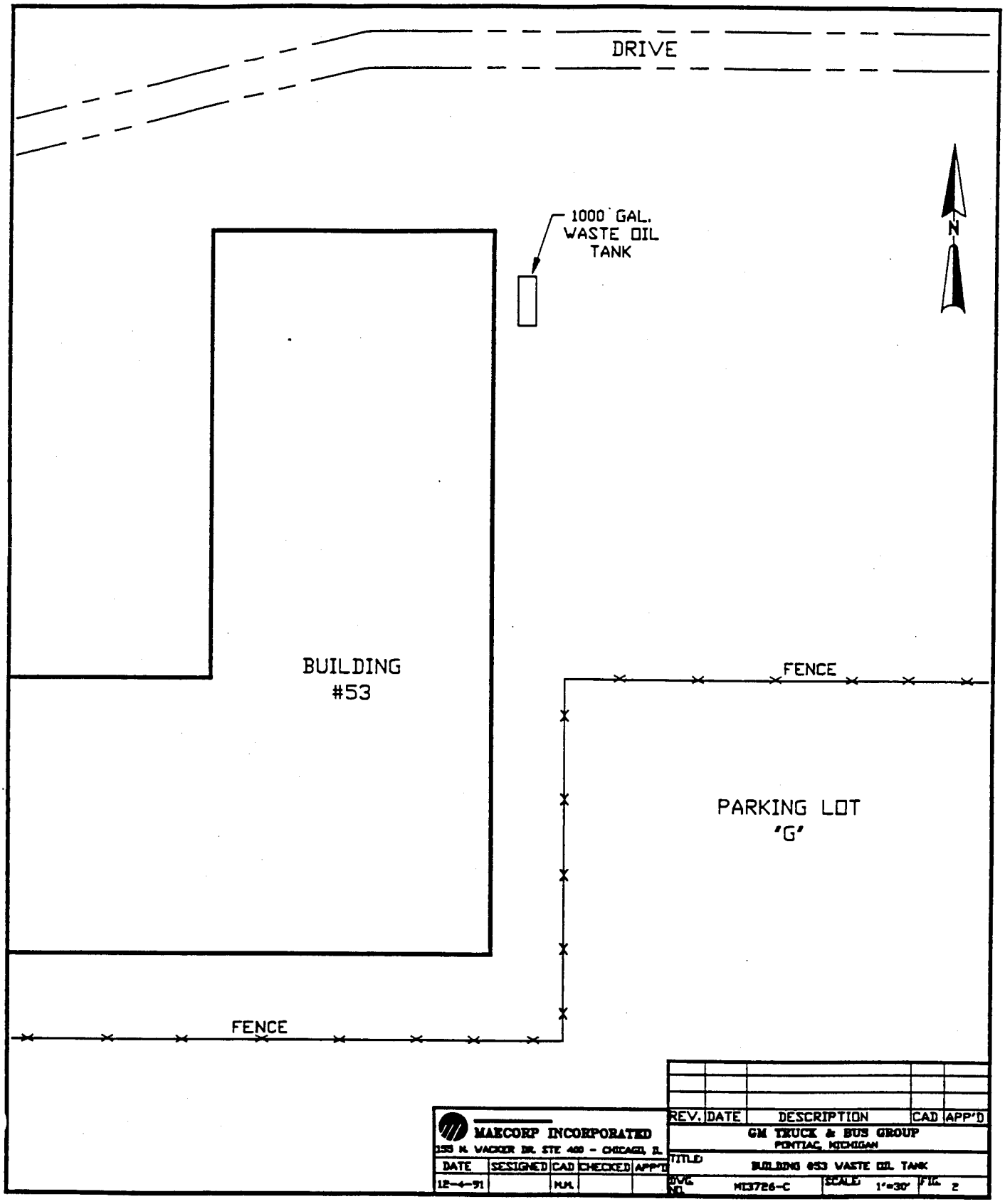


Figure 1 - Topographic location map of the GM Truck & Bus Division site (adapted from the Pontiac South, Pontiac North, Rochester, and Birmingham 7.5 min. USGS quadrangles).



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GM TRUCK & BUS GROUP
PONTIAC, MICHIGAN

TITLE: BUILDING #53 WASTE OIL TANK

DWG. NO. M13726-C | SCALE: 1"=30' | FIG. 2

General Motors notified the MSP-FMD office on October 22, 1991 that a confirmed release had occurred at the "Building 53" UST site (Thurman, 1991). The release was confirmed solely on the basis of analytical results obtained from soil samples collected during the UST excavation. The analytical results confirming this release were briefly discussed in the initial abatement report (Thurman, 1991) submitted to the MDNR-ERD district office in Livonia on October 30, 1991.

Within 45 days of release notification, the State of Michigan's Leaking Underground Storage Tank (LUST) Act No. 478, P.A. of 1988 as amended, requires a report to be submitted to the MDNR-ERD district office which includes a site characterization review and work plan to investigate the vertical and horizontal extent of soil and groundwater contamination. On General Motor's behalf, MAECORP has prepared the following report to fulfill these Lust Act requirements for the "Building 53" UST site. This report addresses each requirement's objectives specifically and in numerical order as they are referenced in Section 7 of the LUST Act legislative document.

II. SITE CHARACTERIZATION

A. Section 7 (3a): Data on the nature and estimated quantity of the release.

The specific materials suspected of being released from the UST at the "Building 53" site consisted of a mixture of waste lubricating oils. Inspection of the tank upon removal did not reveal any cracks or holes in them. Likewise, no free product was recovered from the excavation during UST removal. Based on these observations, it appears that the release was relatively small, not quantifiable, and probably resulted from tank overfills.

B. Section 7 (3b): Data from available sources and site investigations concerning the following factors: surrounding populations and land use, water quality, use and approximate locations of wells potentially affected by the release, subsurface soil conditions, locations of subsurface sewers, and clinatological conditions.

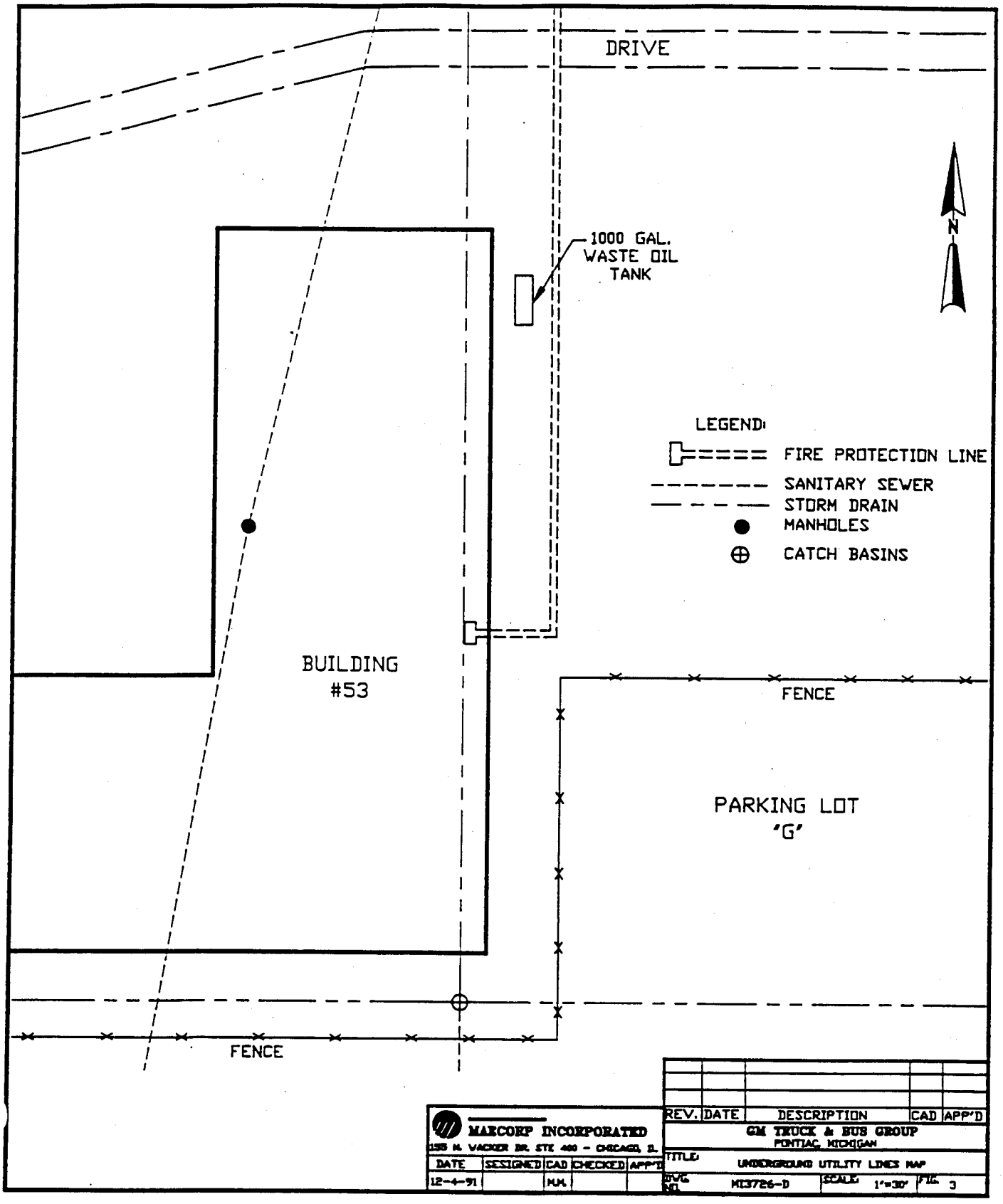
The General Motors Truck and Bus Division is located in the southeastern portion of the city of Pontiac, Oakland County, Michigan. Township and range designation for the plant, to the nearest 40 acres, is given as the NW 1/4, Section 3, T2N, R10E (Bloomfield Township). The population immediately surrounding the GM plant was unavailable, but according to City Officials, the current estimated population for Pontiac as a whole is approximately 76,210.

The general land use found at the GM Truck and Bus facility can best be described as heavy industry. According to the City of Pontiac Assessor's office, the area surrounding the facility

is zoned approximately 60-70% R1 through R3 residential, 20% M1 and M2 industrial, and 10-20% C1 through C3 commercial. The area immediately south of the GM Plant, approximately 2,000 feet due south of the "Building 53" tank area, consists of single-family residences collectively known as the South Bloomfield Highlands Subdivision.

Both the General Motors facility and the residential subdivision are served by municipal storm-sanitary sewer systems. General Motors has its own waste treatment facility in which industrial waste water is treated before entering the municipal lines. On-site locations for the sewer systems in the vicinity of the "Building 53" tank area are shown in Figure 3.

The General Motors facility and the residential subdivision are likewise served by municipal water obtained from the City of Pontiac. In addition, a non-potable water-supply used at the GM facility is obtained from a well drilled into two relatively deep aquifers: 1) a thin, sand aquifer existing at an approximate depth between 150 to 175 feet below grade; and 2) a thicker and deeper, sand and gravel aquifer occurring approximately at a depth of between 230 and 270 feet below ground surface (Overby and Govin, 1981). These aquifers are partially protected from groundwater contamination by the presence of relatively thick, confining clay layers. Well records obtained from the Michigan Department of Natural Resources, Geological Survey Division in Lansing for the area immediately surrounding the GM facility are presented in Appendix C.



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GM TRUCK & BUS GROUP
PONTIAC, MICHIGAN

TITLE: UNDERGROUND UTILITY LINES MAP

DWG. NO. MI3726-D | SCALE: 1"=30' | FIG. 3

Topographically, the "Building 53" UST site occurs near the northwestern corner of a slightly elevated, north-south trending, oblong-shaped, upland surface. Runoff generated along the ground surface of the former tank area would thus flow northward to storm drains occurring north of Building 53. According to the soil survey manual for Oakland County, the surficial soils originally found in the vicinity of the GM facility consisted mainly of sandy clay loams, which, however, have been greatly altered by past industrial and residential development (Feenstra, 1982). Much of the surficial materials now found at the GM plant consist of asphalt or concrete pavement overlying sand and/or gravel backfill.

The geologic deposits underlying the surficial soils and backfill at the General Motors site consist predominantly of glacial till, comprised of a mixture of clay, silt, sand, and gravel materials, that extend downward to an approximate depth of 150 feet (Overby and Govin, 1982). The underlying till found in this area tends to possess a relatively high clay content with low to very low permeability characteristics for groundwater flow. Immediately beneath the clay till at the "Building 53" UST site is a moderately thin, highly permeable, medium to fine sand aquifer that occurs between the approximate depth of 150 to 175 feet.

During UST removal at the "Building 53" site, groundwater was not encountered in the bottom of the excavation. Based on available information for the site, the average depth to the groundwater table is estimated to be approximately 70 feet below

ground level (Overby and Govin, 1981). The great depth to the water table, combined with the observation that the native soils comprising the side walls and base of the UST excavation were identified as clays, would probably prevent any petroleum constituents released from the tank excavation site from reaching the groundwater. The actual direction of flow for the groundwater in this area is not known for sure, although the presumed flow direction is probably toward the north in correspondence to the local topography.

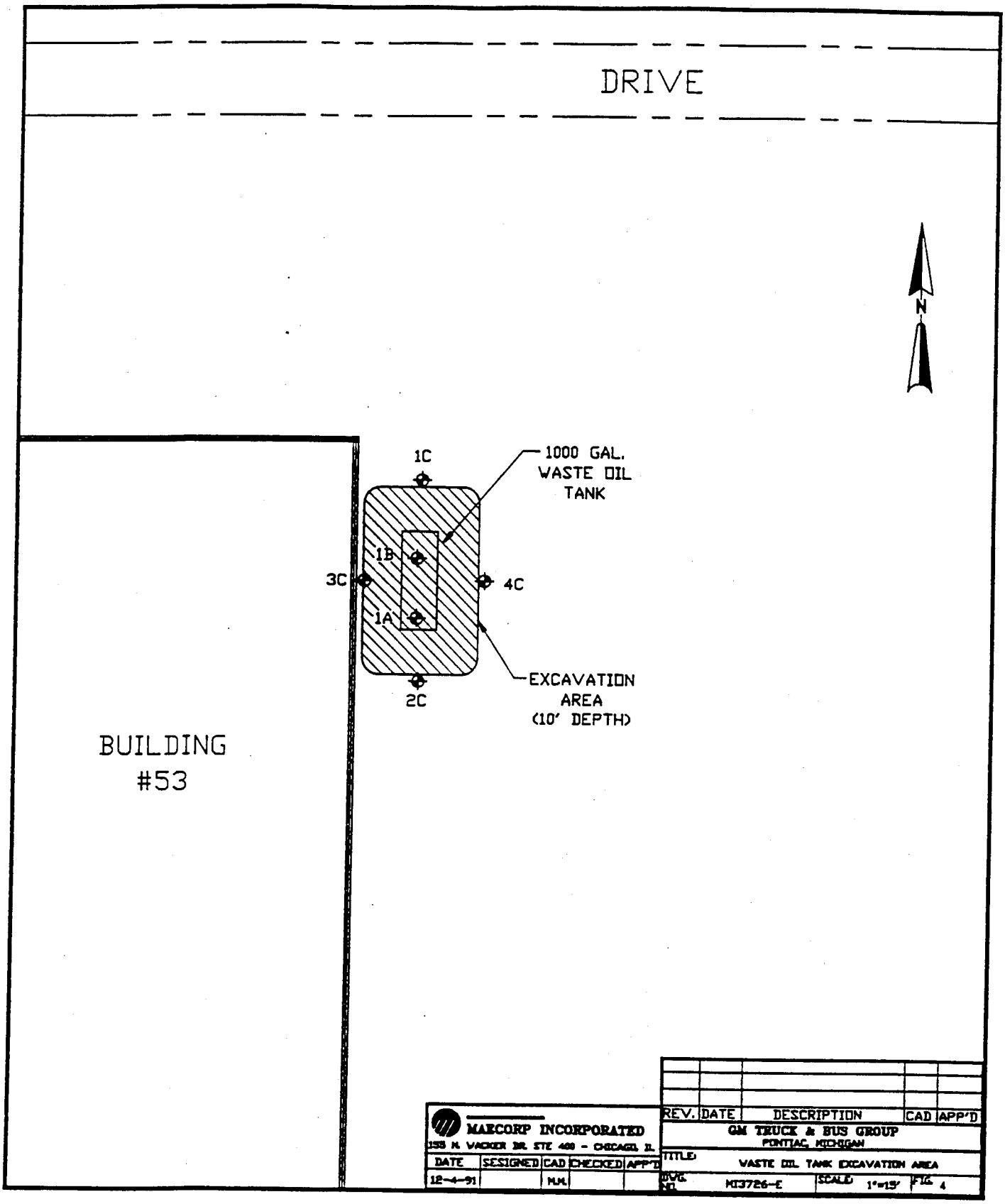
The climate for the Pontiac area, as it is for the rest of Lower Michigan, is characterized as being humid continental with warm, moist summers and cold, snowy winters. The climate is modified somewhat by the regional influence of the Great Lakes. The average total annual precipitation for the Pontiac area is 30.91 inches with approximately 58% (i.e. an average of 17.92 inches) usually occurring as rainfall during April through September (Feenstra, 1982).

C. Section 7(3c): Results of the site characterization investigation as required by subsection (1).

Each of the sidewalls and the floor of the UST excavation were sampled during the initial site assessment according to MDNR-ERD guidelines for verification of soil remediation sites (Truchan, 1990) so that additional sampling and analyses would not be needed if a site characterization had to be performed. The soil sampling procedure thus involved collecting one grab sample from the excavation's floor beneath the tank's fill pipe area and one grab sample from the excavation's floor underneath

the opposite end of the tank. In addition, soil samples were collected from each of the four walls comprising the excavation. The four wall samples were collected approximately six inches into the walls at a depth relative to the center of the former UST location. Locations for soil samples taken at the "Building 53" UST site are depicted in Figure 4.

The soil samples were submitted to Canton Analytical Laboratories in Plymouth, Michigan for total lead, cadmium, chromium, total petroleum hydrocarbons (TPH), polychlorinated biphenyles (PCBs), polynuclear aromatic hydrocarbons (PNAs), and benzene, toluene, ethylbenzene, and xylenes (BTEX) analyses. The most recent state of Michigan Act 307 Type B remediation criteria values for the parameters analyzed are presented in Table II below (after Michigan Department of Natural Resources, 1990 and 1991). Tables III and IV, which follow, summarize the analytical results for soil samples collected from the "Building 53" UST excavation, with the raw laboratory analyses which were used in compiling these tables included in Appendix A. The analytical results for all samples, except the east wall sample, presented in these tables show at least one of the test parameters' levels to be above the Type B clean-up criteria values. In general, elevated levels occurred for xylenes and some PNAs, with the highest concentrations tending to be in the downgradient position of the former UST (i.e., toward the north). However, no PCBs and little or no benzene, ethylbenzene, and toluene, were detected in the excavation's soil samples.



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PONTIAC, MICHIGAN

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TITLE: VASTE OIL TANK EXCAVATION AREA

DWG. NO. M3726-E | SCALE 1"=15' | FIG. 4

The analytical results established a need for further excavation. Additional excavation was required on the floor as well as the north, south, and west walls. The excavation of these areas was conducted in mid November.

Subsequent to excavation activities, verification samples were collected. The verification samples from the walls and floor were collected at locations relative to the previous sample locations. Three samples were collected from each location at the surface, at one foot in and at two feet in. GM is currently awaiting the analytical results for the verification samples.

TABLE II

Type B Clean-Up Criteria Values for LUST Sites[1]

Parameter	Groundwater (in ppb)[2]	Soil (in ppb)[2]
Lead	3.0 or background	125 or background
Cadmium	0.2 or background	5 or background
Chromium	1.0 or background	50 or background
Total Petroleum Hydrocarbons (TPH, ppm)	NA[3]	NA[3]
Benzene	1.0	20
Ethylbenzene	30	1,000
Toluene	40	20,000
Xylenes	20	6,000
Polychlorinated Biphenyls (PCBs)	0.1	33
Polynuclear Aromatic Hydrocarbons (PNAs):		
Acenapthene	400	8,000
Acenapthylene	5	330
Anthracene	2,000	40,000
Benzo(a)anthracene	5	330
Benzo(a)pyrene	5	330
Benzo(b)fluoranthene	5	330
Benzo(ghi)perylene	5	330
Benzo(k)fluoranthene	5	330
Chrysene	5	330
Fluoranthene	300	6,000
Fluorene	300	6,000
Ideno (1,2,3 - cd)pyrene	5	330
Napthalene	40	800
Phenanthrene	5	330
Pyrene	200	4,000

NOTES:

1. After Michigan Department of Natural Resources, 1990 and 1991.

2. In parts per billion unless otherwise specified.

3. Not available for present Type B Criteria; utilized by State Fire Marshal Division for UST site assessments.

TABLE III

Floor Samples Analytical Results (ppb)

Parameter	Sample #1A	Sample #1B
Lead	29,000	38,000
Cadmium	680	800
Chromium	1,600	15,000
Benzene	ND	ND
Ethylbenzene	ND	ND
Toluene	760	2,800
Xylenes	5,500	16,000*
PCBs	ND	ND
Acenapthene	ND	1,300
Acenapthylene	810*	570*
Anthracene	6,200	8,300
Benzo(a)anthracene	2,900*	30,000*
Benzo(b)fluoranthene	3,100*	3,500*
Benzo(k)fluoranthene	ND	ND
Fluorene	ND	1,600
Napthalene	ND	560
Phenanthrene	1,200*	1,600*
Pyrene	ND	ND

ND = None Detected

* = Above Type B Criteria Value

TABLE IV

Sidewalls Samples Analytical Results (ppb)

Parameter	Sample #1C	Sample #2C	Sample #3C	Sample #4C
Lead	38,000	32,000	24,000	29,000
Cadmium	850	850	900	950
Chromium	1,900	1,800	35,000	21,000
Benzene	280	ND	ND	ND
Ethylbenzene	1,100*	ND	150	ND
Toluene	2,100	1,400	300	ND
Xylenes	12,000*	2,100	3,100	ND
PCBs	ND	ND	ND	ND
Acenapthene	4,900	950	ND	ND
Acenapthylene	2,300*	820*	1,100*	ND
Anthracene	23,000	ND	ND	ND
Benzo(a)anthracene	ND	38,000*	ND	ND
Benzo(b)fluoranthene	ND	1,000*	ND	ND
Benzo(k)fluoranthene	9,600*	600*	ND	ND
Fluorene	5,300	1,600	2,300	ND
Napthalene	970*	ND	ND	ND
Phenanthrene	4,800*	940*	1,500*	ND
Pyrene	180	ND	ND	ND

ND = None Detected

* = Above Type B Criteria Value

All of the soil removed during excavation of the UST was stockpiled approximately 20 feet east of the "Building 53" tank site on, and covered with, polyethylene sheeting. Approximately 70 cubic yards of soil are stockpiled in this area. A composite soil sample was collected from the excavation pile in order to assess the proper means for disposal.

The composite soil sample was submitted to Canton Analytical Laboratories for ignitability, corrosivity, reactivity, EPA toxicity and TCLP analyses. The purpose of the analyses was to determine if the soil contained contaminant levels exceeding those established by RCRA for the classification of characteristic hazardous waste. None of the RCRA levels were exceeded. Consequently, the soil pile is considered to be nonhazardous and can be properly disposed of at a Type II Landfill. The raw laboratory analytical data for the soil pile are included in Appendix B.

III. FREE PRODUCT REPORT

A. Section 7 (3d): Results of the free product investigation required by subsection (1).

The free product investigation included a visual and olfactory inspection of the "Building 53" UST excavated area. There was no free product observed or noticeable odor detected in the UST excavation.

B. Section 7 (5d): Unless directed to do otherwise by the director, prepare and submit to the director, within 45 days after confirming a release, a free product removal report.

Since no free product was observed at the "Building 53" UST excavated site, there was no removal of free product. Therefore, a free product removal report was not necessary for the excavated UST site.

IV. WORK PLAN

A. Section 7 (6): Within 45 days after confirmation of a release, a work plan must be submitted to determine the full extent of soil and groundwater contamination.

Further excavation of affected soils above Type B criteria was performed in Mid-November. These areas were resampled, however, the analytical results have not yet been received. The results will be necessary to develop a suitable work plan for investigating the extent of soil and possible groundwater contamination. Therefore, the proposed work plan, along with the results obtained from additional excavation and sampling, will be submitted as an addendum to this report.

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Truchan, James G., 1990. Verification of soil remediation. Michigan Dept. Nat. Res., Envir. Resp. Div., Lansing, MI, 12 p.

APPENDIX A

EXCAVATION SAMPLE ANALYTICAL DATA

GM TRUCK AND BUS GROUP
CAL REPORT# 14939

MPLE RECEIVED 09/19/91

LAB# 1090939 BUILDING 53 WASTE OIL TANK 1A

	ANALYTICAL RESULTS mg/kg
Lead, Total	29
Cadmium, Total	0.68
Chromium, Total	16
TPH By Infra Red (418.1)	77
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.76
Xylenes	5.5
B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
-enaphthylene	0.81
enaphthene	< 0.040

Canton Analytical Laboratory, Inc.
(313) 459-8484 FAX (313) 459-8262

LAB# 1090939 BUILDING 53 WASTE OIL TANK 1A

	ANALYTICAL RESULTS mg/kg
Fluorene	< 0.040
Phenanthrene	1.2
Anthracene	6.2
Fluoranthene	< 0.20
Pyrene	< 0.20
Benzo(a)anthracene	2.9
Chrysene	< 0.20
Benzo(b)fluoranthene	3.1
Benzo(k)fluoranthene	< 0.20
enzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20
Indeno(1,2,3-cd)pyrene	< 0.20

LAB# 1090940 BUILDING 53 WASTE OIL TANK 1B

	ANALYTICAL RESULTS mg/kg
Lead, Total	38
Cadmium, Total	0.80
Chromium, Total	15
TPH By Infra Red (418.1)	5800
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	2.8
Xylenes	16
B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.56
enaphthylene	0.57
enaphthene	1.3

LAB# 1090940 BUILDING 53 WASTE OIL TANK 1B

	ANALYTICAL RESULTS mg/kg
Fluorene	1.6
Phenanthrene	1.6
Anthracene	8.3
Fluoranthene	< 0.20
Pyrene	< 0.20
Benzo(a)anthracene	30
Chrysene	< 0.20
Benzo(b)fluoranthene	3.5
Benzo(k)fluoranthene	< 0.20
Benzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.020
Benzo(ghi)perylene	< 0.020
Indeno(1,2,3-cd)pyrene	< 0.020

LAB# 1090941 BUILDING 53 WASTE OIL TANK 1C

	ANALYTICAL RESULTS mg/kg
Lead, Total	38
Cadmium, Total	0.85
Chromium, Total	19
TPH By Infra Red (418.1)	6400
BETX	
Benzene	0.28
Ethylbenzene	1.1
Toluene	2.1
Xylenes	12
B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.97
·enaphthylene	2.3
.cenaphthene	4.9

LAB# 1090941 BUILDING 53 WASTE OIL TANK 1C

	ANALYTICAL RESULTS mg/kg
Fluorene	5.3
Phenanthrene	4.8
Anthracene	23
Fluoranthene	< 0.20
Pyrene	0.18
Benzo(a)anthracene	< 0.20
Chrysene	< 0.20
Benzo(b)fluoranthene	< 0.20
Benzo(k)fluoranthene	9.6
Benzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20
Indeno(1,2,3-cd)pyrene	< 0.20

LAB# 1090942 BUILDING 53 WASTE OIL TANK 2C

	ANALYTICAL RESULTS mg/kg
Lead, Total	32
Cadmium, Total	0.85
Chromium, Total	18
TPH By Infra Red (418.1)	950
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.14
Xylenes	2.1
B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
enaphthylene	0.82
cenaphthene	0.95

LAB# 1090942 BUILDING 53 WASTE OIL TANK 2C

	ANALYTICAL RESULTS mg/kg
Fluorene	1.6
Phenanthrene	0.94
Anthracene	< 0.04
Fluoranthene	< 0.20
Pyrene	< 0.20
Benzo(a)anthracene	38
Chrysene	< 0.20
Benzo(b)fluoranthene	1.0
Benzo(k)fluoranthene	0.6
Benzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20
Indeno(1,2,3-cd)pyrene	< 0.20

LAB# 1090943 BUILDING 53 WASTE OIL TANK 3C

	ANALYTICAL RESULTS mg/kg
Lead, Total	24
Cadmium, Total	0.90
Chromium, Total	35
TPH By Infra Red (418.1)	890
BETX	
Benzene	< 0.01
Ethylbenzene	0.15
Toluene	0.30
···lenes	3.1
_B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
enaphthylene	1.1
Acenaphthene	< 0.040

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LAB# 1090943 BUILDING 53 WASTE OIL TANK 3C

	ANALYTICAL RESULTS mg/kg
Fluorene	2.3
Phenanthrene	1.5
Anthracene	< 0.040
Fluoranthene	< 0.20
Pyrene	< 0.20
Benzo(a)anthracene	< 0.20
Chrysene	< 0.20
Benzo(b)fluoranthene	< 0.20
Benzo(k)fluoranthene	< 0.20
nzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20
Indeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090944 BUILDING 53 WASTE OIL TANK 4C

	ANALYTICAL RESULTS mg/kg
Lead, Total	29
Cadmium, Total	0.95
Chromium, Total	21
TPH By Infra Red (418.1)	9.3
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Yylenes	< 0.01
:B'S BY AROCHLOR	
PCB-1016	< 1.0
PCB-1221	< 1.0
PCB-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
enaphthylene	< 0.040
cenaphthene	< 0.040

GM TRUCK AND BUS GROUP
CAL REPORT# 14939

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LAB# 1090944 BUILDING 53 WASTE OIL TANK 4C

	ANALYTICAL RESULTS mg/kg
Fluorene	< 0.040
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20
Indeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090945 BUILDING 53 WASTE OIL TANK FIELD BLANK

	ANALYTICAL RESULTS mg/l
TPH By Infra Red (418.1)	< 1.0
BETX	ug/l
Benzene	< 1.0
Ethylbenzene	< 1.0
Toluene	< 1.0
Xylenes	< 1.0
PCB'S BY AROCHLOR	ug/l
PCB-1016	< 1.0
PCB-1221	< 1.0
B-1232	< 1.0
PCB-1242	< 1.0
PCB-1248	< 1.0
PCB-1254	< 1.0
PCB-1260	< 1.0
PCB-1262	< 1.0
PCB, Total	< 1.0
610 POLYNUCLEAR AROMATICS	ug/l
Naphthalene	< 4.0
Acenaphthylene	< 4.0
Acenaphthene	< 4.0
Fluorene	< 4.0
nanthrene	< 4.0
Anthracene	< 4.0

LAB# 1090945 BUILDING 53 WASTE OIL TANK FIELD BLANK

	ANALYTICAL RESULTS ug/l
Fluorene	< 4.0
Phenanthrene	< 4.0
Anthracene	< 4.0
Fluoranthene	< 4.0
Pyrene	< 4.0
Benzo(a)anthracene	< 4.0
Chrysene	< 4.0
Benzo(b)fluoranthene	< 4.0
Benzo(k)fluoranthene	< 4.0
ızo(a)pyrene	< 4.0
Dibenzo(a,h)anthracene	< 20
Benzo(ghi)perylene	< 20
Indeno(1,2,3-cd)pyrene	< 20

CAL

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№ 1677

CHAIN OF CUSTODY RECORD

PROJ. NO./P.O. NO.

PROJECT NAME: Gm truck / Bus Building 53

SAMPLERS (SIGNATURE): Nancy Schaefer

STA. NO	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO OF CONT.	BTEX	TPH	PNA	PCB'S	Lead	Cadmium	Chromium		Full RCRA w/o H.P	EP TOX 10 Metals	REMARKS
	9/17	10:08		✓	1A	3	↓	↓	↓	↓	↓	↓	↓				
		10:18		✓	1B	3											
		10:30		✓	1C	3											
		11:59		✓	2C	3											
		10:50		✓	3C	3											
	↓	10:41		✓	4C	3	↓	↓	↓	↓	↓	↓	↓				
		Waste pile															
	9/17	11:10		✓	P1	3	TPH ONLY					Cadmium			X	X	

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
[signature]	9-17-91	Nancy Schaefer	Nancy Schaefer	9/17 12:08	S. Miller
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
RELINQUISHED BY:	DATE/TIME	RECEIVED FOR LABORATORY BY:	REMARKS:		

CUSTODY #

APPENDIX B

SOIL PILE ANALYTICAL DATA

LAB# 1090946 BUILDING 53 WASTE OIL TANK P1

	ANALYTICAL RESULTS	REGULATORY LIMIT
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.16	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	< 0.12	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
lver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.10	500.0
TCLP RCRA, W/ORGANICS**		
Ignitibility, Deg. F	> 200 *N	< 140 F
Corrosivity, pH Units	8.6	<2, >12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	Variable
as Sulfide, mg/kg	< 0.5	Variable
10 DNR METALS, TCLP**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.42	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	< 0.02	5.0
Copper, TCLP, mg/l	< 0.02	100.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.
**TCLP RESULTS ARE SPIKE-

LAB# 1090946 BUILDING 53 WASTE OIL TANK P1

	ANALYTICAL RESULTS	REGULATORY LIMIT
Lead, TCLP, mg/l	< 0.12	5.0
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.16	500.0
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.004	0.5
Chlorobenzene, mg/l	< 0.002	100.0
loroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl Chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	< 0.005	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
robenzene, mg/l	< 0.005	2.0
,4-Dichlorobenzene, mg/l	< 0.005	7.5

**TCLP RESULTS ARE SPIKE-RECOVERY CORRECTED.

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LAB# 1090946 BUILDING 53 WASTE OIL TANK P1

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	< 0.005	200.0
Pentachlorophenol, mg/l	< 0.40	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.005	2.0

**TCLP RESULTS ARE SPIKE-RECOVERY CORRECTED.

CAL

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№ 1677

CHAIN OF CUSTODY RECORD

PROJ. NO./P.O. NO. | PROJECT NAME: Gen Tank / Bus Building 53

SAMPLERS (SIGNATURE): Nancy Schroder

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONT.	BTEX	TPH	PNA	PCB'S	Lead	Cadmium	Chromium		Full RCRA w/o HOP	EP TOX 10 Metals	REMARKS
	9/17	10:08		✓	1A	3	↓	↓	↓	↓	↓	↓	↓				
		10:18		✓	1B	3											
		10:30		✓	1C	3											
		11:59		✓	2C	3											
		10:50		✓	3C	3											
	↓	10:41		✓	4C	3											
		WA	ste	pile													
	9/17	11:10		✓	P1	3		TPH ONLY							X	X	

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
Nancy Schroder	9-17-91	Nancy Schroder	Nancy Schroder	9/17 12:08	S. Nuber
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
RELINQUISHED BY:	DATE/TIME	RECEIVED FOR LABORATORY BY:	REMARKS:		

CUSTODY #

CAL FIELD TIME SHEET

Customer: GM TRUCK & BUS

Address:

Field Technician(s): Gary Schooler/Pam Varney

Field notebook: 007 Page: 59

Contact Person: Steve Thurman Phone#:

Pickup ____ Collection X

	DATE	TIME START	TIME END	TOTAL
Mobilization				
	9-17-91	8:30	9:00	.50
Travel				
	9-17-91	9:00	9:45	.75
	9-17-91	11:15	12:00	.75
Sampling Time				
	9-17-91	9:45	11:15	1.50
Demobilization				
	9-17-91	12:00	12:15	.25
Report Time				
	9-17-91	12:15	12:45	.50

Total Time: 4.25

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Q A / Q C C O T I L A T I O N S

DATE	PARAMETER	METHOD STANDARD: BLANK	METHOD STANDARD: TRUE CONC.	METHOD STANDARD: CONC. OBSERVED	METHOD STANDARD: % of TRUE	SAMPLE #	MATRIX	UNITS	DILUTION FACTOR	DUPLICATION: TRIAL #1	DUPLICATION: TRIAL #2	DUPLICATION: MEAN	SPIKE*: FINAL SPIKE CONC.	SPIKE*: OBSERVED CONC. OF SPIKE SAMPLE	SPIKE*: % of SPIKE RECOVERED	ANALYST'S
9-30	As	<0.40	2.00	1.95	98	9-946x	EPTOX	mg/l	100/100	<0.40	<0.40	<0.40	2.00	1.81	90	C
"	Ba	<0.01	"	2.13	106	"	"	"	"	0.16	0.16	0.16	"	2.22	103	"
"	Cd	<0.01	"	2.13	106	"	"	"	"	<0.01	<0.01	<0.01	"	2.01	100	"
"	Cr	<0.02	"	2.28	114	"	"	"	"	<0.02	<0.02	<0.02	"	2.12	106	"
"	Cu	<0.02	"	2.01	100	"	"	"	"	<0.02	<0.02	<0.02	"	1.87	94	"
"	Pb	<0.12	"	2.19	109	"	"	"	"	<0.12	<0.12	<0.12	"	2.21	110	"
"	Ag	<0.03	"	0.54	27	"	"	"	"	<0.03	<0.03	<0.03	"	1.27	64	"
"	Zn	<0.01	"	2.18	109	"	"	"	"	0.10	0.10	0.10	"	2.20	105	"
"	Hg	<0.0005	0.0010	0.0011	110	"	"	"	1/3	<0.002	<0.002	<0.002	0.003	0.003	100	J
9-29	Se	<0.0020	0.010	0.0051	51	"	TCLP	"	1/10	<0.020	<0.020	<0.020	0.10	0.091	91	G
9-30	Hg	<0.0005	0.0010	0.0011	110	"	"	"	1/3	<0.002	<0.002	<0.002	0.003	0.003	100	J
"	As	<0.40	2.00	2.12	106	"	"	"	100/100	<0.40	<0.40	<0.40	2.00	1.74	87	C
"	Ba	<0.01	"	2.11	105	"	"	"	"	<0.40	<0.40	<0.40	"	2.29	94	"
"	Cd	<0.01	"	2.05	102	"	"	"	"	<0.01	<0.01	<0.01	"	1.71	85	"
"	Cr	<0.02	"	2.09	104	"	"	"	"	<0.02	<0.02	<0.02	"	1.90	95	"
"	Cu	<0.02	"	2.06	103	"	"	"	"	<0.02	<0.02	<0.02	"	1.79	90	"
"	Pb	<0.12	"	2.42	121	"	"	"	"	<0.12	<0.12	<0.12	"	2.13	106	"
"	Ag	0.22	"	1.02	51	"	"	"	"	0.04	<0.03	<0.03	"	0.35	18	"
"	Zn	<0.01	"	2.10	105	"	"	"	"	0.15	0.15	0.15	"	2.05	95	"

*% of SPIKE RECOVERED = [(OBSERVED CONC. of SPIKE SAMPLE - MEAN)/(FINAL SPIKE CONC.)] x 100%

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QA/QC CORRELATIONS

DATE	PARAMETER	METHOD STANDARD				SAMPLE #	MATRIX	UNITS	DILUTION FACTOR	DUPLICATION			SPIKE*			ANALYST'S
		BLANK	TRUE CONC.	CONC. OBSERVED	% of TRUE					TRIAL #1	TRIAL #2	MEAN	FINAL SPIKE CONC.	OBSERVED CONC. OF SPIKE SAMPLE	% of SPIKE RECOVERED	
10-2	2,4-D					946	TCLP	mg/l	50	<0.02	<0.02	<0.02	0.08	0.004	5	K
"	Silvex					"	"	"	"	<0.002	<0.002	<0.002	0.02	0.0009	5	"
"	Dieldrin					"	"	"	100	<0.002	<0.002	<0.002	0.008	0.013	163	"
"	Endrin					"	"	"	"	<0.002	<0.002	<0.002	0.008	0.013	163	"
"	Methoxychlor					"	"	"	"	<0.010	<0.010	<0.010	0.019	0.025	132	"
10-1	1,4-Dichlorobenzene					946	TCLP	mg/l		<0.005	<0.005	<0.005	1.4	0.69	49	L
"	Hexachloroethane					"	"	"		<0.020	<0.020	<0.020	1.5	0.55	37	"
"	Nitrobenzene					"	"	"		<0.005	<0.005	<0.005	1.4	0.75	54	"
"	Hexachlorobutadiene					"	"	"		<0.005	<0.005	<0.005	1.4	0.72	51	"
"	2,4-Dinitrotoluene					"	"	"		<0.005	<0.005	<0.005	1.4	0.85	61	"
"	Hexachlorobenzene					"	"	"		<0.005	<0.005	<0.005	1.5	0.86	57	"
"	Cresols					"	"	"		<0.005	<0.005	<0.005	3.2	1.8	56	"
"	2,4,6-Trichlorophenol					"	"	"		<0.005	<0.005	<0.005	1.6	0.82	51	"
"	2,4,5-Trichlorophenol					"	"	"		<0.005	<0.005	<0.005	1.8	0.97	54	"
10-3	Methyl ethyl ketone(MEK)					946	ZHE	mg/l		<0.02	<0.02	<0.02	0.200	0.220	110	M
"	Benzene					"	"	"		<0.002	<0.002	<0.002	0.040	0.040	100	"
"	Carbon Tetrachloride					"	"	"		<0.004	<0.004	<0.004	0.020	0.0184	92	"
"	Chloroform					"	"	"		<0.002	<0.002	<0.002	0.020	0.0172	86	"
"	1,2-Dichloroethane					"	"	"		<0.002	<0.002	<0.002	0.020	0.0212	106	"

*% of SPIKE RECOVERED = [(OBSERVED CONC. of SPIKE SAMPLE - MEAN)/(FINAL SPIKE CONC.)] X 100%

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QC DATA

DATE	PARAMETER	METHOD STANDARD				SAMPLE #	MATRIX	UNITS	DILUTION FACTOR	DUPLICATION			SPIKE			ANALYST'S INITIALS
		BLANK	TRUE CONC.	CONC. OBSERVED	% of TRUE					TRIAL #1	TRIAL #2	MEAN	FINAL SPIKE CONC.	OBSERVED CONC. OF SPIKE SAMPLE	% of SPIKE RECOVERED	
9-30	Pb	<0.12	2.00	2.20	110	9-939	Soil	mg/kg	2g/100	29.65	28.85	29.25	100	115.5	86	CH
"	Cd	<0.01	"	1.90	95	"	"	"	"	0.70	0.65	0.68	"	83	82	"
"	Cr	0.04	"	2.09	104	"	"	"	"	18.1	13.5	15.8	"	103.5	88	"
9-27	pH	5.6	7.0	7.0	100	9-946	Soil	pH	1/2	8.5	8.7	8.6	-	-	-	MB
9-30	Cyanide	<0.02	0.10	0.10	100	"	"	ppm	1/5	<0.02	<0.02	<0.02	0.10	0.10	100	AB
9-25	Sulfide	<0.1	-		-	"	"	ppm	1/5	<0.1	<0.1	<0.1	-	-	-	MB
9-26	Benzene					9-939	Soil	mg/kg		<0.01	<0.01	<0.01	2.8	2.9	102	JG
"	Toluene					"	"	"		0.80	0.71	0.76	2.5	3.1	92	"
"	Ethylbenzene					"	"	"		<0.01	<0.01	<0.01	2.6	2.5	94	"
"	Xylene					"	"	"		5.9	5.0	5.5	7.4	11.7	83	"
9-30	A-1254					942	Soil	mg/kg		<0.5	<0.5	<0.5	0.92	0.72	78	KN
"	TPH/1R					941	"	"		9800	5500	640	56	Diluted Out		LP
9-25	Acenaphthene					942	"	"		1.9	<0.20	0.95	8.0	9.0	101	JG
"	Fluorene					"	"	"		1.8	1.3	1.6	8.0	7.6	76	"
"	Pyrene					"	"	"		<0.20	<0.20	<0.20	8.2	5.4	65	"
"	Benzo(a)Pyrene					"	"	"		<0.20	<0.20	<0.20	7.8	3.6	46	"

*% of SPIKE RECOVERED = [(OBSERVED CONC. of SPIKE SAMPLE - MEAN)/(FINAL SPIKE CONC.)] X 100%

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APPENDIX C

LOCAL WATER WELL RECORDS

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

LOCATION OF WELL

County: OAKLAND | Twp.: Bloomfield | Fraction: NW¼ SW¼ | Section No.: 3 | Town: 2 N. | Range: 10 E.

a And Direction from Road Intersections

OWNER No.

3 OWNER OF WELL: Val Schlega

Address: 285 E. Berkshire Pontiac

Set address & City of Well Location

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Muddy Sand	0	50
Rock	5	55
Hard Pan	90	145
Sandy mud	40	180
Water Sand		
Gravel Limestone Course	20	200

4 WELL DEPTH: (completed) 200 ft. Date of Completion: 1-7-69

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ___

7 CASING: Diam. 4 in. to ___ ft. Depth; Threaded ☐ Welded ☐; ___ in. to ___ ft. Depth

Height: Above/Below surface 6 ft.; Weight 11 lbs./ft.; Drive Shoe? Yes ☑ No ☐

8 SCREEN:

Type: Slotted Dia.: 2"

Slot/Gauze 18 Length 4'

Set between 195 ft. and 200 ft.

Fittings: 2" nipple Packer

9 STATIC WATER LEVEL: 60 ft. below land surface

10 PUMPING LEVEL below land surface

___ ft. after ___ hrs. pumping ___ g.p.m.

150 ft. after 8 hrs. pumping 10 g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ___ Chlorides (Cl) ___

Hardness ___

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:

Well Grouted? ☐ Yes ☐ No

Material: ☐ Neat Cement ☐ ___

Depth: From ___ ft. to ___ ft.

14 SANITARY:

Nearest Source of possible contamination NONE

___ feet ___ Direction ___ Type

Well disinfected upon completion ☐ Yes ☐ No

15 PUMP:

Manufacturer's Name ___

Model Number ___ HP ___

Length of Drop Pipe ___ ft. capacity ___ G.P.M.

Type: ☐ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

IED INFO. BY DRILLER, ITEM NO.

CORRECTED BY:

ADDITION BY:

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Fleetwood Drilling — REGISTERED BUSINESS NAME — 0348 — REG. STRATION NO.

Address: 2177 Hunt Ave. Pontiac 48024

Signed: ___ — AUTHORIZED REPRESENTATIVE — Date: 2-16-69

Cons.-7601 Rev.12/63

Page of

Sample No.

MICHIGAN DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION
WATER WELL RECORD

Permit No.

Owner No. TW #3

5

Oakland | Twp. Bloomfield | ¼ ¼ ¼ Sec. 3 | Town 2 N. | Range 10 E.

Distance from Roads, Section Lines, etc.

SW of old 14 inch on Railroad ?

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
fill	4	4
gravel & clay dry	59	63
Hardpan	1	64
Sand yellow	3	67
Gravel yellow	21	88
Gravel grey	40	128
hardpan	24	152
Sand & clay	15	167
nd & gravel	2	169
clay & stones	2	171
sand coarse	4	175
Sand & gravel	7	182
Hardpan & stones	13	195
sand, fine	23	218
Clay sandy	7	225
Clay blue	20	245
Hardpan	34	279
stones & clay	9	288
Sandstone & shale	8	296
shale soft.	2	298

Owner: Baldwin Rubber Co.

Address: Pontiac

Driller and Address: Dunbar - R. Watkins

Well Depth: 298 ft. Date of Completion 10-15-51

☐ Cable tool ☐ Rotary ☐ Dug ☐ R.C.
☐ Driven ☐ Jetted ☐ Bored

Use: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Dewatering
☒ Test well ☐ _____

Casing: Diam. Hole
8 in. to 155 ft. Depth
Pipe pulled - hole filled
6 in. to 298 ft. Depth

Height: Above/Below surface _____ ft.
Type-Weight

Screen:
Type: _____ Dia: _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft.
Accessories:

Water level:
_____ ft. above/below _____
_____ ft. above/below _____
Meas. by Date

Drawdown:
_____ ft. after ___ hrs. pumping ___ g.p.m.
_____ ft. after ___ hrs. pumping ___ g.p.m.
Meas. by Date

Flow: g.p.m./g.p.h. Temp: °F

Water Quality in Parts Per Million:
Iron (Fe) _____ Chlorices (Cl) _____
Hardness _____

Elevation: ft. above

Source of data: Dunbar schedule

Record by: Date:

Remarks:

GEOLOGICAL SURVEY SAMPLE No. [ ]

JAN 12 1973

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

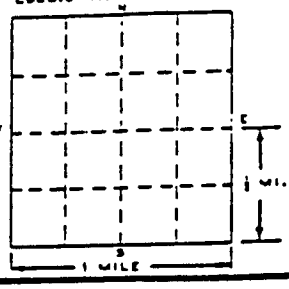
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	¼ SW ¼ SE ¼	3	2 N	10 E

Distance And Direction from Road Intersections: 850 Opdyke (N. of Square Lake, W. off Opdyke for the Grand Trunk Railroad)

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:

3 OWNER OF WELL: Address: Orr Brothers Hldg. Inc. 19040 Farmington Livonia, Michigan 48152

4 WELL DEPTH: (completed) 141½ ft. Date of Completion 11-17-72

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ____

6 USE: [ ] Domestic [X] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ] ____

7 CASING: Threaded [X] Welded [ ] Diam. 4 in. to 135'7" ft. Depth; Height: Above Surface Even ft.; Weight 11 lbs./ft.; Drive Shoe? Yes [X] No [ ]

8 SCREEN: Johnson Stainless Type: Steel Dia.: 4" Slot 18 Length 5' Set between 136'-1" ft. and 141½' ft.

Fittings: 3" x 18" Nipple

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Stony Clay	20'	20'
Very Stiff Clay	15'	35'
Stony Clay	15'	50'
Sandy Hardpan Mostly Sand	50'	100'
Sandy Hardpan	10	110'
Sandy Hardpan Mostly Sand	15'	125'
Sandy Hardpan	10'	135'
Med Sand & Gravel	6½'	141½'

9 STATIC WATER LEVEL 90 ft. below land surface

10 PUMPING LEVEL below land surface: 130 ft. after 2 hrs. pumping 20 g.p.m.; ____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) 2.0 Chlorides (Cl) 34 Hardness 221 Other ____

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adapter [ ] 12" Above Grade

13 Well Grouted? [ ] Yes [X] No [ ] Neat Cement [ ] Bentonite [ ] ____ Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination Unknown ____ feet ____ Direction ____ Type

Well disinfected upon completion [X] Yes [ ] No

15 PUMP: [ ] Not installed Manufacturer's Name Red Jacket Model Number R150N1-11EC HP 1½ Volts 230 Length of Drop Pipe 126 ft. capacity 18½ G.P.M. Type: [X] Submersible [ ] Jet [ ] Reciprocating

USE A 2ND SHEET IF NEEDED

16 Remarks, elevation, source of data, etc.

rand Trunk R.R.

SUBMITTED BY

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

O. O. Corsaut, Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 15201 W. 11 Mile Road, Oak Park 48237

Signed Owen Corsaut Date Dec. 19, 1972
AUTHORIZED REPRESENTATIVE

D67d 100M (Rev. 12-68)

Cons.7501 Rev.12/63

Page ___ of ___

Sample No.

MICHIGAN DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION

WATER WELL RECORD

Permit No.

Owner No. TW # 5

5

County: Oakland | Twp.: Bloomfield | ¼ ¼ ¼ Sec. 3 | Town 2 N. | Range 10 E.

Distance from Roads, Section Lines, etc.

?1

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
fill	30	30
clay, gravely	75	105
gravel, dirty	20	125
clay, gravely	13	138
clay gravel	4	142
clay gravely	10	152
Hardpan	15	167
gravel dirty	5	172
Hardpan	17	189
sand, dirty	1	190
clay sandy	5	195
Hardpan	23	218
clay, sandy	35	253
Hardpan	12	265

Owner: Baldwin Rubber Co

Address: Pontiac

Driller and Address: Dunbar - R. Drummond

Well Depth: 265 ft. Date of Completion 11-29-51

☐ Cable tool ☐ Rotary ☐ Dug ☐ R.C.
☐ Driven ☐ Jetted ☐ Bored

Use: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Dewatering
☒ Test well ☐ _____

Casing: Diam. _____ in. to _____ ft. Depth
_____ in. to _____ ft. Depth

Height: Above/Below surface _____ ft.
Type-weight

Screen:
Type: _____ Dia: _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft.
Accessories:

Water level:
_____ ft. above/below _____
_____ ft. above/below _____
Meas. by Date

Drawdown:
_____ ft. after ___ hrs. pumping ___ g.p.m.
_____ ft. after ___ hrs. pumping ___ g.p.m.
Meas. by Date

Flow:
g.p.m./g.p.h. Temp: °F

Water Quality in Parts Per Million:
Iron (Fe) _____ Chlorides (Cl) _____
Hardness _____

Elevation:
ft. above

Source of data: Dunbar schedule

Record by:
Date:

Remarks:

GEOLOGICAL SURVEY NO. [ ]

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
WATER WELL AND PUMP RECORD

PERMIT NUMBER [ ][ ][ ][ ][ ][ ][ ]

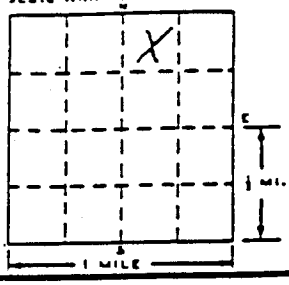
1 LOCATION OF WELL

County Name	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	NW. NW NE	3	2 N	10 E

Distance And Direction From Road Intersection

Street Address & City of Well Location Plant #6 Truck Lots

Locate with "X" in Section Below — Sketch Map



3 OWNER OF WELL

Owner Lotus Inc.

Address 400 Opdyke Rd. Suite 450 Pontiac

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed)

80 ft. Date of Completion 1/85

5

☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐ ____

6 USE

☐ Domestic ☐ Type I Public ☐ Type III Public
☐ Irrigation ☐ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☒ Construction

7 CASING

Diameter ☐ Steel ☐ Threaded
6" ☒ Plastic ☒ Welded
6 in to 72 ft depth
___ in to ___ ft depth
Drive Shoe ☐ Yes ☒ No
Drill Hole Diameter
7⅞ in to 72 ft. depth
___ in to ___ ft depth

Height Above/Below Other
Surface 1 ft
Weight SDR 21

8 SCREEN

☐ Not installed
Type Mat'l C Diameter 4"
Slot/Gauze #15 Length 5'
Set between 75 ft and 80 ft.
FITTINGS: ☒ K-Packer ☐ Leac Packer ☐ Bremer Check
☒ Blank above screen 1 ft Other

9 STATIC WATER LEVEL

46' ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

Pumped Dry ft. after ½ hrs pumping at 25 G.P.M.
___ ft. after ___ hrs pumping at ___ G.P.M.

11 WELL HEAD COMPLETION

☐ Pitless adapter ☒ 12" above grade
☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☐ No ☒ Yes From 75 to 1 ft.
☐ Neat cement ☐ Bentonite ☒ Portland
No. of bags of cement ___ Additives Fluid

13 Nearest source of possible contamination

Type Septic Distance ___ ft. Direction E
Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP

☐ Not installed ☐ Pump installation Only
Manufacturer's name Flint & Walling
Model number 4F10B/Cap 1 Volts 230
Length of Drop Pipe 60 ft. Capacity 10 G.P.M.
TYPE ☒ Submersible ☐ Jet
PRESSURE TANK
Manufacturer's name Well X Trol
Model number WX 203 Capacity 80 Gallons

RECEIVED
Mich. Dept. of Public Health
MAR 27 1985
Bureau of Environmental and Occupational Health - SWQS

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Brown Sand, Gravel.		
(Topsoil)		4'
Blue Clay (Some Sand & Gravel)	9'	13'
Blue Clay	21'	34'
Blue Clay, Sand & Gravel	15'	49'
Black Sand & Gravel. (Some Blue Clay)	13'	62'
Black Water Sand		80'

USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

C. Ward Son Inc. 0058
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 6253 Clarkston Clarkston

Signed R Ward Bus. Date 1/85
AUTHORIZED REPRESENTATIVE

170 2/84

Authority: Act 368 PA 1978

GEOLOGICAL SURVEY SAMPLE NO. [ ]

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

LOCATION OF WELL

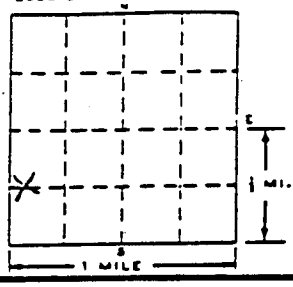
Township Name	Fraction	Section Number	Town Number	Range Number
OAKLAND	1/4 1/4 1/4	3	2 N	10 E

Distance And Direction from Road Intersections

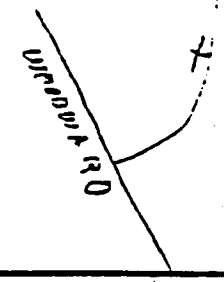
1628 WINTHROP

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: RICHARD SANDERS

Address

4 WELL DEPTH: (completed) 169 ft. Date of Completion NOV 84

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☒ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐

7 CASING: Threaded ☐ Welded ☒ Height: Above/Below Surface ____ ft.
Diam. 4 in. to ____ ft. Depth Weight ____ lbs./ft.
____ in. to ____ ft. Depth Drive Shoe? Yes ☒ No ☐

8 SCREEN:
Type: S. S. Dia.: 4
Slot: 15 Length: 7
Set between ____ ft. and ____ ft.
Fittings: K

9 STATIC WATER LEVEL 87 ft. below land surface

10 PUMPING LEVEL below land surface
100 ft. after ____ hrs. pumping 20 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☒ Yes ☐ No
☐ Neat Cement ☒ Bentonite ☐ ____
Depth: From 0 ft. to 144 ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP: ☐ Not installed
Manufacturer's Name WESTERN
Model Number ____ HP 1/2 Volts 230
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☒ Submersible ☐ Jet ☐ Reciprocating

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
RED CLAY		25
GRAVEL		32
BLUE CLAY ROCKS		135
GRAVEL SOME CLAY		159
WATER SAND	?	169

RECEIVED
Mich. Dept. of Public Health
MAR 11 1985

USE A 2ND SHEET IF NEEDED

Remarks, elevation, source of data, etc.

Bureau of Environmental and Occupational Health - GWQS

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

0613
REGISTERED BUSINESS NAME REGISTRATION NO.

Address 10730 CLARK

Signed [signature] Date 84

Cons. 7501 Rev. 12/63

go of

Sample No.

MICHIGAN DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION

WATER WELL RECORD

Permit No.

Owner No. TW #4

S

Oakland | Twp. Bloomfield | ¼ ¼ ¼ Sec. 3 | Town 2 N. | Range 10 E.

Distance from Roads, Section Lines, etc.

?

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
clay	27	27
Hardpan	5	32
Gravel + sand	13	45
Gravely clay	15	60
Hardpan	20	80
V. gravely hardpan	63	143
Sand clean coarse	7	150
Hardpan + rocks	9	159
Hardpan	37	196
Sand clean coarse	2	198
Sand dirty	7	205
Clay sandy	13	218
Hardpan	7	225
Sand dirty	2	227
Hardpan	18	245
Clay	6	251
Hardpan	42	293
Shale	–	293+

Owner: Baldwin Rubber Co.

Address: Pontiac

Driller and Address: Dunbar - R. Drummond

Well Depth: 293 ft. Date of Completion 11-8-51

☐ Cable tool ☐ Rotary ☐ Dug ☐ R.C.
☐ Driven ☐ Jetted ☐ Bored

Use: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Dewatering
☒ Test well ☐ _____

Casing: Dia. none in. to _____ ft. Depth
Pulled in. to _____ ft. Depth

Height: Above/Below surface _____ ft.
Type-Weight

Screen:
Type: _____ Dia: _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft.
Accessories:

Water level:
99 ft. above/below _____
_____ ft. above/below _____
Meas. by _____ Date _____

Drawdown:
_____ ft. after ___ hrs. pumping ___ g.p.m.
_____ ft. after ___ hrs. pumping ___ g.p.m.
Meas. by _____ Date _____

Flow: _____ g.p.m./g.p.h. Temp: _____ °F

Water Quality in Parts Per Million:
Iron (Fe) _____ Chlorides (Cl) _____
Hardness _____

Elevation: _____ ft. above

Source of data:

Record by: Date:

Remarks:

Cons. 7402 Rev. 12/63

5

MICHIGAN DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION

WATER WELL RECORD

Permit No.

Owner No. #2

Sample No.

Oakland | Twp. Bloomfield | ¼ ¼ ¼ Sec. 3 | Town 2 N. | Range 10 E.

Distance from Roads, Section Lines, etc.

South of Main plant along Grand Trunk RR.

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand	10	10
Clay soft	10	20
Clay blue	30	50
Sand clay	10	60
Sand	10	70
Sand coarse	10	80
Sand + gravel, coarse	25	105
coarse gravel	33	138
Hardpan	12	150
Sand + gravel	20	170
Gravel and sand	20	190
Sand + gravel, muddy	15	205
Sand fine muddy	25	230
Hardpan	20	250

Owner: Baldwin Rubber Co.

Address: South Blvd. Pontiac

Driller and Address: Dunbar

Well Depth: 190 ft. Date of Completion 11-9-40

☐ Cable tool ☐ Rotary ☐ Dug ☐ R.C.
☐ Driven ☐ Jetted ☐ Bored

Use: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Dewatering
☐ Test Well ☐ _____

Casing: Diam. 14 in. to 120 ft. Depth
12 in. to 162 ft. Depth

Height: Above/Below surface _____ ft.
Type-Weight

Screen:
Type: Johnson Silicon red brass Dia: 12"
Slot/~~Gauge~~ 150 Length 32' 30' Slot
Set between Top 118 ft. and 138 ft.
Bottom 180 190
Accessories:

Water level:
80 ft. above/below _____
_____ ft. above/below _____
Meas. by Date

Drawdown:
* 22 ft. after ____ hrs. pumping 1200 g.p.m.
_____ ft. after ____ hrs. pumping ____ g.p.m.
Meas. by Date

Flow: _____ g.p.m./g.p.h. Temp: °F

Water Quality in Parts Per Million:
Iron (Fe) _____ Chlorices (Cl) _____
Hardness _____

Elevation: _____ ft. above

Source of data: Dunbar schedule

Record by: Date:

* _____

Remarks: _____

GPM	PUMPING LEVEL
~~800~~	~~94~~ Ft.
950	97 Ft.
~~1100~~	~~100~~ Ft.
~~1200~~	

Geo. 7401 Rev. 12/69

1 of 1

Sample No.

MICHIGAN DEPARTMENT OF CONSERVATION
GEOLOGICAL SURVEY DIVISION

WATER WELL RECORD

Permit No.

Owner No. #2 14"

Vabland	Twp. Bloomfield	¼ ¼ ¼ Sec. 3	Town 2 N.	Range 10 E.

Distance from Roads, Section Lines, etc.

?

FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM

Owner: Baldwin Rubber Co.

Address: Pontiac

Driller and Address: Dunbar - G. Hofacre

Well Depth: 190 ft. Date of Completion 5-13-52 (or 11-1?)

☐ Cable tool ☐ Rotary ☐ Dug ☐ R.C.
☐ Driven ☐ Jetted ☐ Bored

Use: ☐ Domestic ☐ Public Supply ☐ Industry
☐ Irrigation ☐ Air Conditioning ☐ Dewatering
☐ Test Well ☐ _____

Casing: Diam. _____ in. to _____ ft. Depth
_____ in. to _____ ft. Depth

Weight: Above/Below surface _____ ft.
Type-Weight

Screen:
Type: _____ Dia: _____
Slot/Gauze _____ Length _____
Set between _____ ft. and _____ ft.
Accessories:

Water level:
100 ft. above/below _____
_____ ft. above/below _____
Meas. by Date

Drawdown:
20 ft. after ____ hrs. pumping 675 g.p.m.
_____ ft. after ____ hrs. pumping ____ g.p.m.
Meas. by Date
Developing time 291 hrs.

Flow: _____ g.p.m./g.p.h. Temp: °F

Water Quality in Parts Per Million:
Iron (Fe) _____ Chlorices (Cl) _____
Hardness _____

Elevation: _____ ft. above

Source of data: Dunbar schedule

Record by: Date:

Remarks:

APPENDIX G.2

BUILDING 53 UNDERGROUND STORAGE TANK STUDY AREA REPORT

BUILDING 53 UNDERGROUND STORAGE TANK STUDY AREA

FINAL REPORT

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

FEBRUARY 1994
REF. NO. 5770 (2)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding the soils associated with the former waste oil underground storage tank (UST) located near Building 53 (Study Area) at the GM Facility.

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for the Building 53 UST is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the Building 53 UST area with regards to the outstanding environmental issues identified by the Michigan Department of Natural Resources (MDNR) in their letter to GM dated November 19, 1993, and to present the results of additional investigations conducted to resolve outstanding issues.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area were the result of the operation of an underground storage tank (UST) system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g. final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Following the Facility closure, USTs which were no longer in service were removed from the Facility. Waste oil was noted in the soils in the area of the waste oil UST removed at Building 53. This oil residual was reported to the Michigan State Police - Fire Marshall Division (MSP - FMD) office, and remedial actions were initiated, in accordance with LUST requirements.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g. sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not expected to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This Section presents a summary of available information from GM files regarding the former waste oil tank at Building 53.

3.1 HISTORY OF THE BUILDING 53 WASTE OIL UST

The GM Pontiac Central Manufacturing Facility (Facility) was built in 1927. The Facility was closed as an obsolete factory in the summer of 1991. On August 30, 1991, a 1,000-gallon waste oil steel underground storage tank (UST) was removed from the Building 53 UST Study Area. Figure 1.3 presents a plan of the Building 53 Study Area. The UST was originally installed in 1972, for the temporary storage of waste oil, and was found to be in excellent condition upon removal.

Following the excavation and removal of the tank, soil samples were collected from the excavation, in accordance with MDNR guidelines for verification of soil remediation, to confirm clean closure (Type B) of the Study Area. Four sidewall and two excavation floor samples were collected and analyzed for lead, cadmium, chromium, BTEX, and PNAs. The approximate locations of the samples are presented on Figure 1.3. The analytical data identified BTEX and PNA constituents at levels exceeding Type B criteria in all samples except 4C which was taken from the east wall of the excavation. Based on the analytical results from the sampling, waste oil related soil contamination was identified and reported on October 22, 1991.

In accordance with the Michigan LUST Act, 20-Day and 45-Day reports were prepared and submitted. The 20-Day report was prepared and submitted by GM on October 30, 1991. The 45-Day report was prepared by Maecorp Incorporated (Maecorp) on GM's behalf and submitted on December 2, 1991.

In the 45-Day report it was concluded that the waste oil related contamination was due to routine tank operations (e.g. filling and removal activities).

3.2 PAST REMEDIAL ACTIVITIES

Additional excavation of the Building 53 UST Study Area was completed during November 1991. The limits of this excavation were defined by additional sampling of the excavation sidewalls and floor at previously sampled locations (Figure 1.3). At these locations, samples were taken at the surface, 1-foot, 2-foot and 3-foot depths. Based on the BTEX and PNA analytical results for these additional samples, the excavation limits were increased approximately 3 feet to the north and south, and the excavation depth increased from 10 feet to 15 feet bgs. The excavated soils were stockpiled on plastic sheeting, covered and the excavation backfilled. Composite samples of stockpiled soil were collected and analyzed to determine disposal requirements. Following characterization, the excavated soils were approved for, and disposed of at a landfill.

The final dimensions of the excavation were reported to be approximately 27 feet from north to south, 13 feet from east to west and 15 feet deep. The total volume of soil excavated was approximately 190 cubic yards (based on the dimensions of the excavation and volume of the tank).

As groundwater was not encountered during either UST removal or additional excavation activities, and the extent of BTEX and PNA residual soil contamination had been defined, Type B closure of the Building 53 UST Study Area was requested by GM on January 22, 1992. The original verification samples (August 1991) did, however, identify levels of lead (24-38 mg/kg) and chromium (21-35 mg/kg) in the soil which exceeded Michigan Type A (e.g. background default inorganic levels).

The default Type A Cleanup Criteria for lead and chromium are presented in the MERA Operational Memorandum #15, dated September 30, 1993, as follows:

Inorganic	*Default Type A*
Chromium (total)	18 mg/kg
Lead	21 mg/kg

3.3 GEOLOGY

The stratigraphy in the vicinity of the former waste oil UST at Building 53 was determined to be comprised of glacial clay tills representative of the area. The clay till was identified to extend to depths greater than 20 feet bgs during investigations.

3.4 HYDROGEOLOGY

There are no hydrostratigraphic units in the surficial zone of the clay till overburden in the vicinity of Building 53. As a result, there are no groundwater units in contact with the stratigraphic zone of the former waste oil UST.

3.5 MDNR REQUIREMENTS

On November 19, 1993 the Michigan Department of Natural Resources (MDNR) sent a letter to GM requesting that additional information be provided prior to granting closure for the Building 53 UST area. The MDNR letter is reproduced in Appendix A. The specific MDNR requirements included:

- performing a background inorganics study (or a leachate test), to determine whether or not the levels of lead and chromium were present at a level of concern;

- providing a more specific description of the geology;

- determining whether or not groundwater was present at the location. If groundwater was present, then a hydrogeological investigation was warranted; and

- submission of a complete report containing sufficient information to address MDNR concerns by February 28, 1994.

As stated in the introduction, this report has been prepared to address the above identified MDNR concerns.

4.0 ADDITIONAL INVESTIGATIVE ACTIVITIES

The additional investigative activities conducted by CRA to address MDNR requirements included:

- a literature search to further define local media-specific background concentrations for lead and chromium; and
- installation of boreholes to obtain chemical and geologic samples.

On January 3 and 4, 1994, CRA completed an additional four boreholes within the Building 53 Study Area. The boreholes were drilled by Mateco Drilling of Grand Rapids, Michigan. The purpose of these boreholes was to further define the geology, hydrogeology and nature of lead and chromium concentrations in the soil including the establishment of local background criteria (Type A) and Site-specific leachability factors for lead and chromium.

The locations of the boreholes installed by CRA are presented on Figure 4.1. BH53-1-94 was completed to a depth of 17 feet bgs within the limits of the previous excavation. A sample was collected at the base of the excavation (15 - 17 feet bgs) to further evaluate the nature of the lead and chromium which may be present. BH53-2-94 was completed approximately 14 feet east of the limit of excavation and was completed to a depth of 11.5 feet bgs. Two samples were obtained (at 2 - 4 and 9.5 - 11.5 feet bgs) to establish background levels for lead and chromium and to determine the leachability of the lead and chromium within the Study Area. BH53-3-94 and BH53-4-94 were completed to a depth of 12 feet bgs. Samples were taken from both boreholes at the following intervals to establish local background lead and chromium concentrations:

- 2 to 4 feet bgs;
- 6 to 8 feet bgs; and
- 10 to 12 feet bgs.

The geology encountered within the four boreholes was logged during drilling operations. Borehole stratigraphic logs are presented in Appendix B.

Samples were obtained using standard 2-inch inside diameter split-spoon sampler. Soil recovered using the split-spoon sampler was sampled using clean sampling equipment and placed in laboratory supplied clean sample jars. Sample jars were shipped to IEA Laboratories in coolers at 4°C and analyzed for lead, chromium, (Toxicity Characteristic Leaching Procedure (TCLP) lead and TCLP chromium. A data validation memorandum and chain of custody form for the collected samples are included with the analytical data in Appendix C.

Section 5.0 provides an evaluation of the data obtained during the additional investigations.

5.0 EVALUATION OF CRA BOREHOLE DATA

5.1 GEOLOGY

The following description of the geology in the Building 53 Study Area was prepared based on the stratigraphic logs prepared from the four boreholes completed by CRA. These logs are presented in Appendix B of this report.

Within the Study Area, a parking lot surface layer of gravel with some sand extends approximately 2 feet bgs. This layer is underlain by moist brown clay which terminates at approximately 11 to 12 feet bgs. A layer of stiff moist gray clay extends from the brown clay layer to a depth of at least 17 feet bgs in BH53-1-94 at which depth the borehole was terminated.

Groundwater was not encountered within the native clay till soil in the vicinity of the former waste oil UST.

5.2 ANALYTICAL RESULTS

The samples collected from the Study Area were analyzed for lead and chromium content. In addition, sample BH53-2-94, 9.5'-11' was also analyzed for TCLP lead and chromium. The results of these analyses are summarized in Table 5.1. Laboratory analytical results are presented in Appendix C.

One sample was analyzed from the base of the excavation (BH53-1-94, 15'-17') and was found to contain concentrations of lead and chromium at 7.9 mg/kg and 7.9 mg/kg, respectively. The remaining sample results were utilized to establish local background levels and lead/chromium leachability. Local background concentrations were calculated in accordance with the methods outlined in the MDNR memorandum "Guidance for Determining Adequacy of Soil Remediation" (draft, October 1990). Local

background concentrations were calculated to be 17.1 and 28.3 mg/kg for lead and chromium, respectively (see Table 5.2).

The Michigan Background Soil Survey (Revised, April 1991) was consulted to determine more specific information regarding the background levels of chromium and lead in clay materials in the Pontiac, Michigan area. As identified in the Michigan Background Soil Survey, Pontiac, Michigan is located in an area where the glacial tills are a result predominantly of advances of the Erie glacial lobe.

A review of the survey indicates the following background levels for chromium and lead in clays associated with the Erie lobe:

	n	*mean (mg/kg)*	*SD (mg/kg)*	*(mean + 3SD) (mg/kg)*
Chromium	88	23.6	10	53.6
Lead	107	10.9	6.8	31.3

These levels compare to Type A soil cleanup levels and the Michigan Background Soil Survey as follows:

	Type A (mg/kg)	*Michigan Survey mean (mean + 3SD) (mg/kg)*	*Local (mg/kg)*	*Range (mg/kg)*
Chromium	18	23.6 (53.6)	28.3	18-53.6
Lead	21	10.9 (31.3)	17.1	17.1-31.3

The chromium (21-35 mg/kg) and lead (24 - 38 mg/kg) levels identified during the August 1991 soil verification sampling generally fall within the ranges of background identified above.

The TCLP results are summarized as follows:

	TCLP *Result*	*Type B* *Cleanup Standard*
Chromium	10.0 µg/L	120 µg/L
Lead	4.6 µg/L	4 µg/L

These results indicate that there is minimal concern related to the potential leachability of chromium or lead (especially considering there is no groundwater present). The Site-specific leachability factors for lead and chromium were determined to be 3,040 and 1,800, respectively. The calculations for these leachability factors are presented in Table 5.2.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented herein, the following conclusions may be made regarding the lead and chromium concentrations in the area of the former waste oil UST:

- as groundwater was not encountered during the removal of the UST, or during the completion of boreholes within the Study Area, and the surrounding soil is a glacial clay till, the appropriate soil cleanup levels are the Michigan Type B direct contact levels (e.g. absence of groundwater). These values are 400 mg/kg for lead and 4,400 mg/kg for chromium. The concentrations of lead (24 - 38 mg/kg) and chromium (21 - 35 mg/kg) present within the Study Area are significantly below the Michigan Type B direct contact soil cleanup levels;

- the local background concentrations for lead and chromium calculated for the Study Area are 17.1 and 28.3 mg/kg, respectively. However, the background levels for Erie Lobe clay (lead up to 31.3 mg/kg and chromium up to 53.6 mg/kg) are somewhat higher. The lead (24 - 38 mg/kg) and chromium (21 - 35 mg/kg) concentrations identified in August 1991 in the vicinity of the former waste oil UST are at or below background levels (either on Site or within Erie lobe glacial clay tills); and

- analytical results for the sample taken below the former waste oil UST indicate concentrations of lead and chromium below Type A and Type B direct contact soil cleanup levels. As a result, the vertical extent of remediation has been adequately completed.

The information provided herein addresses the MDNR requirements for additional information and is sufficient to obtain final closure (Type B) for the Building 53, former waste oil UST Study Area.

Based upon the foregoing, no additional investigation or remediation is required or warranted.

7.0 REFERENCES

1. Letter to Keith West (GM) from MDNR, re: Building 53 UST, November 19, 1993

2. Phase I Site Assessment Report, WW Engineering & Science, June 1993

3. Letter to Dave Parsons (MDNR) from Steve Thurman (GM), January 22, 1992

4. Site Characterization Report & Work Plan, Maecorp Inc., December 2, 1991

5. Preliminary Review/Visual Site Inspection (PR/VSI) Report of the General Motors Truck and Bus Group, A. T. Kearney Inc., March 1987

6. Enrolled Senate Bill No. 645, State of Michigan, October 1993

7. Enrolled Senate Bill No. 644, State of Michigan, October 1993

8. Enrolled House Bill No. 4783, State of Michigan, October 1993

9. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

10. MERA Operational Memorandum #8, Revision 2 - Type B Criteria, July 16, 1993

11. "Draft" Justification for the Type B Lead Criteria, MDNR Memorandum, March 11, 1993

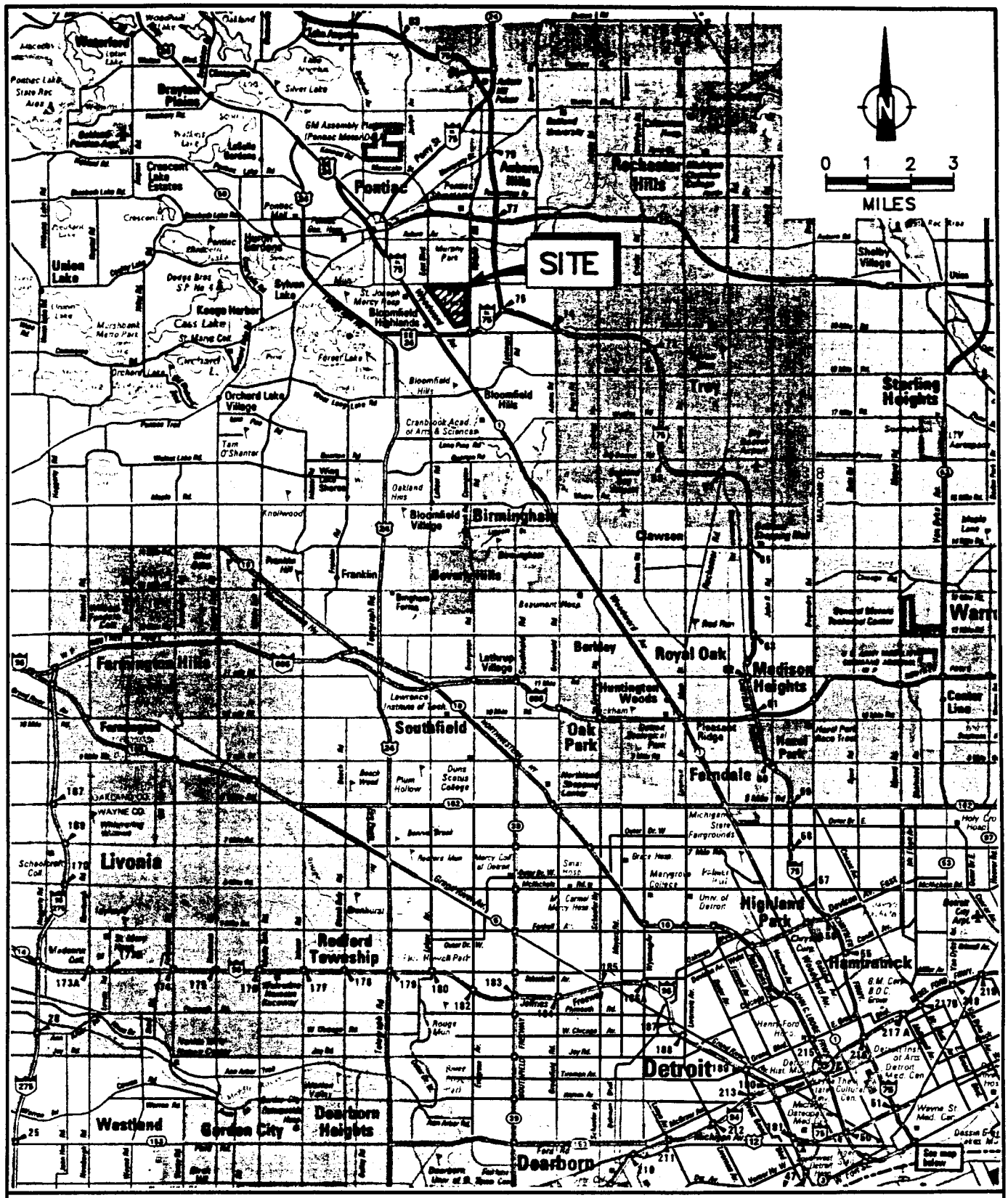
12. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

13. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

14. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

15. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

16. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



MICHIGAN

CRA

5770 (2) DEC 17/93 (W) REV.0

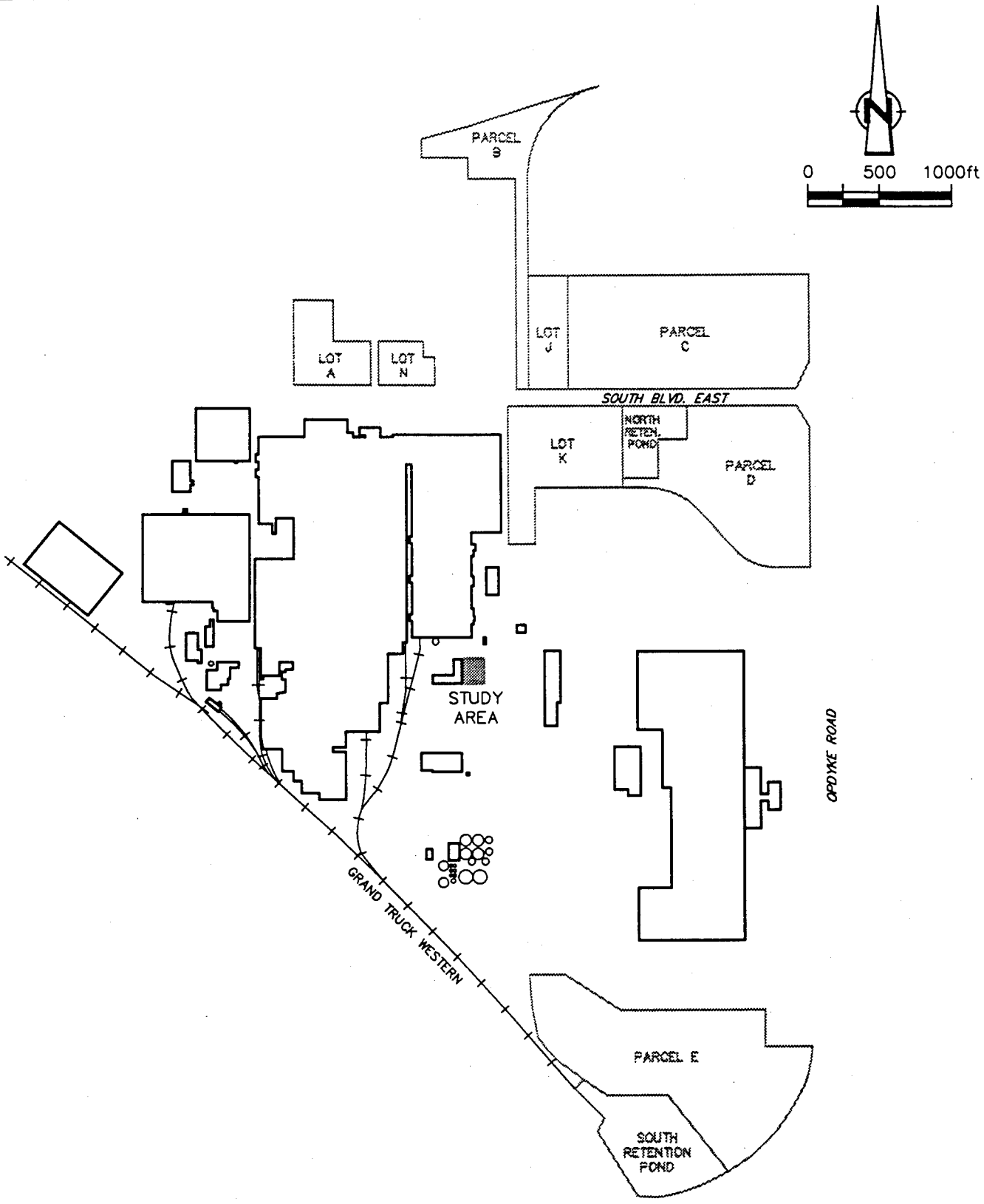


figure 1.2

SITE PLAN
BUILDING 53 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (2) JAN 07/94(W) REV.0 (P–09)

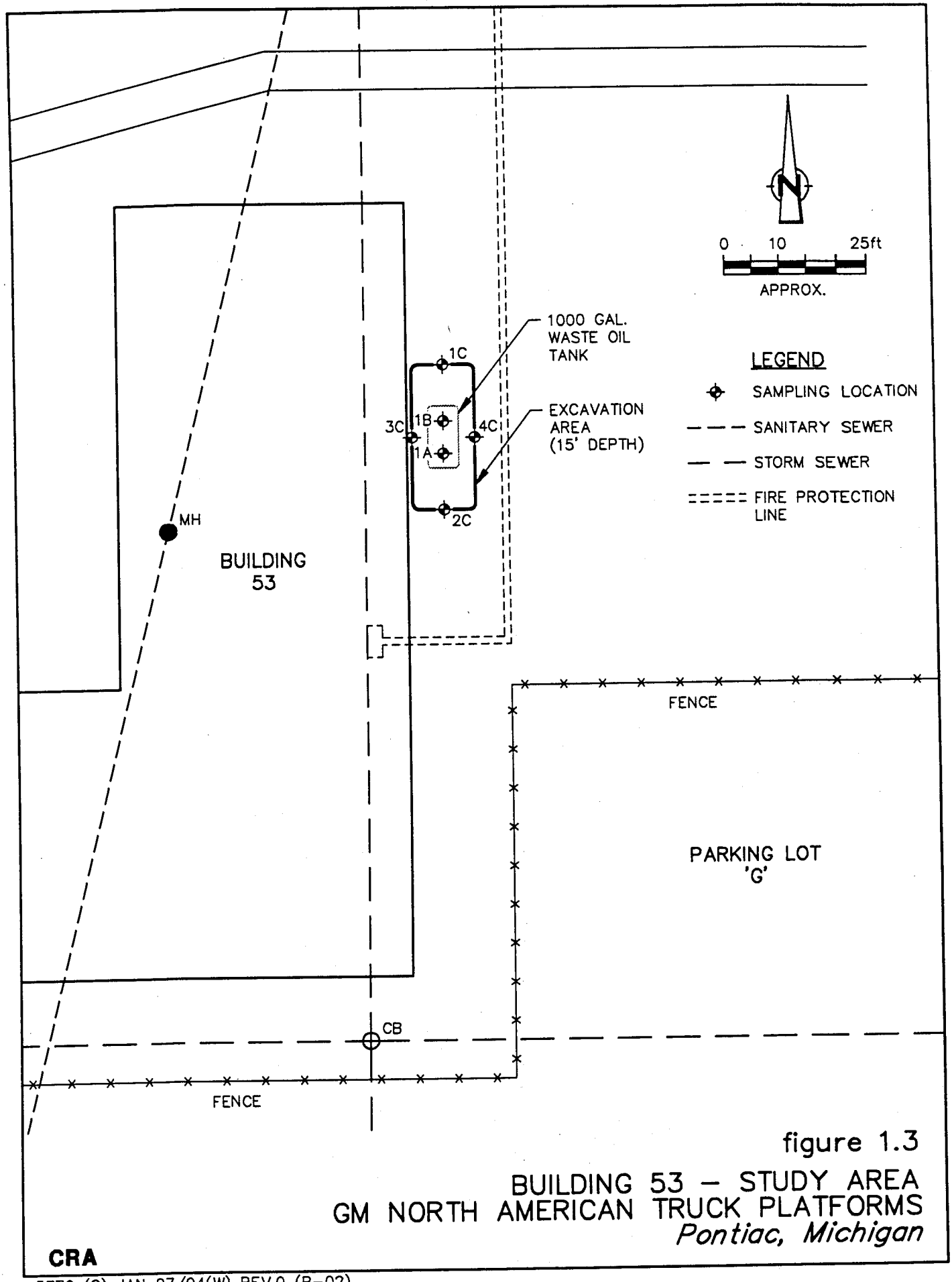


figure 1.3

BUILDING 53 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (2) JAN 07/94(W) REV.0 (P-02)

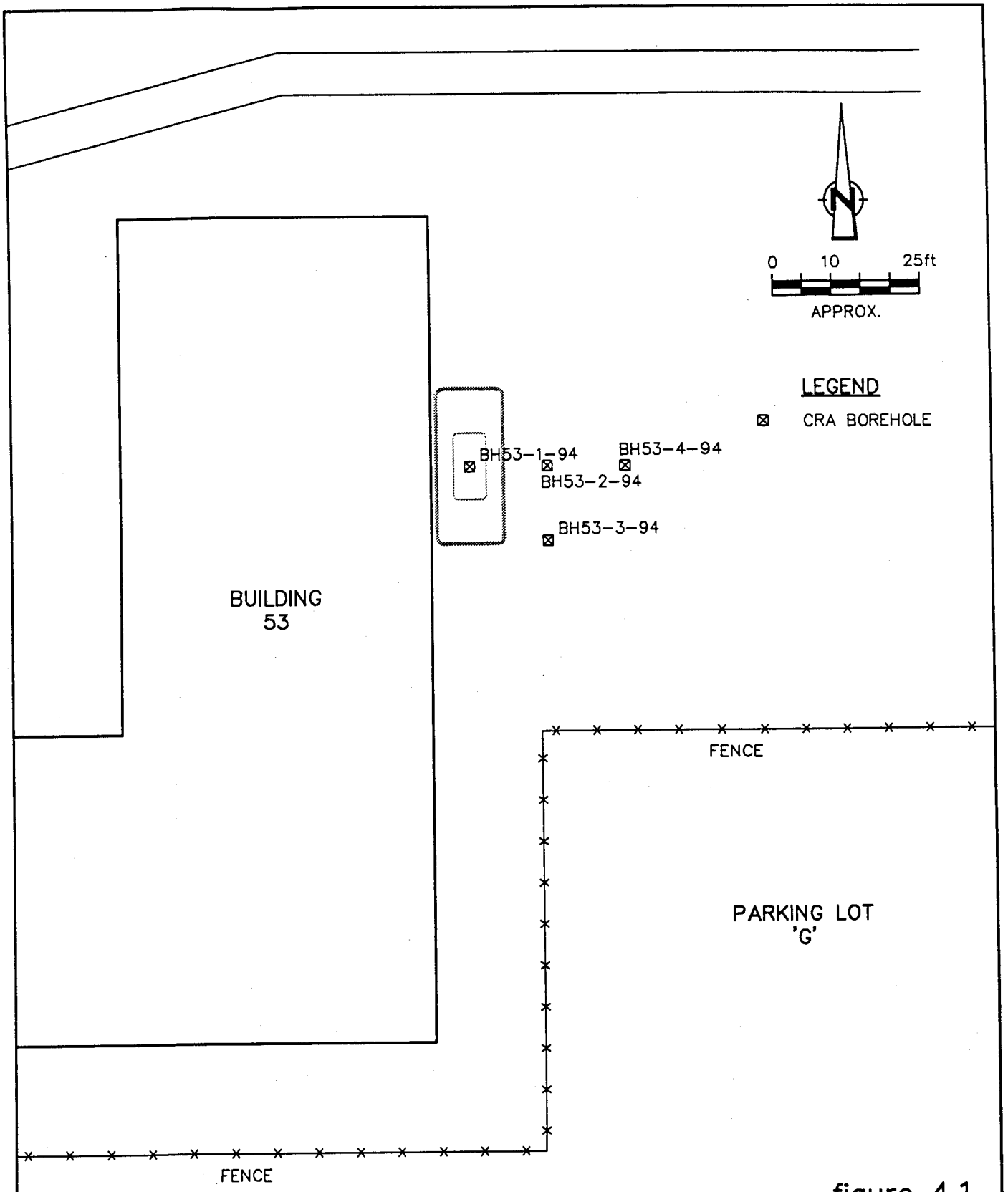


figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES
BUILDING 53 – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (2) JAN 07/94(W) REV.0 (P-03)

TABLE 5.1

ANALYTICAL RESULTS - ADDITIONAL INVESTIGATIVE ACTIVITIES
BUILDING 53 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Type A Criteria Soil (mg/kg)*	*Type B Direct Contact Value (mg/kg)*	*Concentration (mg/kg)*								
			SB53-1-94 (15'-17')	*SB53-2-94 (2'-4')*	*SB53-2-94 (9.5'-11')*	*SB53-3-94 (2'-4')*	*SB53-3-94 (6'-8')*	*SB53-3-94 (10'-12')*	*SB53-4-94 (2'-4')*	*SB53-4-94 (6'-8')*	*SB53-4-94 (10'-12')*
Lead	21	400	7.9	8.3	14	9.4	10	12	13	10	7
Chromium	18	4,400	7.9	9.8	18	12	10	20	17	14	22
TCLP Lead	–	4 (1) µg/L	–	–	4.6 µg/L	–	–	–	–	–	–
TCLP Chromium	–	120 (1) µg/L	–	–	10 µg/L	–	–	–	–	–	–

Note:

(1) Values are Type B Health-Based drinking water standards.

TABLE 5.2

CALCULATION OF LOCAL BACKGROUND LEVELS
FOR LEAD AND CHROMIUM
BUILDING 53 STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Value	*Lead*	*Chromium*
Background (1)		
Sum of Concentrations (Σ)	83.7 mg/kg	122.8 mg/kg
Number of samples	8 (2)	8 (2)
Mean Concentration (Xm)	10.46 mg/kg	15.35 mg/kg
Variance (V)	4.94 mg/kg	18.5 mg/kg
Standard Deviation (S)	2.22 mg/kg	4.30 mg/kg
Coefficient of Variance (CV)	0.21	0.28
Acceptable Background Concentration (Xm + 3s)	17.1 mg/kg	28.3 mg/kg
Leachability in Soil (3)		
Concentration in Soil (S)	14 mg/kg	18 mg/kg
TCLP Concentration (T)	0.0046 mg/L	0.010 mg/L
Site-Specific Leachability Factor (S/T)	3,043	1,800

Notes:

(1) Calculation of local background concentrations was performed using the methodology presented in the MDNR document entitled "Verification of Soil Remediation" (draft, October 25, 1990).

(2) Analytical data from BH53-1-94 was not included in this background analysis due to its location within the excavation.

(3) Site-specific leachability calculations for lead and chromium are based on analytical results for sample SB53-2-94, 9.5 to 11.5-foot bgs interval.

APPENDIX A

MDNR LETTER DATED NOVEMBER 19, 1993

NATURAL RESOURCES COMMISSION
JERRY C. BARTNIK
LARRY DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLLI
M. SPANO
N B. TATTER

JOHN ENGLER, Governor
DEPARTMENT OF NATURAL RESOURCES
ROLAND HARMES, Director
SOUTHEAST MICHIGAN DISTRICT OFFICE
ENVIRONMENTAL RESPONSE DIVISION
38980 West Seven Mile Road
Livonia, Michigan 48152

November 19, 1993

Mr. Keith West
General Motors Corporation
Remediation Group
2860 Clark Street
Detroit, MI 48232

Re: GM North American Truck Platforms, Pontiac Central Facility - Building #53, Pontiac, MI Facility ID #18277, Incident #C-2188-91

Dear Mr. West,

The Michigan Department of Natural Resources (MDNR) staff have completed the review of the file, including the January 22, 1992 submittal which request a Type-B closure for this site. Based on the file review, your request for closure cannot be granted at this time.

In order for this site to be considered for closure, the following MDNR concerns must be addressed:

1. The original 6 verification samples were analyzed for metals (lead, cadmium and chromium). Lead was detected in all of the samples above the default value of 21 ppm. Also, Chromium was detected in 2 of the samples (#3C and #4C) above the default value of 18 ppm). Additional investigation (background study or leachate analysis) should be conducted to determine whether or not these values represent a problem.

2. Provide a more specific description of the geological characteristics encountered at this site.

3. It should be determined whether or not groundwater is an issue with regards to this release. If groundwater is present, then further hydrogeologic investigations are necessary in order to determine if groundwater has been impacted and the extent of impact.

A complete report, that addresses all of the above items, should be submitted to this office by February 28, 1994

Please notify this office, in writing, seven days prior to initiating any work, to provide staff with the opportunity to monitor all site activities.

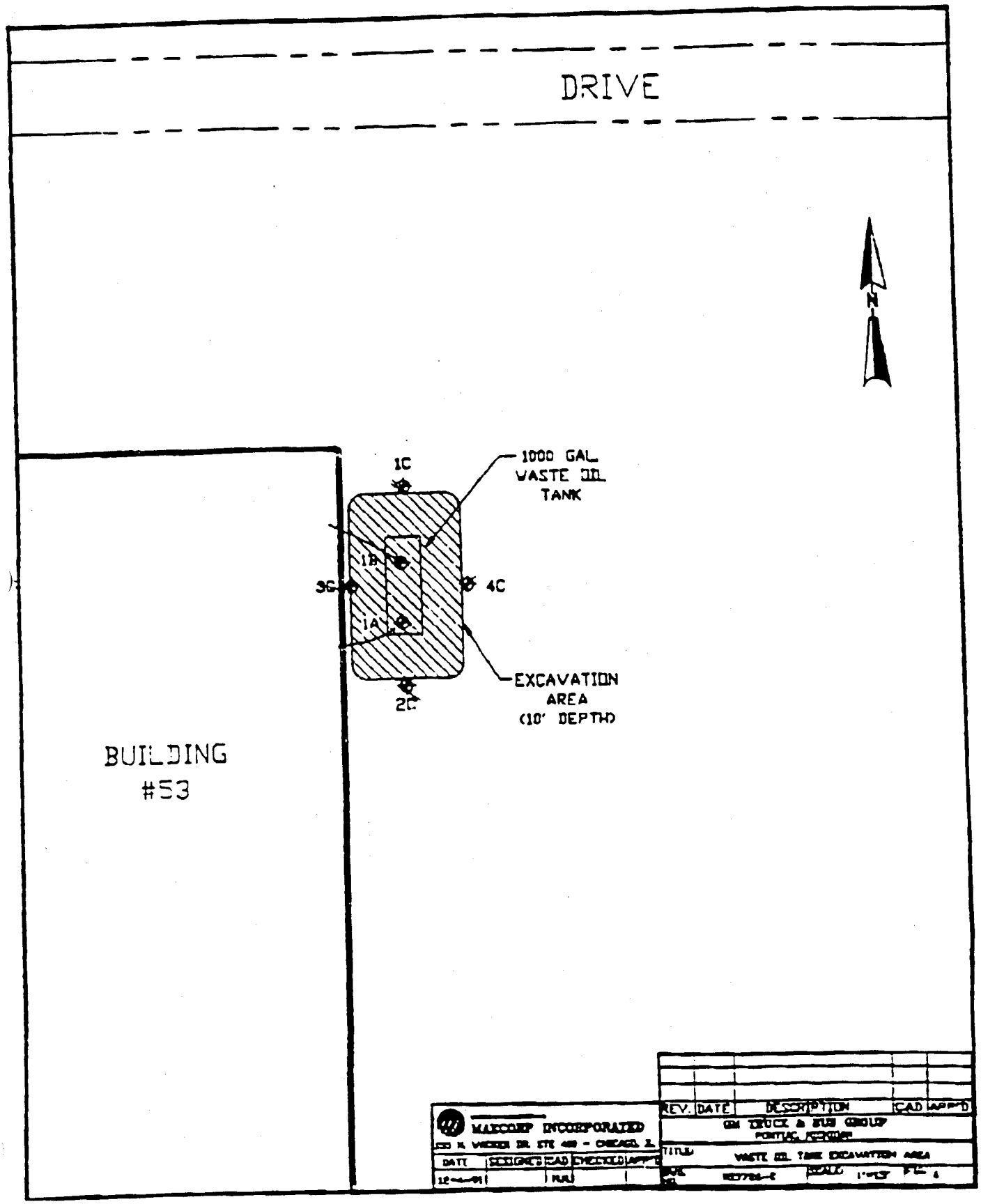
This should not be construed as a sign-off on all investigations or corrective actions that may be necessary at this site.

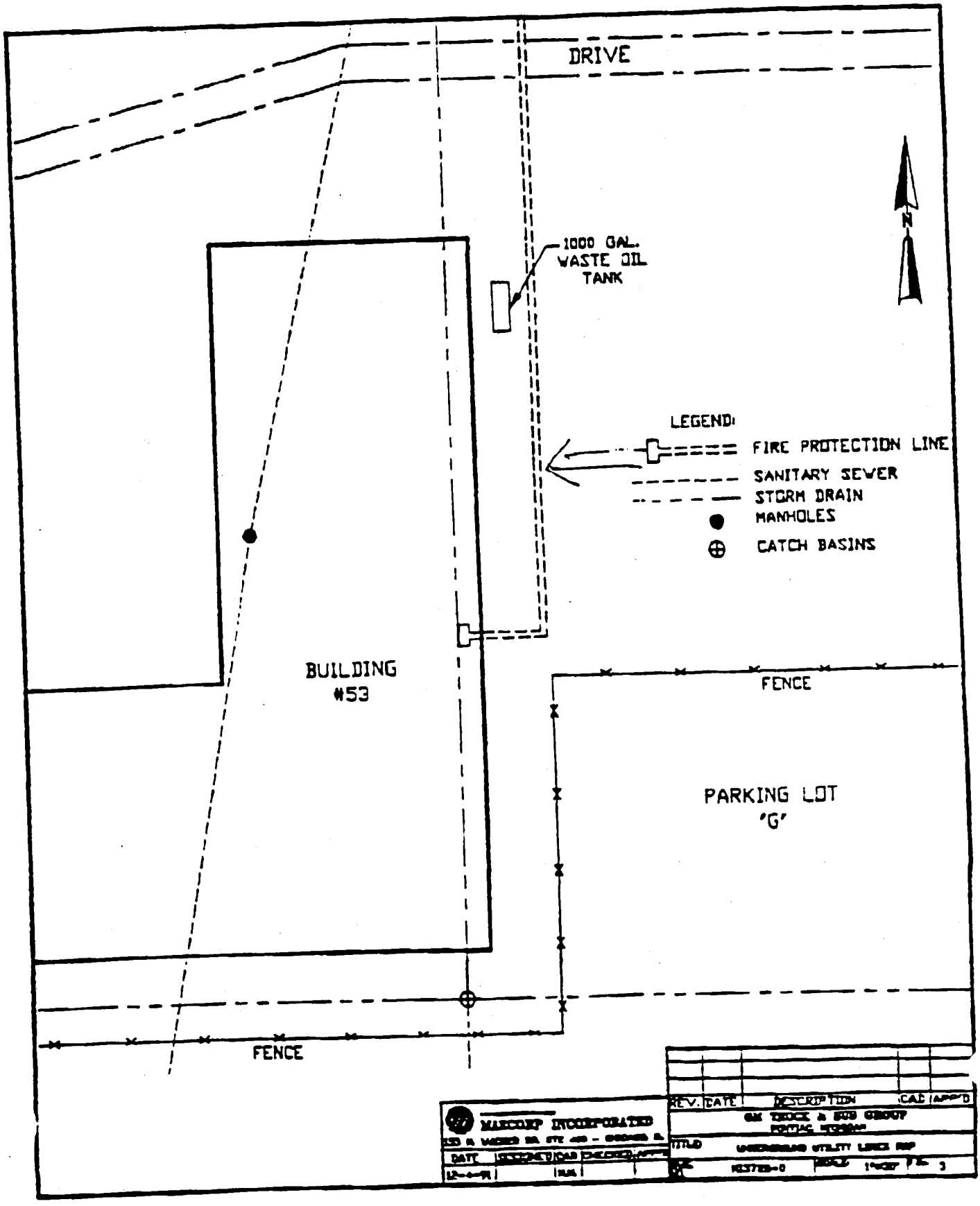
If you have any questions regarding this matter, please contact Paul Owens at (313) 953-1534.

Sincerely,

Oladipo Oyinsan
Southeast MI District Supervisor

cc: Tom Kohl, CIH, MDNR-ERD
Paul Owens, MDNR-ERD


DRIVE
N
1C
1000 GAL
WASTE OIL
TANK
1B
3C
4C
1A
2C
EXCAVATION
AREA
(10' DEPTH)
BUILDING
#53
MAECORP INCORPORATED
REV.
DATE
DESCRIPTION
CAD
APP'D
GM TRUCK & BUS GROUP
PONTIAC, MICHIGAN
TITLE
WASTE OIL TANK EXCAVATION AREA
DATE
DESIGNED
CAD
CHECKED
APP'D
12-4-91
RWJ
SCALE
1"=10'
FIG. 4


DRIVE
1000 GAL.
WASTE OIL
TANK
N
LEGEND:
FIRE PROTECTION LINE
SANITARY SEWER
STORM DRAIN
MANHOLES
CATCH BASINS
BUILDING
#53
FENCE
PARKING LOT
'G'
FENCE
MARCORP INCORPORATED
REV. DATE DESCRIPTION CAD APP'D
TITLE
UNDERGROUND UTILITY LINES MAP

SOIL SAMPLE RESULTS SUMMARY

FOR SUBSEQUENT SOIL SAMPLES

(Results are in mg/kg)

Sample Location	Surface (A)	1 foot (B)	2 foot (C)	3 foot (D)
1	Toluene (.079) Xylenes (.44)	Toluene (BDL) Xylenes (BDL)	N/A	N/A
2	Xylenes (.053)	Xylenes (BDL)	N/A	N/A
3	Fluorene (.53) Phenanthrene (.69) Ethylbenzene (1.3) Toluene (2.0) Xylenes (19)	Fluorene (BDL) Phenanthrene (BDL) Ethylbenzene (BDL) Toluene (.02) Xylenes (.37)	Not Obtainable	Not Obtainable
4	Toluene (.21) Xylenes (2.4)	Toluene (.043) Xylenes (1.2)	Toluene (BDL) Xylenes (BDL)	N/A
5	Naphthalene (2.6) Phenanthrene (1.0) Benzene (.088) Ethylbenzene (.62) Toluene (1.6) Xylenes (6.5)	Naphthalene (.59) Phenathrene (.34) Benzene (BDL) Ethylbenzene (BDL) Toluene (.80) Xylenes (6.2)	Naphthalene (BDL) Phenanthrene (BDL) Toluene (.16) Xylenes (3.9)	Toluene (BDL) Xylenes (BDL)

BDL - Below Detection Limit

N/A - Sample was not analyzed because extent defined

APPENDIX B

BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-07)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 53

HOLE DESIGNATION: BH53-1
DATE COMPLETED: JANUARY 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. TURCHAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
2.5	FILL					
5.0		-5.0	8"ø BOREHOLE			
7.5	SP/GP-SAND and GRAVEL - saturated, petroleum odor					
10.0			CUTTINGS			
12.5		-12.0		1SS		4
15.0	CL-CLAY(NATIVE), gray, odor - moist			2SS		9
17.5		-17.0		3SS		11
20.0	END OF HOLE @ 17.0 FT. BGS					
22.5						
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-08)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 53

HOLE DESIGNATION: BH53-2
DATE COMPLETED: JANUARY 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: G. TURCHAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	Tar and chip	-1.5				
	GP-GRAVEL	-2.0				
2.5	CL/SC-CLAY and SAND, brown		8"ø BOREHOLE	1SS		10
	- dry					
5.0	- stiff					
			CUTTINGS	2SS		10
7.5				3SS		35
		-9.5				
10.0	CL-CLAY, stiff, gray, moist			4GR		
		-11.5				
	END OF HOLE @ 11.5 FT. BGS					
12.5						
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-09)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 53

HOLE DESIGNATION: BH53-3
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. DANIEL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	GP–GRAVEL(FILL), dry	-1.5				
2.5	SP–SAND, brown, moist	-4.0	8"ø BOREHOLE	1SS		9
5.0	CL/SC–CLAY and SAND, moist					
7.5			CUTTINGS	2SS		10
10.0	– brown	-11.0		3SS		12
	CL/ML–CLAY and SILT, brown, moist	-12.0				
12.5	END OF HOLE @ 12.0 FT. BGS					
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-10)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 53

HOLE DESIGNATION: BH53-4
DATE COMPLETED: JANUARY 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. DANIEL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE
	GP-GRAVEL(FILL), dry	-1.0				
2.5	SM/ML-SAND and SILT, some clay, gray, moist - no clay, brown	-3.8		1SS		9
	CL/ML-CLAY and SILT, brown, moist	-4.0	8"ø BOREHOLE			
5.0	SM/ML-SAND and SILT, brown, moist	-6.0		2SS		12
	SC-SAND, some clay and gravel, brown, moist		CUTTINGS			
7.5	CL-CLAY, some sand	-8.0				
10.0	- brown, moist			3SS		12
12.5	END OF HOLE @ 12.0 FT. BGS	-12.0				
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						
32.5						

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

ANALYTICAL RESULTS

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH940104
Project #: 5770

ANALYTE LIST

Matrix: SOIL

Client ID	BH53-1-94 15'-17'	BH53-2-94 2'-4'	BH53-2-94 9.5'-11.5'	BH53-3-94 2'-4'	BH53-3-94 6'-8'		
Lab ID	40104 013	40104 014	40104 015	40104 016	40104 017	Date Analyzed	PQL
Analyte- Method							
Lead - 7421	7.9	8.3	14	9.4	10	1/05/94	0.1
Chromium - 6010	7.9	9.8	18	12	10	1/06/94	5

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH940104
Project #: 5770

ANALYTE LIST

Matrix: SOIL

Client ID	BH53-3-94 10'-12'	BH53-4-94 2'-4'	BH53-4-94 6'-8'	BH53-4-94 10'-12'		Date Analyzed	PQL
Lab ID	40104 018	40104 019	40104 020	40104 021			
Analyte- Method							
Lead - 7421	12	13	10	7.0		1/05/94	0.1
Chromium - 6010	20	17	14	22		1/06/94	5

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: BH-53-2; 9.5'-11.5'
LAB ID: CH940104

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 1/05/94 DATE EXTRACT: 1/06/94		DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS	**Method**					
D007	Chromium	6010	1/07/94	5.0	0.01	0.010	
D008	Lead	7421	1/06/94	5.0	0.002	0.0046	

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: BLANK
LAB ID: BLANK

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: / DATE EXTRACT: 1/06/94		DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS	**Method**					
D007	Chromium	6010	1/07/94	5.0	0.01	<0.010	
D008	Lead	7421	1/06/94	5.0	0.002	<0.002	

GFAA Quality Control Data

Date	1/06/94										
Analyst	DOC				Samples:	940104					
Sample	931526019					931526					
Wt/Vol	100										
Prp.Bat.	720										
Units	mg/L										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP BLK
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.Spk	Dup.Spk	%RPD	
Lead	0.0071	0.0278	0.020	103.5	0.02312	0.020	80.1	103.5	80.1	25.5	<0.002

Serial Dil	Smp #			Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.002	0.01748	0.020	87.4

ICP Quality Control Data

Date	1/06/94
Analyst	LWG
Samples:	940104
Sample	94010417
Wt/Vol	1g/100ml
Prp.Bat.	718
Units	mg/Kg

Element	Matrix Spike										TCLP BLK
	Org.Smp	Spk.Smp	Amt.Spkd	%REC				Initial	Duplicate	%RPD	
Chromium	10.23	138.1	139.7	92				10.23	9.96	2.7	<0.05

Serial Dil	Smp #	940104211		Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Chromium	0.156	0.203	26					<0.05	4.747	5.0	95

GFAA Quality Control Data

Date	1/05/94										
Analyst	DOC				Samples:	940104					
Sample	94010417										
Wt/Vol	2g/100ml										
Prp.Bat.	717										
Units	mg/Kg										
Element	Matrix Spike										TCLP BLK
	Org.Smp	Spk.Smp	Amt.Spkd	%REC				Initial	Duplicate	%RPD	
Lead	10.230	9.077	1.102	0				10.230	9.205	10.5	
Serial Dil	Smp #	940104211		Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.0002	23.42	20.00	117
ug/l											

ICP Quality Control Data

Date	1/07/94		
Analyst	LWG	Samples:	940104
Sample	931526016		931526
Wt/Vol	100 ml		
Prp.Bat.	719		
Units	mg/L		

Element	Matrix Spike				Matrix Spike Duplicate						TCLP BLK
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.Spk	Dup.Spk	%RPD	
Chromium	<0.01	4.360	5.00	87.2	4.239	5.00	84.8	87.2	84.8	2.8	<0.01

Serial Dil	Smp #			Post SpK.	Sample #:			Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Chromium								<0.01	4.636	5.00	

MEMO

TO: Glenn Turchan

REFERENCE NO: 5770

FROM: Jack Lindsay

DATE: January 18, 1994

RE: Data Quality Assessment and Validation for Nine Soil Samples collected from the General Motors Corporation Central Manufacturing Facility Pontiac, Michigan (Report CH940104)

The following details an analytical data quality assessment and validation for data resulting from January 6, 1994 collection of nine soil samples from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Matrix Spike (MS) Sample Analysis

The MS sample analysis provides information about the effect of sample matrix on the preparation and inorganic methods. The data were found to be within the acceptance criteria indicating that an acceptable level of accuracy had been achieved.

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988.

Laboratory Duplicate Analysis

To evaluate the precision of inorganic analytical methods, laboratory duplicate samples were analyzed. The relative percent difference (RPD) criteria for laboratory duplicate analyses was required to be less than or equal to 20 percent. The laboratory duplicate RPDs were found to be within the acceptance criteria.

Laboratory Control Sample (LCS)

The LCS serves as a monitor of all overall accuracy of all steps in the analysis, including sample preparation. All LCS data were found to be within control limits indicating that an acceptable level of accuracy was achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information, and may be used with qualifications noted.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Lead	SW-846[1] 7421
Chromium	SW-846 6010
Toxicity Characteristic Leaching Procedure (TCLP) extraction procedure	SW-846 1311

1 SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986.

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
Metals (Lead, Chromium)	- 6 months from sample collection to completion of analysis
TCLP Metals (Lead, Chromium)	- 6 months from sample collection to extraction - 6 months from extraction to completion of analysis

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IFA, West Schaumberg

REFERENCE NUMBER: 5776

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Jeff Daniel PRINTED NAME: Jeff Daniel

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: Lead	Chromium	TCLP Pb	TCLP Cr	REMARKS
1	1/3/94		BH53-1-94, 15'-17' depth	soil	1	1	1			
2	1/3/94		BH53-2-94, 2'-4' depth	soil	1	1	1			
3	1/3/94		BH53-2-94, 9.5'-11.5' depth	soil	1	1	1	1	1	
4	1/4/94		BH53-3-94, 2'-4' depth	soil	1	1	1			
5	1/4/94		BH53-3-94, 6'-8' depth	soil	1	1	1			
6	1/4/94		BH53-3-94, 10'-12' depth	soil	1	1	1			
7	1/4/94		BH53-4-94, 2'-4' depth	soil	1	1	1			
8	1/4/94		BH53-4-94, 6'-8' depth	soil	1	1	1			
9	1/4/94		BH53-4-94, 10'-12' depth	soil	1	1	1			
			TOTAL NUMBER OF CONTAINERS		9					

RELINQUISHED BY: 1. Jeff Daniel	DATE: 1/4/94 TIME: 4:15 pm	RECEIVED BY: 1. Jim Vaughan	DATE: 1/5/94 TIME: 900 AM
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED X AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0534

SAMPLE TEAM: G. Turchan, J. Daniels

RECEIVED FOR LABORATORY BY: Jim Vaughan
DATE: 1/5/94 TIME: 8:48

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX H

DUCO STORES STUDY AREA

APPENDIX H.1

FINAL REPORT ON THE FINDINGS OF THE SOIL GAS SURVEY AT DUCO STORES

FINAL REPORT ON THE
FINDINGS OF THE
PETREX SOIL GAS SURVEY CONDUCTED FOR
THE GENERAL MOTORS TRUCK AND BUS GROUP
AT THE DUCO STORES TANK FARM SITE
IN PONTIAC, MICHIGAN

PREPARED BY:

Paul Harrington

Paul Harrington, Geologist

DATE: 9/19/90

APPROVED BY:

James C. Hickey

James C. Hickey, Technical Director

DATE: 9/29/90

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R1079PH2/9.18.90

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1.0 EXECUTIVE SUMMARY

Northeast Research Institute, Inc. (NERI) was retained by General Motors Truck and Bus Group to conduct a PETREX soil gas study at the Duco Stores Tank Farm in Pontiac, Michigan. In December of 1989 approximately 500 gallons of gasoline was released into the environment when a gasoline storage tank was overfilled. Since that time the gasoline has migrated and fumes from the gasoline have been detected by personnel in the plant.

The main objective of the soil gas study was to characterize the emanating gases and vapors from subsurface contamination and map the areal distribution of the anomalous soil gas character. Several prominent soil gas features were identified across the site. The different compositions indicate multiple sources are present. The following compilation identifies the relationships between the soil gas features, types of compounds detected and their location in the survey area:

SOIL GAS FEATURE NUMBER	COMPOUNDS DETECTED	LOCATION IN SURVEY AREA
1	Aromatic Hydrocarbons	Storage Tank Area and Hazardous Material Storage Area
2	Cycloalkanes/Alkenes	Storage Tank Area and Hazardous Material Storage Area
3	Oil Character Hydrocarbons	Storage Tank Area
4	Toluene	Most of Survey Area
5	Tetrachloreothylene	Hazardous Material Storage Area
6	Trichloroethylene	Hazardous Material Storage Area

2.0 INTRODUCTION

General Motors Truck and Bus Group of Pontiac, Michigan requested that Northeast Research Institute, Inc. (NERI) perform a petroleum hydrocarbon contamination evaluation using the PETREX Soil Gas Method across the Duco Stores Tank Farm. One of the tanks is known to have leaked gasoline with the potential plume migrating to the west-northwest.

The objectives of this evaluation were to use the PETREX Soil Gas Method to map the distribution of the hydrocarbons associated with gasoline along with any other volatile or semi-volatile organic compounds (VOC and SVOC) detected by the PETREX Soil Gas System in the study area. The mapped results were then used to identify potential source areas and migration pathways.

Site Description

The Duco Stores Tank Farm is located north of building 21 at the General Motors Truck and Bus Group Plant in Pontiac, Michigan. There are eight underground storage tanks, which contain either gasoline or motor oil and two above ground tanks which contain hydraulic fluid. The tanks are located approximately 30 feet east of the Hazardous Material Storage area.

3.0 SURVEY DESIGN AND FIELD METHODS

The survey consisted of fifty-three double collector PETREX soil gas samplers deployed in an offset grid pattern of 15 to 30 foot centers (Plate 6).

The samplers were installed on June 5-6, 1990. At each sample location a hole was drilled to a depth of approximately 18 inches using a hammer drill. The samplers were then lowered into the hole using a wire and the surface was sealed with a cement patch. The samplers were retrieved on June 20, 1990 and returned to NERI's Colorado laboratory for analysis.

One wire from each sampler was used for analysis by Curie-point Desorption Mass Spectrometry (CpD/MS). The second collector was reserved for analysis by Desorption Gas Chromatography/Mass Spectrometry (GC/MS) which permits a higher degree of resolution of the compounds and compound classes detected during the CpD-MS analysis.

A detailed description of the preparation, installation, handling, and analysis of the PETREX soil gas samplers is included in this report as Attachment 1.

4.0 TERMINOLOGY

In order to prevent misunderstanding of certain terms used in this report, the following definitions are offered:

The term "feature" is used in reference to discernable patterns in the contoured data. It denotes a contour form and often relates to a definite or separate chemical occurrence.

The term "hydrocarbon component flux" refers to the response of the hydrocarbon classes, in this case the, Light and Heavy Hydrocarbons that were detected in the survey area.

The term "compositional character" refers to the overall assemblage, relative to both the types and ratios, of soil gas borne VOCs and SVOCs collected at each sampling location. The term is interchangably used with soil gas fingerprint or chemical signature.

The terms "occurrence" and "occurs" is used to indicate an area or areas where chemical compounds are present at sufficient levels to be detected by the analysis of soil vapors. The term is not indicative of any specific mode of source material (vapor, dissolved, etc.), and does not necessarily indicate or suggest the presence of "free product" or "phase-separated hydrocarbons".

The term "plume" refers to an area of anomalous soil gas response for a particular compound which is measured in excess of what would normally be considered "natural" or "background" levels.

The term "threshold background value" is used in discussion of the soil gas value for a specific chemical constituent that is a boundary between background and anomalous values.

The term "indicates" is used when evidence dictates a unique conclusion. The term "suggests" is used when several explanations of certain evidence are possible, but one in particular seems more likely. As a result, "indicates" carries a higher degree of confidence in a conclusion that does "suggests".

The term "collector" refers to a Ferromagnetic adsorption wire which will be used to collect soil gas during a PETREX survey.

The term "sampler" refers to any device which contains at least one collector and is used during a PETREX survey.

5.0 DISCUSSION

5.1 Compound Identification

Compound identification is based on molecular weight, compound fragmentation, and isotopic distribution, as applicable. Each VOC or SVOC exhibits a unique mass spectral signature. NERI maintains a large library of spectra to identify individual compounds, which is accessible by computer. In addition, the company maintains a large library of commonly used chemical mixtures; e.g., gasolines, diesels, industrial oils, solvents, coatings, plastics, etc. These are used to assist in both compound and mixture identifications.

The reported ions or specific peaks utilized to generate each of the gasoline or oil range constituent flux maps are reported in Table 1.

TABLE 1

GASOLINE AND OIL TYPE COMPOUNDS AND ASSOCIATED MASS SPECTRAL PEAKS

Gasoline or Oil Range Constituents	Associated Peaks	Typical Compounds
C_7	92	Toluene
C_9-C_{11} Heavy Aromatic Hydrocarbons	120, 134, 148	Trimethyl Benzenes Tetramethyl Benzenes, etc.
C_{10}-C_{11} Heavy Cycloalkanes/Alkenes	126, 140	Tetramethyl cyclopentane Trimethy cyclohexane, etc.
C_{14} Oil Character	177, 178, 180	PAHs, etc.

These masses were selected as being specifically associated with soil gas fingerprints displaying a gasoline or oil related hydrocarbon profile.

5.2 Physiochemical Interactions

The ability to detect VOCs in soil gas is dependent upon various physiochemical properties of the interacting materials involved. The physical characteristics of a particular compound (i.e., vapor pressure, solubility, etc.) will determine how it partitions into the vapor phase of the vadose zone from groundwater. Additionally, the chemical and physical nature of the local lithologies and soils will influence the behavior and composition of soil gases. Therefore, the detection of different compounds or compound classes cannot be directly compared on a quantitative basis. Values for the same compound can be compared to distinguish potentially higher and lower contaminant emanation levels. This information is useful for identifying source areas, migration pathways, and the areal extent of contamination.

5.3 Contouring Considerations

The subdivision of ion flux values for (threshold background value and contour levels) a compound or compound group is based on population breaks in the data for a particular site. The determination of these breaks are interpreted through visual inspection of the data, summary of univariate statistics, or through the use of histograms. Generally, soil gas data is contoured on an order of magnitude in order to smooth environmental effects.

6.0 GC/MS Data

Table 2 lists the compounds detected for samples analyzed using GC/MS. Samples 3, 13, 16, 22 and 39 were chosen for GC/MS analysis basd on the compositional character associated with their CpD-MS spectra.

Tetrachloroethylene was detected on sample 16. Toluene and Ethylbenzene was detected on sample 13. Samples 3, 22, and 39 were determined to contain various hydrocarbons typical gasoline and oil type compositional fingerprints.

TABLE 2
GC/MS DATA

Sample # 3	1,1,3,5-Tetramethylcyclohexane
	1-Ethyl-2,3-Dimethylcyclohexane
	Diethylcyclohexane
	4-Methyl-1-Decene
	5-Proylnonane
	1-Ethyl-2-propylcyclohexane
	Methylbenzene (Toluene)
	6-Methyltridecane
	1,5-Dimethylhexylcyclohexane
Sample #13	Methylbenzene (Toluene)
	Ethylbenzene
	1,4-Dimethylbenzene
	1,3-Dimethylbenzene
Sample #16	Tetrachloroethylene
Sample #22	1,3-Dimethylbenzene
	1,4-Dimethylbenzene
	3,6-Dimethylundecane
	1-Ethyl-2-Methylbenzene
	1,3,5-Trimethylbenzne
	1-Methylpropylbenzene
	2-Ethyl-1,3-Dimethylbenzene
	Methyl(1-Methylethyl)benzene
	1,2,3,5-Tetramethylbenzene
	1,2,3,4-Tetramethylbenzene
	1,3-Diethyl-5-Methylbenzene
	1,1-Dimethypropylbenzene
	2,3-Dihydro-4,7-Dimethyl-1H-Indene
	Ethyl-1,2,4-Trimethylbenzene
	2,4-Dimethyl-1-(1-Methylpropyl)benzene
	2,3-Dihydro-1,6-Dimethyl-1H-Indene
	1,2-Diethyl-4,5-Dimethylbenzene
	1-methylnaphthalene
	1-Ethylidene-1H-Indene
	6-Ethyl-1,2,3,4-Tetrahydronaphthalene
Sample #39*	1,3-Diethyl-5-methylbenzene
	1,2,3,4-Tetramethylbenzene
	Decahydro-2,6-Dimethylnaphthalene
	Decahydro-2,3-Dimethylnaphthalene
	1,2,4,5-Tetraethylcyclohexane
	Decahydro-1,5-Dimethylnaphthanlene
	1,7-Dimethyl-4-(1-methylethyl)cyclodecane
	2-Butyl-4-Hexyloctahydro-1H-Indene
	Heptadecane

*Sample overloaded GC/MS column and most compounds were unresolved as a result.

7.0 DATA EVALUATION

The results of the PETREX Soil Gas Survey are displayed on the following plates:

Plate 1: Relative Flux of Heavy Aromatic Hydrocarbons

Plate 2: Relative Flux of Heavy Cycloalkanes/Alkenes

Plate 3: Relative Flux of Oil Character Hydrocarbons

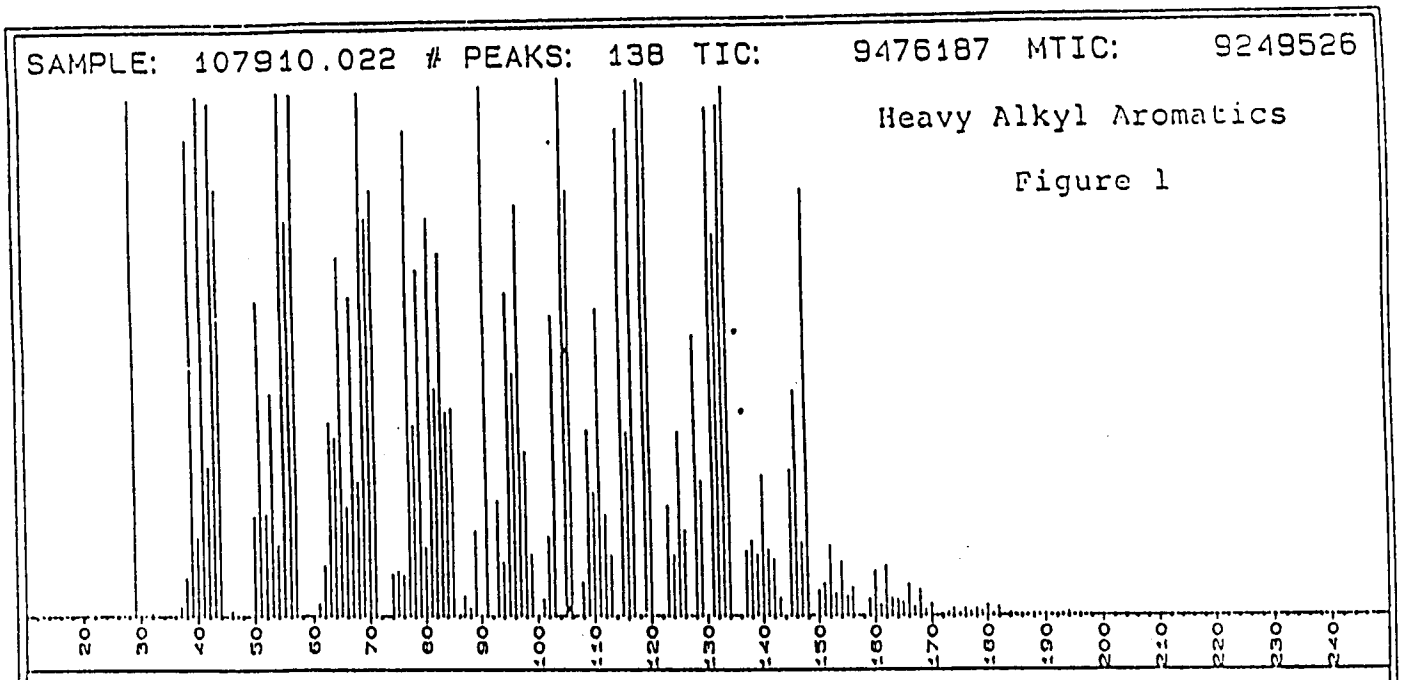
Plate 4: Relative Flux of Toluene

Plate 5: Relative Flux of Tetrachloroethylene (PCE)

Plate 6: Sample Locations

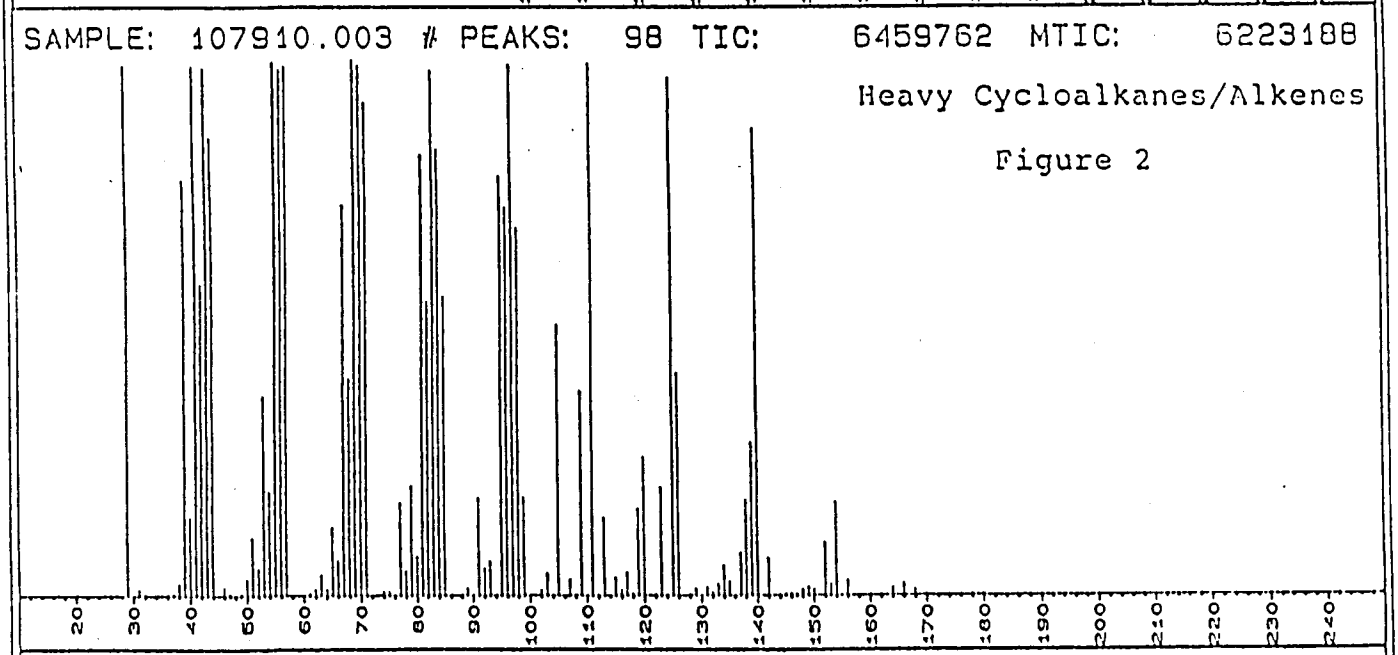
There are four different hydrocarbon characters indicated by the chemical compositions detected in this survey. They are represented as Heavy Aromatic Hydrocarbons, Heavy Cycloalkanes/Alkenes, Oil Character Hydrocarbons, and Toluene. Spectra of these compositional hydrocarbon characters are displayed in Figures 1-4, respectively. Since these hydrocarbon characters are distinctly different, they are likely sourced from different types of hydrocarbon products.

The Heavy Aromatic Hydrocarbons displayed on Plate 1 form a large plume located near the gasoline storage tanks adjacent to building 21. This plume extends to the northwest near the western boundary of the hazardous material storage area. A small plume also appears near samples 11 and 12. Aromatic hydrocarbons are commonly found in gasoline and this suggests that a previous gasoline spill is the source of this character.



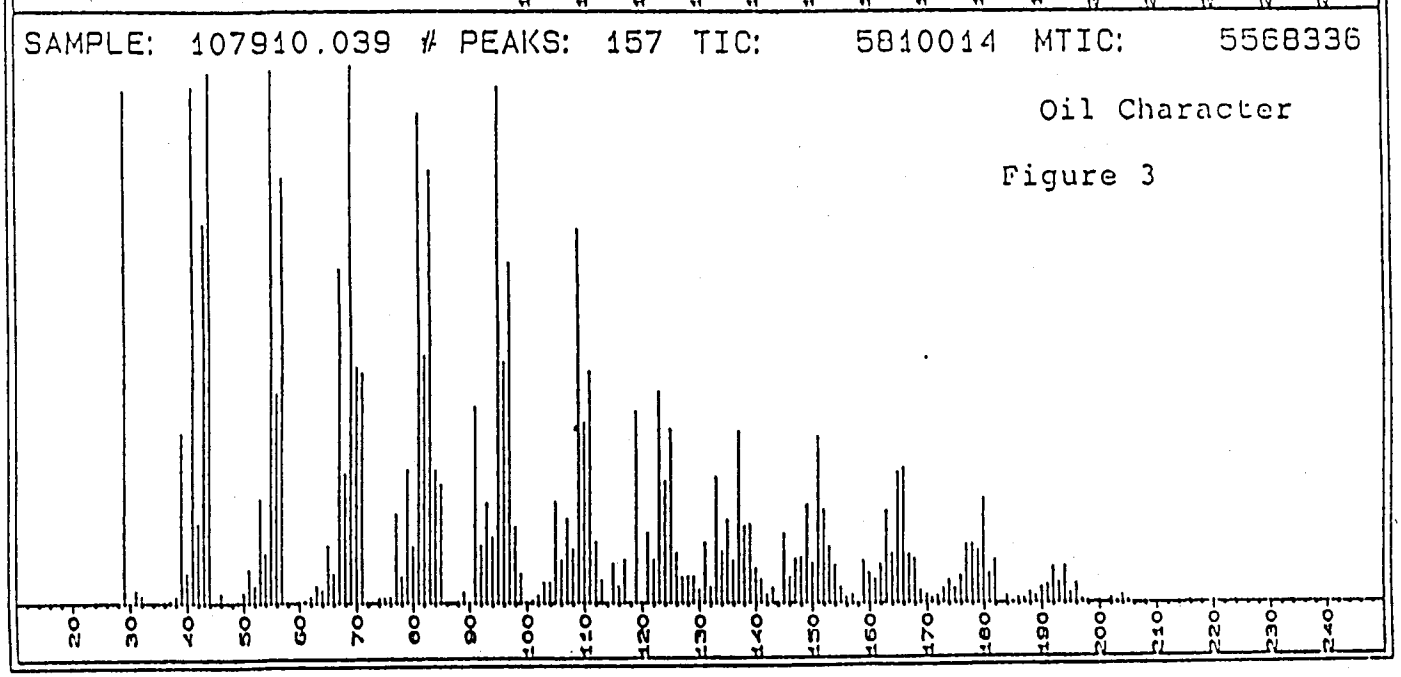
Heavy Alkyl Aromatics

Figure 1



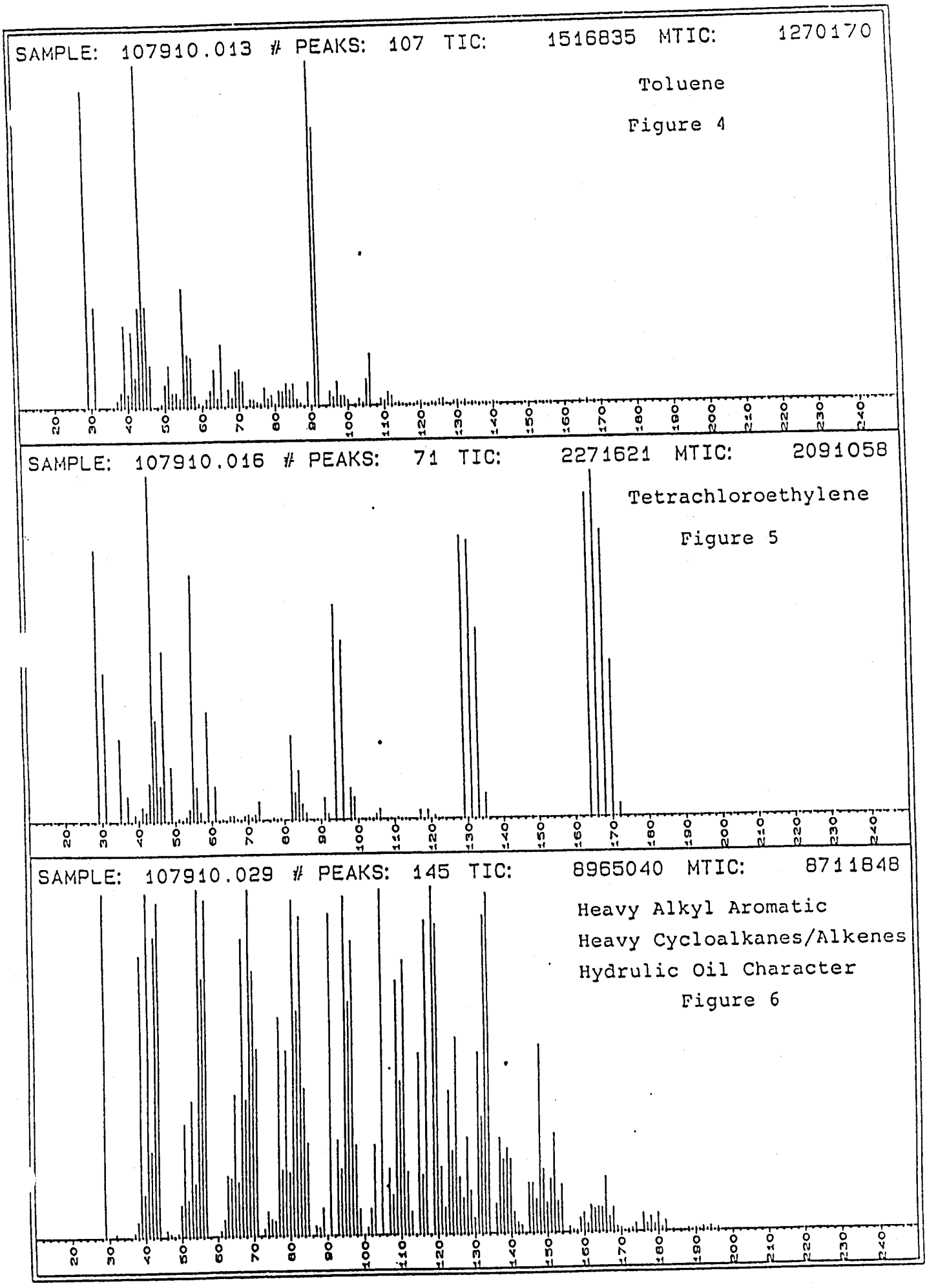
Heavy Cycloalkanes/Alkenes

Figure 2



Oil Character

Figure 3



Toluene

Figure 4

Tetrachloroethylene

Figure 5

Heavy Alkyl Aromatic
Heavy Cycloalkanes/Alkenes
Hydrulic Oil Character

Figure 6

Plate 2 is a map of Heavy Cycloalkane/Alkene Hydrocarbons. A plume extends from the gasoline storage tanks near building 21 northwest to the edge of the survey boundary. Samples 11 and 12 also detected a moderate level of these hydrocarbons. These compound classes comprise a significant portion of gasoline. The previous gasoline spill could also be the source of these cycloalkanes/alkenes.

A plume of Oil Character Hydrocarbons is displayed on Plate 3. The highest response levels detected were located near the storage tanks in the northwest corner of the survey area. Figure 3 is a spectrum of this oil character. This type of spectra is similar to a light to medium grade oil, possibly hydraulic fluid oil or motor oil.

A large plume of toluene was detected and is displayed on Plate 4. The highest concentrations detected were in the hazardous material storage area. Since very little toluene was detected near the gasoline storage it is unlikely that the previous gasoline spill is the source. Additionally, the dominance of toluene in the plume samples indicates that the source is a solvent rather than toluene. A second area of high concentration of toluene were detected near a fuel product.

Figure 5 is a spectrum of tetrachloroethylene (PCE). A plume of PCE was detected near the southeast corner of the hazardous material storage area. This plume is displayed on Plate 5. Tetrachloroethylene is a commonly used solvent and degreaser.

Several samples on Plate 5 have an asterisk next to the sample. It was not possible to make a positive identifications of PCE at these locations due to interference from other compounds with the same atomic masses as PCE.

In addition to the compounds displayed on the maps, trichloroethylene (TCE) was detected at sample locations 9, 15, 44, 46 and 48. TCE is also a commonly used solvent and degreaser.

Figure 6 displays a spectrum which is a combination of Heavy Aromatic Hydrocarbons, Heavy Cycloalkanes/Alkenes Hydrocarbons and Oil Character Hydrocarbons. This spectrum is typical of samples where the plumes of these chemical characters overlap.

8.0 CONCLUSIONS

Aromatic Hydrocarbons, Cycloalkanes/Alkene Hydrocarbons, Oil Character Hydrocarbons, toluene, tetrachloroethylene and trichloroethylene were detected at the Duco Stores Tank Farm area of the GM Truck and Bus Group plant. The distribution of the soil gas response values were mapped and several potential contaminant plumes were indicated. High values occurring near the gasoline storage tanks and the hazardous material storage area indicate these areas are potential sources for the various contaminants. The contaminant plumes appear to be migrating in a west-northwest direction. Several contaminant plumes extend beyond the survey boundary.

9.0 RECOMMENDATIONS

Since several of the contaminant plumes extend to the edge of the survey boundary, NERI recommends an expansion of the PETREX Soil Gas Survey to the north and east. This expanded survey would map the contaminant plumes which extend beyond the boundary of the previous PETREX Soil Gas Survey.

NERI also recommends the installation of at least three monitoring wells and the analysis of the water from these wells by EPA Methods. These methods should include VOC's by GC/MS 8240/624 and B/N SVOCs by GC/MS 8270. This would give quantative information about the nature of the source materials responsible for the soil gas plumes as well as allowing monitoring of the changes in concentrations over time. The recommended location for these wells are:

1 well located between samples 28 and 29.

1 well located near sample number 8.

1 well located in background near sample number 49.

R1079PH2/9.18.90

PETREX SOIL GAS PROTOCOL

INTRODUCTION

The Petrex Static Collection Technique provides a means by which trace quantities of subsurface derived organic compounds can be detected and collected at the earth's surface. It is integrative, thereby eliminating the short-term variations associated with other gas/vapor detection methods. The Petrex Technique directly collects and records a broad range of organic compounds emanating from subsurface sources.

SOIL GAS COLLECTOR PREPARATION

Soil gas collectors are prepared as follows:

1. Adsorption wires (after construction) are cleaned by heating to 358°C in a high vacuum system.
2. Wires are packed under an inert atmosphere in airtight tubes.
3. One collector out of every thirty is checked for cleanliness by mass spectrometry. Based on the results, the group of thirty collectors is approved for release into the field.

SAMPLER SHIPMENT AND FIELD HANDLING

Two transportation blanks are included with each shipment. Transportation blank samplers are stored unopened until analysis with the field samplers.

SOIL GAS COLLECTOR INSTALLATION

The collector consists of a ferromagnetic wire coated with an activated adsorbent. Each sample is typically placed in a shallow hole, 20-30 cm deep, within a protective container. The hole is backfilled and the location is marked. The collector is left in the ground for as long as 45 days, then retrieved and sealed in its container for transportation back to the laboratory for analysis.

MASS SPECTROMETER TUNING

An Extranuclear Quadrupole Mass Spectrometer equipped with a Curie-point pyrolysis/thermal desorption inlet is used for collector analysis. Mass assignment and resolution are manually adjusted using a perfluorotributylamine (PFTBA) standard. A linear correction, based on the known spectrum of PFTBA, is calculated. This correction is applied to a second PFTBA spectrum. If correct mass (M/Z) values are obtained, the operator proceeds to the next tuning step. If not, the procedure is repeated until correct masses are obtained.

Peak intensity ratios are set from the major peaks in the PFTBA spectrum using the following values:

Mass (M/Z)		Spectrum Intensities
69	=	100%
131	=	25% ± 5%
219	=	35% ± 5%

During tuning, the ion signal for mass (M/Z) 69 of PFTBA is measured at a preset sample pressure and detector voltage and compared to previous values at the same setting.

Electron energy is set to 70 electron volts and emission is set at 12 milliseconds. All other operating parameters, such as scans, scan range, and mass offset, are established in the computer program. These values may only be changed by the laboratory manager.

Tuning is performed at the beginning of a run so that an individual survey is analyzed at the same set of instrument conditions. The samples are analyzed in random order.

LABORATORY ANALYSIS

Machine background analyses are performed periodically (approximately every 20 samples) to assure that there is no carryover between successive samples. If there are peaks which are not related to atmospheric gases, the supervisor is notified and the mass spectrometer is shut down and cleaned as necessary.

A written sample number record is kept during the analysis to prevent accidental sample number duplication. The mass spectrometer control program contains appropriate "flag statements" that prompt the operator with a warning if an input sample number has already been analyzed. The operator then checks the current number, along with the disk storage location of the previously entered number to identify the true sample number.

COMPOUND IDENTIFICATION

Compound identification is based on molecular weight, compound fragmentation, and isotope distribution, as applicable. Each compound exhibits a unique mass spectral signature. NERI/Petrex maintains a large library of spectra for individual compounds, accessible by computer. In addition, the company maintains a large library of commonly used chemical mixtures, e.g., gasolines, diesels, industrial oils and solvents, coatings, and plastics. These are used to assist in both compound and mixture identifications.

Indicator peaks, indicative of the compound and away from interference by other compounds, are selected for data presentation and mapping.

RELATIVE FLUX DETERMINATION

The process of determining ion counts (fluxes) of indicator peaks for the specified compounds is totally computerized. Sample locations on a base map are digitized as X-Y coordinates and flux data for the given compounds are plotted at respective locations. All flux data are then extracted from the original data file for subsequent processing.

Mapping of the relative flux data occurs after contour intervals for each compound or component class are determined. In order to establish the contour intervals, factors such as flux distribution, physiochemical considerations, and component-source material relationship (if known) are taken into account for each compound or class, in each area, on an individual basis. Each map is then contoured by hand, or in special cases, computer contoured. The resultant contour zones for each compound or component in each area are color-coded on a relative basis.

It should be noted that the reported ion counts are representative of a flux which is proportional to the component's emanation rate at a particular sample location and is not a measure of concentration. Flux values for one compound cannot be quantitatively compared to flux values for different compounds. At this time, there has been no absolute equation established from which subsurface compound concentrations can be calculated from surficial flux levels.

APPENDIX H.2

SITE CHARACTERIZATION REPORT AND WORK PLAN FOR DUCO STORES

SITE CHARACTERIZATION REPORT AND WORK PLAN

FOR

GENERAL MOTORS CORPORATION
Truck and Bus Division
"DUCO Store Area"
Pontiac, MI 48053

Presented to:

GENERAL MOTORS CORPORATION
TRUCK AND BUS GROUP - PONTIAC CENTRAL

Submitted by:

MAECORP INCORPORATED
Caledonia, Michigan

October 14, 1991

MAECORP PROJECT # MI-3627

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Appendices

A. Excavation Sample Results
B. Soil Pile Sample Results

I. INTRODUCTION

On August 20, 1991 through August 28, 1991 a total of eight underground storage tanks (USTs) were removed from the "DUCO Stores" area at General Motors Corporation's Truck and Bus Division in Pontiac, Michigan. The location of the Truck and Bus Division is highlighted on the map on page 2, and the basic layout of the plant is enclosed in the insert on page 3. The USTs were situated north and west of Building 21. Figure 1 on page 4 depicts the location of each UST, and Table 1 below presents the available data on each UST:

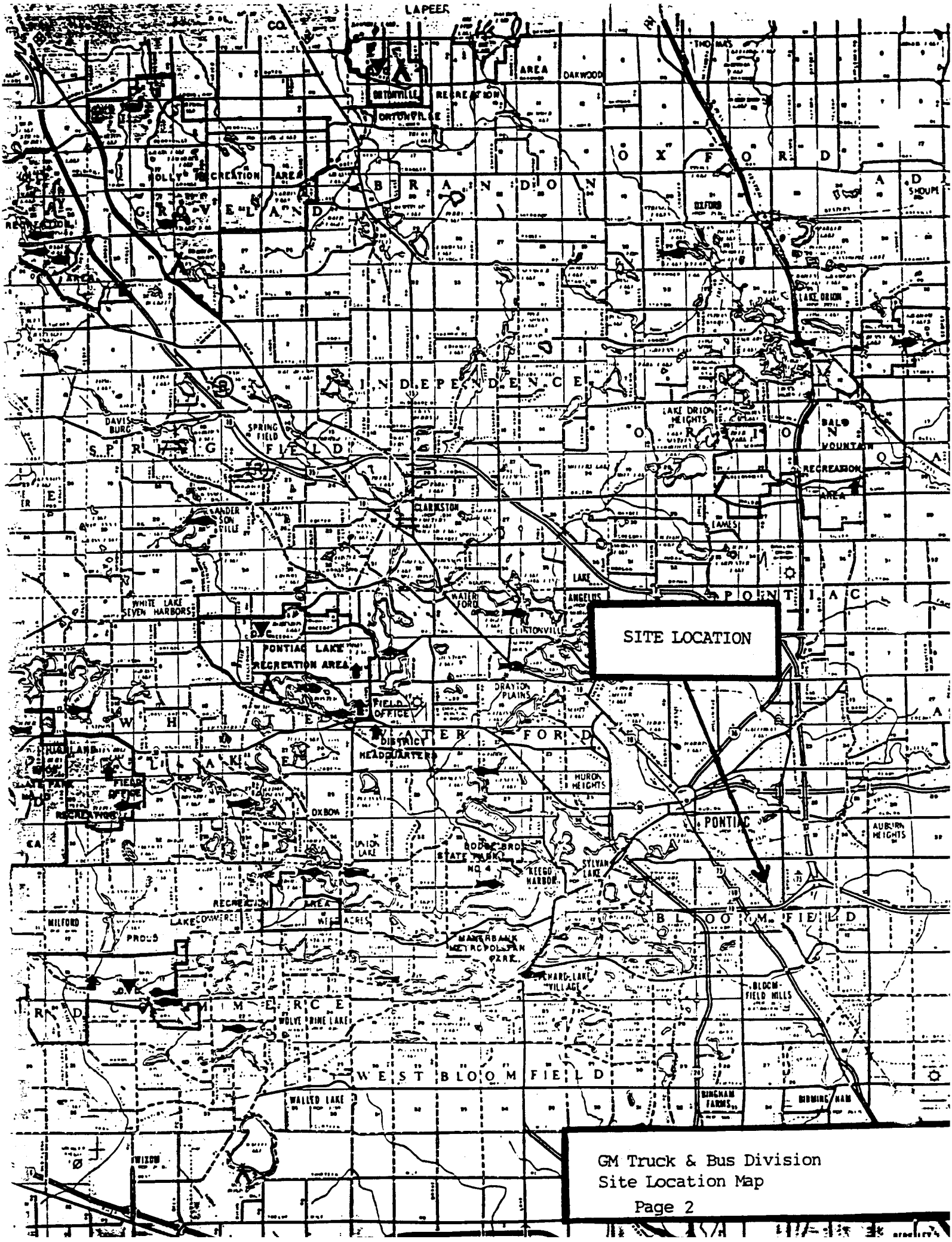
TABLE 1

DUCO Stores UST Data

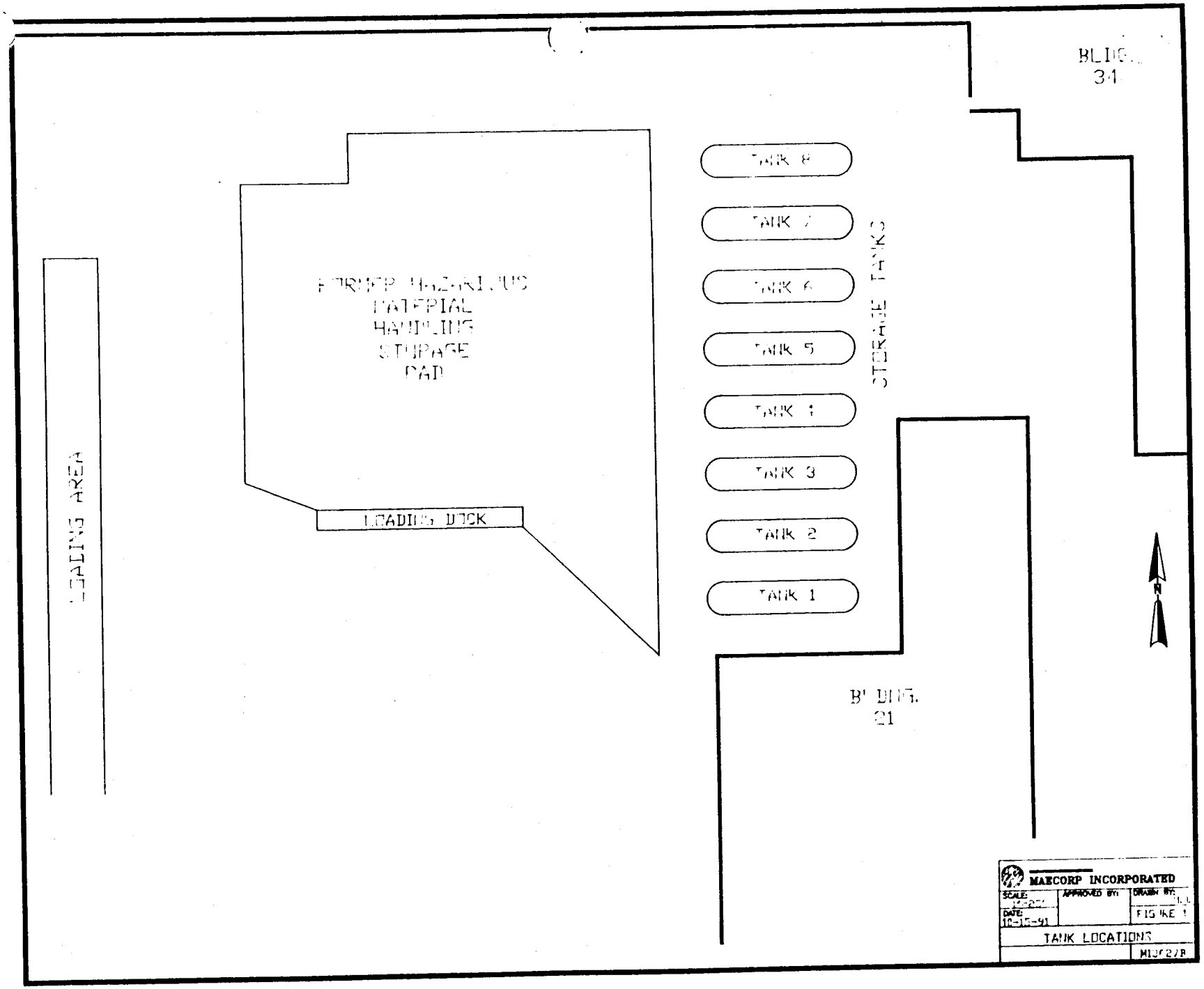
Tank No.	Material	Tank Mat'l	Tank Size	Year Inst	Pipe Mat'l	Pipe Buried
1	Gasoline	Steel	12000	27	Steel	No
2	Gasoline	Steel	12000	27	Steel	No
3	RR End Lube	Steel	12000	27	Steel	No
4	Glycol	Steel	12000	27	Steel	No
5	Axle Oil 80w90	Steel	12000	27	Steel	No
6	#1 Diesel	Steel	12000	27	Steel	No
7	#1 Diesel	Steel	12000	27	Steel	No
8	#1 Diesel	Steel	10500	27	Steel	No

During the UST removals, visible evidence of a release was not observed. Therefore, the excavation was sampled to satisfy the site assessment requirements of the Michigan State Police Fire Marshal Division UST rules on permanent UST closures. The results of the site assessment will be discussed in this report.

On September 5, 1991, prior to receipt of the analytical data from the site assessment, diesel fuel was observed to be seeping into the excavation at the north end. The State Fire



GM Truck & Bus Division
Site Location Map


BLDG. 34
FORMER HAZARDOUS MATERIAL HANDLING STORAGE PAD
LOADING DOCK
LOADING AREA
TANK 8
TANK 7
TANK 6
TANK 5
TANK 4
TANK 3
TANK 2
TANK 1
STORAGE TANKS
N
B' DLG. 21
MAECORP INCORPORATED
SCALE: 1"=20'
APPROVED BY:
DRAWN BY: L.L.
DATE: 10-15-91
FIGURE 1
TANK LOCATIONS
MW27B

Marshal was notified and corrective actions to recover the diesel fuel were implemented immediately.

On September 20, 1991 an initial abatement report was submitted detailing the abatement measures taken subsequent to the release. These measures included the immediate implementation of a plan to recover the diesel fuel from the excavation floor.

Within 45 days of release notification, the Leaking Underground Storage Tank Act No. 478, P.A. of 1988 requires a report to be submitted which includes a site characterization and work plan to investigate the vertical and horizontal extent of soil and groundwater contamination. The following report is submitted to meet these requirements.

II. SITE CHARACTERIZATION

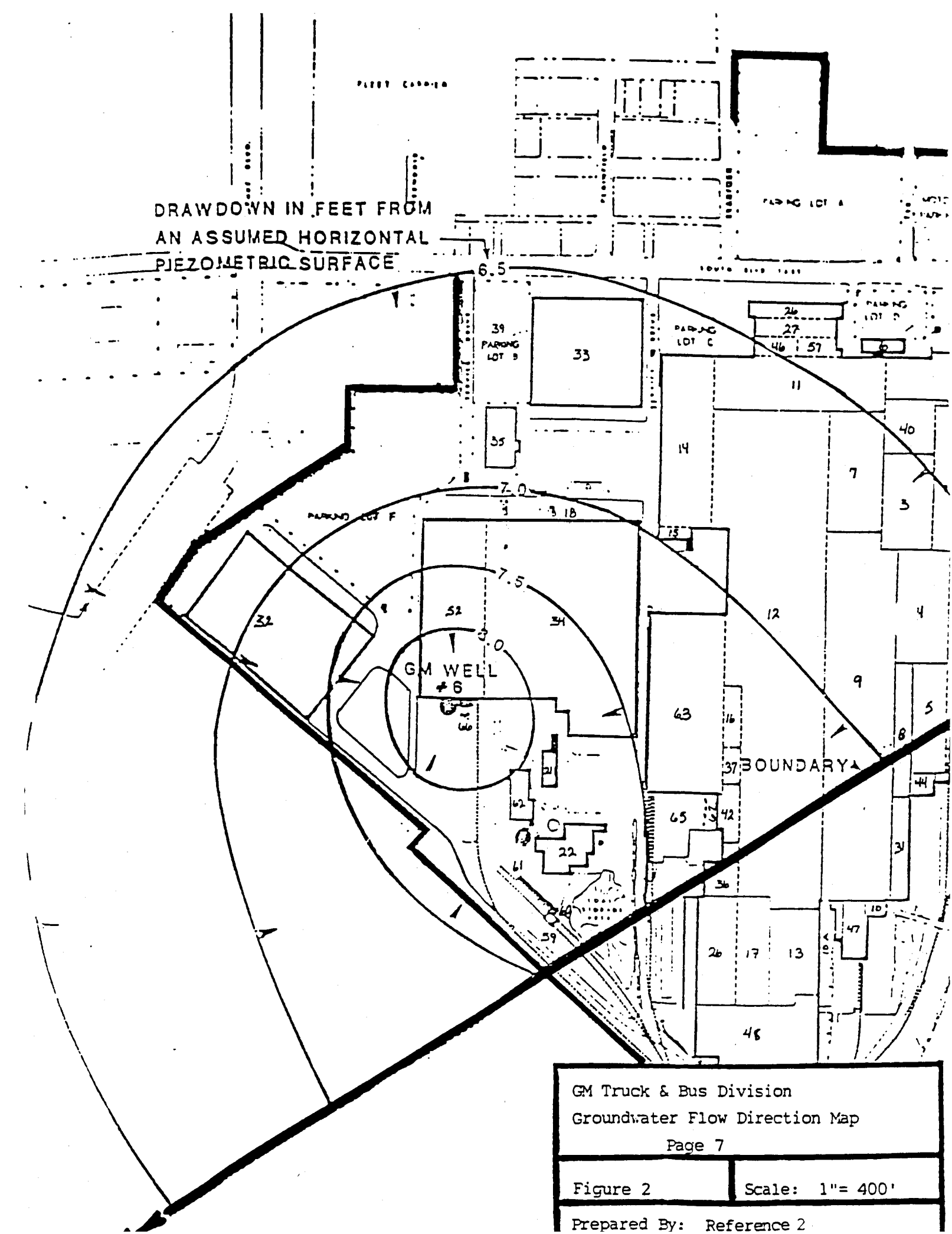
A. Section 7 (3a): Data on the nature and estimated quantity of the release.[1]

The "DUCO Stores" UST release was reported as being diesel fuel. Tightness testing had been performed on the USTs approximately one year prior to removal. The tanks were found to be tight. Upon removal, inspection of the tanks and piping did not reveal cracks or holes. Also, the free product recovered from the excavation did not amount to more than 100 gallons. Based on these observations, it appears the release was small and the result of overfills.

B. Response to Section 7 (3b): Data from available sources and site investigations concerning the following factors: surrounding populations, water quality, use and approximate locations of wells potentially affected by the release, subsurface soil conditions, locations of subsurface sewers, climatological conditions, and land use.

The General Motors Truck and Bus Division is located in Pontiac, Michigan which has a population of 76,210. The area surrounding the facility is zoned approximately 60-70% R1 through R3 residential, 20% M1 and M2 industrial and 10-20% C1 through C3 commercial.

Groundwater was observed in the excavation at a depth of 20 feet. The soil above and below the groundwater is clay and confines the aquifer. The groundwater flow is northwest toward General Motors' process well #6, which supplies water to the toilet facilities throughout the plant. Figure 2 on page 7 demonstrates the effect of the process well on the groundwater in the area[2]. Water samples are periodically collected from the well and tested for priority pollutants. This analytical data



GM Truck & Bus Division
Groundwater Flow Direction Map
Page 7

Figure 2	Scale: 1"= 400'
Prepared By: Reference 2	

can be made available if deemed necessary. A request was made with the Michigan Department of Natural Resources Geological Survey Division for the well records of the area immediately surrounding the facility. They will be submitted as an addendum to this report once received by MAECORP.

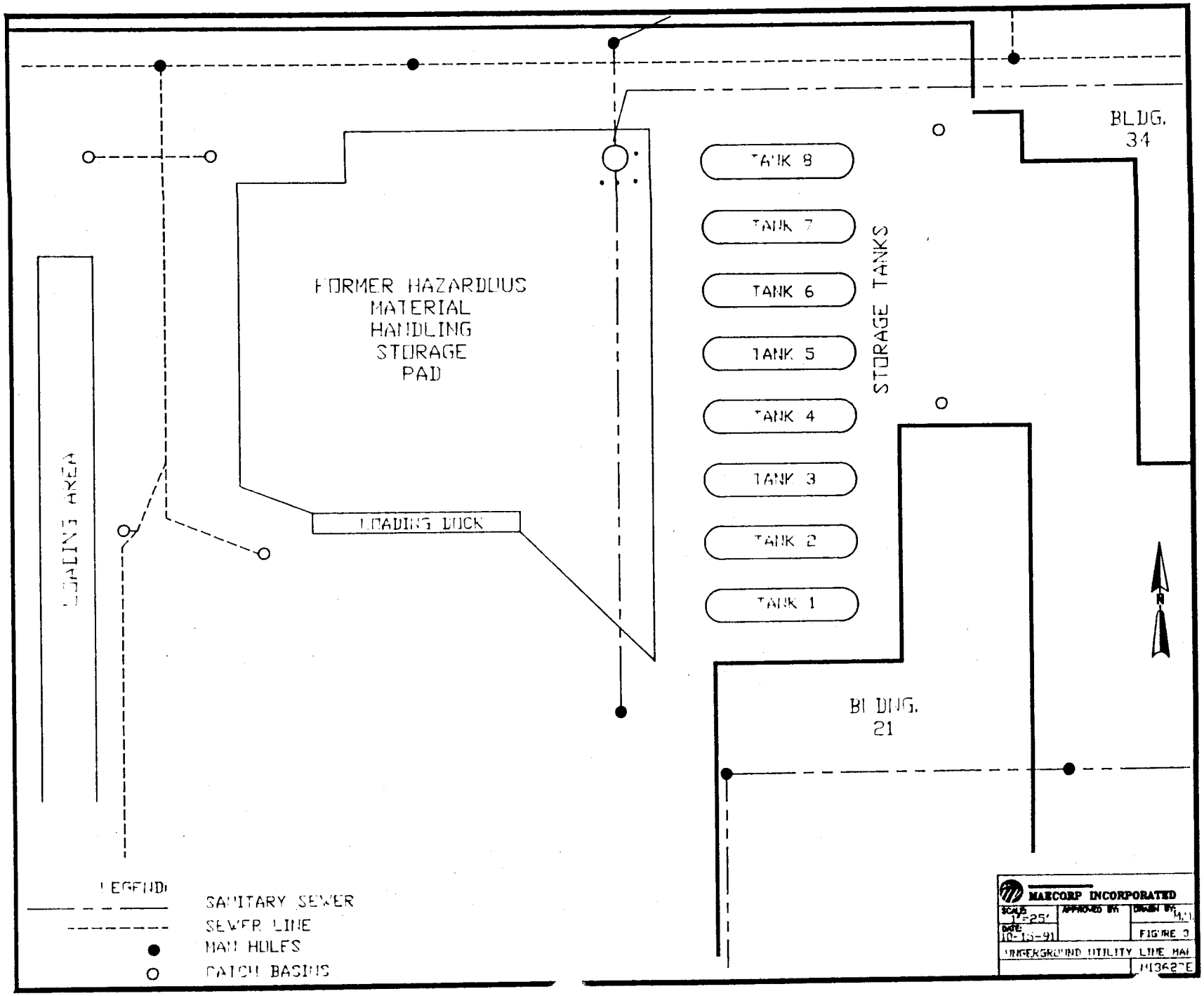
Based on available information, the GM Truck and Bus plant was built in an area where the underlying soils were predominantly clay tills comprised of a mixture of clay, silt, sand and gravel. The clay tills proceed from the surface down to an approximate depth of 150 feet. Visual inspection of the walls and floor of the excavation yielded soil types to be exclusively clay. In the areas where diesel fuel seeped back into the excavation noticeable stains could be seen in the clay walls.

The locations of the underground utilities are shown in Figure 3 on page 9.

The climatological conditions for the area are temperate with an average yearly rainfall of 30.91".

C. Section 7 (3c): Results of the site characterization required by subsection (1).

During the UST removals, visible evidence of a release was not observed. Therefore, the excavation was sampled according to the Michigan State Police Fire Marshal Division UST rules, which require the collection of one grab sample from the excavation floor underneath the fill pipe area for each tank and one grab sample from the excavation floor underneath the opposite end of the tank[3]. In addition, east and west wall samples were collected relative to each tank end position along with samples


BLDG.
34
TANK 8
TANK 7
TANK 6
TANK 5
TANK 4
TANK 3
TANK 2
TANK 1
STORAGE TANKS
FORMER HAZARDOUS
MATERIAL
HANDLING
STORAGE
PAD
LOADING DOCK
LOADING AREA
BLDG.
21
LEGEND:
SANITARY SEWER
SEWER LINE
MAN HOLES
CATCH BASINS
MARCORP INCORPORATED
SCALE 1"=25'
APPROVED BY
DRAWN BY
DATE 10-15-91
FIGURE 3
UNDERGROUND UTILITY LINE MAP

of the north and south wall of the excavation. The wall samples were collected approximately 6 inches into the walls at a depth relative to the centers of the former UST locations. Figure 4 on page 11 illustrates the sample locations.

The samples were submitted to Canton Analytical Laboratories for total lead, total petroleum hydrocarbons (TPH), polynuclear aromatics (PNAs) and benzene, toluene, ethylbenzene, and xylene (BTEX) analysis. The analytical results for samples 2C and 4C revealed nondetectable levels for all of the test parameters. Sample 1A, 1B, 1D, 2B, 3C, 3D, 4D, 5C, 5D, 6C, 6D, 7B, 7C, S1, S2, S3, and S4 registered PNAs and BTEX levels below the current Type B Clean-up Criteria. The remaining samples, 2A, 2D, 3A, 3B, 4A, 4B, 5A, 5B, 6A, 6B, 7A, 7D, 8A, and 8B, had some constiuent levels above the Type B Clean-up Criteria. An overall look at the analytical results indicate the north wall, the south wall and the bottom (except for sample locations 2D and 7D) of the excavation have met the Type B Clean-up Criteria. The analytical results also indicate the east and west walls will require further excavation to satisfy the Type B Clean-up Criteria. Tables 2 - 10 below summarize the analytical results, and the raw analytical results are included in Appendix A.

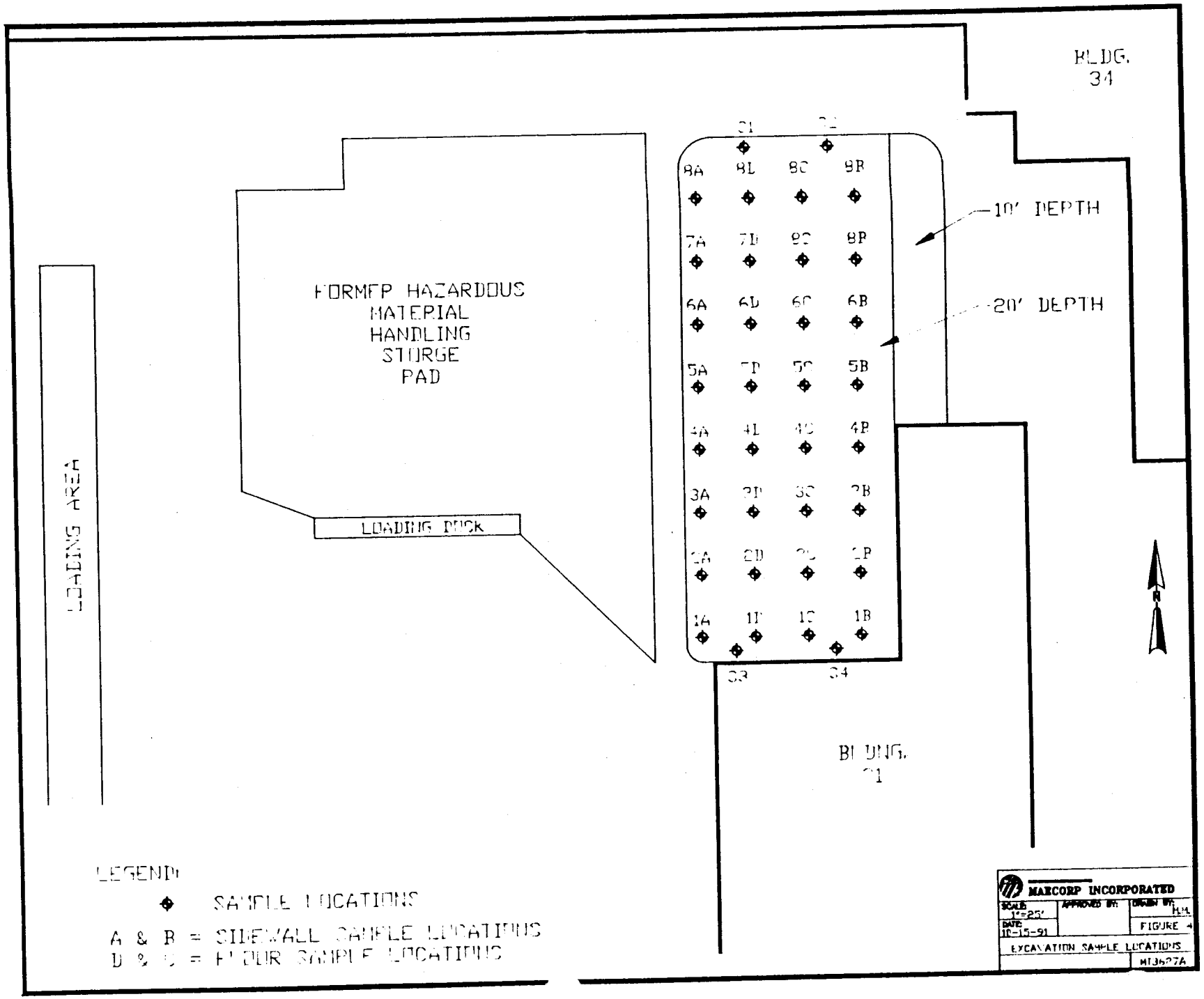

BLDG.
34
FORMER HAZARDOUS
MATERIAL
HANDLING
STORGE
PAD
LOADING DOCK
LOADING AREA
10' DEPTH
20' DEPTH
BLDG.
31
LEGEND:
SAMPLE LOCATIONS
A & B = SIDEWALL SAMPLE LOCATIONS
MARCORP INCORPORATED
SCALE 1"=25'
DATE 10-15-91
FIGURE 4
EXCAVATION SAMPLE LOCATIONS
MI3627A

TABLE 2

Excavation Soil Sample Results (ppm)

Parameter	Sample #1A	Sample #1B	Sample #1C	Sample #1D
TPH	ND	ND	NS	ND
Benzene	.10	ND	NS	ND
Ethyl-benzene	.026	ND	NS	ND
Toluene	.098	.033	NS	.15
Xylenes	.68	.370	NS	.93
Naphtha-lene	ND	.068	NS	.069
Acenaph-thylene	ND	.046	NS	.13
Acenaph-thene	ND	0.12	NS	.34
Fluorene	ND	.11	NS	.29
Phenan-threne	ND	.06	NS	.19
Anth-racene	ND	ND	NS	ND
Flouran-thene	ND	ND	NS	ND
Pyrene	ND	ND	NS	ND
Benzo (a) Anth-recene	ND	ND	NS	ND
Chrysene	ND	ND	NS	ND

ND = None Detected
NS = No sample

TABLE 3

Excavation Soil Sample Results (ppm)

Parameter	Sample #2A	Sample #2B	Sample #2C	Sample #2D
TPH	10	49	ND	8.9
Benzene	.310	ND	ND	ND
Ethyl-benzene	.590	ND	ND	ND
Toluene	1.7	.016	ND	7.2
Xylenes	4.2	.016	ND	32
Naphtha-lene	ND	ND	ND	.083
Acenaph-thylene	ND	.042	ND	.055
Acenaph-thene	ND	.078	ND	.091
Fluorene	ND	.12	ND	.067
Phenan-threne	ND	.051	ND	ND
Anth-racene	ND	ND	ND	ND
Flouran-thene	ND	.074	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No sample

TABLE 4

Excavation Soil Sample Results (ppm)

Parameter	Sample #3A	Sample #3B	Sample #3C	Sample #3D
TPH	24	6.9	5.4	6.5
Benzene	.044	.032	ND	ND
Ethyl-benzene	ND	.030	ND	ND
Toluene	.026	.37	ND	ND
Xylenes	ND	1.5	ND	ND
Naphtha-lene	ND	ND	ND	ND
Acenaph-thylene	.046	ND	ND	.062
Acenaph-thene	ND	ND	.15	.14
Fluorene	ND	ND	.43	.12
Phenan-threne	ND	ND	ND	.072
Anth-racene	ND	ND	ND	ND
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 5

Excavation Soil Sample Results (ppm)

Parameter	Sample #4A	Sample #4B	Sample #4C	Sample #4D
TPH	4500	810	ND	ND
Benzene	63	ND	ND	ND
Ethyl-benzene	24	ND	ND	ND
Toluene	140	1.4	ND	ND
Xylenes	120	5.2	ND	ND
Naphtha-lene	26	7.4	ND	ND
Acenaph-thylene	11	9.5	ND	.068
Acenaph-thene	6.1	27	ND	.17
Fluorene	1.7	20	ND	.14
Phenan-threne	3.5	13	ND	.094
Anth-racene	11	4.7	ND	ND
Flouran-thene	.74	2.1	ND	ND
Pyrene	ND	1.3	ND	ND
Benzo (a) Anth-recene	.24	2.5	ND	ND
Chrysene	ND	.3	ND	ND

ND = None Detected
NS = No Sample

TABLE 6

Excavation Soil Sample Results (ppm)

Parameter	Sample #5A	Sample #5B	Sample #5C	Sample #5D
TPH	1600	610	ND	ND
Benzene	6.8	.21	ND	ND
Ethyl-benzene	10	.060	ND	ND
Toluene	32	.81	ND	.069
Xylenes	53	2.4	.056	.040
Naphtha-lene	7.0	3.3	ND	ND
Acenaph-thylene	11	5.6	.068	.054
Acenaph-thene	5.0	5.3	.18	.14
Fluorene	1.6	3.7	.17	.13
Phenan-threne	1.2	3.5	ND	.075
Anth-racene	7.4	3.0	ND	ND
Flouran-thene	ND	.46	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	1.4	1.5	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 7

Excavation Soil Sample Results (ppm)

Parameter	Sample #6A	Sample #6B	Sample #6C	Sample #6D
TPH	130	26	ND	ND
Benzene	.98	.26	ND	ND
Ethyl-benzene	1.2	.58	ND	ND
Toluene	3.0	.26	ND	ND
Xylenes	3.0	7.0	ND	ND
Naphtha-lene	1.2	1.6	ND	ND
Acenaph-thylene	.88	1.3	ND	.058
Acenaph-thene	.56	1.0	.12	.15
Fluorene	.83	.53	.088	.12
Phenan-threne	.66	ND	ND	.078
Anth-racene	.35	.26	ND	ND
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	.04
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 8

Excavation Soil Sample Results (ppm)

Parameter	Sample #7A	Sample #7B	Sample #7C	Sample #7D
TPH	22	450	6.2	ND
Benzene	ND	ND	ND	ND
Ethyl-benzene	ND	.18	ND	ND
Toluene	.12	.18	ND	ND
Xylenes	4.1	1.4	ND	ND
Naphtha-lene	1.2	.12	ND	ND
Acenaph-thylene	.85	.13	ND	.14
Acenaph-thene	.42	.56	.14	.33
Fluorene	.25	ND	.11	.29
Phenan-threne	.15	ND	ND	.20
Anth-racene	ND	ND	ND	.60
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	.52
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 9

Excavation Soil Sample Results (ppm)

Parameter	Sample #8A	Sample #8B	Sample #8C	Sample #8D
TPH	480	2400	NS	NS
Benzene	ND	ND	NS	NS
Ethyl-benzene	ND	ND	NS	NS
Toluene	.74	.84	NS	NS
Xylenes	2.1	2.3	NS	NS
Naphtha-lene	1.8	29	NS	NS
Acenaph-thylene	9.5	71	NS	NS
Acenaph-thene	2.9	23	NS	NS
Fluorene	1.2	6.5	NS	NS
Phenan-threne	ND	ND	NS	NS
Anth-racene	2.3	13	NS	NS
Flouran-thene	ND	ND	NS	NS
Pyrene	ND	ND	NS	NS
Benzo (a) Anth-recene	ND	ND	NS	NS
Chrysene	ND	ND	NS	NS

ND = None Detected
NS = No Sample

TABLE 10

Excavation Soil Sample Results (ppm)

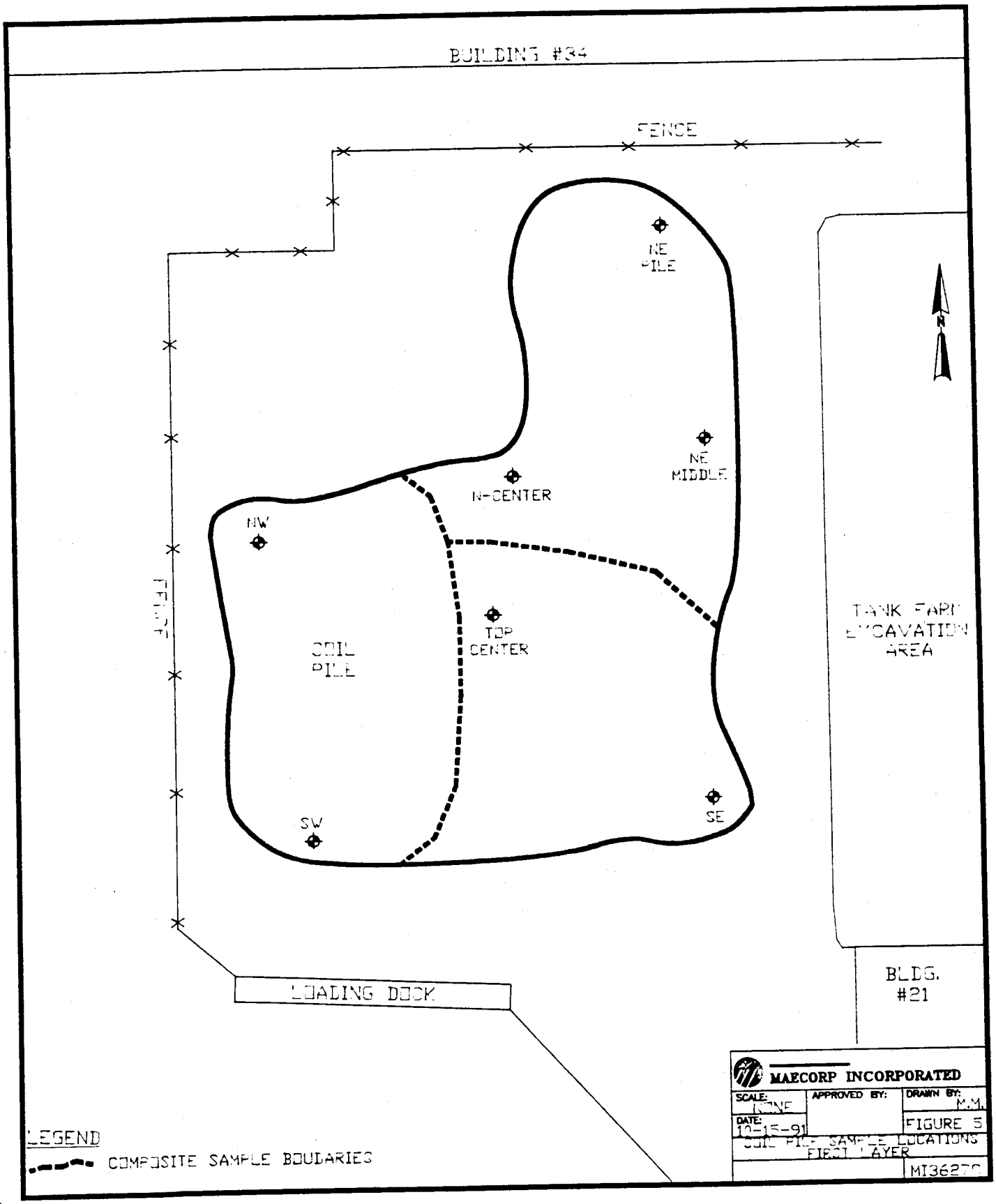
Parameter	Sample #S1	Sample #S2	Sample #S3	Sample #S4
TPH	ND	ND	7.0	12
Benzene	.49	ND	ND	ND
Ethyl-benzene	ND	ND	ND	ND
Toluene	.68	.15	ND	ND
Xylenes	1.6	.42	ND	ND
Naphtha-lene	ND	ND	ND	ND
Acenaph-thylene	ND	ND	.069	.052
Acenaph-thene	ND	.045	.16	1.6
Fluorene	ND	ND	.12	.097
Phenan-threne	ND	ND	.08	.062
Anth-racene	ND	ND	.30	.23
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	.13	.11
Chrysene	ND	ND	ND	ND

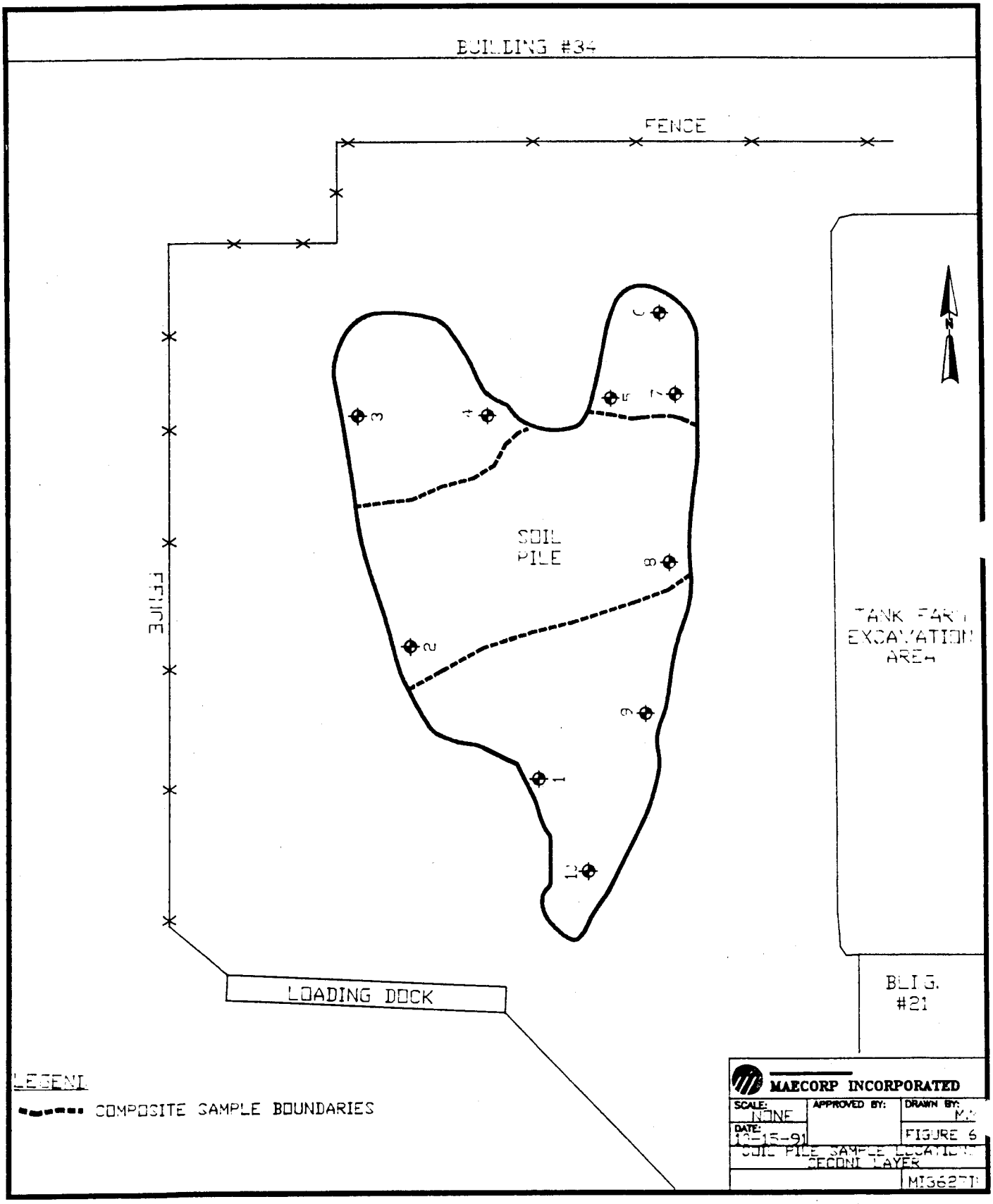
ND = None Detected
NS = No Sample

All of the soil removed during excavation of the USTs was stockpiled directly east of the excavation on a concrete storage pad. Approximately 3000 cubic yards of soil were stockpiled on the pad. The soil was sampled according to Figure 5 on page 22 and Figure 6 on page 23. From these soil samples the following composite samples were prepared:

SW & NW
NE,NE MID, & N Center
Top Center & SE
#1, #9 & #10
#2, & #8
#3 & #4
#5, #6 & #7
All 10 Locations of Layer 1 & Layer 2

The eight composite samples were submitted to Canton Analytical Laboratories for ignitability, corrosivity, reactivity, EP Toxicity and TCLP analysis. The purpose of the analysis was to determine if the soil contained contaminant levels exceeding those established by RCRA for the classification of characteristic hazardous waste. None of the RCRA levels were exceeded by any of the samples. Consequently, the soil pile is considered to be nonhazardous. Although the soil pile is nonhazardous, a faintly noticeable petroleum odor was present. Discussion is still in progress as to whether the soil will be disposed of at a Type 2 landfill, or an alternative treatment technology will be employed to treat the soil on site. The raw soil pile analytical results are included in Appendix B.


BUILDING #34
FENCE
NE PILE
NE MIDDLE
N-CENTER
NW
TOP CENTER
SOIL PILE
SW
SE
FENCE
TANK FARM EXCAVATION AREA
N
LOADING DOCK
BLDG. #21
LEGEND
COMPOSITE SAMPLE BOUDARIES
MAECORP INCORPORATED
SCALE: NONE
APPROVED BY:
DRAWN BY: M.M.
DATE: 12-15-91
FIGURE 5
SOIL PILE SAMPLE LOCATIONS FIRST LAYER
MI3627C


BUILDING #34
FENCE
FENCE
SOIL PILE
TANK FARM EXCAVATION AREA
BLDG. #21
LOADING DOCK
LEGEND
COMPOSITE SAMPLE BOUNDARIES
MAECORP INCORPORATED
SCALE: NONE
APPROVED BY:
DRAWN BY:
DATE: 12-15-91
FIGURE 6
SOIL PILE SAMPLE LOCATION SECOND LAYER

III FREE PRODUCT REPORT

A. Section 7 (3d): Results of the free product investigation required by subsection (1).

The free product investigation included a visual inspection of the excavation area and the ground water within it. On September 5, 1991 free product was observed seeping into the north west area of the excavation. The flow of product discontinued on October 4, 1991. On October 8, 1991 a slight sheen was observed on the groundwater at a few isolated spots toward the north end of the excavation, however, no free product was observed. The water in the storm sewer directly to the north and west of the excavation was also inspected for free product. There was no free product or noticeable odor present.

B. Section 7 (5d): Unless directed to do otherwise by the director, prepare and submit to the director, within 45 days after confirming a release, a free product removal report.

On September 5, 1991 diesel fuel was observed to be seeping into the excavation from the northwest wall area. Steve Thurman, an Environmental engineer with the GM Truck and Bus Group, implemented a free product recovery plan.

Since groundwater had also been seeping into the excavation, the plan began with the construction of a bermed area at the north end to confine the diesel fuel to a small area on the excavation floor. Inland Waters was then contracted to inspect the groundwater in the bermed area daily and pump off any observed free product. No more than a quarter of an inch of diesel fuel accumulated in the bermed area at any one time. On October 4, 1991 the diesel fuel discontinued entering the

excavation. Therefore, recovery operations were halted, but daily monitoring of the bermed area has continued.

A total of less than 100 gallons of diesel fuel was recovered and transported by vacuum tanker to the GM Truck and Bus Group - Pontiac East waste water treatment plant for treatment.

IV WORK PLAN

A. Section 7 (6): Within 45 days after confirmation of a release, a work plan must be submitted to determine the full extent of soil and groundwater contamination.

Contaminated soil still exists within the excavation area. The free product removal operation produced less than 100 gallons of diesel fuel indicating the amount of material was relatively small. The soil type surrounding the UST excavation is clay, which is very impermeable and would act to keep any released material confined to a limited area. Based on these observations and the analytical data, further excavation will be performed in an attempt to remove the visibly contaminated soil. The results of the additional soil excavation will be necessary to develop a work plan to investigate the extent of soil and groundwater contamination. Therefore, the work plan along with the excavation results, will be submitted as an addendum to this report.

REFERENCES

1. Leaking Underground Storage Tank Act No. 478 P.A. of 1988; State of Michigan Compiled Laws

2. Overby, Ross, Govin, Charles T.; Mathematical Simulation of the Groundwater Flow Conditions Under GM's Truck and Coach Division, Pontiac, Michigan, Camp Dresser and McKee Inc.; Milwaukee, Wisconsin, October 1981.

3. Michigan Underground Storage Tank Rules, Michigan State Police Fire Marshal Division State Fire Safety Board, Lansing, Michigan, January 1991.

APPENDIX A

EXCAVATION SAMPLE RESULTS

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

MPLE RECEIVED 09/16/91

B# 1090650 DUCO STORES 51

	ANALYTICAL RESULTS mg/kg
ead, Total	9.4
PH By Infra Red (418.1)	< 6.0
ETX	
enzene	0.49
thylbenzene	< 0.01
oluene	0.68
Xylenes	1.6
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	< 0.04
Acenaphthene	< 0.04
Fluorene	< 0.04
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.2
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

SAMPLE RECEIVED 09/16/91

LAB# 1090650 DUCO STORES S1

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

AMPLE RECEIVED 09/16/91

AB# 1090651 DUCO STORES S2

	ANALYTICAL RESULTS mg/kg
ead, Total	19
PH By Infra Red (418.1)	< 6.0
ETX	
enzene	< 0.01
thylbenzene	< 0.01
oluene	0.15
ylenes	0.42
10 POLYNUCLEAR AROMATICS	
aphthalene	< 0.04
cenaphthylene	< 0.04
cenaphthene	0.045
luorene	< 0.04
henanthrene	< 0.04
nthracene	< 0.04
luoranthene	< 0.04
yrene	< 0.04
enzo(a)anthracene	< 0.04
hrysene	< 0.04
enzo(b)fluoranthene	< 0.04
enzo(k)fluoranthene	< 0.2
enzo(a)pyrene	< 0.2
ibenzo(a,h)anthracene	< 0.2
enzo(ghi)perylene	

(PLE RECEIVED 09/16/91

3# 1090651 DUCO STORES S2

	ANALYTICAL RESULTS mg/kg
deno(1,2,3-cd)pyrene	< 0.2

AMPLE RECEIVED 09/16/91

AB# 1090652 DUCO STORES 53

	ANALYTICAL RESULTS mg/kg
Lead, Total	27
TPH By Infra Red (418.1)	7.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.069
Acenaphthene	0.16
Fluorene	0.12
Phenanthrene	0.08
Anthracene	0.30
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	0.13
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

MPLE RECEIVED 09/16/91

B# 1090652 DUCO STORES S3

	ANALYTICAL RESULTS mg/kg
ideno(1,2,3-cd)pyrene	< 0.2

MPLE RECEIVED 09/16/91

B# 1090653 DUCO STORES S4

	ANALYTICAL RESULTS mg/kg
ead, Total	27
PH By Infra Red (418.1)	12
ETX	
enzene	< 0.01
thylbenzene	< 0.01
oluene	< 0.01
ylenes	< 0.01
10 POLYNUCLEAR AROMATICS	
aphthalene	< 0.04
cenaphthylene	0.052
cenaphthene	1.6
luorene	0.097
henanthrene	0.062
nthracene	0.23
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	0.11
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

SAMPLE RECEIVED 09/16/91

LAB# 1090653 DUCO STORES 84

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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SAMPLE RECEIVED 09/19/91

LAB# 1090984 DUCO STORES 1A

	ANALYTICAL RESULTS mg/kg
Lead, Total	25
TPH By Infra Red (418.1)	< 6.5
BETX	
Benzene	0.10
Ethylbenzene	0.026
Toluene	0.098
Xylenes	0.68
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	< 0.04
Acenaphthene	< 0.04
Fluorene	< 0.04
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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CAL REPORT# 14947

AMPLE RECEIVED 09/19/91

AB# 1090984 DUCO STORES 1A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

LAB# 1090985 DUCO STORES 1B

	ANALYTICAL RESULTS mg/kg
Lead, Total	24
TPH By Infra Red (418.1)	< 6.5
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.033
Xylenes	0.37
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.068
Acenaphthylene	0.046
Acenaphthene	0.12
Fluorene	0.11
Phenanthrene	0.06
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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AB# 1090985 DUCO STORES 1B

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1090649 DUCO STORES 1D

	ANALYTICAL RESULTS mg/kg
Lead, Total	27
TPH By Infra Red (418.1)	< 6.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.15
Xylenes	0.93
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.069
Acenaphthylene	0.13
Acenaphthene	0.34
Fluorene	0.29
Phenanthrene	0.19
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

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LAB# 1090649 DUCO STORES 1D

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

SAMPLE RECEIVED 09/19/91

LAB# 1090986 DUCO STORES 2A

	ANALYTICAL RESULTS mg/kg
Lead, Total	20
TPH By Infra Red (418.1)	10
BETX	
Benzene	0.31
Ethylbenzene	0.59
Toluene	1.7
Xylenes	4.2
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	< 0.04
Acenaphthene	< 0.04
Fluorene	< 0.04
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.2
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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CAL REPORT# 14947

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AB# 1090986 DUCO STORES 2A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

LAB# 1090987 DUCO STORES 2B

	ANALYTICAL RESULTS mg/kg
Lead, Total	23
TPH By Infra Red (418.1)	49
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.016
Xylenes	0.016
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.042
Acenaphthene	0.078
Fluorene	0.12
Phenanthrene	0.051
Anthracene	< 0.04
Fluoranthene	0.074
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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SAMPLE RECEIVED 09/19/91

LAB# 1090987 DUCO STORES 2B

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1090071 DUCO STORES 2C

	ANALYTICAL RESULTS mg/kg
Lead, Total	10
TPH By Infra Red (418.1)	< 5.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	< 0.040
Acenaphthene	< 0.040
Fluorene	< 0.040
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

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CAL REPORT# 14667

SAMPLE RECEIVED 09/03/91

LAB# 1090071 DUCO STORES 2C

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

AMPLE RECEIVED 09/16/91

LAB# 1090648 DUCO STORES 2D

	ANALYTICAL RESULTS mg/kg
Lead, Total	30
TPH By Infra Red (418.1)	8.9
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	7.2
Xylenes	32
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.083
Acenaphthylene	0.055
Acenaphthene	0.091
Fluorene	0.067
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.2
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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LAB# 1090648 DUCO STORES 2D

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

GM TRUCK AND BUS GROUP
CAL REPORT# 14947

SAMPLE RECEIVED 09/19/91

LAB# 1090988 DUCO STORES 3A

	ANALYTICAL RESULTS mg/kg
Lead, Total	20
TPH By Infra Red (418.1)	24
BETX	
Benzene	0.044
Ethylbenzene	< 0.01
Toluene	0.026
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	< 0.04
Acenaphthene	0.046
Fluorene	< 0.04
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

GM TRUCK AND BUS GROUP
CAL REPORT# 14947

SAMPLE RECEIVED 09/19/91

LAB# 1090988 DUCO STORES 3A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

GM TRUCK AND BUS GROUP
CAL REPORT# 14947

SAMPLE RECEIVED 09/19/91

LAB# 1090989 DUCO STORES 3B

	ANALYTICAL RESULTS mg/kg
Lead, Total	27
TPH By Infra Red (418.1)	6.9
BETX	
Benzene	0.032
Ethylbenzene	0.030
Toluene	0.37
Xylenes	1.5
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	< 0.04
Acenaphthene	< 0.04
Fluorene	< 0.04
Phenanthrene	< 0.04
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.20
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

LAB# 1090989 DUCO STORES 3B

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

GM TRUCK AND BUS GROUP
CAL REPORT# 14667

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SAMPLE RECEIVED 09/03/91

LAB# 1090072 DUCO STORES 3C

	ANALYTICAL RESULTS mg/kg
Lead, Total	11
TPH By Infra Red (418.1)	5.4
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	< 0.040
Acenaphthene	0.15
Fluorene	0.43
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

GM TRUCK AND BUS GROUP
CAL REPORT# 14667

SAMPLE RECEIVED 09/03/91

LAB# 1090072 DUCO STORES 3C

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090647 DUCO STORES 3D

	ANALYTICAL RESULTS mg/kg
Lead, Total	32
TPH By Infra Red (418.1)	6.5
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.062
Acenaphthene	0.14
Fluorene	0.12
Phenanthrene	0.072
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.2
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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LAB# 1090647 DUCO STORES 3D

	ANALYTICAL RESULTS ug/kg
ndeno(1,2,3-cd)pyrene	< 0.2

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1081194 DUCO STORES 4A

	ANALYTICAL RESULTS mg/kg
d, Total	15
By Infra Red (418.1)	4500
TX	
zene	63
hylbenzene	24
luene	140
lenes	120
0 POLYNUCLEAR AROMATICS	
phthalene	26
cenaphthylene	11
enaphthene	6.1
luorene	1.7
nenanthrene	3.5
thracene	11
luoranthene	0.74
rene	< 0.1
nzo(a)anthracene	0.24
nrysene	< 0.1
nzo(b)fluoranthene	< 0.1
enzo(k)fluoranthene	< 0.1
nzo(a)pyrene	< 0.1
benzo(a,h)anthracene	< 0.2
enzo(ghi)perylene	< 0.2

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LAB# 1081194 DUCO STORES 4A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1081195 DUCO STORES 4B

	ANALYTICAL RESULTS mg/kg
Lead, Total	42
'PH By Infra Red (418.1)	810
BETX	
›enzene	< 0.01
Ethylbenzene	< 0.01
Toluene	1.4
Xylenes	5.2
610 POLYNUCLEAR AROMATICS	
Naphthalene	7.4
Acenaphthylene	9.5
Acenaphthene	27
Fluorene	20
Phenanthrene	13
Anthracene	4.7
Fluoranthene	2.1
Pyrene	1.3
Benzo(a)anthracene	2.5
Chrysene	0.3
Benzo(b)fluoranthene	0.44
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.1
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

LAB# 1081195 DUCO STORES 4B

	ANALYTICAL RESULTS mg/kg
ndeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1090073 DUCO STORES 4C

	ANALYTICAL RESULTS mg/kg
Lead, Total	9.6
TPH By Infra Red (418.1)	< 5.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	< 0.040
Acenaphthene	< 0.040
Fluorene	< 0.040
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

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LAB# 1090073 DUCO STORES 4C

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090646 DUCO STORES 4D

	ANALYTICAL RESULTS mg/kg
Lead, Total	33
TPH By Infra Red (418.1)	< 6.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.068
Acenaphthene	0.17
Fluorene	0.14
Phenanthrene	0.094
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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LAB# 1090646 DUCO STORES 4D

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1081192 DUCO STORES 5A

	ANALYTICAL RESULTS mg/kg
Lead, Total	15
TPH By Infra Red (418.1)	1600
BETX	
Benzene	6.8
Ethylbenzene	10
Toluene	32
Xylenes	53
610 POLYNUCLEAR AROMATICS	
Naphthalene	7.0
Acenaphthylene	11
Acenaphthene	5.0
Fluorene	1.6
Phenanthrene	1.2
Anthracene	7.4
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	1.4
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.1
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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LAB# 1081192 DUCO STORES 5A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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1081193 DUCO STORES 5B

	ANALYTICAL RESULTS mg/kg
Total	23
By Infra Red (418.1)	610
ene	0.21
lbenzene	0.060
ene	0.81
nes	2.4
POLYNUCLEAR AROMATICS	
thalene	3.3
aphthylene	5.6
aphthene	5.3
rene	3.7
anthrene	3.5
racene	3.0
ranthene	0.46
ne	< 0.1
o(a)anthracene	1.5
sene	< 0.1
o(b)fluoranthene	< 0.1
o(k)fluoranthene	< 0.1
o(a)pyrene	< 0.1
enzo(a,h)anthracene	< 0.2
o(ghi)perylene	< 0.2

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1081193 DUCO STORES 5B

	ANALYTICAL RESULTS mg/kg
no(1,2,3-cd)pyrene	< 0.2

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LAB# 1090074 DUCO STORES 5C

	ANALYTICAL RESULTS mg/kg
Lead, Total	9.8
TPH By Infra Red (418.1)	< 5.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	0.056
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	0.068
Acenaphthene	0.18
Fluorene	0.17
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20

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AB# 1090074 DUCO STORES 5C

	ANALYTICAL RESULTS mg/kg
ndeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090645 DUCO STORES 5D

	ANALYTICAL RESULTS mg/kg
Lead, Total	33
TPH By Infra Red (418.1)	< 6.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.069
Xylenes	0.040
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.054
Acenaphthene	0.14
Fluorene	0.13
Phenanthrene	0.075
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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AB# 1090645 DUCO STORES 5D

	ANALYTICAL RESULTS ug/kg
ndeno(1,2,3-cd)pyrene	< 0.2

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AB# 1081190 DUCO STORES 6A

	ANALYTICAL RESULTS mg/kg
Lead, Total	13
:PH By Infra Red (418.1)	130
3ETX	
Benzene	0.98
Ethylbenzene	1.2
Toluene	3.0
Xylenes	3.0
610 POLYNUCLEAR AROMATICS	
Naphthalene	1.2
Acenaphthylene	0.88
Acenaphthene	0.56
Fluorene	0.83
Phenanthrene	0.66
Anthracene	0.35
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	< 0.1
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.1
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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1081190 DUCO STORES 6A

	ANALYTICAL RESULTS mg/kg
eno(1,2,3-cd)pyrene	< 0.2

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B# 1081191 DUCO STORES 6B

	ANALYTICAL RESULTS mg/kg
ead, Total	24
PH By Infra Red (418.1)	26
ETX	
enzene	0.26
thylbenzene	0.58
oluene	0.26
ylenes	7.0
10 POLYNUCLEAR AROMATICS	
aphthalene	1.6
cenaphthylene	1.3
cenaphthene	1.0
luorene	0.53
henanthrene	< 0.1
nthracene	0.26
luoranthene	< 0.1
yrene	< 0.1
enzo(a)anthracene	< 0.1
hrysene	< 0.1
enzo(b)fluoranthene	< 0.1
enzo(k)fluoranthene	< 0.1
enzo(a)pyrene	< 0.1
ibenzo(a,h)anthracene	< 0.2
enzo(ghi)perylene	< 0.2

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LAB# 1081191 DUCO STORES 6B

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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CAL REPORT# 14667

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LAB# 1090075 DUCO STORES 6C

	ANALYTICAL RESULTS mg/kg
Lead, Total	22
TPH By Infra Red (418.1)	< 5.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	< 0.040
Acenaphthene	0.12
Fluorene	0.088
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

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LAB# 1090075 DUCO STORES 6C

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090644 DUCO STORES 6D

	ANALYTICAL RESULTS mg/kg
Lead, Total	33
TPH By Infra Red (418.1)	< 6.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.058
Acenaphthene	0.15
Fluorene	0.12
Phenanthrene	0.078
Anthracene	< 0.04
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	< 0.04
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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LAB# 1090644 DUCO STORES 6D

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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CAL REPORT# 14528

AMPLE RECEIVED 08/23/91

LAB# 1081188 DUCO STORES 7A

	ANALYTICAL RESULTS mg/kg
Lead, Total	9.8
PH By Infra Red (418.1)	22
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.12
Xylenes	4.1
610 POLYNUCLEAR AROMATICS	
Naphthalene	1.2
Acenaphthylene	0.85
Acenaphthene	0.42
Fluorene	0.25
Phenanthrene	0.15
Anthracene	< 0.1
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	< 0.1
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.1
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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LAB# 1081188 DUCO STORES 7A

	ANALYTICAL RESULTS mg/kg
ndeno(1,2,3-cd)pyrene	< 0.2

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AB# 1081189 DUCO STORES 7B

	ANALYTICAL RESULTS mg/kg
Lead, Total	7.8
TPH By Infra Red (418.1)	450
BETX	
Benzene	< 0.01
Ethylbenzene	0.18
Toluene	0.18
Xylenes	1.4
610 POLYNUCLEAR AROMATICS	
Naphthalene	0.12
Acenaphthylene	0.13
Acenaphthene	< 0.1
Fluorene	< 0.1
Phenanthrene	< 0.1
Anthracene	0.56
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	< 0.1
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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LAB# 1081189 DUCO STORES 7B

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1090076 DUCO STORES 7C

	ANALYTICAL RESULTS mg/kg
Lead, Total	12
TPH By Infra Red (418.1)	6.2
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.040
Acenaphthylene	< 0.040
Acenaphthene	0.14
Fluorene	0.11
Phenanthrene	< 0.040
Anthracene	< 0.040
Fluoranthene	< 0.040
Pyrene	< 0.040
Benzo(a)anthracene	< 0.040
Chrysene	< 0.040
Benzo(b)fluoranthene	< 0.040
Benzo(k)fluoranthene	< 0.040
Benzo(a)pyrene	< 0.040
Dibenzo(a,h)anthracene	< 0.20
Benzo(ghi)perylene	< 0.20

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LAB# 1090076 DUCO STORES 7C

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.20

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LAB# 1090643 DUCO STORES 7D

	ANALYTICAL RESULTS mg/kg
Lead, Total	32
TPH By Infra Red (418.1)	< 6.0
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	< 0.01
Xylenes	< 0.01
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 0.04
Acenaphthylene	0.14
Acenaphthene	0.33
Fluorene	0.29
Phenanthrene	0.20
Anthracene	0.60
Fluoranthene	< 0.04
Pyrene	< 0.04
Benzo(a)anthracene	< 0.04
Chrysene	< 0.04
Benzo(b)fluoranthene	< 0.04
Benzo(k)fluoranthene	0.52
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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LAB# 1090643 DUCO STORES 7D

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1081186 DUCO STORES 8A

	ANALYTICAL RESULTS mg/kg
Lead, Total	22
TPH By Infra Red (418.1)	480
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.74
Xylenes	2.1
610 POLYNUCLEAR AROMATICS	
Naphthalene	1.8
Acenaphthylene	9.5
Acenaphthene	2.9
Fluorene	1.2
Phenanthrene	< 0.1
Anthracene	2.3
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	< 0.1
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.2
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	

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LAB# 1081186 DUCO STORES 8A

	ANALYTICAL RESULTS mg/kg
Indeno(1,2,3-cd)pyrene	< 0.2

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LAB# 1081187 DUCO STORES 8B

	ANALYTICAL RESULTS mg/kg
Lead, Total	22
PH By Infra Red (418.1)	2400
BETX	
Benzene	< 0.01
Ethylbenzene	< 0.01
Toluene	0.84
Xylenes	2.3
610 POLYNUCLEAR AROMATICS	
Naphthalene	29
Acenaphthylene	71
Acenaphthene	23
Fluorene	6.5
Phenanthrene	< 0.1
Anthracene	13
Fluoranthene	< 0.1
Pyrene	< 0.1
Benzo(a)anthracene	< 0.1
Chrysene	< 0.1
Benzo(b)fluoranthene	< 0.1
Benzo(k)fluoranthene	< 0.1
Benzo(a)pyrene	< 0.1
Dibenzo(a,h)anthracene	< 0.2
Benzo(ghi)perylene	< 0.2

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AB# 1081187 DUCO STORES 8B

	ANALYTICAL RESULTS mg/kg
ndeno(1,2,3-cd)pyrene	< 0.2

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B# 1090701 DUCO STORES DUCO FIELD BLANK

	ANALYTICAL RESULTS mg/l
ead, Total	< 0.12
PH By Infra Red (418.1)	< 6.0
	ug/l
ETX	< 1.0
enzene	< 1.0
thylbenzene	< 1.0
oluene	< 1.0
ylenes	
310 POLYNUCLEAR AROMATICS	
Naphthalene	< 4.0
Acenaphthylene	< 4.0
Acenaphthene	< 4.0
Fluorene	< 4.0
Phenanthrene	< 4.0
Anthracene	< 4.0
Fluoranthene	< 4.0
Pyrene	< 4.0
Benzo(a)anthracene	< 4.0
Chrysene	< 4.0
Benzo(b)fluoranthene	< 4.0
Benzo(k)fluoranthene	< 4.0
Benzo(a)pyrene	< 20
Dibenzo(a,h)anthracene	< 20
Benzo(ghi)perylene	

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B# 1090701 DUCO STORES DUCO FIELD BLANK

	ANALYTICAL RESULTS ug/l
ndeno(1,2,3-cd)pyrene	< 20

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CAL REPORT# 14855

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LB# 1090702 DUCO STORES BUILDING FIELD BLANK

	ANALYTICAL RESULTS mg/l
ead, Total	< 0.12
PH By Infra Red (418.1)	< 6.0
	ug/l
ETX	< 1.0
Benzene	< 1.0
Ethylbenzene	< 1.0
Toluene	< 1.0
Xylenes	
610 POLYNUCLEAR AROMATICS	
Naphthalene	< 4.0
Acenaphthylene	< 4.0
Acenaphthene	< 4.0
Fluorene	< 4.0
Phenanthrene	< 4.0
Anthracene	< 4.0
Fluoranthene	< 4.0
Pyrene	< 4.0
Benzo(a)anthracene	< 4.0
Chrysene	< 4.0
Benzo(b)fluoranthene	< 4.0
Benzo(k)fluoranthene	< 4.0
Benzo(a)pyrene	< 20
Dibenzo(a,h)anthracene	< 20
Benzo(ghi)perylene	

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AB# 1090702 DUCO STORES BUILDING FIELD BLANK

	ANALYTICAL RESULTS ug/l
Indeno(1,2,3-cd)pyrene	< 20

AL

Canton Analytical Laboratory, Inc.
1 Anchor Court Plymouth, Michigan 48170
(313) 459-8484 FAX (313) 459-8262

№ 1537

CHAIN OF CUSTODY RECORD

NO./PO. NO.	PROJECT NAME: GM "Duco Stalls"
SAMPLERS (SIGNATURE): Dan Vaney	

NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO OF CONT.	REMARKS
	8/23/91	9:50		X	8a	3	
	8/23/91	10:05		X	8b	3	
	8/23/91	10:10		X	7a	3	
	8/23/91	10:20		X	7b	3	
	8/23/91	11:30		X	6a	3	
	8/23/91	10:40		X	6b	3	
	8/23/91	10:50		X	5a	3	
	8/23/91	11:00		X	5b	3	
	8/23/91	11:10		X	4a	3	
	8/23/91	11:20		X	4b	3	
	8/23/91	12:20		X	NE PILE	3	
	8/23/91	12:40		X	NE - MIDDLE	3	
	8/23/91	12:50		X	BP - CENTER	3	
	8/23/91	1:00		X	N - CENTER	3	
	8/23/91	1:10		X	NW	3	
	8/23/91	11:20		X	SW	3	
	8/23/91	1:30		X	SE	3	

Composite samples will appear on separate report.

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
E. Wyink	8/23/91 1:51p	Dan Vaney		3:15p 8-23-91	
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
RELINQUISHED BY:	DATE/TIME	RECEIVED FOR LABORATORY BY:	REMARKS:		CUSTODY #

YELLOW: FILE COPY

CAL

Canton Analytical Laboratory, Inc.
47801 Anchor Court Plymouth, Michigan 48170
(313) 459-8484 FAX (313) 459-8262

№ 1539

CHAIN OF CUSTODY RECORD

PROJ. NO./PO. NO.

PROJECT NAME: Duco Stores — GM truck / BUS

SAMPLERS (SIGNATURE):

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONT.	REMARKS
	9/3	9:20		✓	2C	3	
	9/3	9:30			3C	3	
	9/3	9:50			4C	3	
	9/3	10:10			5C	3	
	9/3	10:30			6C	3	
	9/3	10:48			7C	3	

RELINQUISHED BY: — DATE/TIME: 9/3 11:00 AM — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED FOR LABORATORY BY:

RELINQUISHED BY: — DATE/TIME: 9/3 3:21 pm — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

REMARKS:

CUSTODY #

APPENDIX B

SOIL PILE SAMPLE RESULTS

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090666 DUCO STORES COMPOSITE OF SW & NW

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.1	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.34	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	< 0.12	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.47	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.63	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	< 0.02	5.0
Copper, TCLP, mg/l	0.02	100.0
Lead, TCLP, mg/l	< 0.12	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

** ARE NOT SPIKE-

AMPLE RECEIVED 09/16/91

LAB# 1090666 DUCO STORES COMPOSITE OF SW & NW

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	1.1	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	0.0030	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	< 0.005	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	0.006	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.044	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

AMPLE RECEIVED 09/16/91

AB# 1090666 DUCO STORES COMPOSITE OF SW & NW

	ANALYTICAL RESULTS	REGULATORY LIMIT
yridine, mg/l	< 0.5	5.0
CID EXTRACTS, TCLP**		
,O,P Cresol, mg/l	< 0.005	200.0
entachlorophenol, mg/l	< 0.005	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.50	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090667 DUCO STORES COMPOSITE OF NE PILE, NE MID. & N CENTER

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.3	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.22	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	0.14	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.03	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.50	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	< 0.02	5.0
Copper, TCLP, mg/l	0.02	100.0
Lead, TCLP, mg/l	< 0.12	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090667 DUCO STORES COMPOSITE OF NE PILE, NE MID. & N CENTER

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.09	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	0.008	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.012	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090667 DUCO STORES COMPOSITE OF NE PILE, NE MID. & N CENTER

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	< 0.005	200.0
Pentachlorophenol, mg/l	< 0.005	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.50	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

AMPLE RECEIVED 09/16/91

AB# 1090668 DUCO STORES COMPOSITE OF TOP CENTER & SE

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.3	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.24	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	< 0.12	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.05	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.55	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	< 0.02	5.0
Copper, TCLP, mg/l	0.03	100.0
Lead, TCLP, mg/l	< 0.12	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

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LAB# 1090668 DUCO STORES COMPOSITE OF TOP CENTER & SE

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.09	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	0.011	0.5
Hexachlorobenzene, mg/l	0.007	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.030	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

**TCLP RESULTS ARE NOT SPIKE-

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CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090668 DUCO STORES COMPOSITE OF TOP CENTER & SE

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	0.007	200.0
Pentachlorophenol, mg/l	< 0.005	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.005	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

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LAB# 1090664 DUCO STORES COMPOSITE #1, #9 & #10

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.2	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.17	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	< 0.12	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.02	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.42	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	0.03	5.0
Copper, TCLP, mg/l	0.02	100.0
Lead, TCLP, mg/l	0.26	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

**TCLP RESULTS ARE NOT SPIKE-

SAMPLE RECEIVED 09/16/91

LAB# 1090664 DUCO STORES COMPOSITE #1, #9 & #10

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	0.03	5.0
Zinc, TCLP, mg/l	0.06	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	0.026	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	< 0.005	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	< 0.005	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

**TCLP RESULTS ARE NOT SPIKE-

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CAL REPORT# 14855

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1090664 DUCO STORES COMPOSITE #1, #9 & #10

	ANALYTICAL RESULTS	REGULATORY LIMIT
idine, mg/l	< 0.5	5.0
D EXTRACTS, TCLP**		
,P Cresol, mg/l	< 0.005	200.0
tachlorophenol, mg/l	< 0.50	100.0
,5-Trichlorophenol, mg/l	< 0.005	400.0
,6-Trichlorophenol, mg/l	< 0.005	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

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LAB# 1090665 DUCO STORES COMPOSITE #2 & #8

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.2	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.29	100.0
mium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	< 0.12	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.06	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.57	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	0.02	5.0
opper, TCLP, mg/l	0.02	100.0
Lead, TCLP, mg/l	0.25	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

ECLP RESULTS ARE NOT SPIKE-

AMPLE RECEIVED 09/16/91

AB# 1090665 DUCO STORES COMPOSITE #2 & #8

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.10	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	< 0.005	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.024	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

- RESULTS ARE NOT SPIKE-

SAMPLE RECEIVED 09/16/91

LAB# 1090665 DUCO STORES COMPOSITE #2 & #8

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	< 0.005	200.0
Pentachlorophenol, mg/l	< 0.50	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.005	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

SAMPLE RECEIVED 09/16/91

LAB# 1090662 DUCO STORES COMPOSITE OF #3 & #4

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.0	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.25	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	0.19	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	0.02	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.50	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	0.02	5.0
Copper, TCLP, mg/l	0.02	100.0
Lead, TCLP, mg/l	0.27	5.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

... NOT SPIKE-

SAMPLE RECEIVED 09/16/91

LAB# 1090662 DUCO STORES COMPOSITE OF #3 & #4

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.07	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Cl robenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	0.040	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.096	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

**TCLP RESULTS ARE NOT SPIKE-

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090662 DUCO STORES COMPOSITE OF #3 & #4

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	0.005	200.0
Pentachlorophenol, mg/l	< 0.50	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	0.018	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

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SAMPLE RECEIVED 09/16/91

LAB# 1090663 DUCO STORES COMPOSITE OF #5, #6 & #7

	ANALYTICAL RESULTS	REGULATORY LIMIT
Corrosivity, pH Units	8.2	< 2,>12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	VARIABLE
as Sulfide, mg/kg	< 0.5	VARIABLE
Ignitibility, Deg. F	> 200 * N	< 140 F
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.16	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0
Copper, EP Tox., mg/l	< 0.02	100.0
Chromium, Tot., EP Tox, mg/l	< 0.02	5.0
Lead, EP Tox., mg/l	0.18	5.0
Mercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
Silver, EP Tox., mg/l	< 0.03	5.0
Zinc, EP Tox., mg/l	< 0.01	500.0
TCLP, DNR METALS**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.40	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	0.03	5.0
Copper, TCLP, mg/l	0.03	100.0
Lead, TCLP, mg/l	0.24	5.0

*YES/NO, CAPACITY TO SUSTAIN [illegible] AFTER BEING FLAMED.

SAMPLE RECEIVED 09/16/91

LAB# 1090663 DUCO STORES COMPOSITE OF #5, #6 & #7

	ANALYTICAL RESULTS	REGULATORY LIMIT
Mercury, TCLP, mg/l	< 0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	< 0.03	5.0
Zinc, TCLP, mg/l	0.04	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	0.016	0.5
Hexachlorobenzene, mg/l	< 0.005	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.022	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5

... RESULTS ARE NOT SPIKE-

GM TRUCK AND BUS GROUP
CAL REPORT# 14855

SAMPLE RECEIVED 09/16/91

LAB# 1090663 DUCO STORES COMPOSITE OF #5, #6 & #7

	ANALYTICAL RESULTS	REGULATORY LIMIT
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	0.007	200.0
Pentachlorophenol, mg/l	< 0.50	100.0
2,4,5-Trichlorophenol, mg/l	0.013	400.0
2,4,6-Trichlorophenol, mg/l	< 0.005	2.0

**TCLP RESULTS ARE NOT SPIKE-RECOVERY CORRECTED.

GM TRUCK AND BUS GROUP
CAL REPORT# 14666

SAMPLE RECEIVED 09/03/91

LAB# 1090070 COMPOSITE OF LAYER 1 (10 LOCATIONS) AND LAYER 2 (10 LOCATIONS)

	ANALYTICAL RESULTS	REGULATORY LIMIT
TCLP RCRA**		
Ignitibility, Deg. F	> 200 *N	< 140 F
Corrosivity, pH Units	7.9	<2, >12.5
REACTIVITY		
As Cyanide, mg/kg	< 0.05	Variable
as Sulfide, mg/kg	< 0.5	Variable
10 DNR METALS, TCLP**		
Arsenic, TCLP, mg/l	< 0.40	5.0
Barium, TCLP, mg/l	0.64	100.0
Cadmium, TCLP, mg/l	< 0.01	1.0
Chromium, TCLP, mg/l	0.05	5.0
Copper, TCLP, mg/l	0.06	100.0
Lead, TCLP, mg/l	< 0.12	5.0
Mercury, TCLP, mg/l	0.002	0.2
Selenium, TCLP, mg/l	< 0.020	1.0
Silver, TCLP, mg/l	0.09	5.0
Zinc, TCLP, mg/l	0.16	500.0
TCLP ORGANICS, W/O HERB/PEST		
ZHE ORGANICS FOR TCLP RCRA**		
Benzene, mg/l	< 0.002	0.5
Carbon Tetrachloride, mg/l	< 0.002	0.5
Chlorobenzene, mg/l	< 0.002	100.0
Chloroform, mg/l	< 0.002	6.0

*YES/NO, CAPACITY TO SUSTAIN BURNING AFTER BEING FLAMED.

SAMPLE RECEIVED 09/03/91

LAB# 1090070 COMPOSITE OF LAYER 1 (10 LOCATIONS) AND LAYER 2 (10 LOCATIONS)

	ANALYTICAL RESULTS	REGULATORY LIMIT
1,2-Dichloroethane, mg/l	< 0.002	0.5
1,1-Dichloroethene, mg/l	< 0.002	0.7
Methyl Ethyl Ketone, mg/l	< 0.02	200.0
Tetrachloroethene, mg/l	< 0.002	0.7
Trichloroethene, mg/l	< 0.002	0.5
Vinyl chloride, mg/l	< 0.05	0.2
BASE NEUTRALS, TCLP**		
Hexachlorobutadiene, mg/l	< 0.005	0.5
Hexachlorobenzene, mg/l	0.027	0.13
2,4-Dinitrotoluene, mg/l	< 0.005	0.13
Hexachloroethane, mg/l	< 0.020	3.0
Nitrobenzene, mg/l	0.062	2.0
1,4-Dichlorobenzene, mg/l	< 0.005	7.5
Pyridine, mg/l	< 0.5	5.0
ACID EXTRACTS, TCLP**		
M,O,P Cresol, mg/l	< 0.005	200.0
Pentachlorophenol, mg/l	< 4.0	100.0
2,4,5-Trichlorophenol, mg/l	< 0.005	400.0
2,4,6-Trichlorophenol, mg/l	< 0.005	2.0
EP TOX, DNR METALS		
Arsenic, EP Tox., mg/l	< 0.40	5.0
Barium, EP Tox., mg/l	0.23	100.0
Cadmium, EP Tox., mg/l	< 0.01	1.0

AMPLE RECEIVED 09/03/91

LAB# 1090070 COMPOSITE OF LAYER 1 (10 LOCATIONS) AND LAYER 2 (10 LOCATIONS)

	ANALYTICAL RESULTS	REGULATORY LIMIT
opper, EP Tox., mg/l	< 0.02	100.0
hromium, Tot., EP Tox, mg/l	< 0.02	5.0
ead, EP Tox., mg/l	< 0.12	5.0
ercury, EP Tox., mg/l	< 0.002	0.2
Selenium, EP Tox., mg/l	< 0.020	1.0
ilver, EP Tox., mg/l	0.04	5.0
Zinc, EP Tox., mg/l	< 0.01	500.0
ERBICIDES, TCLP**		
,4-D, mg/l	< 0.02	10.0
2,4,5-TP (Silvex), mg/l	< 0.02	1.0
ESTICIDES, TCLP**		
Chlordane, mg/l	< 0.003	0.03
eptachlor Epoxide, mg/l	< 0.0008	0.008
ndrin, mg/l	< 0.002	0.02
gamma-BHC (Lindane), mg/l	< 0.0008	0.4
ethoxychlor, mg/l	< 0.010	10.0
Toxaphene, mg/l	< 0.040	0.5
eptachlor, mg/l	< 0.0008	0.008

**TCLP RESULTS ARE SPIKE-

GM TRUCK AND BUS GROUP
CAL REPORT# 14947

SAMPLE RECEIVED 09/19/91

LAB# 1090990 DUCO STORES OIL NORTH END

	ANALYTICAL RESULTS mg/l
HYDROCARBONS	
Fuel Oil / Diesel Fuel	5000 *
Gasoline	< 10
Kerosine	< 10
Hydrocarbons, Total	5000

*This unidentifiable heavy hydrocarbon pattern resembled fuel oil.

AL

Canton Analytical Laboratory, Inc.
301 Anchor Court Plymouth, Michigan 48170
(313) 459-8484 FAX (313) 459-8262

№ 1537

CHAIN OF CUSTODY RECORD

PROJECT NO./PO. NO.: | PROJECT NAME: GM "Duco Stores"

SAMPLERS (SIGNATURE): Dan Vaney

LAB NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONT.	REMARKS
8a	8/23/91	9:50		X	8a	3	
8b	8/23/91	10:00		X	8b	3	
7a	8/23/91	10:10		X	7a	3	
7b	8/23/91	10:20		X	7b	3	
6a	8/23/91	10:30		X	6a	3	
6b	8/23/91	10:40		X	6b	3	
5a	8/23/91	10:50		X	5a	3	
5b	8/23/91	11:00		X	5b	3	
4a	8/23/91	11:10		X	4a	3	
4b	8/23/91	11:20		X	4b	3	
NE PILE	8/23/91	12:20		X	NE PILE	3	Composite samples will appear on separate report.
NE-MIDDLE	8/23/91	12:40		X	NE - MIDDLE	3	
TOP-CENTER	8/23/91	12:50		X	TOP - CENTER	3	
N-CENTER	8/23/91	1:00		X	N - CENTER	3	
NW	8/23/91	1:10		X	NW	3	
SW	8/23/91	1:20		X	SW	3	
SE	8/23/91	1:30		X	SE	3	

RELINQUISHED BY: C. E. Uyink	DATE/TIME: 8/23/91 1:35p	RECEIVED BY: Dan Vaney	RELINQUISHED BY:
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	RELINQUISHED BY:
RELINQUISHED BY:	DATE/TIME	RECEIVED FOR LABORATORY BY:	REMARKS:

DATE/TIME: 3:15p 8-23-91 | RECEIVED BY:

DATE/TIME | RECEIVED BY:

CUSTODY #

WHITE: ACCOMPANIES SHIPMENT YELLOW: FILE COPY

CAL

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№ 1539

CHAIN OF CUSTODY RECORD

PROJ. NO./P.O. NO.

PROJECT NAME: Duco Stores — GM truck / BUS

SAMPLERS (SIGNATURE): Mary Schrader / Dan Dayer

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONT.	REMARKS
	9/3	9:20		✓	2C	3	
	9/3	9:30			3C	3	
	9/3	9:50			4C	3	
	9/3	10:10			5C	3	
	9/3	10:30			6C	3	
	9/3	10:48			7C	3	

RELINQUISHED BY: [signature] — DATE/TIME: 9/3 11:00 AM — RECEIVED BY: Mary Schrader

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

RELINQUISHED BY: — DATE/TIME: — RECEIVED FOR LABORATORY BY:

RELINQUISHED BY: Mary Schrader — DATE/TIME: 9/3 3:24 pm — RECEIVED BY: [signature]

RELINQUISHED BY: — DATE/TIME: — RECEIVED BY:

REMARKS:

CUSTODY #

YELLOW FILE COPY

APPENDIX H.3

DUCO STORES STUDY AREA REPORT

DUCO STORES STUDY AREA

FINAL REPORT

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

MAY 1994

REF. NO. 5770 (6)

This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding soils associated with the former underground storage tank (UST) area near the DUCO Stores Building (Study Area) at the GM Facility.

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for DUCO Stores is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the DUCO Stores UST area with regards to the outstanding environmental issues identified by GM and to present the results of additional investigations and remedial activities conducted to resolve outstanding issues.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area were the result of the operation of an underground storage tank (UST) system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g., final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmentally contaminated sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Following the Facility closure, USTs which were no longer in service were removed from the Facility. Benzene, toluene, ethylbenzene and xylene (BTEX) and polynuclear aromatic hydrocarbons (PNAs) were identified at concentrations above regulatory levels in confirmatory samples collected from the area of the USTs removed at DUCO Stores. These constituents were reported to the Michigan State Police - Fire Marshall Division (MSP - FMD) office, and remedial actions were initiated, in accordance with LUST requirements.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g., sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This section presents a summary of available information from GM files regarding the DUCO Stores UST Study Area.

3.1 HISTORY OF DUCO STORES UST FARM

The DUCO Stores UST area of the Facility consisted of eight steel tanks, installed in 1927 when the plant was originally constructed. Available information regarding tank construction and contents is provided below. The tanks were numbered one to eight from south to north.

DUCO Stores UST Data

Tank No.	*Material*	*Tank Mat'l*	*Tank Size (gallons)*	*Year Installed*	*Pipe Mat'l*	*Pipe Buried*
1	Gasoline	Steel	12,000	1927	Steel	No
2	Gasoline	Steel	12,000	1927	Steel	No
3	RR End Lube	Steel	12,000	1927	Steel	No
4	Glycol	Steel	12,000	1927	Steel	No
5	Axle Oil 80w90	Steel	12,000	1927	Steel	No
6	#1 Diesel	Steel	12,000	1927	Steel	No
7	#1 Diesel	Steel	12,000	1927	Steel	No
8	#1 Diesel	Steel	12,000	1927	Steel	No

On February 2, 1990 gasoline odors were detected in the Pontiac Central Power House (located to the south of DUCO stores). The source was found to be gasoline which was infiltrating a 12 inch diameter sanitary sewer line which drains northerly from the power house through Building 34. This sanitary sewer runs immediately to the west of the former DUCO Stores UST area.

A pneumatic plug was inserted in the sewer line south of Building 34, and the sewer contents removed, as necessary, by vacuum tanker truck.

In May 1990, a second gasoline release was discovered near the DUCO Stores tank farm. The gasoline was discovered infiltrating into a storm sewer which was located near the Study Area. The sewer was plugged and sewer contents collected through the use of a vacuum tanker truck.

In order to further define the extent of the gasoline plume, GM retained Northeast Research Institute, Inc. (NERI) to perform a soil gas survey of the area in June 1990. The survey consisted of a grid of 53 sample points, installed to a depth of approximately 18 inches bgs, which covered the DUCO Stores UST area, the hazardous material handling storage pad and loading area. The findings of the soil gas survey were presented to GM by NERI in a September 19, 1990 report entitled "Final Report on the Findings of the Petrex Soil Gas Survey Conducted for the General Motors Truck and Bus Group at the DUCO Stores Tank Farm Site in Pontiac Michigan" (NERI, 1990).

The following conclusions were made regarding soil vapors in the DUCO Stores Study Area:

- compounds typically found in gasoline were identified in soil vapors. Concentrations indicted that the likely source was the gasoline tanks in DUCO Stores, near Building 21; and

- a plume of oil constituents (likely from medium grade oil) was identified. Its source was identified as being in the DUCO Stores UST area, based on concentration data.

Between August 20, 1991 and August 29, 1991 the eight tanks were excavated and removed from the area. During the UST removals, visible evidence of a release was not observed. Therefore, the excavation was sampled to satisfy the site assessment requirements of the MSP-FMD UST rules on permanent UST closures. The results of the site assessment are discussed below.

On September 5, 1991, prior to receipt of the analytical data from the site assessment, diesel fuel was observed to be seeping into the

excavation at the north end. The MSP-FMD was notified and corrective actions to recover the diesel fuel were implemented immediately. Approximately 100 gallons of diesel fuel was recovered before seepage ceased.

On September 20, 1991, an initial abatement (20-Day) report was submitted to the MDNR detailing the abatement measures taken subsequent to the diesel release. These measures included the immediate implementation of a plan to recover the diesel fuel from the excavation floor. A 45-Day report was prepared and submitted to the MDNR by Maecorp Incorporated (Maecorp) on August 14, 1991.

The locations of confirmatory samples obtained by Maecorp to satisfy the site assessment requirements of the MSP-FMD UST rules are presented in Appendix A. Confirmatory sampling was conducted on soils at the base and on the side walls of the open excavation. Samples labeled A and B were obtained from the side walls. Samples labeled C and D were obtained from the excavation base. The analytical results of this sampling are also presented in Appendix A.

The results of the confirmatory analytical data were compared with Act 307 Type B direct contact criteria. Due to the significant depth to the first aquifer (approximately 120 feet) and the impermeable nature of the clay soils, the 20x drinking water criteria was considered to be inappropriate.

Only five of the thirty six confirmatory samples reported concentrations of benzene or PNAs which were above the Type B direct contract criteria. Table 3.1 summarizes the results of the exceedances. These samples included 4A and 5A from the west excavation wall, samples 4B and 5B from the east wall and sample 7D from the base or floor of the excavation. The exceeded parameters included benzene, benzo(a)anthracene and chrysene. Benzene was exceeded in sample 4A. Chrysene was exceeded in Sample 4B. Benzo(a)anthracene criteria was exceeded in each of the five samples indicated on Table 3.1.

With respect to Type C criteria (MDNR Industrial Cleanup criteria), only benzo(a)anthracene was exceeded in Sample 4B, by an insignificant margin.

Further excavation of the east and west walls was not possible due to the location of existing structures, including; buildings, concrete sewers and a concrete storage pad. Additional excavation of the base of the excavation at location 7D was conducted, and is reported in Section 6.0 of this report.

3.2 PAST REMEDIAL ACTIVITIES

Following the receipt of analytical results from composite samples collected from the soil pile, M.L. Chartier was contracted to perform thermal treatment of the excavated soils. Thermal treatment of soils excavated from the DUCO Stores area was performed. The soils were characterized following treatment and certified by M.L. Chartier as being clean. Approximately 3,000 cubic yards of soil from DUCO Stores was treated by M.L. Chartier. This material was stockpiled on-Site. Further excavation of the DUCO Stores area was not possible due to the presence of structures on the east and west sides of the excavation.

3.3 HYDROGEOLOGY

During removal activities, perched groundwater was encountered at a depth of approximately 20 feet bgs. This groundwater likely collected within the porous fill material surrounding the USTs and was confined by the low permeability clay soils surrounding the area.

4.0 ADDITIONAL INVESTIGATIVE ACTIVITIES

To further define the nature and extent of the residual soil contamination and geology at the DUCO Stores area, six boreholes were installed on January 5-6, 1994. These boreholes were completed to a depth of approximately 20 feet bgs. BHDS-1-94, -2-94, -3-94, and -4-94 were installed approximately 10 feet west of the western limit of excavation while BHDS-5-94 and BHDS-6-94 were installed east of the eastern wall of the excavation north of Building 21. The locations of these boreholes are identified on Figure 4.1.

Samples were collected from each borehole in the intervals 8 to 10 feet and 18 to 20 feet bgs for chemical analysis. All samples were analyzed for BTEX and PNAs. Samples were obtained using a standard 2-inch inside diameter split-spoon sampler. Soil recovered using the split-spoon sampler was sampled using clean sampling equipment and placed in laboratory supplied clean sample jars. Sample jars were shipped to IEA Laboratories in coolers at 4°C, and analyzed for BTEX and PNAs.

Additional samples for verification of soil remediation from the base of the excavation could not be obtained at the time due to the size and depth of the excavation and the presence of frozen water within the excavation.

5.0 EVALUATION OF RESULTS

5.1 GEOLOGY

The following description of the geology in the DUCO Stores Study Area was prepared based on the stratigraphic logs from the six boreholes completed by CRA. The logs are presented in Appendix A of this report.

The concrete pad within the Study Area has a thickness of approximately 10 inches. The concrete pad is underlain by approximately 2 feet of sand and gravel fill (e.g., engineering fill). A layer of stiff brown to gray clay, with some silt and sand extends to 8 feet bgs. A brown sand layer with clay and silt exists approximately between 8 and 12 feet bgs. A moist gray clay with traces of sand and silt extends below the sand layer at least to a depth of 20 feet bgs. This material exists at the base of the excavation as observed during excavation base sampling activities. Boreholes were not extended below 20 feet bgs.

Groundwater was not encountered during the installation of the six boreholes by CRA.

5.2 ANALYTICAL RESULTS

Two split spoon samples for chemical analysis were obtained from each of the six boreholes installed in the DUCO Stores Study Area at the intervals 8-10 and 18-20 feet bgs. All samples were analyzed for BTEX and PNAs and the results compared to the regulatory levels presented in Table 5.1. The analytical results, data validation memoranda and chain of custody forms are presented in Appendix B and summarized in Table 5.2. A discussion of the analytical results is presented below.

BTEX constituents were detected at varying levels in soil samples collected from the boreholes installed by CRA. The detected concentrations of BTEX constituents were generally low with the exception of

samples collected from BHDS-4-94 and BHDS-6-94 at the 8 to 10 feet bgs interval which contained the following levels of BTEX.

Compound	*Units*	*BHDS-4-94 (8' - 10')*	*BHDS-6-94 (8' - 10')*	*Type B Direct Contact*
benzene	µg/kg	1,800	2,700	13,000
toluene	µg/kg	12,000	28,000	17,000,000
ethylbenzene	µg/kg	4,400	21,000	7,500,000
xylene	µg/kg	70,000	16,000	86,000,000

These levels are below the Michigan Type B direct contact criteria (appropriate for Sites with no groundwater).

PNAs were not detected in the samples collected from the 18 to 20 feet bgs interval or sample BHDS-1-94, 8 to 10 feet bgs. Fluoranthene was detected in samples from the 8 to 10 feet bgs interval in BHDS-3-94, -5-94 and -6-94 at concentrations of 370, 800 and 6,300/7,600 (duplicate sample) µg/kg, respectively. Anthracene was detected in sample BHDS-6-94, 8 to 10 feet bgs at 900 µg/kg. Fluorene was detected in BHDS-6-94 and BHDS-2-84 in the 8 to 10 feet bgs interval at concentrations of 1,400 and 760 µg/kg, respectively. Naphthalene was detected in the 8 to 10 feet bgs interval in BHDS-2-94, -3-94, -4-94, -5-94 and -6-94 at concentrations of 2,700, 3,900/3,700, 5,300/5,600, 2,200 and 3,600/4,500 µg/kg, respectively. Phenanthrene was detected in the 8 to 10 feet bgs interval is BHDS-2-94, -5-94 and -6-94 at concentrations of 1,000, 400 and 3,600/5,100 µg/kg, respectively. The detected concentrations of PNA constituents in the DUCO Stores Study Area are all below the Michigan Type B direct contact criteria for soils.

The results of the additional investigation indicate that the exceedances of Type B direct contact criteria at confirmatory sample locations 4A, 4B, 5A and 5B reported by Maecorp Inc. (Appendix A) are limited in extent to the area near the excavation. Figure 5.1 presents the locations of the confirmatory samples and the additional boreholes. Since the BTEX or PNA parameters did not exceed the Type B direct contact criteria at

the boreholes, the exceedences which were identified at 4A, 4B, 5A and 5B are limited to the area near the excavation.

As discussed in Section 3.0, only one parameter in sample 4B exceeded the MDNR Type C Industrial Cleanup Criteria. This exceedance was for benzo(a)anthracene at a concentration of 2.5 µg/kg, which is not significantly above the 2.1 mg/kg Type C criteria.

As such, based on the limited extent of the soils which exceed the Type B criteria, and the fact that the soils do not exceed Type C criteria, it is considered that additional remedial activities on the walls of the excavation are not necessary. It is also noted that due to the existing structures, including; buildings, sewers and a concrete storage pad, extension of the excavation laterally is not possible.

6.0 ADDITIONAL REMEDIAL ACTIVITIES

Figure 6.1 indicates the extent of the additional remedial activities conducted at the base of the excavation.

The base of the north end of the excavation was extended downward an additional 2 feet. In order to facilitate this additional excavation, water ponded at the base was first removed. Three confirmatory samples were obtained by CRA (CS-001, CS-002 and CS-003) at the locations presented on Figure 6.1. Sample CS-001 was obtained near the location of Sample 7D which exceeded the Type B criteria. Samples CS-002 and CS-003 were obtained at random locations. The samples were placed in laboratory supplied jars and submitted for BTEX and PNA analysis.

The results of the analyses of the CRA samples are presented on Table 6.1. In summary, all parameters were reported to be below the detection limits and therefore are below the Type B criteria. As a result, all of the base of the excavation meets the Type B criteria.

Based on the results of the analyses, GM backfilled the excavation using clean clay earth fill materials.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented herein, the following conclusions may be made regarding the area of the former DUCO Stores USTs:

- Eight 12,000-gallon USTs were removed from the DUCO Stores UST area between August 20-29, 1991. The tanks were identified to be in good condition upon removal;

- There have been two documented gasoline releases (February 1990 to sanitary sewer, and May 1990 to storm sewer) and one documented diesel fuel release (September 5, 1991, free product in excavation). Abatement measures were taken at the time of each release to contain and remove the fuel which was identified;

- Approximately 3,000 cubic yards of excavated soils were thermally treated and used as backfill at Building 29 or stockpiled near Building 29;

- Relatively low residual levels of BTEX and PNAs exist in the east and west sidewalls of the excavation. Some parameters exceed the Type B criteria, but no parameters exceed the Type C criteria significantly. These soils were found to be limited in extent to near the excavation, by a borehole investigation;

- The soils in the Study Area are predominantly clay till with an unsaturated sand and silt layer of varying thickness from approximately 8 to 13 feet bgs;

- As groundwater was not encountered in any of the boreholes and a layer of clay till approximately 100 feet thick exists between the floor of the excavation the uppermost sand aquifer (120-foot aquifer), the most appropriate cleanup criteria are the Type B and Type C direct contact values for soil;

- Based on the analytical data obtained from samples collected from CRA boreholes and excavation floor samples, the extent of contamination has been adequately defined. East and west sidewall soils which exceed Type B criteria are limited in extent and west concentration. All samples are within the requirements of the Type C criteria; and

- Additional confirmatory samples are not required from the floor of the excavation as the confirmatory sampling of the excavation floor performed by CRA on April 22, 1994 and previous (September 1991) sampling, indicates that the excavation floor has no residual BTEX or PNAs at levels exceeding Type B direct contact values.

The information provided herein is sufficient to obtain final closure of the DUCO Stores Study Area.

Based on the foregoing, no additional investigation or remediation is required or warranted.

8.0 REFERENCES

1. Phase I Site Assessment Report, W. W. Engineering & Science (WWES), June 1993

2. Phase II Site Investigation Report, W. W. Engineering & Science (WWES), June 1993

3. Site Characterization Report - DUCO Stores Area, Maecorp Incorporated, October 14, 1991

4. Final Report on the Findings of the Petrex Soil Gas Survey Conducted for the General Motors Truck and Bus Group at the Duco Stores Tank Farm Site, Northeast Research Institute (NERI), Inc., September 19, 1990

5. Site photos, June 1, 1992

6. Letter to Gerald King (GM) from Paul Herrington (NERI) re: results of the soil gas study, July 16, 1990

7. Enrolled Senate Bill No. 645, State of Michigan, October 1993

8. Enrolled Senate Bill No. 644, State of Michigan, October 1993

9. Enrolled House Bill No. 4783, State of Michigan, October 1993

10. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

11. MERA Operational Memorandum #8, Revision 2 - Type B Criteria, July 16, 1993

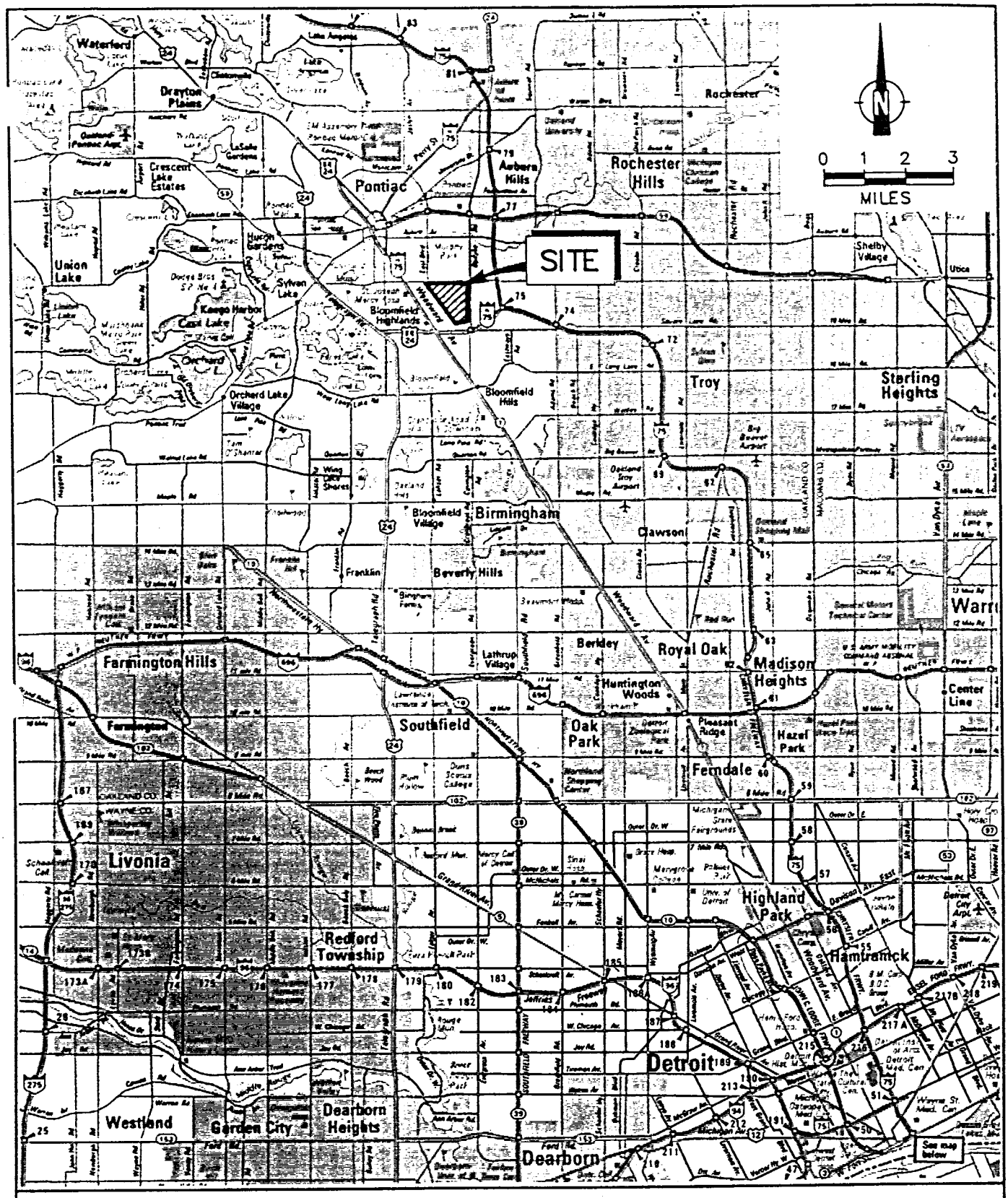
12. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

13. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

14. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

15. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

16. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



CRA

5770 (6) DEC 17/93 (W) REV.0

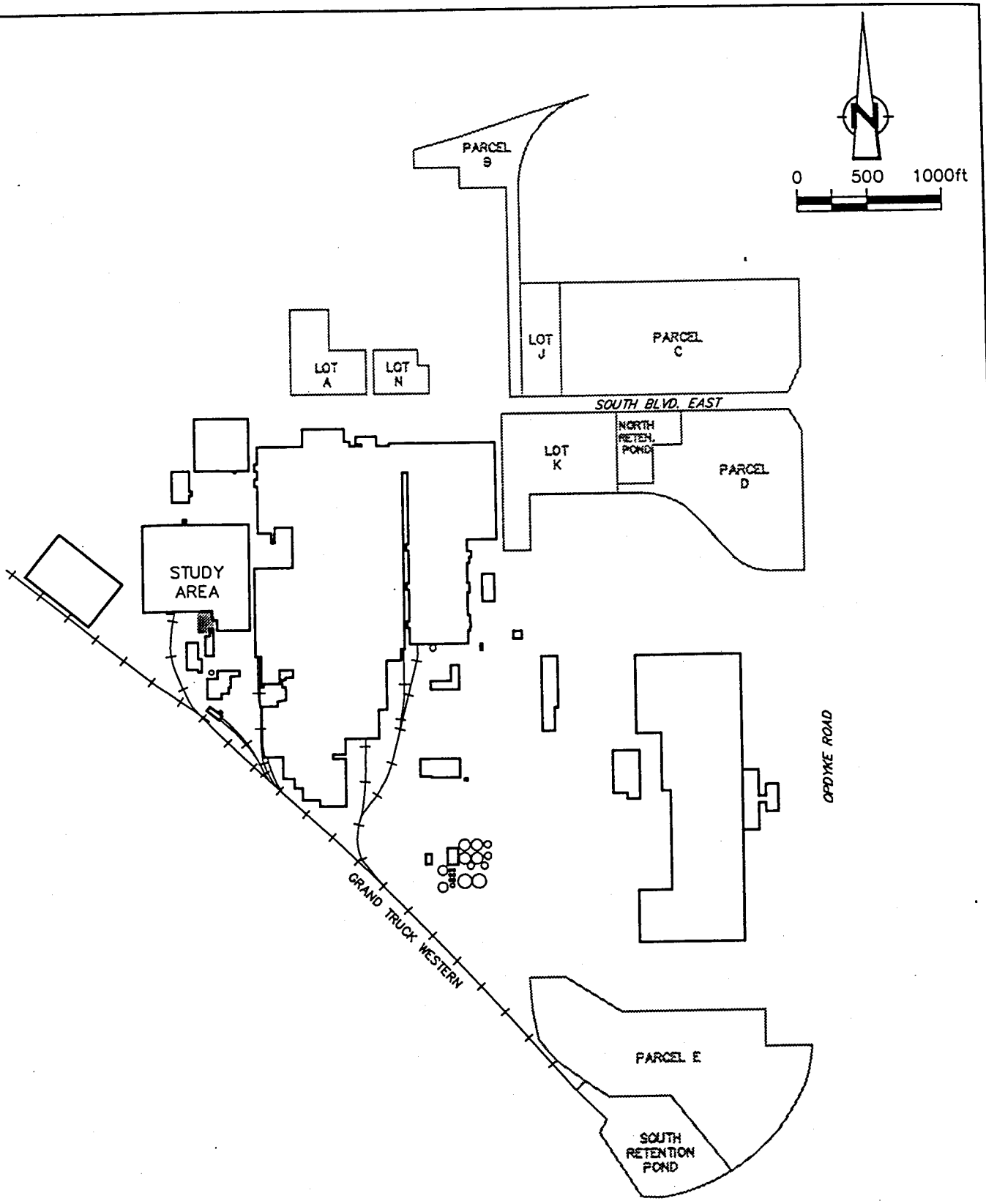


figure 1.2

SITE PLAN
DUCO STORES – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (6) JAN 07/94(W) REV.0 (P-13)

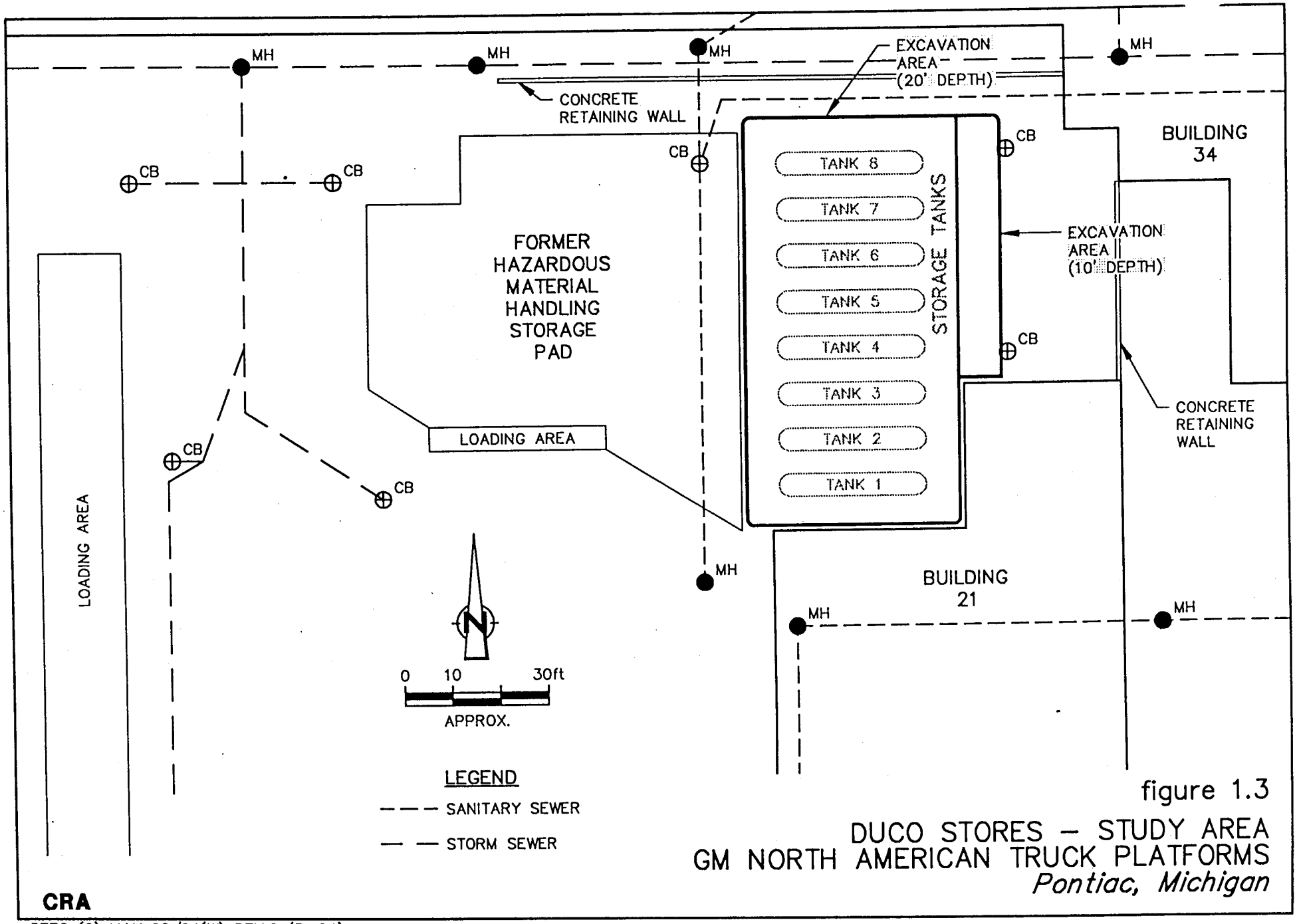


figure 1.3

DUCO STORES – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (6) MAY 26/94(W) REV.0 (P-04)

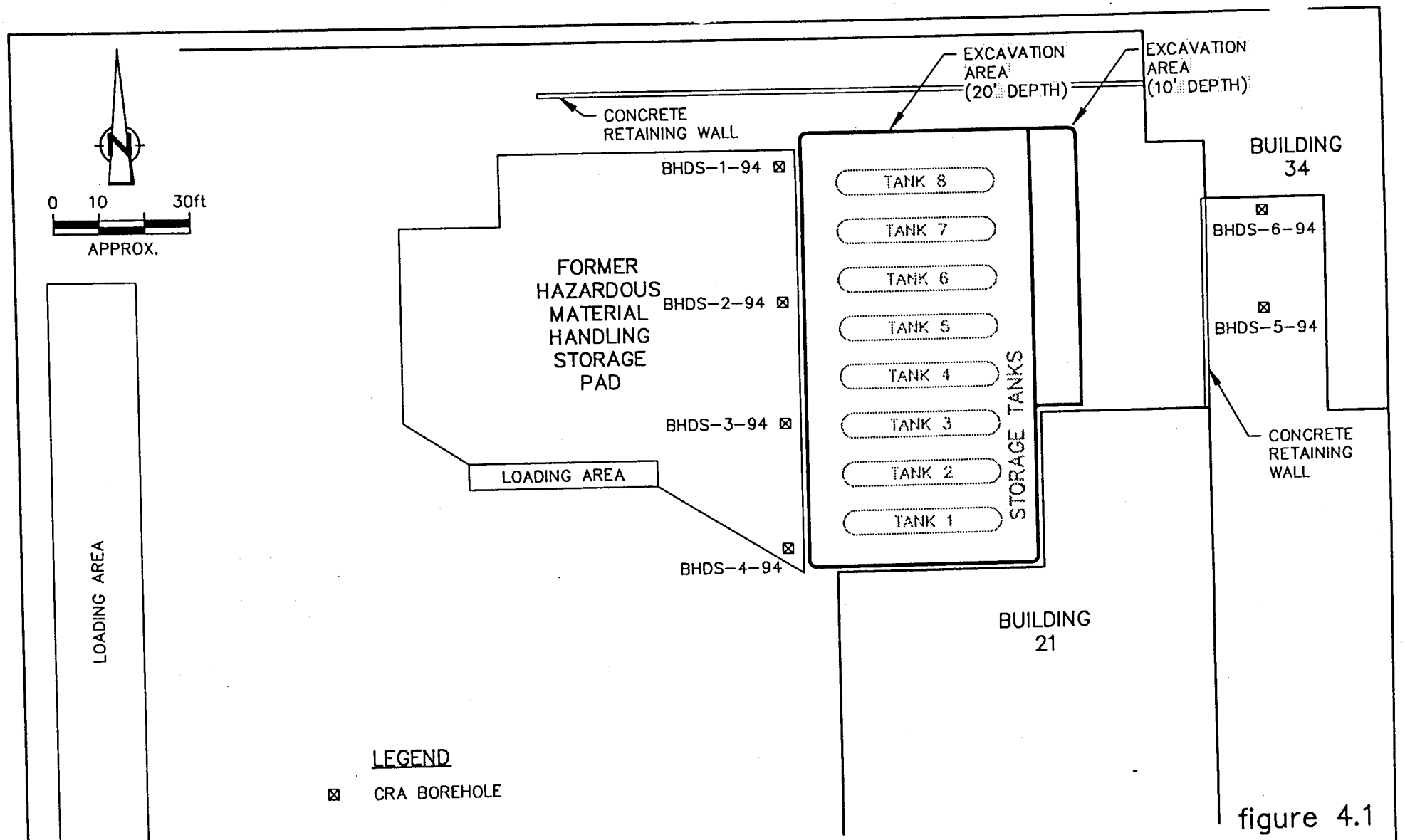


figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES
DUCO STORES – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (6) MAY 26/94(W) REV.2 (P-16)

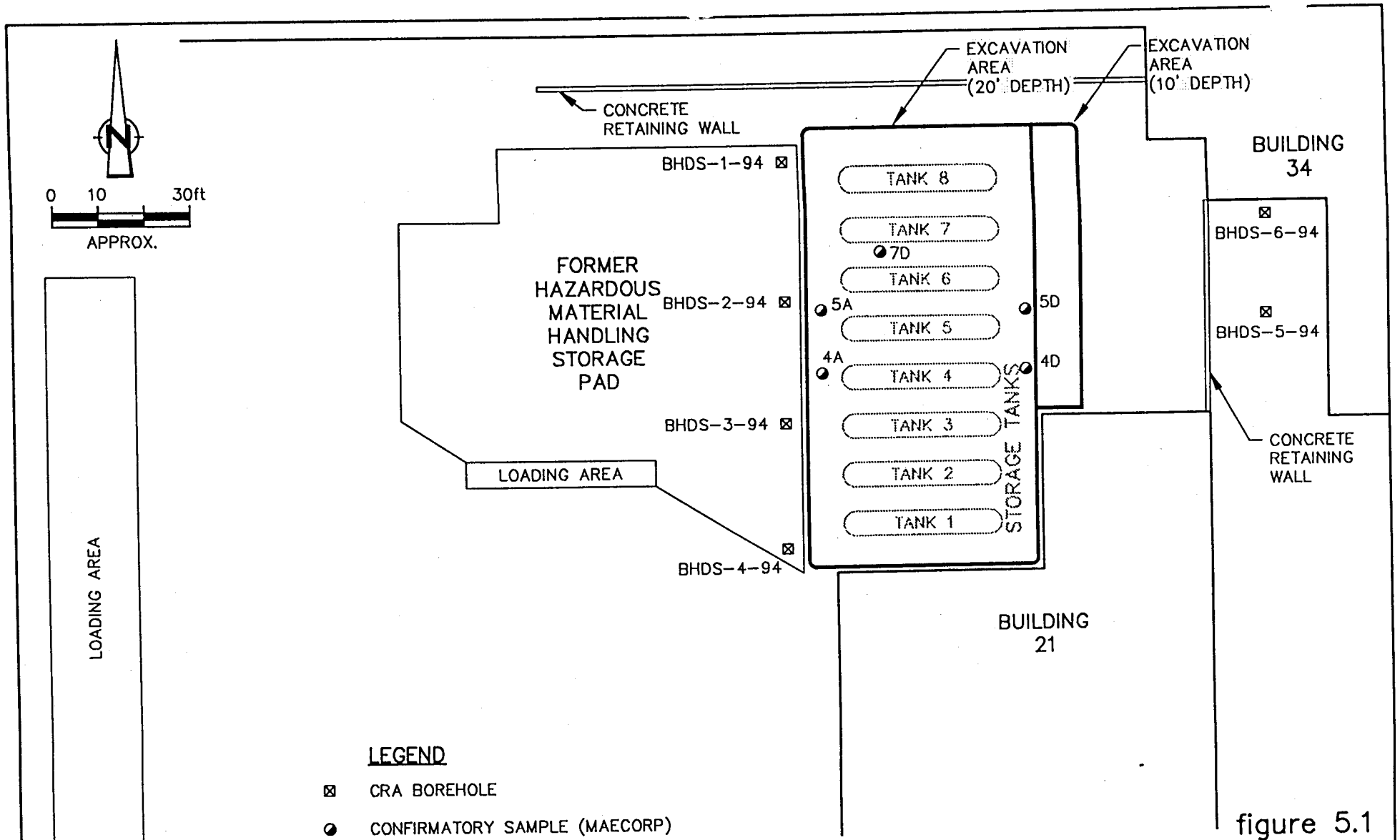


figure 5.1

SAMPLING COMPARISON
DUCO STORES – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (6) MAY 26/94(W) REV.0 (P-25)

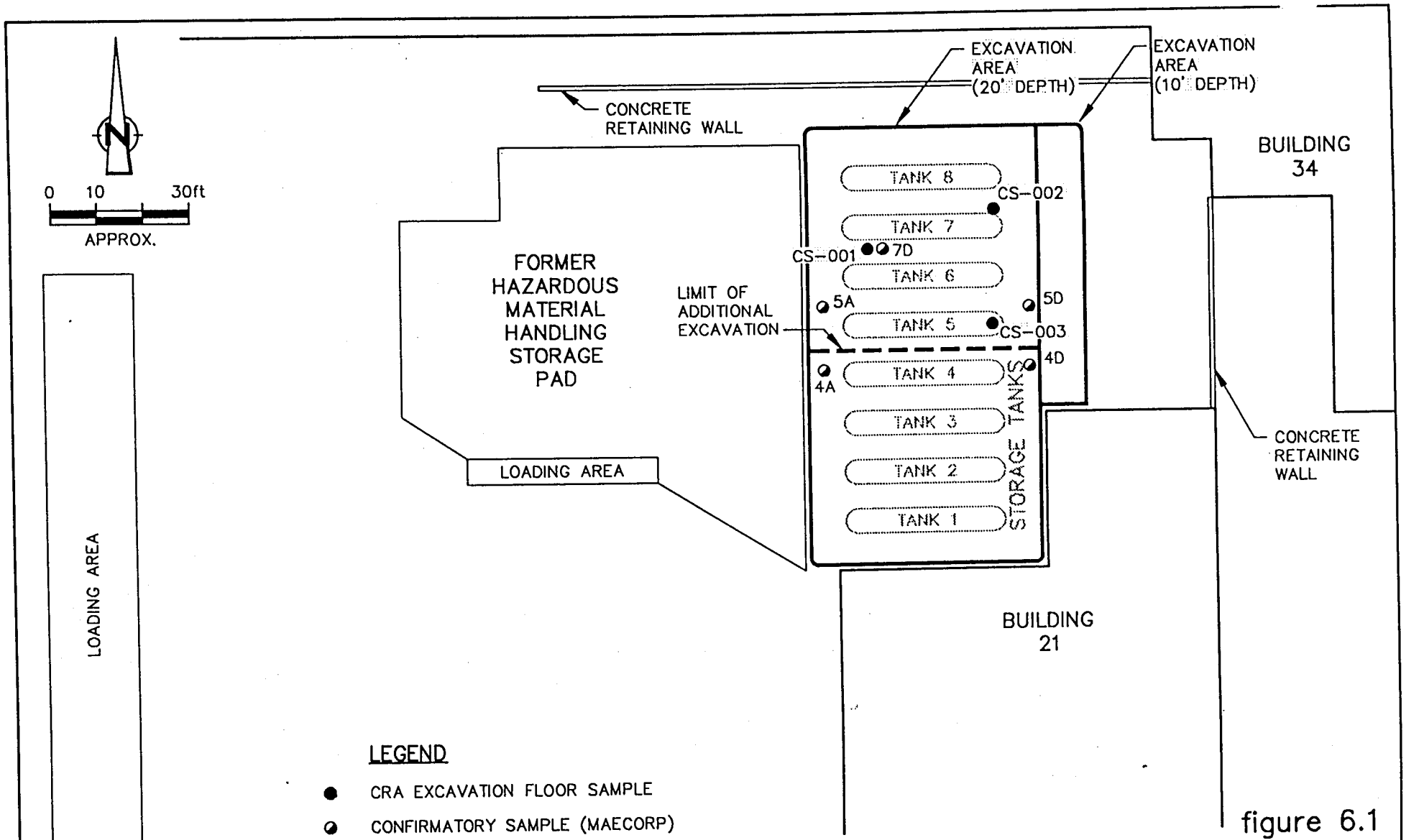


figure 6.1

ADDITIONAL REMEDIAL ACTIVITY
DUCO STORES – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (6) MAY 26/94(W) REV.0 (P-26)

TABLE 3.1

CONFIRMATORY SAMPLING
SUMMARY OF EXCEEDENCES
DUCO STORES STUDY AREA

Compound	*Sample 4A*	*Sample 4B*	*Sample 5A*	*Sample 5B*	*Sample 7D*	*Type B Criteria*	*Type C Criteria*
Benzene	63	ND	6.8	0.21	ND	13	85
Benzo(a)Anthracene	0.24	2.5	1.4	1.5	0.52	0.18	2.1
Chrysene	ND	0.3	ND	ND	ND	0.18	2.1

Notes:

(1) All reported data in mg/kg
(2) ND = Non Detect
(3) Type B Criteria obtained from MDNR - MERA Operational Memo #8, February 11, 1994.
(4) Type C Criteria obtained from MDNR - MERA Operational Memo #14, September 23, 1993.

TABLE 5.1

ACT 307 - TYPE B CRITERIA
DUCO STORES STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Type B Criteria					
	Soil (ppb)			*GW (µg/L)*		
Parameter	*20X Drinking Water*	*20X GSI Value*	*Direct Contact*	*Health Based*	*Aesthetic*	*GSI Value*
BTEX						
Benzene	24	1,200	13,000	1.2	NA	60
Toluene	16,000	2,200	1.7E+07	1,500	790	110
Ethylbenzene	1,500	620	7.5E+06	680	74	31
Xylene	46,000	1,600	8.6E+07	2,300	5,000	81
PNAs						
Acenaphthene	24,000	--	4.50E+07	1,200	NA	--
Acenaphtylene	500	--	9.30E+05	25	NA	--
Anthracene	1.40E+05	2.20E+06	2.60E+05	7,000	NA	1.10E+05
Benzo(a)anthracene	N/A	N/A	180	0.0049	NA	0.31
Benzo(a)pyrene	N/A	N/A	180	0.0049	NA	0.31
Benzo(b)fluoranthene	N/A	N/A	180	0.0049	NA	0.31
Benzo(g,h,i)perylene	N/A	N/A	9.30E+05	25	NA	--
Benzo(k)fluoranthene	N/A	N/A	180	0.0049	NA	0.31
Chrysene	N/A	N/A	180	0.0049	NA	0.31
Dibenzo(a,h)anthracene	N/A	N/A	180	0.0049	NA	0.31
Fluoranthene	17,000	7,400	3.10E+04	840	NA	370
Flourene	17,000	2.80E+05	3.10E+07	840	NA	14,000
Indeno(1,2,3-cd)pyrene	N/A	N/A	180	0.0049	NA	0.31
Naphthalene	5,000	580	9.30E+06	250	NA	29
Phenanthrene	500	--	9.30E+05	25	NA	--
Pyrene	10,000	2.20E+05	1.90E+07	520	NA	11,000

Notes:

NA - not available.
N/A - not applicable (i.e., direct contact value is considered to be protective).
-- - chemical has not yet been evaluated.

TABLE 5.2

ANALYTICAL RESULTS - ADDITIONAL INVESTIGATIVE ACTIVITIES
DUCO STORES STUDY AREA
PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Sample Concentration (µg/kg)					
Parameter	*BH DS-1 (8'-10')*	*BH DS-1 (18'-20')*	*BH DS-2 (8'-10')*	*BH DS-2 (18'-20')*	*BH DS-3 (8'-10')*	*BH DS-3 (18'-20')*
BTEX						
Benzene	48	6	ND (50)	49	ND(50)	46
Toluene	100	ND(10)	210	31	310	19
Ethylbenzene	44	ND(10)	ND(100)	ND(10)	ND(100)	ND(10)
Xylene	210	ND(10)	130	15	1,000	ND(10)
PNAs						
Acenaphthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Acenaphtylene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	ND(330)	ND(330)	ND(330)	ND(330)	370	ND(330)
Flourene	ND(330)	ND(330)	760	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Naphthalene	ND(330)	ND(330)	2,700	ND(330)	3,900(1)/3,700	ND(330)
Phenanthrene	ND(330)	ND(330)	1,000	ND(330)	ND(330)	ND(330)
Pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)

Notes:

(1) Concentration of the compound exceeded the calibration range of the instrument for that particular analysis.
ND Compound not detected at method detection limit.

TABLE 5.2

ANALYTICAL RESULTS - ADDITIONAL INVESTIGATIVE ACTIVITIES
DUCO STORES STUDY AREA
PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Sample Concentration (µg/kg)					
	BH DS-4 (8'-10')	*BH DS-4 (18'-20')*	*BH DS-5 (8'-10')*	*BH DS-5 (18'-20')*	*BH DS-6 (8''-10')*	*BH DS-6 (18'-20')*
BTEX						
Benzene	1,800	110	510	56	2,700	40
Toluene	12,000	220	460	35	28,000	ND(10)
Ethylbenzene	4,400	150	ND(100)	ND(10)	21,000	ND(10)
Xylene	70,000	1,400	280	14	16,000	ND(10)
PNAs						
Acenaphthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Acenaphtylene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	ND(330)	ND(330)	ND(330)	ND(330)	900	ND(330)
Benzo(a)anthracene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	ND(330)	ND(330)	800	ND(330)	6300(1)/7,600	ND(330)
Flourene	ND(330)	ND(330)	ND(330)	ND(330)	1,400	ND(330)
Indeno(1,2,3-cd)pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Naphthalene	5,300(1)/5,600	ND(330)	2,200	ND(330)	3600(1)/4,500	ND(330)
Phenanthrene	ND(330)	ND(330)	400	ND(330)	3600(1)/5,100	ND(330)
Pyrene	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)

Notes:

(1) Concentration of the compound exceeded the calibration range of the instrument for that particular analysis.
ND Compound not detected at method detection limit.

TABLE 6.1

ADDITIONAL REMEDIAL ACTIVITIES
CONFIRMATORY SAMPLING
DUCO STORES STUDY AREA
PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Sample Concentrations (µg/kg)*		
	CS-001	*CS-002*	*CS-003*
BTEX			
Benzene	ND(10)	ND(10)	ND(10)
Toluene	ND(10)	ND(10)	ND(10)
Ethylbenzene	ND(10)	ND(10)	ND(10)
Xylene	ND(10)	ND(30)	ND(30)
PNAs			
Acenaphthene	ND(330)	ND(330)	ND(330)
Acenaphtylene	ND(330)	ND(330)	ND(330)
Anthracene	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	ND(330)	ND(330)	ND(330)
Chrysene	ND(330)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	ND(330)	ND(330)	ND(330)
Fluoranthene	ND(330)	ND(330)	ND(330)
Flourene	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-cd)pyrene	ND(330)	ND(330)	ND(330)
Naphthalene	ND(330)	ND(330)	ND(330)
Phenanthrene	ND(330)	ND(330)	ND(330)
Pyrene	ND(330)	ND(330)	ND(330)

APPENDIX A

ANALYTICAL RESULTS - SEPTEMBER 1991 CONFIRMATORY SAMPLING

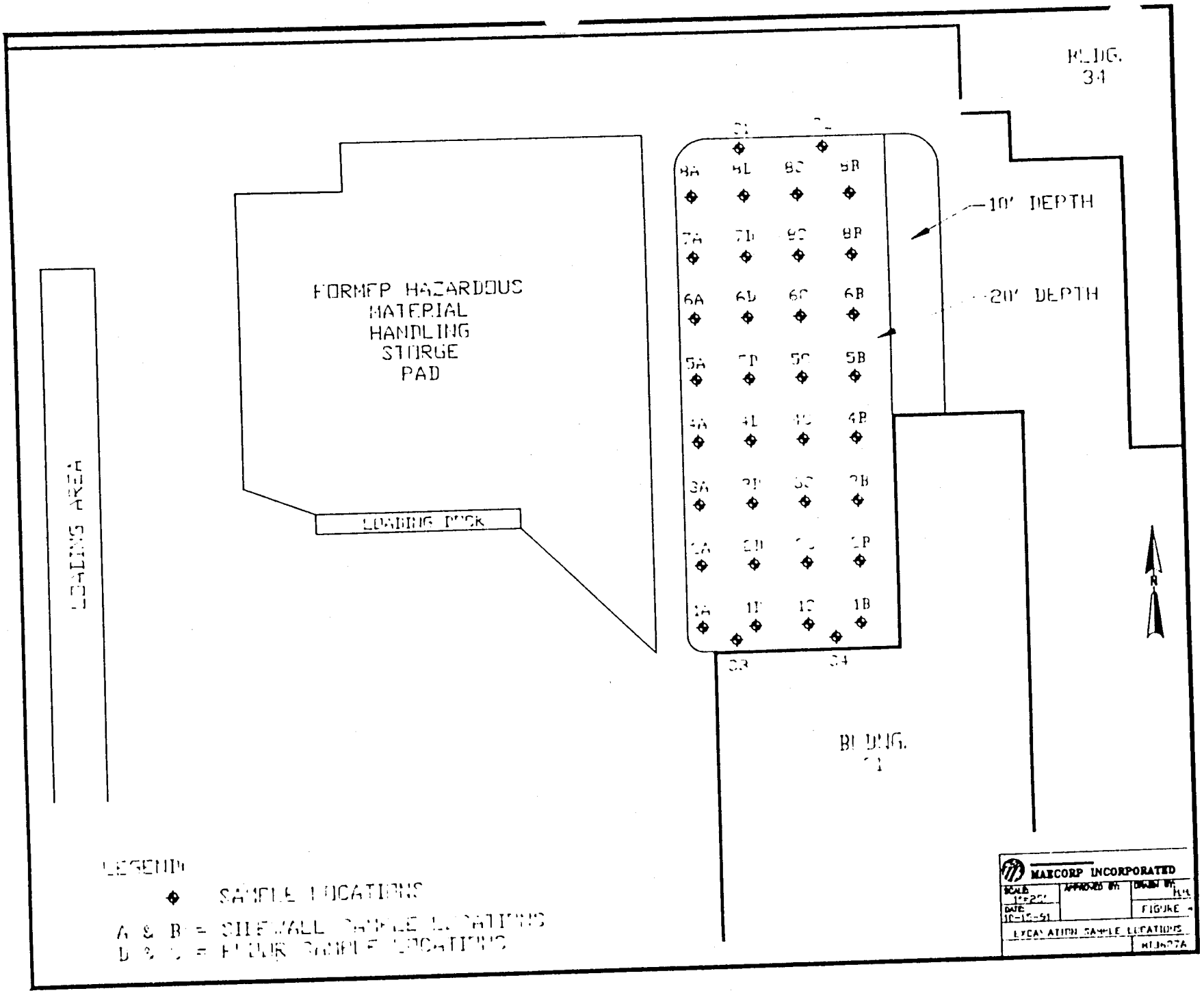

BLDG.
34
FORMER HAZARDOUS
MATERIAL
HANDLING
STORGE
PAD
LOADING DOCK
LOADING AREA
10' DEPTH
20' DEPTH
8A
8L
8C
8B
7A
7B
7C
7B
6A
6B
6C
6B
5A
5B
5C
5B
4A
4B
4C
4B
3A
3B
3C
3B
2A
2B
2C
2B
1A
1B
1C
1B
N
BLDG.
LEGEND
SAMPLE LOCATIONS
A & B = SIDEWALL SAMPLE LOCATIONS
MACORP INCORPORATED
SCALE
1"=25'
DATE
12-15-91
APPROVED BY
DRAWN BY
FIGURE
EXCAVATION SAMPLE LOCATIONS

TABLE 2

Excavation Soil Sample Results (ppm)

Parameter	Sample #1A	Sample #1B	Sample #1C	Sample #1D
TPH	ND	ND	NS	ND
Benzene	.10	ND	NS	ND
Ethyl-benzene	.026	ND	NS	ND
Toluene	.098	.033	NS	.15
Xylenes	.68	.370	NS	.93
Naphtha-lene	ND	.068	NS	.069
Acenaph-thylene	ND	.046	NS	.13
Acenaph-thene	ND	0.12	NS	.34
Fluorene	ND	.11	NS	.29
Phenan-threne	ND	.06	NS	.19
Anth-racene	ND	ND	NS	ND
Flouran-thene	ND	ND	NS	ND
Pyrene	ND	ND	NS	ND
Benzo (a) Anth-recene	ND	ND	NS	ND
Chrysene	ND	ND	NS	ND

ND = None Detected
NS = No sample

TABLE 3

Excavation Soil Sample Results (ppm)

Parameter	Sample #2A	Sample #2B	Sample #2C	Sample #2D
TPH	10	49	ND	8.9
Benzene	.310	ND	ND	ND
Ethyl-benzene	.590	ND	ND	ND
Toluene	1.7	.016	ND	7.2
Xylenes	4.2	.016	ND	32
Naphtha-lene	ND	ND	ND	.083
Acenaph-thylene	ND	.042	ND	.055
Acenaph-thene	ND	.078	ND	.091
Fluorene	ND	.12	ND	.067
Phenan-threne	ND	.051	ND	ND
Anth-racene	ND	ND	ND	ND
Flouran-thene	ND	.074	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No sample

TABLE 4

Excavation Soil Sample Results (ppm)

Parameter	Sample #3A	Sample #3B	Sample #3C	Sample #3D
TPH	24	6.9	5.4	6.5
Benzene	.044	.032	ND	ND
Ethyl-benzene	ND	.030	ND	ND
Toluene	.026	.37	ND	ND
Xylenes	ND	1.5	ND	ND
Naphtha-lene	ND	ND	ND	ND
Acenaph-thylene	.046	ND	ND	.062
Acenaph-thene	ND	ND	.15	.14
Fluorene	ND	ND	.43	.12
Phenan-threne	ND	ND	ND	.072
Anth-racene	ND	ND	ND	ND
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 5

Excavation Soil Sample Results (ppm)

Parameter	Sample #4A	Sample #4B	Sample #4C	Sample #4D
TPH	4500	810	ND	ND
Benzene	63	ND	ND	ND
Ethyl-benzene	24	ND	ND	ND
Toluene	140	1.4	ND	ND
Xylenes	120	5.2	ND	ND
Naphtha-lene	26	7.4	ND	ND
Acenaph-thylene	11	9.5	ND	.068
Acenaph-thene	6.1	27	ND	.17
Fluorene	1.7	20	ND	.14
Phenan-threne	3.5	13	ND	.094
Anth-racene	11	4.7	ND	ND
Flouran-thene	.74	2.1	ND	ND
Pyrene	ND	1.3	ND	ND
Benzo (a) Anth-recene	.24	2.5	ND	ND
Chrysene	ND	.3	ND	ND

ND = None Detected
NS = No Sample

TABLE 6

Excavation Soil Sample Results (ppm)

Parameter	Sample #5A	Sample #5B	Sample #5C	Sample #5D
TPH	1600	610	ND	ND
Benzene	6.8	.21	ND	ND
Ethyl-benzene	10	.060	ND	ND
Toluene	32	.81	ND	.069
Xylenes	53	2.4	.056	.040
Naphtha-lene	7.0	3.3	ND	ND
Acenaph-thylene	11	5.6	.068	.054
Acenaph-thene	5.0	5.3	.18	.14
Fluorene	1.6	3.7	.17	.13
Phenan-threne	1.2	3.5	ND	.075
Anth-racene	7.4	3.0	ND	ND
Flouran-thene	ND	.46	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	1.4	1.5	ND	ND
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 7

Excavation Soil Sample Results (ppm)

Parameter	Sample #6A	Sample #6B	Sample #6C	Sample #6D
TPH	130	26	ND	ND
Benzene	.98	.26	ND	ND
Ethyl-benzene	1.2	.58	ND	ND
Toluene	3.0	.26	ND	ND
Xylenes	3.0	7.0	ND	ND
Naphtha-lene	1.2	1.6	ND	ND
Acenaph-thylene	.88	1.3	ND	.058
Acenaph-thene	.56	1.0	.12	.15
Fluorene	.83	.53	.088	.12
Phenan-threne	.66	ND	ND	.078
Anth-racene	.35	.26	ND	ND
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	.04
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 8

Excavation Soil Sample Results (ppm)

Parameter	Sample #7A	Sample #7B	Sample #7C	Sample #7D
TPH	22	450	6.2	ND
Benzene	ND	ND	ND	ND
Ethyl-benzene	ND	.18	ND	ND
Toluene	.12	.18	ND	ND
Xylenes	4.1	1.4	ND	ND
Naphtha-lene	1.2	.12	ND	ND
Acenaph-thylene	.85	.13	ND	.14
Acenaph-thene	.42	.56	.14	.33
Fluorene	.25	ND	.11	.29
Phenan-threne	.15	ND	ND	.20
Anth-racene	ND	ND	ND	.60
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	ND	.52
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

TABLE 9

Excavation Soil Sample Results (ppm)

Parameter	Sample #8A	Sample #8B	Sample #8C	Sample #8D
TPH	480	2400	NS	NS
Benzene	ND	ND	NS	NS
Ethyl-benzene	ND	ND	NS	NS
Toluene	.74	.84	NS	NS
Xylenes	2.1	2.3	NS	NS
Naphtha-lene	1.8	29	NS	NS
Acenaph-thylene	9.5	71	NS	NS
Acenaph-thene	2.9	23	NS	NS
Fluorene	1.2	6.5	NS	NS
Phenan-threne	ND	ND	NS	NS
Anth-racene	2.3	13	NS	NS
Flouran-thene	ND	ND	NS	NS
Pyrene	ND	ND	NS	NS
Benzo (a) Anth-recene	ND	ND	NS	NS
Chrysene	ND	ND	NS	NS

ND = None Detected
NS = No Sample

TABLE 10

Excavation Soil Sample Results (ppm)

Parameter	Sample #S1	Sample #S2	Sample #S3	Sample #S4
TPH	ND	ND	7.0	12
Benzene	.49	ND	ND	ND
Ethyl-benzene	ND	ND	ND	ND
Toluene	.68	.15	ND	ND
Xylenes	1.6	.42	ND	ND
Naphtha-lene	ND	ND	ND	ND
Acenaph-thylene	ND	ND	.069	.052
Acenaph-thene	ND	.045	.16	1.6
Fluorene	ND	ND	.12	.097
Phenan-threne	ND	ND	.08	.062
Anth-racene	ND	ND	.30	.23
Flouran-thene	ND	ND	ND	ND
Pyrene	ND	ND	ND	ND
Benzo (a) Anth-recene	ND	ND	.13	.11
Chrysene	ND	ND	ND	ND

ND = None Detected
NS = No Sample

APPENDIX B

BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-11)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-1
DATE COMPLETED: JANUARY 6, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	Concrete Augered to 3.0 ft BGS						
	CL-CLAY, some sand, brownish tan	-3.0		1SS		6	0
5.0			8"ø BOREHOLE				
7.5							
				2SS		8	17.4
10.0			CUTTINGS				
12.5							
	SP-SAND, some stones and pebbles, coarse grained, gray, moist, some staining	-13.0 -14.0		3SS		7	31
15.0	CL/ML-CLAY and SILT, dense, gray, moist						
17.5							
	CL-CLAY, some small gravel, stiff, gray	-18.0		4SS		10	0
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-12)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-2
DATE COMPLETED: JANUARY 5, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	Concrete Augered to 3.0 ft BGS						
	CL-CLAY, some sand and silt, brown	-3.0		1SS		7	0
5.0			8"ø BOREHOLE				
7.5							
	SM/ML-SAND and SILT, some clay, gray	-8.0		2SS		13	0
10.0			CUTTINGS				
12.5							
	SM/GM-SAND and GRAVEL, some silt, visible staining, strong gasoline odor	-13.0		3SS		18	1400
15.0							
17.5							
	CL-CLAY, gray	-18.0		4SS		16	200
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-13)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-3
DATE COMPLETED: JANUARY 5, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Concrete Augered to 3.0 ft BGS						
2.5		-3.0					
	SP/GP-SAND and GRAVEL(FILL)	-4.0		1SS		15	0
	CL/ML-CLAY and SILT, trace sand, stiff, brown						
5.0			8"ø BOREHOLE				
7.5		-8.0					
	SP-SAND, little clay seams, brown			2SS		10	96.8
10.0			CUTTINGS				
12.5		-13.0					
	CL/ML-CLAY and SILT(TILL), gray, moist			3SS		7	2.3
15.0							
17.5	- trace sand and gravel			4SS		8	0
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-14)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-4
DATE COMPLETED: JANUARY 5, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	Concrete Augered to 3.0 ft BGS						
	SP/GP-SAND and GRAVEL(FILL)	-3.0 -3.5		1SS		9	12.6
5.0	CL/ML-CLAY and SILT, trace sand, stiff, brown and gray mottled		8"ø BOREHOLE				
7.5							
	SP-SAND, little silt seams, brown	-8.0		2SS		7	62.7
10.0			CUTTINGS				
12.5							
	CL/ML-CLAY and SILT, gray, moist	-13.0		3SS		6	0
15.0							
17.5	- trace sand			4SS		10	0
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-15)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-5
DATE COMPLETED: JANUARY 5, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	Augered to 3.0 ft BGS						
	SP/GP-SAND and GRAVEL(FILL), dark brown	-3.0					
5.0	CL/ML-CLAY and SILT, little sand, stiff, gray	-4.0		1SS		5	0
7.5	- no sand, trace gravel, dark gray		8" ø BOREHOLE	2SS		8	2.5
10.0			CUTTINGS				
12.5	- no gravel			3SS		11	0
15.0							
17.5	- little sand seam			4SS		31	0
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-16)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: DUCO STORES

HOLE DESIGNATION: BHDS-6
DATE COMPLETED: JANUARY 5, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: J. McCLELLAN

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
2.5	Augered to 3.0 ft BGS						
	SM-SAND(FILL), some silt and gravel, brown	-3.0		1SS		5	75.6
5.0							
7.5	- some clay		8"ϕ BOREHOLE	2SS		18	21.8
10.0			CUTTINGS				
12.5	CL/ML-CLAY and SILT(TILL), trace gravel, dark gray	-13.0		3SS		7	0
15.0							
17.5				4SS		23	0
20.0	END OF HOLE @ 20.0 FT. BGS	-20.0					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

ANALYTICAL RESULTS

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BHDS 3-94 18'-20'	BHDS 2-94 8'-10'	BHDS 2-94 18'-20'	BHDS 1-94 8'-10'	BHDS 1-94 18'-20'	
LAB ID	940113 008	940113 009	940113 010	940113 011	940113 012	PQL
COMPOUNDS						
Naphthalene	U	2700	U	U	U	330
Acenaphthylene	U	U	U	U	U	330
Acenaphthene	U	U	U	U	U	330
Fluorene	U	760	U	U	U	330
Phenanthrene	U	1000	U	U	U	330
Anthracene	U	U	U	U	U	330
Fluoranthene	U	U	U	U	U	330
Pyrene	U	U	U	U	U	330
Benzo(a)anthracene	U	U	U	U	U	330
Chrysene	U	U	U	U	U	330
Benzo(b)fluoranthene	U	U	U	U	U	330
Benzo(k)fluoranthene	U	U	U	U	U	330
Benzo(a)pyrene	U	U	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	U	U	U	U	330
Dibenzo(a,h)anthracene	U	U	U	U	U	330
Benzo(g,h,i)perylene	U	U	U	U	U	330

DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/06/94	01/06/94
DATE EXTRACTED	01/07/94	01/07/94	01/07/94	01/07/94	01/07/94
DATE ANALYZED	01/08/94	01/08/94	01/08/94	01/08/94	01/08/94
DILUTION FACTOR	1	1	1	1	1

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BHDS 4-94 8'-10'	BHDS 4-94 8'-10'	BHDS 4-94 18'-20'	BHDS 3-94 8'-10'	BHDS 3-94 8'-10'	
LAB ID	940113 005	940113 005D	940113 006	940113 007	940113 007D	PQL
COMPOUNDS						
Naphthalene	5300E	5600	U	3900E	3700	330
Acenaphthylene	U	UD	U	U	UD	330
Acenaphthene	U	UD	U	U	UD	330
Fluorene	U	UD	U	U	UD	330
Phenanthrene	U	UD	U	U	UD	330
Anthracene	U	UD	U	U	UD	330
Fluoranthene	U	UD	U	370	UD	330
Pyrene	U	UD	U	U	UD	330
Benzo(a)anthracene	U	UD	U	U	UD	330
Chrysene	U	UD	U	U	UD	330
Benzo(b)fluoranthene	U	UD	U	U	UD	330
Benzo(k)fluoranthene	U	UD	U	U	UD	330
Benzo(a)pyrene	U	UD	U	U	UD	330
Indeno(1,2,3-cd)pyrene	U	UD	U	U	UD	330
Dibenzo(a,h)anthracene	U	UD	U	U	UD	330
Benzo(g,h,i)perylene	U	UD	U	U	UD	330

DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94
DATE EXTRACTED	01/07/94	01/08/94	01/07/94	01/07/94	01/07/94
DATE ANALYZED	01/07/94	01/10/94	01/08/94	01/08/94	01/10/94
DILUTION FACTOR	1	5	1	1	1

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	BHDS 6-94 8'-10'	BHDS 6-94 8'-10'	BHDS 6-94 18'-20'	BHDS 5-94 8'-10'	BHDS 5-94 18'-20'	PQL
LAB ID	940113 001	940113 001D	940113 002	940113 003	940113 004	
COMPOUNDS						
Naphthalene	3600E	4500	U	2200	U	330
Acenaphthylene	U	UD	U	U	U	330
Acenaphthene	U	UD	U	U	U	330
Fluorene	1400	UD	U	U	U	330
Phenanthrene	3600E	5100	U	400	U	330
Anthracene	900	UD	U	U	U	330
Fluoranthene	6300E	7600	U	800	U	330
Pyrene	U	UD	U	U	U	330
Benzo(a)anthracene	U	UD	U	U	U	330
Chrysene	U	UD	U	U	U	330
Benzo(b)fluoranthene	U	UD	U	U	U	330
Benzo(k)fluoranthene	U	UD	U	U	U	330
Benzo(a)pyrene	U	UD	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	UD	U	U	U	330
Dibenzo(a,h)anthracene	U	UD	U	U	U	330
Benzo(g,h,i)perylene	U	UD	U	U	U	330

DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94
DATE EXTRACTED	01/07/94	01/07/94	01/07/94	01/07/94	01/07/94
DATE ANALYZED	01/07/94	01/10/94	01/07/94	01/07/94	01/07/94
DILUTION FACTOR	1	5	1	1	1

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL
ANALYSIS BY: JR

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
ug/kg (Dry Weight)

CLIENT ID	METHOD BLANK					PQL
LAB ID	SS0107					
COMPOUNDS						
Naphthalene	U					330
Acenaphthylene	U					330
Acenaphthene	U					330
Fluorene	U					330
Phenanthrene	U					330
Anthracene	U					330
Fluoranthene	U					330
Pyrene	U					330
Benzo(a)anthracene	U					330
Chrysene	U					330
Benzo(b)fluoranthene	U					330
Benzo(k)fluoranthene	U					330
Benzo(a)pyrene	U					330
Indeno(1,2,3-cd)pyrene	U					330
Dibenzo(a,h)anthracene	U					330
Benzo(g,h,i)perylene	U					330
DATE SAMPLED	--					
DATE EXTRACTED	01/07/94					
DATE ANALYZED	01/07/94					
DILUTION FACTOR	1					

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL

PURGEABLE AROMATICS
BTEX–MTBE EPA 602/8020
ug/kg
(Dry Weights)

CLIENT ID	BHDS 1–94 8'–10'	BHDS 1–94 18'–20'	METHOD BLANK	METHOD BLANK	METHOD BLANK	
LAB ID	40113 011	40113 012	VS0107	VS0108	VS0110	PQL
COMPOUNDS						
Benzene	48	6	< 5	< 5	< 5	5
Toluene	100	< 10	< 10	< 10	< 10	10
Ethylbenzene	44	< 10	< 10	< 10	< 10	10
Xylene	210	< 10	< 10	< 10	< 10	10
MTBE	–	–	–	–	–	–
DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94	
DATE ANALYZED	01/07/94	01/07/94	01/07/94	01/08/94	01/10/94	
DILUTION FACTOR	5	5	1	1	1	

IEA
An Aquarion Company

IEA PROJECT#: CH940113
CLIENT PROJECT ID: 5770
MATRIX: SOIL

PURGEABLE AROMATICS
BTEX–MTBE EPA 602/8020
ug/kg
(Dry Weights)

CLIENT ID	BHDS 6–94 8'–10'	BHDS 6–94 18'–20'	BHDS 5–94 8'–10'	BHDS 5–94 18'–20'	BHDS 4–94 8'–10'	
LAB ID	40113 001	40113 002	40113 003	40113 004	40113 005	PQL
COMPOUNDS						
Benzene	2700	40	510	56	1800	5
Toluene	28,000	< 10	460	35	12,000	10
Ethylbenzene	21,000	< 10	< 100	<10	4400	10
Xylene	16,000	< 10	280	14	70,000	10
MTBE	–	–	–	–	–	–
DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94	
DATE ANALYZED	01/08/94	01/07/94	01/07/94	01/07/94	01/07/94	
DILUTION FACTOR	1000	5	50	5	500	

CLIENT ID	BHDS 4–94 18'–20'	BHDS 3–94 8'–10'	BHDS 3–94 18'–20'	BHDS 2–94 8'–10'	BHDS 2–94 18'–20'	
LAB ID	40113 006	40113 007	40113 008	40113 009	40113 010	PQL
COMPOUNDS						
Benzene	110	< 50	46	< 50	49	5
Toluene	220	310	19	210	31	10
Ethylbenzene	150	< 100	< 10	< 100	< 10	10
Xylene	1400	1000	< 10	130	15	10
MTBE	–	–	–	–	–	–
DATE SAMPLED	01/05/94	01/05/94	01/05/94	01/05/94	01/05/94	
DATE ANALYZED	01/07/94	01/10/94	01/07/94	01/10/94	01/07/94	
DILUTION FACTOR	5	50	5	50	5	

IEA
An Aquarion Company

GC SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: CH940113

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC	QC LIMITS REC
BENZENE	30	2	24	73	70–130
TOLUENE	30	25	46	70	70–130

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC	% RPD	QC LIMITS RPD REC
BENZENE	30	25	77	5	25 70–130
TOLUENE	30	48	77	10	25 70–130

Corresponding Samples: 40113001 – 40113012

IEA
An Aquarion Company

SOIL VOLATILE SURROGATE RECOVERIES

PROJECT NO:CH940104

SAMPLE ID	SURR 1 (% RECOV.)
40113001	99
40113002	100
40113003	117
40113004	99
40113005	90
40113006	88
40113007	99
40113008	83
40113009	104
40113010	82
40113011	118
40113012	99
VS0107	96
VS0108	95
VS0110	104

S1 = Bromofluorobenzene

QC Limits
(65–130)

IEA
An Aquarion Company

SOIL PNA SURROGATE RECOVERIES

SAMPLE ID	SURR 1 (% RECOV.)
SS0107	92
SS0107-BS	87
940113001	118
940113001D	112
940113002	95
940113003	118
940113004	90
940113004MS	90
94011300MSD	92
940113005	97
940113005D	117
940113006	83
940113007	89
940113007D	108
940113008	75
940113009	114
940113010	87
940113011	89
940113012	90
SURR 1 = Carbozole	QC Limits (30-130%)

IEA
An Aquarion Company

PNA SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
Dry Weight

IEA Reference No.: 940113004

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % RECOVERY	QC LIMITS
Naphthalene	750	0	620	83	40 - 120
Acenaphthene	750	0	500	67	40 - 120
Fluorene	750	0	630	84	40 - 120
Phenanthrene	750	0	730	97	40 - 120
Pyrene	750	0	690	92	40 - 120
Chrysene	750	0	660	88	40 - 120
Benzo(b)fluoranthene	750	0	650	87	40 - 120
Benzo(a)pyrene	750	0	620	83	40 - 120

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MS % RECOVERY	% RPD	QC LIMITS RPD	QC LIMITS REC
Naphthalene	750	680	91	9	35	40-120
Acenaphthene	750	530	71	6	35	40-120
Fluorene	750	640	85	1	35	40-120
Phenanthrene	750	790	105	8	35	40-120
Pyrene	750	740	99	7	35	40-120
Chrysene	750	690	92	4	35	40-120
Benzo(b)fluoranthene	750	670	89	2	35	40-120
Benzo(a)pyrene	750	660	88	6	35	40-120

Comments:
BQL = Below Quantitation Limit

IEA
An Aquarion Company

PNA SOIL QC CHECK SAMPLE RECOVERY

IEA Reference No.:

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % RECOVERY	QC LIMITS
Naphthalene	670	0	660	98	40 – 120
Acenaphthene	670	0	560	84	40 – 120
Fluorene	670	0	570	85	40 – 120
Phenanthrene	670	0	620	92	40 – 120
Pyrene	670	0	660	98	40 – 120
Chrysene	670	0	610	91	40 – 120
Benzo(b)fluoranthene	670	0	630	94	40 – 120
Benzo(a)pyrene	670	0	580	87	40 – 120

Comments:
BQL = Below Quantitation Limit

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH940113
Project #: 5770
Date Analyzed: 1/10/94
Matrix: SOIL

ANALYTE LIST

	Client ID	BHDS 6-94 8'-10'	BHDS 6-94 18'-20'	BHDS 5-94 8'-10'	BHDS 5-94 18'-20'	BHDS 4-94 8'-10'	BHDS 4-94 18'-20'	
		940113	940113	940113	940113	940113	940113	
	Lab ID	001	002	003	004	005	006	Units
Analyte	Method							
Total Solids	160.3	90	91	90	89	92	89	%

	Client ID	BHDS 3-94 8'-10'	BHDS 3-94 18'-20'	BHDS 2-94 8'-10'	BHDS 2-94 18'-20'	BHDS 1-94 8'-10'	BHDS 1-94 18'-20'	
		940113	940113	940113	940113	940113	940113	
	Lab ID	007	008	009	010	011	012	Units
Analyte	Method							
Total Solids	160.3	94	88	90	89	88	88	%

IEA
An Aquarion Company

IEA JOB#: CH940113
DATE: 01/10/94
ANALYST: TV
PREP BLANK: _____

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
940113012	88%	89%	1.1%

M E M O

TO: Glenn Turchan

REFERENCE NO: 5770

FROM: Jack Lindsay

DATE: January 17, 1994

RE: Data Quality Assessment and Validation
for Twelve Soil Samples collected from the
General Motors Corporation Central Manufacturing Facility
Pontiac, Michigan (Report CH940113)

The following details an analytical data quality assessment and validation for data resulting from January 6, 1994 collection of twelve soil samples from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Surrogate Compund Percent Recoveries

Individual sample performance for the Benzene, Toluene, ethylbenzene and xylene (BTEX), and Polynuclear Aromatic Hydrocarbons (PNA) analyses were monitored using the percent recoveries of surrogate compound spikes. All surrogate data were found to be withing the acceptance criteria.

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and the relative percent difference (RFD) were determined. All data were found to be within the control limits indicating that the data achieved acceptable levels of accuracy and precision based on the information provided.

Laboratory Check Spike Recovery

Laboratory check spike recoveries were examined to assess the accuracy of the laboratory procedures for PNA analyses. The laboratory procedures for PNA analyses. The laboratory check spike samples were found to be within the control limits indicating that an acceptable level of accuracy had been achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	SW-846[1] 8020
Polynuclear Aromatic Hydrocarbons (PNA)	SW-846 8310

1 SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
BETX	- 14 days from sample collection to completion of analysis
PNA	- 14 days from sample collection to extraction - 40 days from sample extraction to completion of analysis

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA - Labs

REFERENCE NUMBER: 5770

PROJECT NAME: GM - Pontiac

SAMPLER'S SIGNATURE: J. McClellan PRINTED NAME: J.L. McClellan

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BEX	PARAMETERS: PNA	REMARKS
1	1-5		BHDS-6-94-8-10'	Soil	2	X	X	
2			-6-94-18-20'			X	X	
3			-5-94-8-10'			X	X	
4			-5-94-18-20'			X	X	
5			-4-94-8-10'			X	X	
6			-4-94-18-20'			X	X	
7			-3-94-8-10'			X	X	
8			-3-94-18-20'			X	X	
9			-2-94-8-10'			X	X	
10	↓		-2-94-18-20'			X	X	
11	1-6		-1-94-8-10'			X	X	
12	↓		-1-94-18-20'	↓	↓	X	X	

TOTAL NUMBER OF CONTAINERS: 24

RELINQUISHED BY 1.: J. McClellan	DATE: 1-6-94 TIME: 7:10 pm	RECEIVED BY 1.: Vinod Vaghan	DATE: 1/7/94 TIME: 9:20
RELINQUISHED BY 2.:	DATE: TIME:	RECEIVED BY 2.:	DATE: TIME:
RELINQUISHED BY 3.:	DATE: TIME:	RECEIVED BY 1.:	DATE: TIME:

METHOD OF SHIPMENT: Fed Ex AIR BILL No.

White -Fully Executed Copy Yellow -Receiving Laboratory Copy Pink -Shipper Copy Goldenrod -Sampler Copy

SAMPLE TEAM: J. McClellan, S. Schwieder, B. Holbrook

RECEIVED FOR LABORATORY BY: Vinod Vaghan DATE: 1/7/94 TIME: 9:20

№ 0551

1001 (FOR...S)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX I

"BURN PILE" STUDY AREA

APPENDIX I.1

SUMMARY REPORT, BURN PILE

PRIVILEGED AND CONFIDENTIAL
PREPARED AT THE REQUEST OF
GENERAL MOTORS COUNSEL

SUMMARY REPORT
BURN PILE

General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

APRIL 1995

REF. NO. 5770 (16)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

This document presents the summary report for the Burn Pile Site (Site) located between the General Motors Pontiac East and Central Manufacturing Facilities (Facility) in Pontiac, Michigan. The Facility location is presented on Figure 1.1. The Site location is presented on Figure 1.2. A Site plan is presented on Figure 1.3.

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) Truck and Bus Group to support ongoing activities at the Burn Pile Site, on an as required basis. Site activities were conducted by GM and GM's contractors with CRA oversight, as requested by GM.

The work completed at the Site was initiated as a result of a road construction project for the Centerpoint Business Campus Development and a property transaction between GM and the City of Pontiac.

This report is presented in the following sections:

2.0 Site Background
3.0 Field Activities
4.0 Results
5.0 Soil Removal Activities
6.0 Summary

2.0 BACKGROUND

The facility is located in an industrial area which is bordered to the south by The Grand Trunk Western Railroad Line, to the east by Opdyke Rd., to the west by industrial areas, and to the north by South Boulevard Rd.

The Facility was built in 1927 and was utilized to manufacture trucks, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August, 1990 and the Facility was closed in the summer of 1991.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

The Burn Pile Site (Site) is located at the Facility south of the waste water treatment plant and north of the Grand Trunk Western Railroad (See Figure 1.2).

The Burn Pile is comprised of an earth fill matrix with some wood and metal construction debris, paint chips, brick, and metal scraps. The Burn Pile originated from historic filling activities conducted on Site.

The Burn Pile was initially evaluated by GM in 1993 as part of the re-development of the Facility. This evaluation and re-development plan eventually resulted in the partial excavation and disposal for construction purposes of the Burn Pile materials located in the eastern extent of the pile. The excavation of Burn Pile materials was conducted in two phases.

Prior to the excavation and segregation of materials, the Burn Pile was approximately 400 feet in length, from east to west, 150 feet wide at its widest point, and 40 feet in height at its peak. The Pile sloped up gradually from the east for approximately 150 feet to its peak height of 40 feet

above grade, then sloped down to the west returning to grade. It was estimated that the Burn Pile contained approximately 50,000 to 100,000 cubic yards (cy) of material. Figure 1.2 presents the approximate location of the Burn Pile.

2.1 FACILITY GEOLOGY

The Facility and Site are located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and the Rouge River drainage basins.

Shallow native soil materials underlying the Site are predominately comprised of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

2.2 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the GM Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150, and 210 feet bgs and are approximately 7, 25, and 50 feet thick, respectively. The "210-foot aquifer" is a known local source for the municipal water supply.

Shallow groundwater has been encountered in several areas of the GM Facility, generally at depths of 10 to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower water bearing zones.

3.0 FIELD ACTIVITIES

The evaluation of the Burn Pile has been ongoing since November 1993. The initial investigation was begun by GM personnel and continued by Cook & Associates, Inc., an environmental consulting firm retained by GM. CRA became involved in the evaluation initially to coordinate the field activities associated with the project. CRA was retained on an as required basis, to continue the investigation. This section is presented in the following sub-sections:

3.1 Phase I Investigation
3.2 Phase I Excavation
3.3 Phase II Investigation

3.1 PHASE I INVESTIGATION

The Phase I investigation at the Site began in November 1993. An extensive sub-surface soil investigation was subsequently conducted at the Site in March, 1994 by Cook & Associates, Inc. (Cook). In April, 1994 CRA was retained by GM to coordinate field activities at the Site and to provide services on an as requested basis. Seventy-six (76) boreholes were advanced into the native clay/till underlying the Site. The boreholes were located across the Site on a 50 foot grid initially, and later on a 25 foot grid to better delineate the materials at the Site.

Soil samples were collected for visual observation continuously with a two foot long, two inch inside diameter stainless steel split spoon sampler. Photographs of each sample were taken and are maintained by GM.

Soil samples were collected for chemical analysis at 5 foot intervals and analyzed for total lead concentrations. Several composite samples were also collected and analyzed for total and TCLP lead concentrations.

A letter dated June 29, 1994 from CRA to GM summarizes the analytical results of the soil samples collected in the initial investigations conducted at the Site from November, 1993 through June, 1994. The above referenced letter is presented in Appendix A.

3.2 PHASE I EXCAVATION

In July, 1994 a portion of the Burn Pile was excavated and segregated into "potentially clean" and "potentially affected" soil stockpiles by Barton Malow for GM.

Information obtained in the Phase I investigation was used to delineate "potentially clean" and "potentially affected" soil at the Site. GM personnel reported that the soil was segregated using this delineation information and by visual observations.

It was reported by GM that approximately 35,000 cy of material was excavated, segregated and stockpiled on Site during the Phase I excavation. Approximately 32,000 cy were stockpiled as "potentially clean" soil and 3500 cy were stockpiled as "potentially affected". The "potentially affected" stockpiled soil was subsequently characterized and disposed off-Site at a Michigan Type II landfill. (Disposal of the stockpiled soil is discussed in Section 5.0).

3.3 PHASE II CRA INVESTIGATION

A Phase II field investigation was conducted by CRA from August 10, 1994 to August 26, 1994, after odors were reported by a GM contractor during earth moving operations at the Site. The investigation was conducted to characterize the nature and extent of affected or potentially affected material remaining on Site after the Phase I excavation. The investigation consisted of the installation of twelve boreholes and four temporary monitoring wells. Borehole and monitoring well locations are presented on Figure 3.1.

3.3.1 Soil Investigation

In order to characterize the nature and extent of affected material at the Site twelve boreholes were advanced approximately two feet into the native clay underlying the Site. Borehole stratigraphic logs are presented in Appendix B.

Boreholes were advanced using 3 1/4 inch hollow stem augers. The augers were decontaminated between boreholes with a high pressure, low volume steam cleaner. At each borehole continuous soil samples were obtained using 2 foot long, 2 inch inside diameter, stainless steel split spoon samplers. All soil samples were screened with a Photoionization Detector (PID) by a CRA field representative. The results of the PID screening are presented on the stratigraphic logs which are presented in Appendix B.

Soil samples were selected for chemical analysis according to the PID reading and visual examination, at the discretion of the CRA field representative. Fifteen soil samples were submitted for TCL VOC, SVOC, PCB/Pesticide and TAL inorganics analysis.

3.3.2 Groundwater Investigation

Four temporary groundwater monitoring wells, MW-1, 2, 3, and 4, were installed in boreholes SB-10, 11, 12, and between boreholes SB-6 and SB-7, respectively. Monitoring well locations are presented on Figure 3.1.

All temporary monitoring wells installed at the Site consist of a two-inch diameter PVC riser pipe with a five-foot long PVC well screen, with the exception of MW-1 which has a ten foot well screen. The screens are packed with a clean quartz sand where the natural formation did not collapse. The sand pack extend two feet above the top of the screen. A 2-foot bentonite pellet plug was placed on top of the sand pack. The

remainder of the boring annulus was backfilled with bentonite pellet plug or a bentonite pellet plug and cuttings mixture. The monitoring well instrumentation details are outlined on the monitoring well construction logs presented in Appendix B.

Prior to collecting groundwater samples, a minimum of three well volumes were purged from each monitoring well. The pH, conductivity and temperature of the groundwater were obtained following removal of each well volume to determine when groundwater quality had stabilized. Well development logs, dated August 25, 1994, are presented in Appendix C. A new disposable teflon bailer was used at each temporary monitoring well to purge and obtain samples from each of the wells.

Groundwater samples were collected from all temporary monitoring wells and analyzed for TCL VOC and SVOC.

4.0 PHASE II INVESTIGATION RESULTS

The Phase II investigation, presented in Section 3.3, identified the Site geology and hydrogeology and characterized the nature and extent of affected material remaining on Site.

The Site geology and hydrogeology are presented in Section 4.1. The chemical analytical results of the investigation are presented in Section 4.2.

4.1 GEOLOGIC/HYDROGEOLOGIC CONDITIONS

Twelve boreholes and four monitoring wells were installed to identify the geologic and hydrogeologic conditions at the Site. Stratigraphic and well instrumentation logs are presented in Appendix B.

The borehole stratigraphic logs indicate that clay/till deposits exists immediately below and around the affected material on Site. The clay/till unit is continuous below and across the Site. The thickness of this clay/till unit was not determined by on Site borings but is regionally identified in Section 2.1 to be approximately 100 to 250 feet thick.

In general, no distinct hydrostratigraphic units were identified at the Site. Only perched discontinuous water zones were identified to exist.

Water level elevations were measured before and after development for the four monitoring wells are presented on Table 4.1. Water level elevations for monitoring wells MW-1 and MW-2, do not correlate with the water level elevation in near by monitoring wells MW-3 and MW-4. This illustrates that the perched water off Site to the south and on Site to the west is not hydraulically connected to the perched water at the east end of the Site. In addition, no water was identified in boreholes SB-1, 2, 3, 4, 5, 7 and 9. This again indicates that the groundwater on Site is perched water only. As a result, the water is characterized as groundwater not in an aquifer.

4.2 CHEMICAL ANALYTICAL RESULTS

A total of fifteen soil samples and four water samples were collected and analyzed for various compounds as presented in Table 4.2. The laboratory analytical data is presented in Appendix D. Chain-of-Custody Records are presented in Appendix E. Data validation reports are presented in Appendix F.

A summary of detected compounds in soil compared to Michigan Type B 20 x Drinking Water and Direct Contact Cleanup Criteria is presented in Table 4.3.

Several compounds were detected above the Michigan Type B 20 x Drinking Water Cleanup Criteria for soil including vinyl chloride, in SB-10 at 7 to 8 feet below ground surface (bgs), toluene, in SB-10 at 7 to 8 feet bgs, ethylbenzene, in SB-10 at 7 to 8 feet bgs and SB-11 at 6 to 7 feet bgs, phenanthrene, in SB-8 at 4 to 5 feet bgs and SB-9 at 6 to 8 feet bgs and SB-11 at 2 to 4 feet bgs. Several inorganic analytes were also detected above the Michigan Type B 20 x Drinking Water Cleanup Criteria.

Benzo(a)pyrene, arsenic and lead were detected above the Michigan Type B Direct Contact Cleanup Criteria. Benzo(a)pyrene was detected in SB-8 at 4 to 5 feet bgs, SB-9 at 6 to 8 feet bgs, and SB-11 at 2 to 4 feet bgs above the Michigan Type B Direct Contact Criteria. Arsenic was detected in SB-10 at 7 to 8 feet bgs, and lead in SB-10 at 7 to 8 feet bgs and SB-11 at 2 to 4 feet bgs, above the Michigan Type B Direct Contact Cleanup Criteria.

Although Michigan Type B (or C) Direct Contact Cleanup Criteria are appropriate for this Site, the extent of affected material was estimated based on the Michigan Type B 20 x Drinking Water Cleanup Criteria. The selection of the Type B 20 x Drinking Water Cleanup Criteria was made to ensure that all affected material on-Site was contained within the estimated extent of affected material. The estimated extent of affected material is presented on Figure 4.1.

A summary of the compounds detected in perched water is compared to the Michigan Type B Drinking Water Cleanup Criteria in Table 4.4. It should be noted that Table 4.4 is presented for demonstrative purposes only. The Michigan Type B Drinking Water Criteria do not apply to the Site.

5.0 SOIL REMOVAL ACTIVITIES

To support the Centerpoint Parkway road construction project and property transaction, affected soil on Site was characterized and removed.

The soil removal was comprised of the following components:

- characterize soil for disposal;
- excavate, transport and dispose of soil (Phase I and II);
- sample collection to verify all affected soil was removed; and
- backfill and restore site.

5.1 CHARACTERIZE SOIL FOR DISPOSAL

In order to facilitate the removal and disposal of the affected soil off Site, the soil was characterized for disposal. The soil characterized for disposal included the soil stockpiled during the Phase I excavation (see Section 3.2) and the in-situ soil identified as affected in the Phase II investigation (see Sections 3.3 and 4.0).

Twelve soil samples were collected from the stockpiled soil, ten from the "potentially clean" soil (approximately 32,000 cy), and two from the "potentially affected" soil (approximately 3,500 cy). The sample summary is presented in Table 4.2. Laboratory analytical results are presented in Appendix D.

The analytical results for the soil samples collected from the "potentially clean" soil indicated that the soil was non-hazardous and the concentrations of all compounds analyzed are below the Michigan Type C Direct Contact Cleanup Criteria. This "potentially clean" soil was used at the Facility to construct berms or other landscaping structures.

The analytical results for the soil samples collected from the "potentially affected" soil indicated the soil was non-hazardous and was suitable for disposal at a Michigan Type II landfill.

The in-situ affected soil was then further characterized during the Phase II investigation. Analytical results from soil samples FR-103, 111 and 112 indicated that the affected soil was non-hazardous and suitable for disposal at a Michigan Type II landfill.

A memorandum presenting the volume of soil to be disposed, analytical results, and the Generator's Waste Profile Sheet for the disposal at a Michigan Type II landfill of the above identified soil is presented in Appendix G.

5.2 SOIL EXCAVATION, TRANSPORTATION AND DISPOSAL

During the period from October 13, 1994 to October 18, 1994 approximately 6,500 cubic yards of soil, stockpiled (Phase I) and in-situ (Phase II), were excavated, loaded, and transported to Waste Management's Eagle Valley Recycling and Disposal Facility in Orion, Michigan.

Approximately six inches of soil was removed from underneath the stockpiled soil to assure that all affected soil was removed and disposed properly.

The limits of the in-situ excavation were determined in the field based on the results of the Phase II investigation (see Section 3.3), and field screening of head-space samples with a PID, with the exception of the western edge of the excavation.

The western edge of the excavation was approximately five feet west of the right of way clearance for the road that is to be constructed through the Site. The west wall of the excavation contained affected soil and no verification samples were collected. The west edge of the excavation was stopped at this location at the request of GM. Excavation limits are presented on Figure 5.1.

During the excavation of the affected soil an old clay sewer line was encountered. The line and associated bedding were filled with water. Approximately 30,000 gallons of water were pumped into two frac tanks on site, sampled, (sample number W-103194-BP-001) and treated by the GM Pontiac East Waste Water Treatment Plant. Laboratory analytical results for the sample collected from the frac tanks are presented in Appendix D. No other substantial water was encountered during the excavation. The clay sewer line and associated bedding material was disposed along with the affected soil.

5.3 VERIFICATION SAMPLING

Once head-space readings from the PID meter indicated no further contamination was detectable (i.e., <1ppm), verification samples were collected in accordance with MDNR guidance on verification sampling, with the exception of the west side wall. Excavation limits and verification sample locations are presented on Figure 5.1. A summary of verification samples collected is presented in Table 4.2.

Following receipt of the analytical results, one sample, sample number FR-011, was identified to contain constituents above Michigan Type B 20x Drinking Water Cleanup Criteria for soil. An additional excavation of approximately 20 cubic yards of soil was undertaken on December 20, 1994. An additional verification sample was collected (sample number S-122094-BP-001). The analytical results of this additional sample indicated that all compounds were below the Michigan Type B 20x Drinking Water Cleanup Criteria. A summary of analytical results for all verification samples collected is presented in Table 5.1.

Laboratory Analytical results are presented in Appendix D. Chain of Custody Records are presented in Appendix E. Validation reports are presented in Appendix F.

5.4 BACKFILLING

The Phase II excavation was backfilled with clean aggregate by Burton Malow under the direction of GM.

6.0 SUMMARY

The following summary has been prepared based on the information obtained during the on-going investigations and during the soil removal action.

1. All affected soil in the right of way of the road to be constructed has been removed;

2. The groundwater at the Site is not continuous, and exists only in perched zones (i.e., groundwater not in an aquifer);

3. Excavated soil and water pumped from the excavation were characterized and properly disposed;

4. In total, approximately 6,500 cubic yards of soil and 30,000 gallons of water were removed, characterized and disposed;

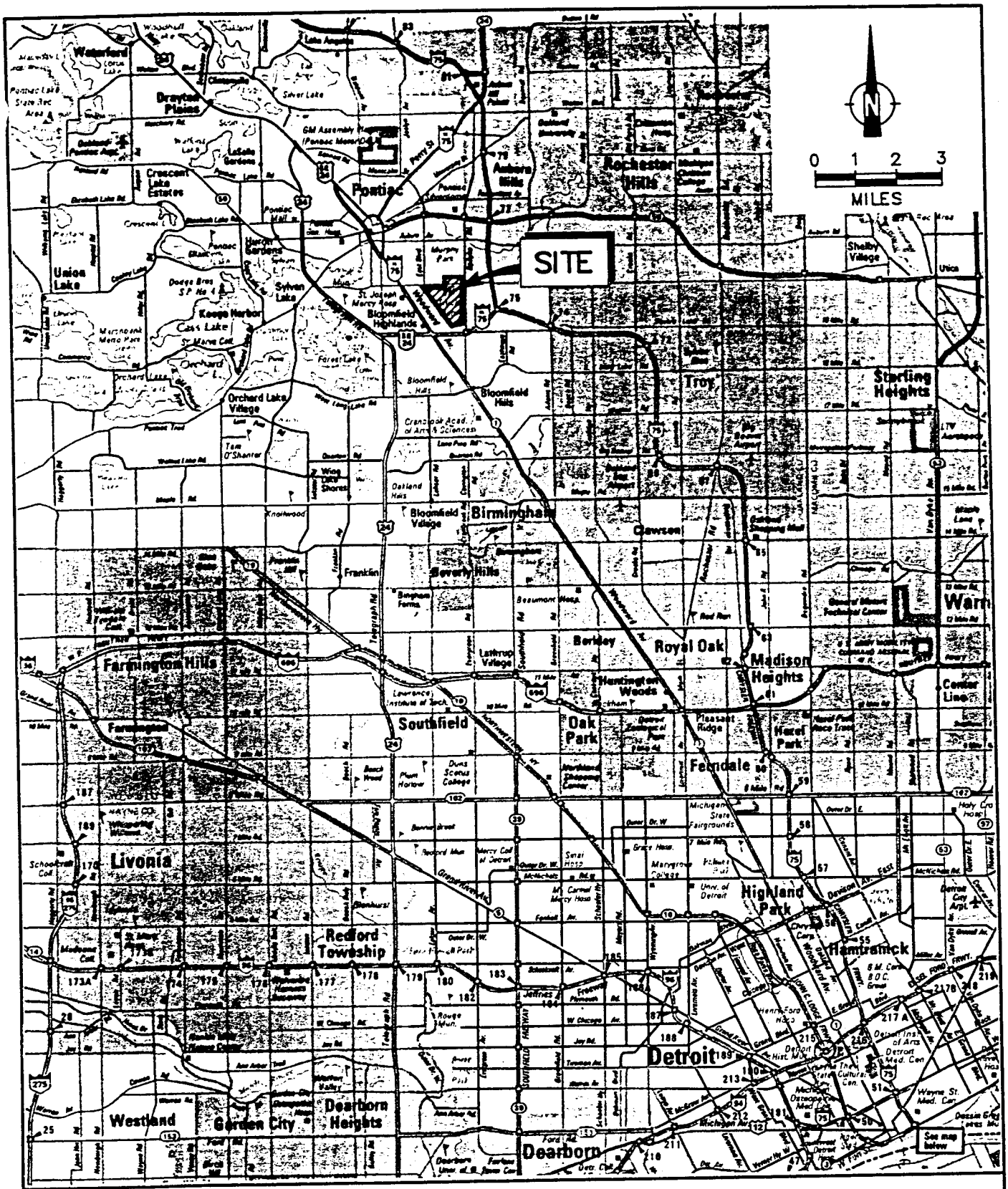
5. Verification samples were collected in accordance with MDNR guidance, with exception of the west side wall;

6. Analytical results of the verification samples indicate all affected soil, with the exception of the west side wall, was removed;

7. The excavation was backfilled with compacted backfill to match existing grade;

8. Approximately 5,000 cubic yards of affected soil remain on the GM Pontiac East Property; and

9. Stratigraphic logs indicate the fill and underlying geologic materials are clay/till which limit the potential movement of contaminants.



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 25/95 (W) REV.0

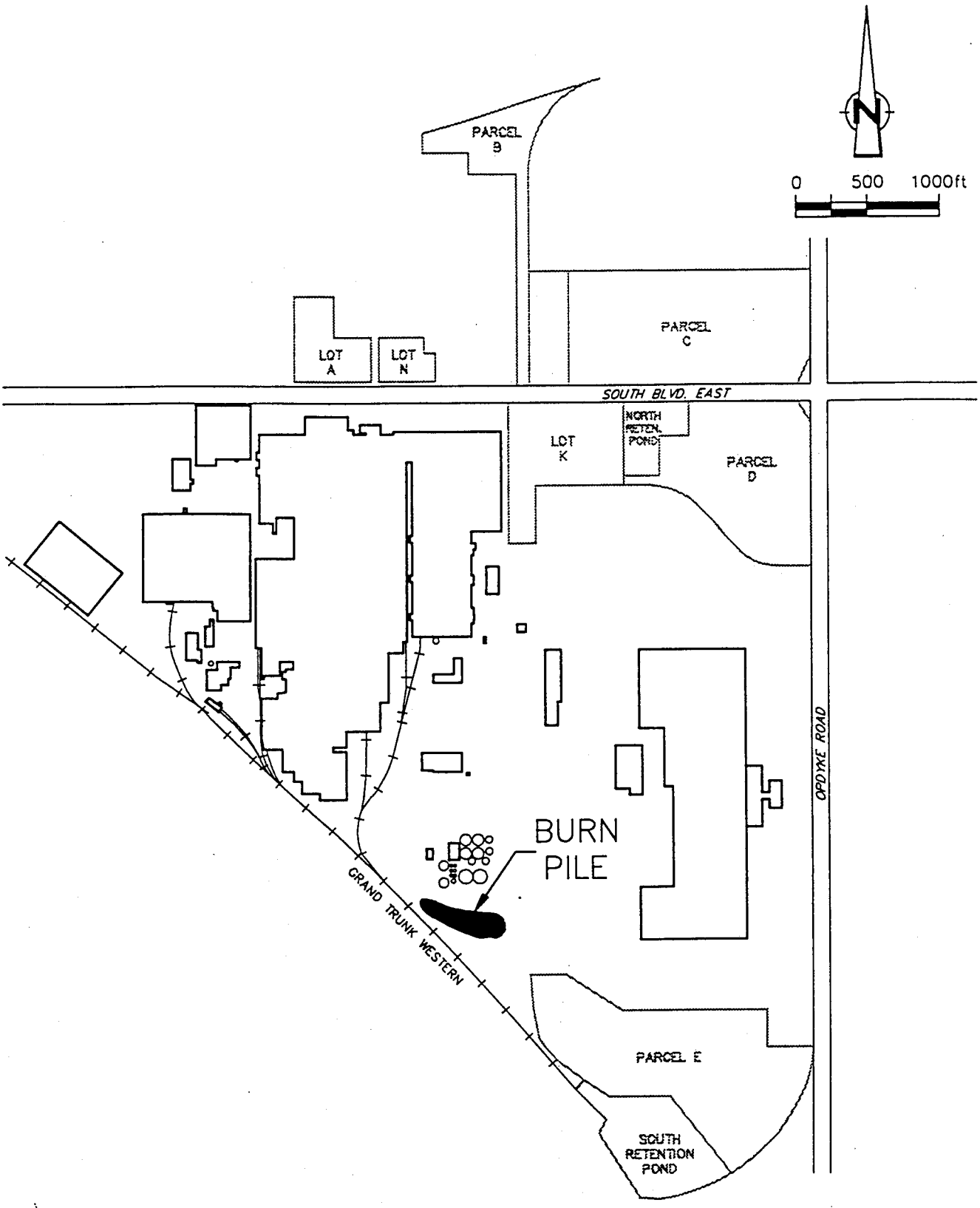


figure 1.2

SITE LOCATION
BURN PILE
PONTIAC CENTRAL/EAST MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 20/95(D) REV.0 (P-01)

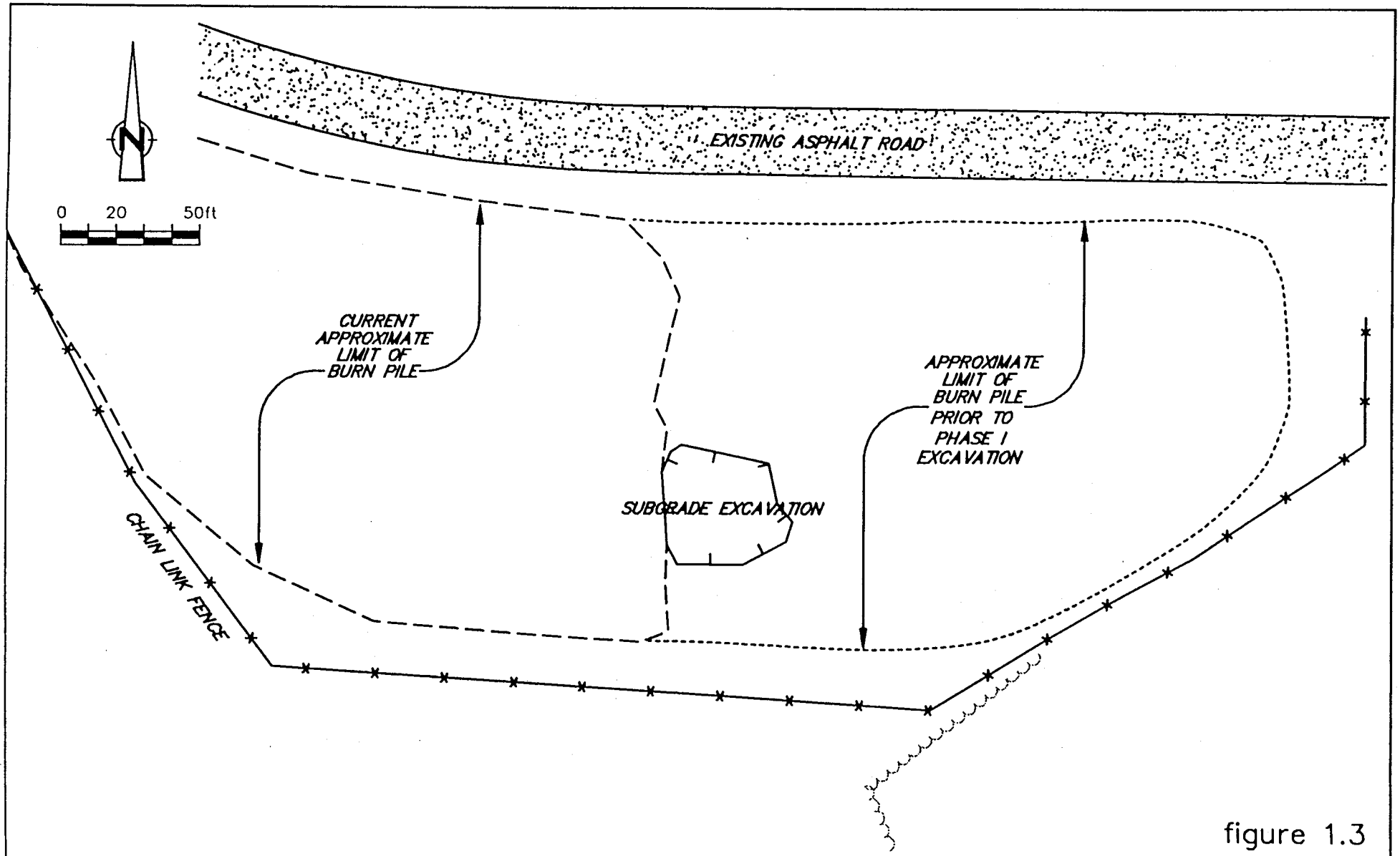


figure 1.3

SITE PLAN
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 20/95(D) REV.0 (P-02)

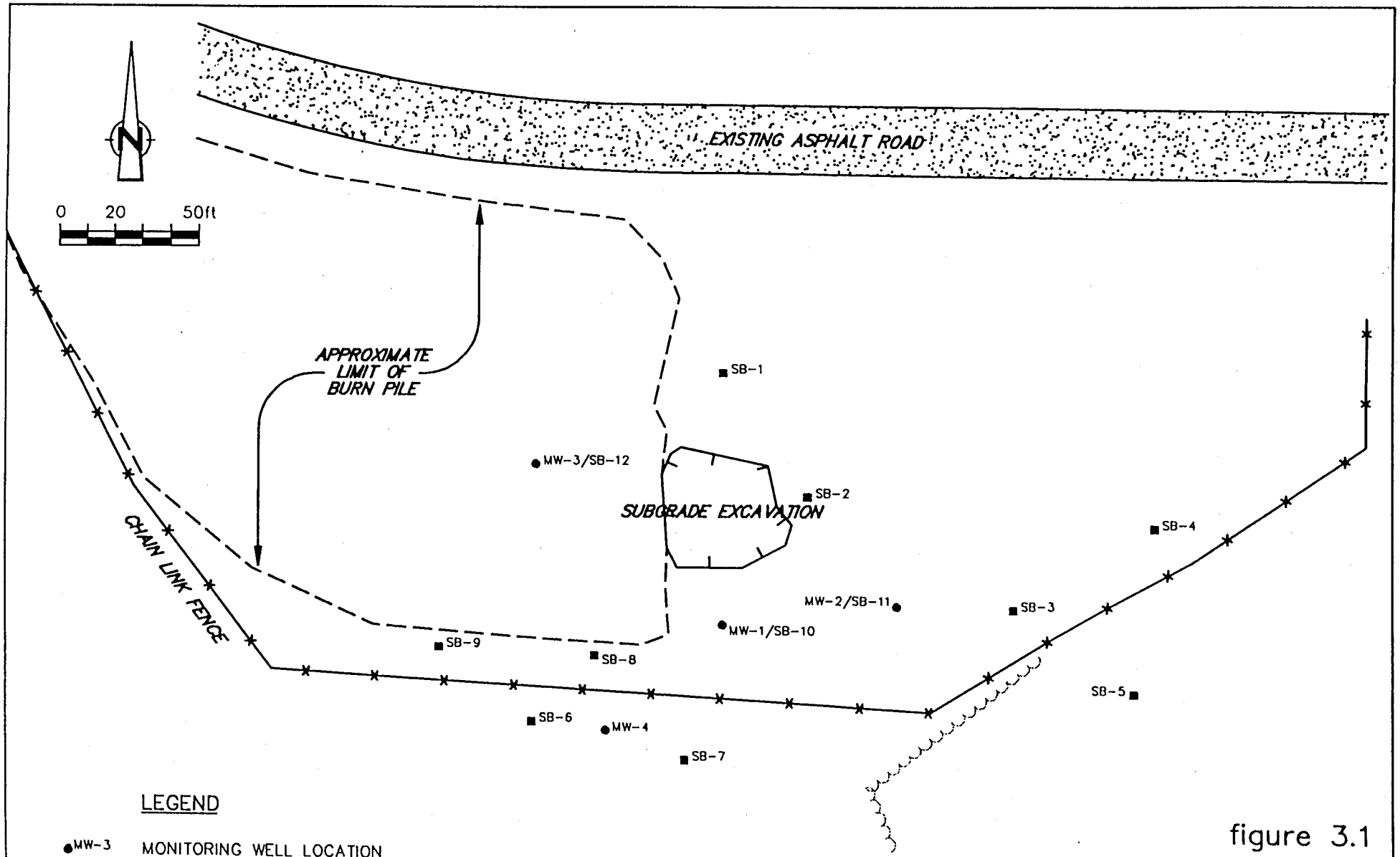


figure 3.1

BOREHOLE AND MONITORING WELL LOCATIONS
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 26/95(D) REV.0 (P-03)

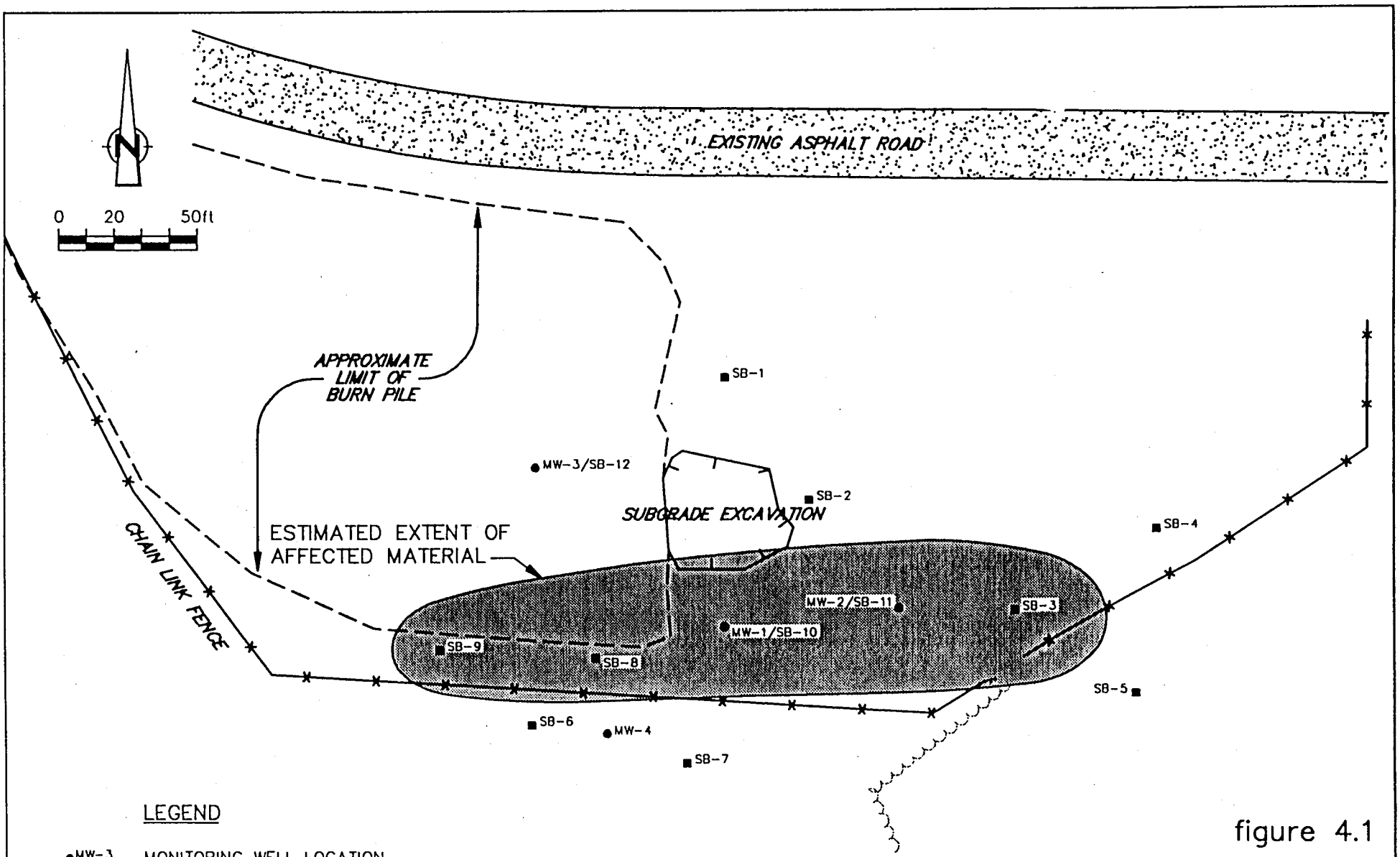


figure 4.1

ESTIMATED EXTENT OF AFFECTED MATERIAL
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 26/95(D) REV.0 (P-04)

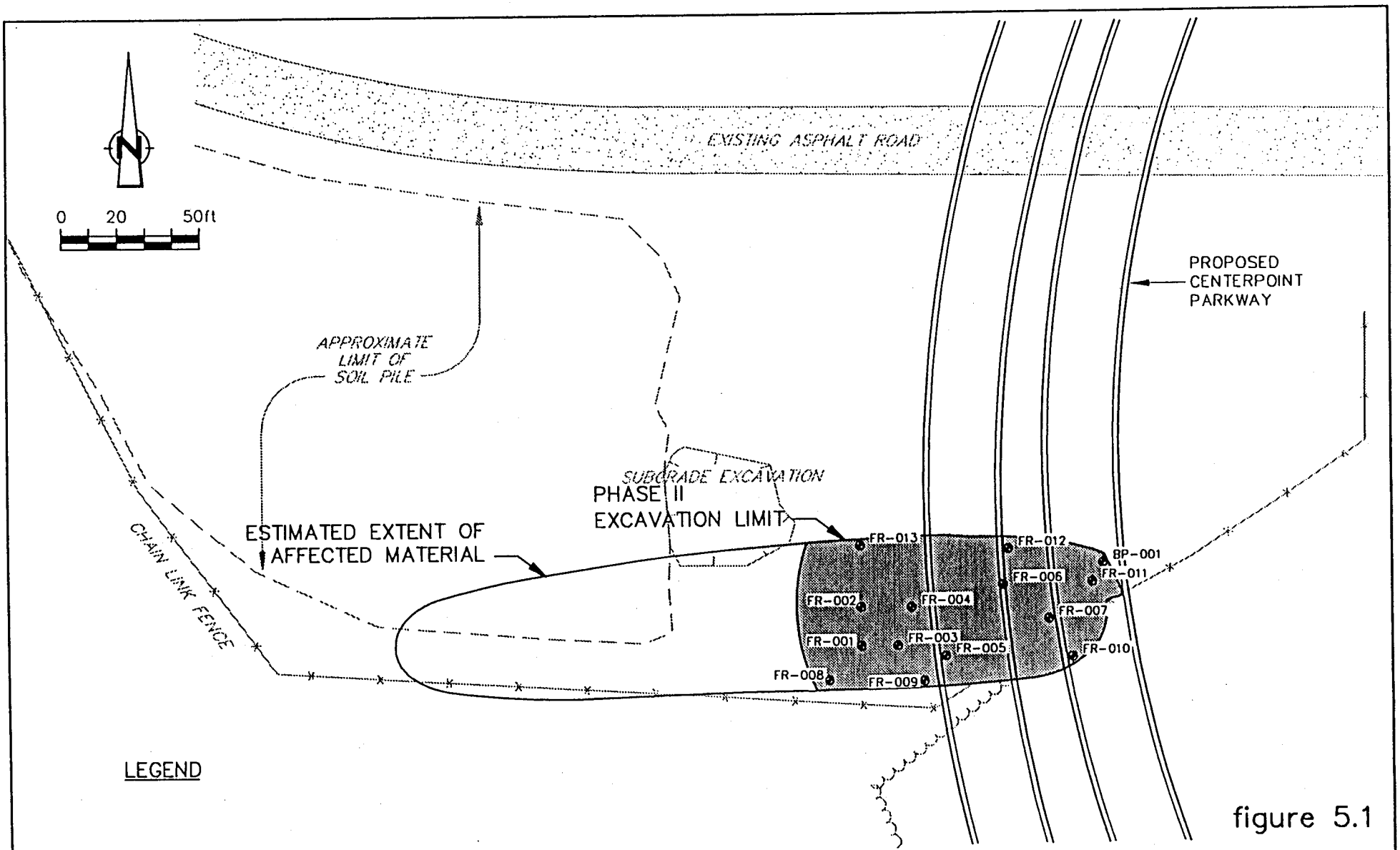


figure 5.1

EXCAVATION LIMITS AND VERIFICATION SAMPLING LOCATIONS
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (16) JAN 26/95(D) REV.0 (P-05)

TABLE 4.1

PERCHED WATER ELEVATIONS
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Monitoring Well	*Top of Casing Elevation (feet AMSL)*	*Water Elevation 8/25/94 (feet AMSL)*	*Water Elevation 8/26/94 (feet AMSL)*
MW-1	949.80	941.22	941.21
MW-2	950.14	941.24	941.23
MW-3	977.54	938.30	938.29
MW-4	946.79	938.27	938.28

Notes:

AMSL = Above Mean Sea Level

TABL .2

SAMPLE SUMMARY
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Number	*Sample Location*	*Depth (feet below ground surface)*	*Analysis*
W-082694-FR-001	MW-1	water	VOC, SVOC
W-082694-FR-002	MW-2	water	VOC, SVOC
W-082694-FR-003	MW-3	water	VOC, SVOC
W-082694-FR-004	MW-4	water	VOC, SVOC
S-081094-FR-100	SB-1	5-6'	VOC, SVOC
S-081094-FR-101	SB-1	10-12'	VOC, SVOC
S-081294-FR-102	SB-2	4-5'	VOC, SVOC
S-081294-FR-103	SB-3	4-6'	VOC, SVOC, TCLP Lead, Cadmium
S-081294-FR-104	SB-4	6-8'	VOC, SVOC
S-081294-FR-105	SB-5	12-14'	VOC, SVOC, Lead
S-081594-FR-106	SB-6	6-8'	VOC, SVOC, Lead
S-081594-FR-107	SB-7	4-5.5'	VOC, SVOC, Lead
S-081694-FR-108	SB-8	4-5'	VOC, SVOC
S-081694-FR-109	SB-9	6-8'	VOC, SVOC
S-081694-FR-110	SB-10	7-8'	VOC, SVOC, Metals,PCB
S-081794-FR-111	SB-11	2-4'	VOC, SVOC, Metals,PCB, TCLP Lead, Cadmium
S-081794-FR-112	SB-11	6-7'	VOC, SVOC, Metals,PCB, TCLP Lead, Cadmium
S-081794-FR-113	SB-12	35-37'	VOC,SVOC
S-081794-FR-114	SB-12	43-45'	VOC,SVOC
S-091294-FR-402	"Potentially affected" soil	2-4'	(a)
S-091294-FR-403	"Potentially clean" soil	2-4'	(b)
S-091294-FR-404	"Potentially affected" soil	2-4'	(a)
S-091294-FR-405	"Potentially clean" soil	2-4'	(a)
S-091394-FR-406	"Potentially clean" soil	2-4'	(b)
S-091394-FR-407	"Potentially clean" soil	2-4'	(a)
S-091394-FR-408	"Potentially clean" soil	2-4'	(b)
S-091394-FR-409	"Potentially clean" soil	2-4'	(a)

Notes:

(a) TCLP for VOC, SVOC, and MI metals, total PCB, flash point, cyanide and reactive sulfide

(b) TCLP for VOC, SVOC, and MI metals, total VOC, SVOC, and PCB, flash point, cyanide and reactive sulfide

SAMPLE SUMMARY
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Number	*Sample Location*	*Depth (feet below ground surface)*	*Analysis*
S-091394-FR-410	"Potentially clean" soil	2-4'	(b)
S-091394-FR-411	"Potentially clean" soil	2-4'	(a)
S-091394-FR-412	"Potentially clean" soil	2-4'	(b)
S-091394-FR-413	"Potentially clean" soil	2-4'	(a)
S-101894-FR-001	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-002	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-003	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-004	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-005	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-006	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-007	Excavation	Floor	VOC, SVOC, Metals
S-101894-FR-008	Excavation	South Wall - West	VOC, SVOC, Metals
S-101894-FR-009	Excavation	East	VOC, SVOC, Metals
S-101894-FR-010	Excavation	East Wall - South	VOC, SVOC, Metals
S-101894-FR-011	Excavation	East Wall - North	VOC, SVOC, Metals
S-101894-FR-012	Excavation	North Wall - East	VOC, SVOC, Metals
S-101894-FR-013	Excavation	North Wall - West	VOC, SVOC, Metals
W-103194-BP-001	Frac Tank	Water	VOC, SVOC, Metals, PCB/Pesticides
S-122094-BP-001	Excavation	East Wall - North	SVOC

Notes:

(a) TCLP for VOC, SVOC, and MI metals, total PCB, flash point, cyanide and reactive sulfide

(b) TCLP for VOC, SVOC, and MI metals, total VOC, SVOC, and PCB, flash point, cyanide and reactive sulfide

TABL

SUMMARY OF DETECTED ANALYTES IN VERIFICATION SAMPLES
BURN PILE EXCAVATION
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION SAMPLE LOCATION	Michigan Type B Criteria(a)		FR-001 Floor	FR-002 Floor	FR-003 Floor	FR-004 Floor	FR-005 Floor	FR-006 Floor	FR-007 Floor	FR-008 South wall- West	FR-009 South wall-East
PARAMETER	20X Drinking Water	Direct Contact Value									
VOC (ug/kg)											
Benzene	24	13,000	11	ND(10)	ND(550)	31	ND(5,600)	ND(10)	ND(60)	ND(10)	ND(10)
Ethylbenzene	1,500	7,500,000	320	ND(10)	15,000	ND(10)	78,000	ND(10)	ND(60)	ND(10)	ND(10)
Toluene	16,000	17,000,000	21	ND(10)	ND(550)	ND(10)	ND(5,600)	ND(10)	ND(60)	ND(10)	ND(10)
Trichloroethene	44	24,000	ND(10)	ND(10)	ND(550)	ND(10)	ND(5,600)	ND(10)	ND(60)	ND(10)	ND(10)
Vinyl Chloride	10(c)	180	ND(10)	20	ND(550)	ND(10)	ND(5,600)	ND(10)	ND(60)	ND(10)	ND(10)
Total Xylenes	5,600	140,000,000	740	ND(30)	45,000	ND(30)	400,000	ND(30)	2,100	ND(30)	ND(30)
SVOC (ug/kg)											
2,4-Dimethylphenol	7,000	13,000,000	ND(330)	ND(330)	420	ND(330)	420	ND(330)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	–	–	ND(330)	ND(330)	ND(330)	ND(330)	560	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	140,000	260,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	1,800	1,800	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(a)pyrene	330(c)	330(c)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	1,800	1,800	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	18,000	18,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	930,000	930,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Di-n-butylphthalate	17,000	31,000,000	ND(330)	ND(330)	ND(330)	ND(330)	540	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	180,000	180,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Fluoranthene	17,000	31,000,000	730	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-c,d)pyrene	1,800	1,800	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Naphthalene	5,000	9,300,000	ND(330)	ND(330)	ND(330)	ND(330)	850	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	500	930,000	570	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Pyrene	10,000	19,000,000	600	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Inorganics (mg/kg)											
Aluminum	6900(b)	6900(b)	4,900	5,800	5,800	5,100	7,300	4,600	6,400	5,000	4,500
Antimony	0.048	91	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)	ND(0.25)
Arsenic	5.8(b)	5.8(b)	3.9	5.2	3.1	3.8	4.5	1.7	4.1	4.9	1.9
Barium	75(b)	18,000	28	23	25	24	32	17	25	27	13
Berylium	-	-	0.33	0.36	0.37	0.34	0.46	0.33	0.42	0.38	ND(0.20)
Cadmium	1.2(b)	130	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	0.07
Calcium	-	-	70,000	72,000	68,000	72,000	66,000	82,000	64,000	74,000	980
Chromium	18(b)	1,200	9.1	11	9.9	8.8	12	7.3	10	9.5	7.8
Cobalt	-	-	17	18	19	18	21	16	19	20	9.3
Copper	32(b)	9,800	12	11	11	11	12	10	11	16	3.4
Iron	12000(b)	12000(b)	12,000	12,000	13,000	11,000	14,000	11,000	13,000	13,000	6,600
Lead	21(b)	400	5.6	4.8	6.1	5.0	7.2	5.0	5.8	12	3.4
Magnesium	-	-	20,000	20,000	20,000	2,300	19,000	24,000	18,000	20,000	990
Maganese	440(b)	1,200	290	230	210	270	260	240	230	260	130
Nickel	20(b)	20,000	14	15	15	14	16	13	15	16	5.6
Potassium	-	-	850	1,100	990	920	1,400	780	1,400	1,200	250
Selenium	0.7	1,300	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)	ND(0.50)
Silver	1.0(b)	1,200	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)	ND(0.20)
Sodium	3,000	1,000,000	53	68	56	50	72	49	63	92	22
Vanadium	1.2	2,200	14	18	16	15	21	13	19	16	13
Zinc	47(b)	86,000	33	35	34	32	37	37	35	76	12

Notes:

(a) - MERA Operational Memorandum #8, February 4, 1994 and addendum dated June 21, 1994.
(b) - MERA Operational Memorandum #15, September 30, 1993.
(c) - Michigan Target Method Detection Limit has been substituted for the Michigan Type B Cleanup Criteria.
( ) - number in parenthesis indicates the method detection limit.
J - The reported result is estimated.
R - The result is unusable.
* - Benzo(k)fluoranthene coeluted with benzo(b)fluoranthene. Total value is assumed to be benzo(b)fluoranthene.
ND - Not Detected

TABL

SUMMARY OF DETECTED ANALYTES IN VERIFICATION SAMPLES
BURN PILE EXCAVATION
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION			FR-010	FR-011	BP-001	FR-012	FR-013
SAMPLE LOCATION			East wall- South	East wall- North	East wall- North	North wall- East	North wall- West
	Michigan Type B Criteria(a)						
PARAMETER	20X Drinking Water	Direct Contact Value					
VOC (ug/kg)							
Benzene	24	13,000	ND(10)	ND(30)	NA	ND(10)	ND(10)
Ethylbenzene	1,500	7,500,000	ND(10)	410	NA	ND(10)	36
Toluene	16,000	17,000,000	ND(10)	140	NA	ND(10)	ND(10)
Trichloroethene	44	24,000	ND(10)	ND(30)	NA	410	ND(10)
Vinyl Chloride	10(c)	180	ND(10)	ND(30)	NA	ND(10)	ND(10)
Total Xylenes	5,600	140,000,000	ND(30)	1,700	NA	ND(30)	170
SVOC (ug/kg)							
2,4-Dimethylphenol	7,000	13,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
2-Methylnaphthalene	–	–	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Anthracene	140,000	260,000,000	ND(330)	810	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	1,800	1,800	ND(330)	2,300	340	ND(330)	ND(330)
Benzo(a)pyrene	330(c)	330(c)	ND(330)	1,100	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	1,800	1,800	ND(330)	2200J*	370	ND(330)	ND(330)
Benzo(k)fluoranthene	18,000	18,000	ND(330)	R*	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	930,000	930,000	ND(330)	660	ND(330)	ND(330)	ND(330)
Di-n-butylphthalate	17,000	31,000,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Chrysene	180,000	180,000	ND(330)	1,200	340	ND(330)	ND(330)
Fluoranthene	17,000	31,000,000	ND(330)	4,800	650	ND(330)	ND(330)
Indeno(1,2,3-c,d)pyrene	1,800	1,800	ND(330)	600	ND(330)	ND(330)	ND(330)
Naphthalene	5,000	9,300,000	ND(330)	ND(330)	ND(330)	ND(330)	ND(330)
Phenanthrene	500	930,000	ND(330)	3,100	480	ND(330)	ND(330)
Pyrene	10,000	19,000,000	ND(330)	3,600	640	ND(330)	ND(330)
Inorganics (mg/kg)							
Aluminum	6900(b)	6900(b)	2,900	6,000	NA	5,300	5,300
Antimony	0.048	91	0.34	1.4	NA	ND(0.25)	ND(0.25)
Arsenic	5.8(b)	5.8(b)	2.0	5.9	NA	4.7	3.3
Barium	75(b)	18,000	8.8	130	NA	20	29
Berylium	-	-	0.21	0.39	NA	0.31	0.32
Cadmium	1.2(b)	130	ND(0.05)	1.6	NA	ND(0.05)	ND(0.05)
Calcium	-	-	57,000	50,000	NA	70,000	70,000
Chromium	18(b)	1,200	5.1	33	NA	11	9.9
Cobalt	-	-	11	21	NA	18	16
Copper	32(b)	9,800	7.2	55	NA	11	13
Iron	12000(b)	12000(b)	6,800	15,000	NA	12,000	11,000
Lead	21(b)	400	2.2	250	NA	4.0	12
Magnesium	-	-	16,000	15,000	NA	19,000	22,000
Maganese	440(b)	1,200	210	280	NA	200	260
Nickel	20(b)	20,000	6.9	23	NA	14	12
Potassium	-	-	600	720	NA	900	810
Selenium	0.7	1,300	ND(0.50)	1.1	NA	ND(0.50)	ND(0.50)
Silver	1.0(b)	1,200	ND(0.20)	0.31	NA	ND(0.20)	ND(0.20)
Sodium	3,000	1,000,000	47	110	NA	96	53
Vanadium	1.2	2,200	12	17	NA	17	18
Zinc	47(b)	86,000	25	220	NA	35	38

Notes:

(a) - MERA Operational Memorandum #8, February 4, 1994 and addendum dated June 21, 1994.
(b) - MERA Operational Memorandum #15, September 30, 1993.
(c) - Michigan Target Method Detection Limit has been substituted for the Michigan Type B Cleanup Criteria.

J - The reported result is estimated.
R - The result is unusable.
* - Benzo(k)fluoranthene coeluted with benzo(b)fluoranthene. Total value is assumed to be benzo(b)fluoranthene.
ND - Not Detected
Number in parenthesis is the method detection limit.

TABLE 4.3

SUMMARY OF DETECTED ANALYTES IN BOREHOLE SOIL SAMPLES
BURN PILE
PONTIAC EAST MANUFACUTRING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION			FR-100	FR-101	FR-102	FR-103	FR-104	FR-105	FR-106	FR-107
LOCATION			SB-1	SB-1	SB-2	SB-3	SB-4	SB-5	SB-6	SB-7
DEPTH (feet bgs)			5-6	10-12	4-5	4-6	6-8	12-14	6-8	4-5.5
	Michigan Type B Criteria(a)									
PARAMETER	20 X Drinking Water	Direct Contact Value								
VOC (ug/kg)										
Vinyl Chloride	10(c)	180	ND (10)	ND (10)	ND (50)	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
Methylene Chloride	92	51,000	ND (10)	ND (10)	ND (50)	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
cis-1,2-Dichloroethene	1,500	860,000	ND (10)	ND (10)	ND (50)	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
Benzene	24	13,000	ND (10)	ND (10)	ND (50)	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
Toluene	16,000	17,000,000	ND (10)	ND (10)	ND (50)	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
Ethylbenzene	1,500	7,500,000	ND (10)	ND (10)	53	ND (50)	ND (10)	ND (10)	ND (10)	ND (10)
Total Xylenes	5,600	140,000,000	ND (30)	ND (30)	480	74,000	ND (30)	ND (30)	ND (30)	ND (30)
SVOC (ug/kg)										
2-Methylnaphthalene	-	-	ND (330)	ND (330)	ND (330)	560	ND (330)	ND (330)	ND (330)	ND (330)
Acenaphthene	24,000	45,000,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Anthracene	140,000	260,000,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)anthracene	1,800	1,800	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)pyrene	330(c)	330(c)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(b)fluoranthene	1,800	1,800	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(g,h,i)perylene	930,000	930,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(k)fluoranthene	18,000	18,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Chrysene	180,000	180,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Di-n-butylphthalate	17,000	31,000,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Dibenzofuran	-	-	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Flourene	17,000	31,000,000	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Fluoranthene	17,000	31,000,000	620	ND (330)	ND (330)	690	ND (330)	ND (330)	ND (330)	ND (330)
Indeno(1,2,3-c,d)pyrene	1,800	1,800	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Naphthalene	5,000	9,300,000	ND (330)	ND (330)	ND (330)	1,300	ND (330)	ND (330)	ND (330)	ND (330)
Phenanthrene	500	930,000	530	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Pyrene	10,000	19,000,000	ND (330)	ND (330)	ND (330)	380	ND (330)	ND (330)	ND (330)	ND (330)
INORGANICS (mg/kg)										
Aluminum	6900 (b)	6900(b)	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	0.5	91	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	5.8(b)	5.8(b)	NA	NA	NA	NA	NA	NA	NA	NA
Barium	48	18,000	NA	NA	NA	NA	NA	NA	NA	NA
Berylium	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	1.2(b)	130	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	18(b)	1,200	NA	NA	NA	NA	NA	NA	NA	NA
Cobalt	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Copper	32(b)	9,800	NA	NA	NA	NA	NA	NA	NA	NA
Iron	12000(b)	12000(b)	NA	NA	NA	NA	NA	NA	NA	NA
Lead	21(b)	400	NA	NA	NA	NA	NA	6.4	11	6.3
Magnesium	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	440(b)	1,200	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	0.13(b)	78	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	20(b)	20,000	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	-	-	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	0.7	1,300	NA	NA	NA	NA	NA	NA	NA	NA
Silver	1.0(b)	1,200	NA	NA	NA	NA	NA	NA	NA	NA
Sodium	3,000	1,000,000	NA	NA	NA	NA	NA	NA	NA	NA
Thallium	0.5(c)	22	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	1.2	2,200	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	47(b)	86,000	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

(a) - MERA Operational Memorandum #8, February 4, 1994 and addendum dated June 21, 1994.
(b) - Type A Background levels from MERA Operational MEMORANDUM #15, September 30, 1993.
(c) - Michigan Target Method Detection Limit has been substituted for the Michigan Type B Cleanup Criteria.
ND - Not Detected
NA - Not Analysed
Memorandum #15, September 30,1993 has been substituted for the Michigan Type B Cleanup Criteria.
Number in parenthesis indicates method detection limit.

TABLE 4.3

SUMMARY OF DETECTED ANALYTES IN BOREHOLE SOIL SAMPLES
BURN PILE
PONTIAC EAST MANUFACUTRING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION			FR-108	FR-109	FR-110	FR-111	FR-112	FR-113	FR-114
LOCATION			SB-8	SB-9	SB-10	SB-11	SB-11	SB-12	SB-12
DEPTH (feet bgs)			4-5	6-8	7-8	2-4	6-7	35-37	43-45
	Michigan Type B Criteria(a)								
PARAMETER	20 X Drinking Water	Direct Contact Value							
VOC (ug/kg)									
Vinyl Chloride	10(c)	180	ND (50)	ND (10)	36	ND (10)	ND (50)	ND (50)	ND (10)
Methylene Chloride	92	51,000	ND (50)	ND (10)	ND (50)	66	ND (50)	ND (50)	ND (10)
cis-1,2-Dichloroethene	1,500	860,000	ND (50)	ND (10)	27	ND (10)	380	ND (50)	ND (10)
Benzene	24	13,000	ND (50)	ND (10)	15	ND (10)	ND (50)	ND (50)	13
Toluene	16,000	17,000,000	ND (50)	ND (10)	370,000	ND (10)	15,000	ND (50)	ND (10)
Ethylbenzene	1,500	7,500,000	130	ND (10)	170,000	70	10,000	74	ND (10)
Total Xylenes	5,600	140,000,000	940	ND (30)	760,000	990	46,000	1,500	31
SVOC (ug/kg)									
2-Methylnaphthalene	-	-	2,000	870	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Acenaphthene	24,000	45,000,000	800	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Anthracene	140,000	260,000,000	360	360	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Benzo(a)anthracene	1,800	1,800	840	840	ND (330)	850	ND (330)	ND (330)	ND (330)
Benzo(a)pyrene	330(c)	330(c)	420	530	ND (330)	640	ND (330)	ND (330)	ND (330)
Benzo(b)fluoranthene	1,800	1,800	850	800	ND (330)	1,400	ND (330)	ND (330)	ND (330)
Benzo(g,h,i)perylene	930,000	930,000	460	690	ND (330)	890	ND (330)	ND (330)	ND (330)
Benzo(k)fluoranthene	18,000	18,000	410	610	ND (330)	470	ND (330)	ND (330)	ND (330)
Chrysene	180,000	180,000	670	830	ND (330)	1,200	ND (330)	ND (330)	ND (330)
Di-n-butylphthalate	17,000	31,000,000	2,600	1,600	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Dibenzofuran	-	-	660	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Flourene	17,000	31,000,000	750	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Fluoranthene	17,000	31,000,000	1,400	1,600	ND (330)	1,100	ND (330)	ND (330)	ND (330)
Indeno(1,2,3-c,d)pyrene	1,800	1,800	460	730	ND (330)	620	ND (330)	ND (330)	ND (330)
Naphthalene	5,000	9,300,000	4,800	930	ND (330)	ND (330)	ND (330)	ND (330)	ND (330)
Phenanthrene	500	930,000	2,400	1,800	ND (330)	540	ND (330)	ND (330)	ND (330)
Pyrene	10,000	19,000,000	2,100	2,900	ND (330)	1,400	ND (330)	ND (330)	ND (330)
INORGANICS (mg/kg)									
Aluminum	6900 (b)	6900(b)	NA	NA	4,100	4,100	5,100	NA	NA
Antimony	0.5	91	NA	NA	11	37	0.14	NA	NA
Arsenic	5.8(b)	5.8(b)	NA	NA	6.1	5.4	5.6	NA	NA
Barium	48	18,000	NA	NA	280	450	33	NA	NA
Berylium	-	-	NA	NA	0.24	0.18	0.45	NA	NA
Cadmium	1.2(b)	130	NA	NA	32	18	0.4	NA	NA
Calcium	-	-	NA	NA	34,000	27,000	64,000	NA	NA
Chromium	18(b)	1,200	NA	NA	68	55	10	NA	NA
Cobalt	-	-	NA	NA	8.3	9.1	6.6	NA	NA
Copper	32(b)	9,800	NA	NA	310	110	13	NA	NA
Iron	12000(b)	12000(b)	NA	NA	55,000	11,000	11,000	NA	NA
Lead	21(b)	400	NA	NA	400	1,100	14	NA	NA
Magnesium	-	-	NA	NA	7,700	12,000	18,000	NA	NA
Manganese	440(b)	1,200	NA	NA	400	200	280	NA	NA
Mercury	0.13(b)	78	NA	NA	<0.023	0.019	0.011	NA	NA
Nickel	20(b)	20,000	NA	NA	54	43	13	NA	NA
Potassium	-	-	NA	NA	490	520	790	NA	NA
Selenium	0.7	1,300	NA	NA	<1.7	2	<2.4	NA	NA
Silver	1.0(b)	1,200	NA	NA	2.2	0.29	0.043	NA	NA
Sodium	3,000	1,000,000	NA	NA	130	120	93	NA	NA
Thallium	0.5(c)	22	NA	NA	<0.23	NA	NA	NA	NA
Vanadium	1.2	2,200	NA	NA	6.7	38	13	NA	NA
Zinc	47(b)	86,000	NA	NA	460	480	39	NA	NA

Notes:

(a) - MERA Operational Memorandum #8, February 4, 1994 and addendum dated June 21, 1994.
(b) - Type A Background levels from MERA Operational MEMORANDUM #15, September 30, 1993.
(c) - Michigan Target Method Detection Limit has been substituted for the Michigan Type B Cleanup Criteria.
ND - Not Detected
NA - Not Analysed
Memorandum #15, September 30,1993 has been substituted for the Michigan Type B Cleanup Criteria.
Number in parenthesis indicates method detection limit.

TABL .4

SUMMARY OF DETECTED ANALYTES IN PERCHED WATER SAMPLES
BURN PILE
PONTIAC EAST MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE IDENTIFICATION LOCATION	Michigan Type B Drinking Water Cleanup Criteria (a)	FR-001 MW-1	FR-002 MW-2	FR-003 MW-3	FR-004 MW-4
VOC (ug/kg)					
Vinyl Chloride	1(b)	2800	4300	3	41
Methylene Chloride	4.6	ND(5)	ND(5)	1	ND(1)
1,1-Dichloroethene	7	20	31	ND(1)	ND(1)
cis-1,2-Dichloroethene	77	7300	13,000	ND(1)	53
Benzene	1.2	130	190	3	ND(1)
Toluene	1500	26,000	30,000E	ND(1)	51
Ethylbenzene	680	7000	6500	ND(1)	46
Total Xylenes	13,000	29,000	29,000	8	200
Trans-1,2-Dichloroethene	120	13	22	ND(1)	ND(1)
SVOC (ug/kg)					
Bis (2-Ethylhexyl) phthalate	5(b)	ND(10)	ND(10)	ND(10)	ND(10)
2,4-Dimethylphenol	350	ND(10)	ND(10)	ND(10)	ND(10)
Dimethylphthalate	70,000	ND(10)	ND(10)	ND(10)	ND(10)
Di-n-Butylphthalate	840	ND(10)	ND(10)	ND(10)	ND(10)
Naphthalene	250	ND(10)	ND(10)	ND(10)	ND(10)

Notes:

(a) - MERA Operational Memorandum #8, February 4, 1994 and addendum dated June 21, 1994.

(b) - Michigan Target Method Detection Limit has been substituted for the Michigan Type B Cleanup Criteria.

( ) - number in parenthesis indicates the method detection limit.

ND - Not Detected

APPENDIX A

JUNE 29, 1994 LETTER SUMMARIZING ANALYTICAL RESULTS TO DATE

CRA
Consulting Engineers

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June 29, 1994

Reference No. 5770

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Mr. G. Keith West
Remediation Team - Plant Environment Department
ARGO "A" - 1004H
485 W. Milwaukee Avenue
Detroit, Michigan
U.S.A. 48202-3220

Dear Mr. West:

Re: Burn-Pile Data/Evaluation
GM Pontiac Central Manufacturing Facility
Pontiac, Michigan

This letter summarizes and evaluates the data collected in connection with the investigation of the stockpiled materials known as the "Burn-Pile", located at the GM Pontiac Central Manufacturing facility.

Table 1 summarizes the analytical data acquired on the Burn-Pile materials to date.

The analytical results for the borehole samples taken from the Burn-Pile are presented on Table 2. Also presented on Table 2 is the average concentration for all the samples taken. Figures 1 through 6 are cross-sections through the Burn-Pile which are spaced at 25-foot increments. These figures indicate the depth of various elevated lead concentrations with respect to the top of the pile.

The regulatory criteria of concern with respect to lead concentrations are:

Total Lead	-	400 mg/kg (MDNR Type B Direct Contact Value)
TCLP Lead	-	5 mg/L (Defines Characteristic Hazardous Waste)
Inert Criteria	-	<0.5 mg/L on TCLP (Act 641)

As outlined in CRA's letter of June 15, 1994, the following options are being considered by GM for the handling of the Burn-Pile materials:

1. Remove the materials to the G&H Landfill,

2. Remove the materials to Wayne Disposal Oakland Inc. Landfill in Auburn Hills, Michigan,

3. Relocate the materials on-Site.

Since the time of the June 15, 1994 letter, materials containing organic odors have been identified in the Burn-Pile. These materials will likely not be accepted at the above landfills and should not remain on Site. Therefore, the Burn-Pile materials should be segregated for final disposal into soils containing and not containing organics. The forth option available for the soils which contain organics is disposal at USPCI.

In order to dispose of the Burn-Pile materials at the G&H Landfill, or at Wayne Disposal, a full characterization of the materials will be required, including; Total TCL/TAL parameters, TCLP constituents, ignitability, reactivity and corrosivity. These analyses should be performed on representative samples of the stockpiled materials.

Current data, as presented on the attached Tables and Figures, indicates that the Burn-Pile materials which do not contain organics are inert and may be accepted at the G&H Landfill Site. However, insufficient data on compounds and analytes other than lead is available to confirm this, and as such, confirmatory sampling and complete characterization must first be conducted on representative samples, following excavation and segregation.

In summary, it will be necessary to excavate and stockpile the Burn-Pile materials, segregating them into "organic containing materials" and "clean materials". Each stockpile will require full characterization prior to disposal. Segregation of the material should be conducted under the supervision of CRA. Following characterization, a decision can be made, or verified, as to the final destination of each stockpile.

Please feel free to contact us should any questions or comments arise. We will await further specific directions from you with respect to the project.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Renato Pasqualoni, P.Eng.

RP/cz/17
Encl.
c.c.: Glenn Turchan (CRA)

TABLE 1

DATA SUMMARY

Date(s) Sampled	*Sampled By*	*Location(s) Sampled*	*Analysis Conducted*	*Results*	*Data Validation*
Unknown (possibly November 93)	GM	4-foot depth at unknown location by GM	TCLP Parameters	Lead had a leachate concentration of 11 mg/L. All other parameters below regulatory criteria	- Not provided - Schrader Laboratory used
March 94	GM	Boreholes A1-A5, B3-B4, C1-C5, D2-D4, E1-E5 by GM	Total Lead	Range 3.2 - 17,200 mg/L	- Not Provided - Schrader Laboratory used
April 94	GM/CRA	Boreholes F2-F5, G2-GF, H2-H4 by GM	Total Lead	Range 2.2 - 5,220 mg/L	- Not provided - Schrader Laboratory used
May 94	CRA	Borehole D3, split in four	TCLP Lead and Total Lead	*Sample* / *Total* / *TCLP* 1) 7,000 mg/L 0.91 mg/L 2) 5,200 mg/L 1.1 mg/L 3) 8,800 mg/L 4.6 mg/L 4) 6,000 mg/L 4.6 mg/L	- Data validated
May 94	GM/CRA	Boreholes E6, F6, G5-G6, I2-I6, J2-J6 by GM	Total Lead	Range 4.2 - 6,650 mg/L	- Not provided - Schrader Laboratory used
June 94	GM/CRA	Boreholes K4, K7, L3-L4, L7, M3-M4, M7, N3, N7 by GM	Total Lead	Range 3.5 - 3,480 mg/L	- Not provided - Schrader Laboratory used
June 6-10/94	CRA	Boreholes K2-K3, K5-K6, L2, L5-L6, M2, M5-M6, CRA N2-N3, N5-N6, O6, P6, R3, U1, X2N	Total Lead	Range 3.7 - 6,200 mg/L	- Validation in process - IEA Laboratory used by
June 14/94	CRA	Combined sample from several boreholes across CRA Burn-Pile, split in four	TCLP Lead and Total Lead	*Sample* / *Total* / *TCLP* 1) 150 mg/L 0.021 mg/L 2) 190 mg/L 0.031 mg/L 3) 110 mg/L 0.029 mg/L 4) 140 mg/L 0.022 mg/L	- Validation in process - IEA Laboratory used by

TABLE 2

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	# of Samples at Depth	Average Concentration (mg/kg)	Range		BH Line A				
			Miniumum	Maximum	A1	A2	A3	A4	A5
0.0	45	236.1	3.7	2,720.0	47.5	24.9	4.8	5.4	4.9
5.0	67	635.5	3.8	10,900.0	5.2	4.5	4.3	4.9	6.1
10.0	73	438.8	2.9	10,600.0	4.2	4.3	5.6	7.3	8.0
15.0	65	222.7	2.7	5,820.0					
20.0	59	792.4	2.5	17,200.0					
25.0	42	287.3	2.4	2,800.0					
30.0	32	66.8	2.2	1,360.0					
35.0	17	89.6	4.2	1,214.0					
40.0	4	5.6	4.3	7.4					
45.0	4	5.9	5.1	6.5					
50.0	1	6.5	6.5	6.5					
TOTAL	408	397.6							

TABI

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	BH Line B			BH Line C					BH Line D		
	B2	B3	B4	C1	C2	C3	C4	C5	D2	D3	D4
0.0		576.0	5.9	5.2	2,720.0	16.3	610.0	22.3	2,370.0	274.0	351.0
5.0		63.8	5.3	7.0	8,660.0	6,770.0	1,130.0	6.8	10,900.0	1,860.0	4.4
10.0		12.3	6.3	4.3	23.0	1,560.0	7.3	9.0	5.7	8,250.0	84.0
15.0		57.5	6.6		8.1	27.6	4.8	8.9	4.2	187.0	17.7
20.0					24.7	52.7	4.7	4.3	5.6	17,200.0	6.2
25.0										116.0	7.3
30.0										12.5	
35.0										4.3	
40.0											
45.0											
50.0											
TOTAL											

TABLE 2

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	BH Line E						BH Line F					BH Line G				
	E1	E2	E3	E4	E5	E6	F2	F3	F4	F5	F6	G2	G3	G4	G5	G6
0.0	7.2	1,280.0	72.0	12.0	29.4	28.3	7.1	422.0	71.8	123.0	4.6	4.2	19.2	9.2	94.2	209.0
5.0	7.8	20.3	4,600.0	44.9	9.2	399.0	6.1	100.0	59.5	6.5	4.4	3.8	11.9	26.2	8.5	973.0
10.0	6.8	5.0	10,600.0	316.0	3.5	5.4	5.3	2,660.0	303.0	188.0	7.4	4.2	592.0	32.2	43.4	4.8
15.0		4.6	33.9	315.0	3.2	4.6	5.0	11.1	704.0	91.3	6.8	2.8	2.7	68.1	5.0	4.0
20.0		3.4	34.4	83.0	5.8	8.0		5.3	3,060.0	158.0			6.7	5,220.0	4.1	6.2
25.0			47.9	11.4				4.0	456.0	6.5			4.5	10.6		
30.0														337.0		
35.0																
40.0																
45.0																
50.0																
TOTAL																

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	BH Line H					BH Line I				
	H2	H3	H4	H5	H6	I2	I3	I4	I5	I6
0.0	3.7	43.8	64.2		220.0					75.6
5.0	6.1	414.0	56.3	16.0	102.0	94.4	319.0	158.0	114.0	84.3
10.0	2.9	59.2	15.5	18.0	7.8	700.0	395.0	17.2	105.0	3,160.0
15.0	3.6	441.0	4.8	5,820.0	4.9	6.5	561.0	87.4	103.0	10.7
20.0		5.6	2.5	2,300.0	4.2	4.9	1,280.0	697.0	2,120.0	5.7
25.0		4.4	4.7	20.0		23.0	5.2	893.0	2,180.0	
30.0		2.2	4.7			4.5	1,360.0	33.1	52.7	
35.0							15.5	177.0		
40.0										
45.0										
50.0										
TOTAL										

TABLE 2

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	BH Line J					BH Line K						BH Line L					
	J2	J3	J4	J5	J6	K2	K3	K4	K5	K6	K7	L2	L3	L4	L5	L6	L7
0.0								34.8						160.0			112.0
5.0	239.0	165.0	61.8	47.4	533.0		13.0	103.0			6.5		10.0	54.1	12.0		6.3
10.0	202.0	10.6	7.9	43.2	255.0	420.0	63.0	85.7	12.0	150.0	3.5	16.0	21.6	18.5	18.0	13.0	4.3
15.0	24.8	18.6	21.1	57.5	228.0	380.0	17.0	14.1	5.4	2,100.0	6.9	110.0	13.8	42.4	13.0	1,500.0	4.3
20.0	335.0	75.8	23.5	6,650.0	114.0	3.7	72.0	8.4	210.0	6.0	4.8	7.8		22.0	67.0	5.9	4.5
25.0	6.3	4.7	5.0	2,800.0		5.2	460.0	1,750.0	2.4	8.4			780.0	11.4	12.0	6.2	
30.0	4.8	4.5	4.7	8.2			6.0	5.5	5.0			4.6	4.7		6.4	7.3	
35.0		5.6	4.8	1,214.0			4.8	4.2					5.0	5.5			
40.0			5.0														
45.0																	
50.0																	
TOTAL																	

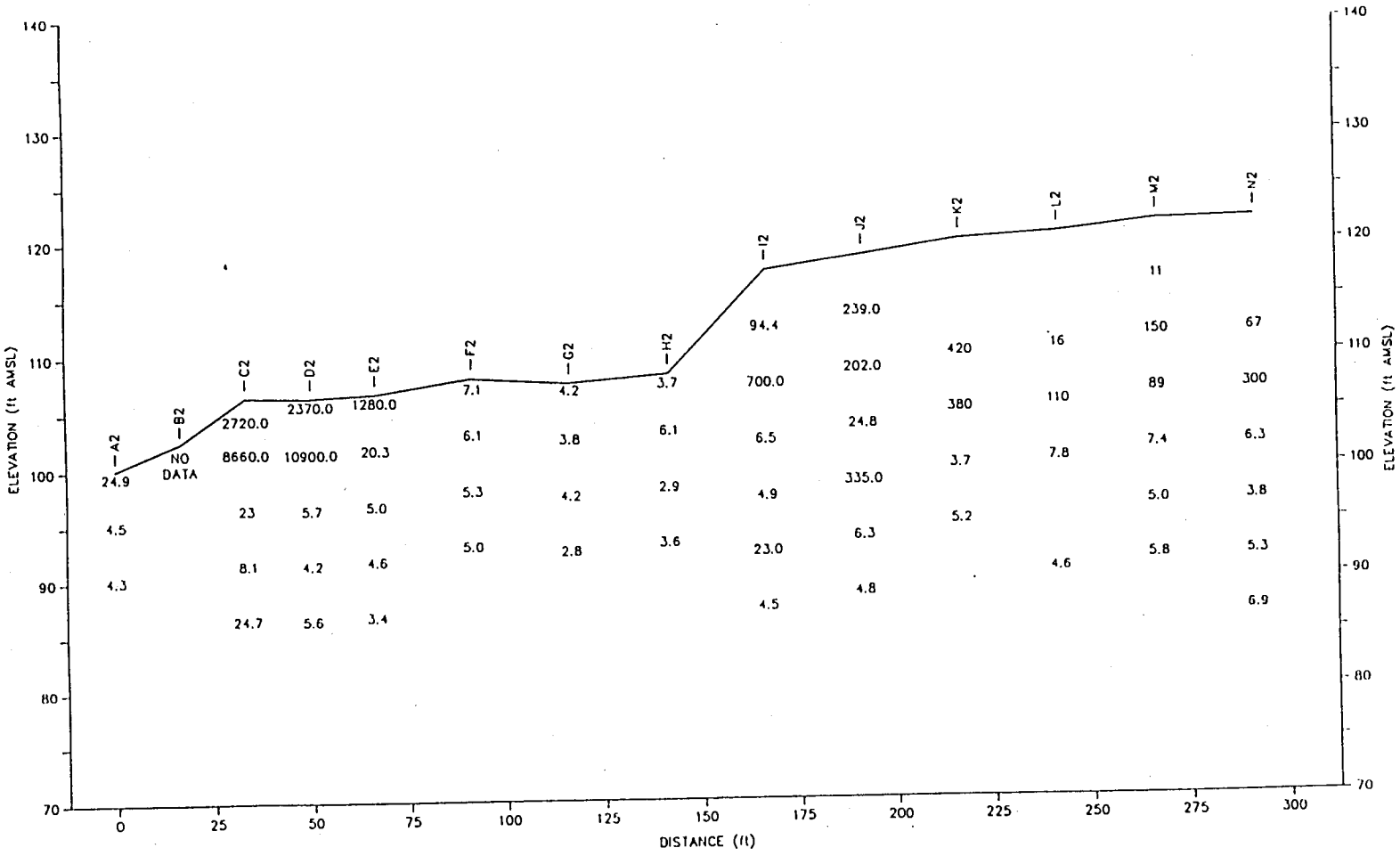
SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	BH Line M						BH Line N					
	M2	M3	M4	M5	M6	M7	N2	N3	N4	N5	N6	N7
0.0			51.6			133.0			53.6			194.0
5.0	11.0	12.2	158.0	18.0		36.3		160.0	55.8	16.0	69.0	3,480.0
10.0	150.0	10.3		34.0	9.2	5.2	67.0	11.0		9.2	19.0	934.0
15.0	89.0	14.2	28.9	62.0	650.0	4.1	300.0	21.0		22.0		5.1
20.0	7.4	375.0	42.5	68.0	4.9		6.3	19.0	21.2	7.7	6,200.0	8.8
25.0	5.0	246.0	37.7	3.7	1,300.0		3.8	560.0	164.0	12.0	6.8	
30.0	5.8	8.3	184.0	5.6	9.9		5.3	8.4	7.1	5.4	10.0	
35.0		7.9	16.4	6.8			6.9	20.0	10.0	15.0		
40.0			ND					5.7	4.3	7.4		
45.0		6.0	6.5					5.8	5.1			
50.0								6.5				
TOTAL												

TABLE 2

SUMMARY OF BURN PILE ANALYTICAL DATA
GM PONTIAC CENTRAL PLANT
PONTIAC, MICHIGAN

Depth (feet bgs)	O6	P6	R3	U1	X2N
0.0			35.0		12.0
5.0	16.0	130.0		13.0	72.0
10.0	73.0	59.0	17.0	10.0	28.0
15.0	8.4	71.0		4.7	11.0
20.0	14.0	5.4	40.0	5.8	
25.0	71.0	7.1	4.5		
30.0	11.0		4.3	4.4(28' BGS)	
35.0					
40.0					
45.0					
50.0					
TOTAL					



LEGEND

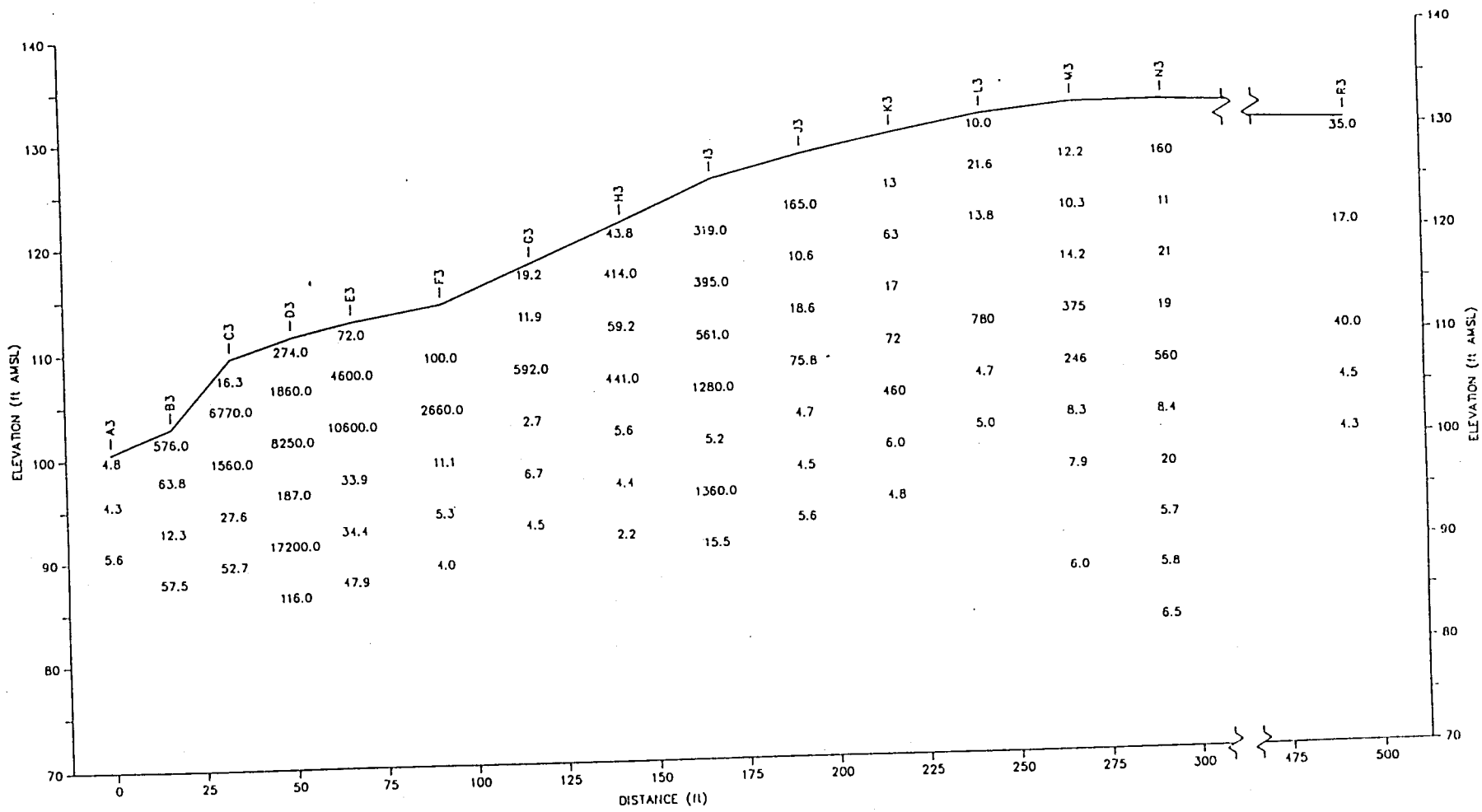
A2 BOREHOLE ID AND LOCATION

24.9 TOTAL LEAD CONCENTRATION (ppb)

figure 1

CROSS-SECTION 2 (A2-N2)
GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA



LEGEND

A3 — BOREHOLE ID AND LOCATION

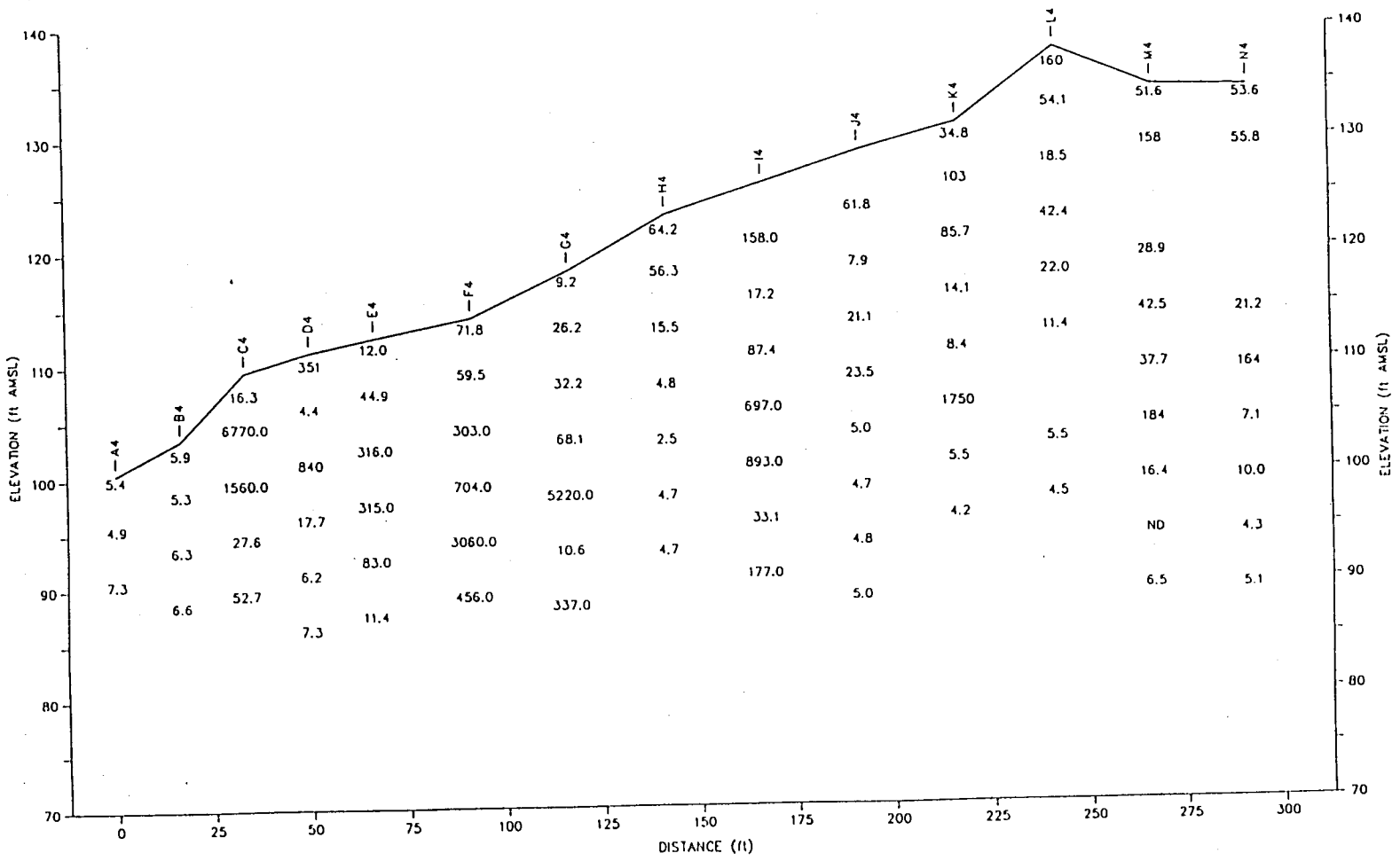
4.8 — TOTAL LEAD CONCENTRATION (ppb)

figure 2

CROSS-SECTION 3 (A3-N3)
GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS
Pontiac Michigan

CRA

5770 (L) JUNE 29/94(W) REV.0 (X-03)



LEGEND

A4 — BOREHOLE ID AND LOCATION

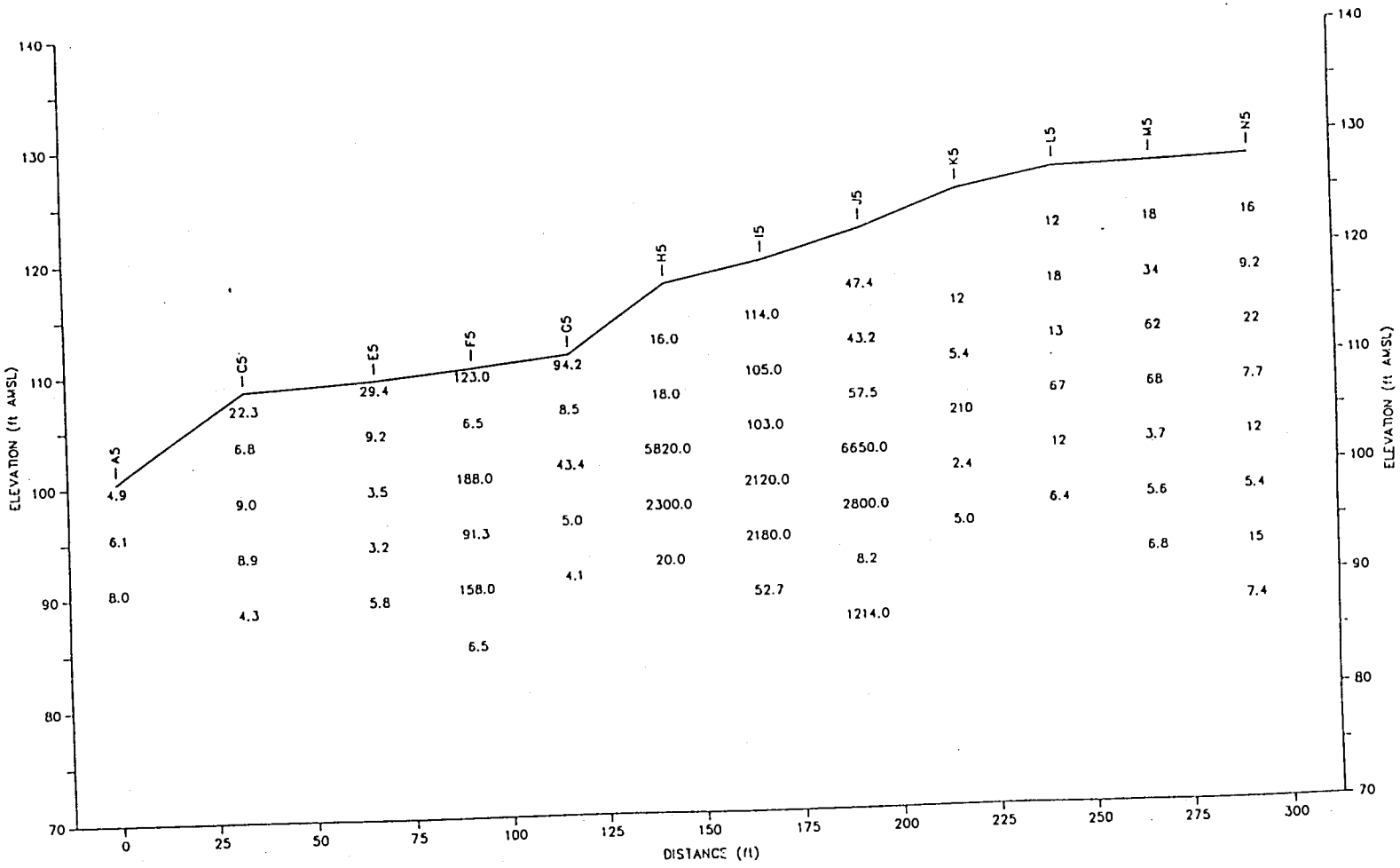
5.4 — TOTAL LEAD CONCENTRATION (ppb)

figure 3

CROSS-SECTION 4 (A4-N4)
GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

6770 (L) JUNE 27/94(W) REV.0 (X-04)



LEGEND

A5 BOREHOLE ID AND LOCATION

4.9 TOTAL LEAD CONCENTRATION (ppb)

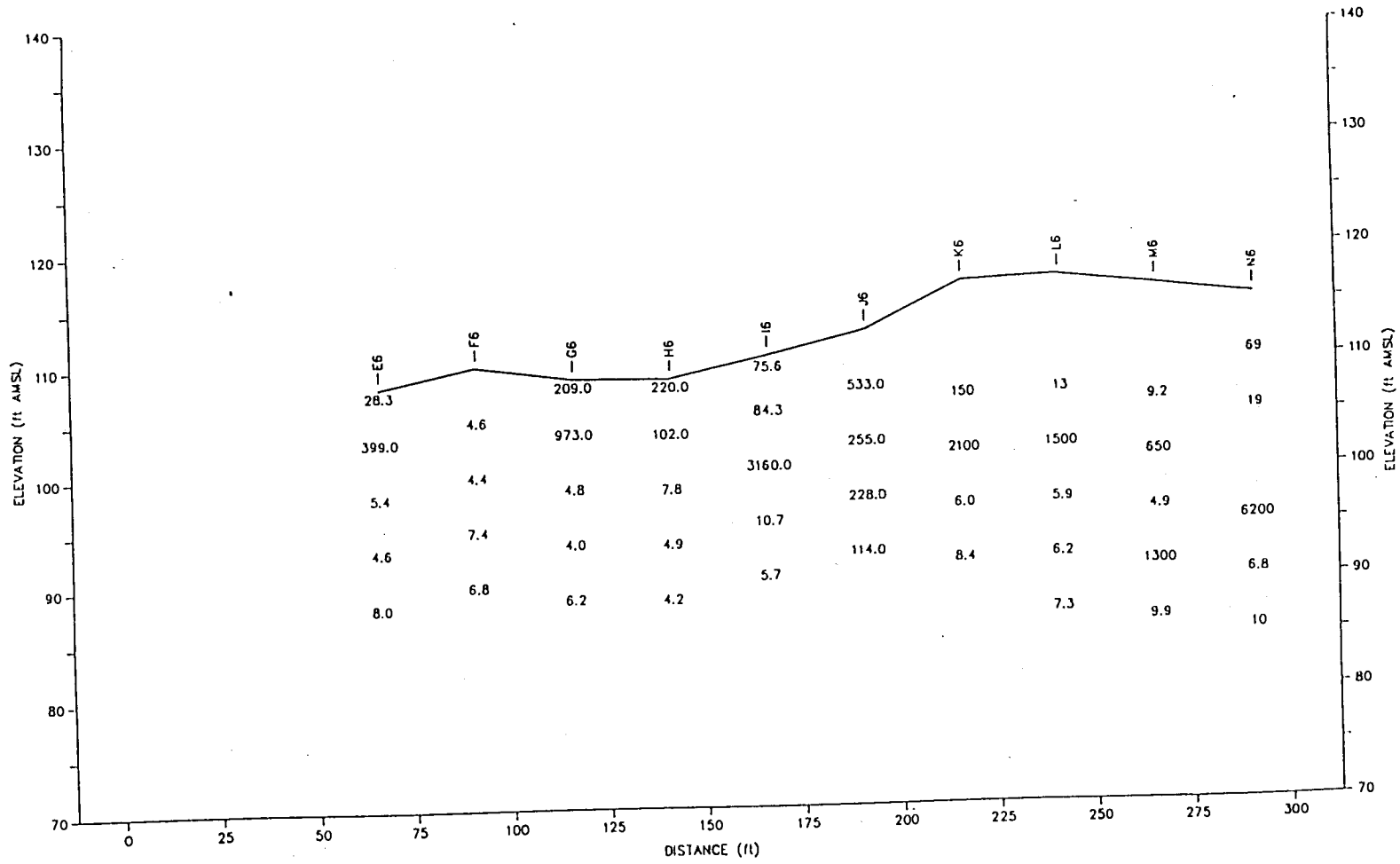
figure 4

CROSS-SECTION 5 (A5-N5)

GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS

Pontiac, Michigan

CRA



LEGEND

E6 — BOREHOLE ID AND LOCATION

28.3 TOTAL LEAD CONCENTRATION (ppb)

figure 5

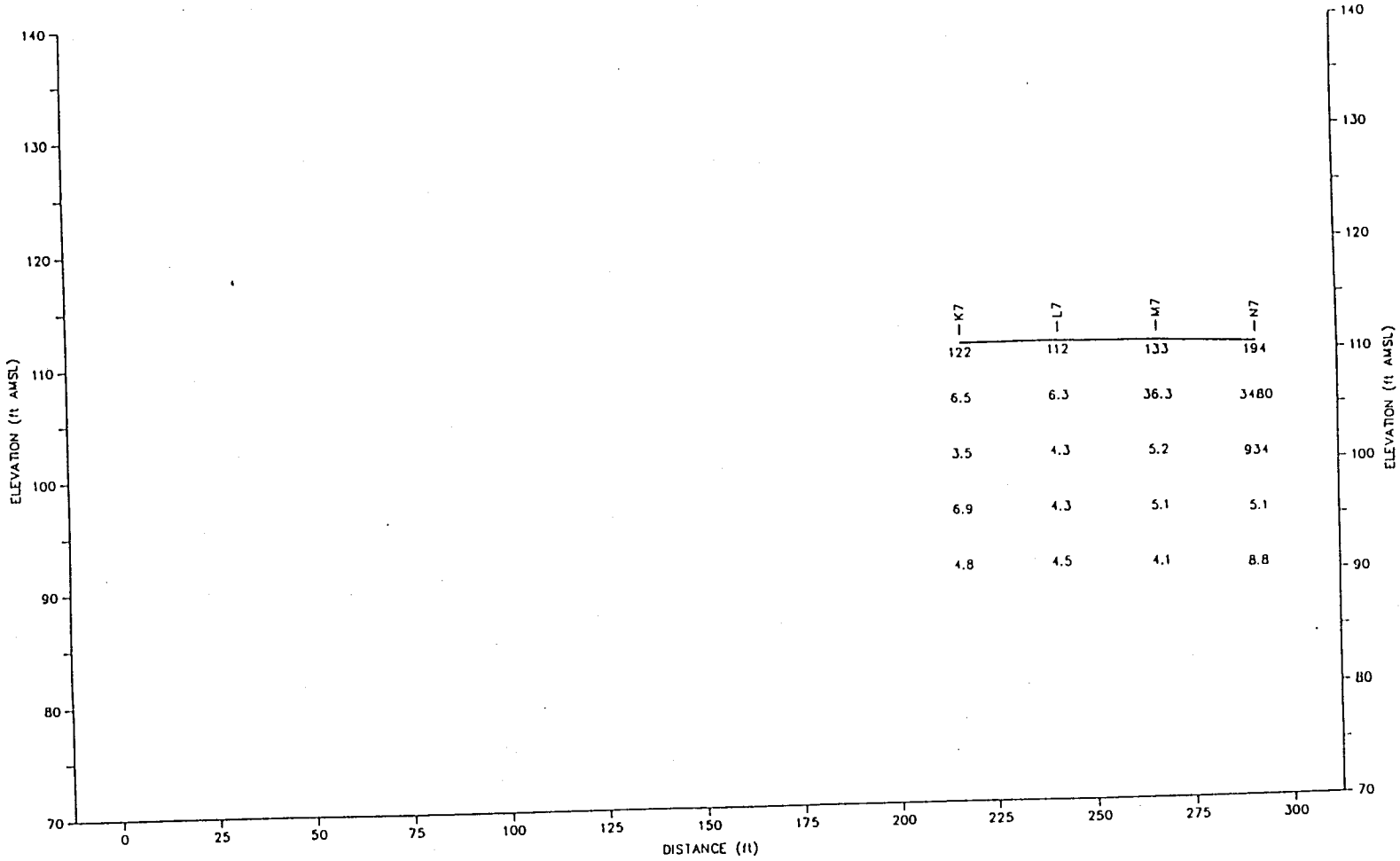
CROSS-SECTION 6 (E6-N6)

GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS

Pontiac, Michigan

CRA

5770 (L) JUNE 27/94(W) REV.0 (X-06)



LEGEND

—K7 BOREHOLE ID AND LOCATION

122 TOTAL LEAD CONCENTRATION (ppb)

figure 6

CROSS-SECTION 7 (K7-N7)

GENERAL MOTORS NORTH AMERICAN TRUCK PL ATFORMS

Pontiac, chigan

CRA

5770 (L) JUNE 27/94(W) REV.0 (X-07)

APPENDIX B

STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-49)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-1
DATE COMPLETED: AUGUST 10, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	943.8					
	ML-SILT, some clay, trace fine sand, light brown, moist			1SS		5	
		941.8					
2.5	CL-CLAY, some silt, trace gravel, light gray, moist			2SS		7	
5.0		938.8		3SS		5	
	SW-SAND, some silt, fine grained, well graded, light brown, saturated	937.8					
	CL-CLAY, little silt, trace gravel, gray, moist		7" ø BOREHOLE	4SS		11	
7.5							
				5SS		9	
10.0			CUTTINGS/ BENTONITE CHIPS				
	- fine sand seams			6SS		12	
12.5				7SS		12	
15.0							
17.5							
				8SS		9	
20.0	END OF HOLE @ 20.0 FT. BGS	923.8					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-50)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-2
DATE COMPLETED: AUGUST 12, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	946.0					
	CL-CLAY(FILL), some silt, soft, moist - fine sand, little silt			1SS		5	0
		944.0					
2.5	CL-CLAY, some silt, sand seams, gray, moist			2SS		7	5
	- black sand seam (@ 4.5 ft BGS)						
5.0			7" BOREHOLE	3SS		5	189
				4SS		9	0
7.5	- light brown						
				5SS		10	0
10.0			CUTTINGS/ BENTONITE CHIPS				
				6SS		14	0
12.5	- trace gravel, gray, dry			7SS		14	0
		932.0					
	END OF HOLE @ 14.0 FT. BGS						
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-51)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-3
DATE COMPLETED: AUGUST 12, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	947.5					
	SW/GW-SAND and GRAVEL, black, moist, wood chips, stones			1SS		15	
2.5	SW-SAND, some gravel, black, moist	945.5		2SS		5	7
	- little silt, well graded, green, petroleum odor		7" ø BOREHOLE	3SS		5	66.8
5.0							
	CL-CLAY, some silt, trace gravel, gray green, moist	941.5		4SS		7	0
7.5							
				5SS		6	0
10.0	- light brown		CUTTINGS/ BENTONITE CHIPS				
	- gray			6SS		12	0
12.5							
				7SS		12	0
	END OF HOLE @ 14.0 FT. BGS	933.5					
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-52)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-4
DATE COMPLETED: AUGUST 12, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	942.1					
2.5	CL-CLAY, little silt, mottled, moist - some stones		7"ø BOREHOLE	1SS		5	1.1
5.0	- sand seam			2SS		6	0
7.5			CUTTINGS/ BENTONITE CHIPS	3SS		12	1.2
	CL-CLAY, little silt, trace gravel, dry	934.1		4SS		15	0
10.0	END OF HOLE @ 8.0 FT. BGS						
12.5							
15.0							
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-53)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-5
DATE COMPLETED: AUGUST 12, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	948.1					
2.5	CL-CLAY(FILL), some silt, little gravel, moist - dry - some roots			1SS		11	0
				2SS		13	0.7
5.0	SM-SAND, some gravel, little silt, well graded	943.1		3SS		13	0.8
7.5	ML/SM-SILT and SAND, light brown, wet	942.1	7"ø BOREHOLE	4SS		9	0.4
				5SS		11	0.4
10.0	CL-CLAY, some silt, trace gravel, light gray, moist - and silt	938.1	CUTTINGS/ BENTONITE CHIPS	6SS		6	0
12.5	- some silt			7SS		11	0
15.0				8SS		19	0
17.5							
20.0	END OF HOLE @ 20.0 FT. BGS	928.1					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-54)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-6
DATE COMPLETED: AUGUST 15, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	946.5					
	SM-SAND, some silt, fine grained, some organic matter, black, roots	945.5		1SS		9	0
2.5	SP-SAND, fine grained, poorly graded, light brown, dry, some cobbles			2SS		19	0
	- stones						
5.0	ML-SILT, trace gravel, hard, light brown, mottled, gray, dry	941.5	7"ø BOREHOLE	3SS		18	0
7.5				4SS		22	0
	CL-CLAY, some silt, trace gravel, gray, dry	938.5		5SS		11	0
10.0	- gravel and cobbles, saturated		CUTTINGS/ BENTONITE CHIPS	6SS		16	0
	- no silt, moist						
12.5				7SS		14	0
15.0				8SS		13	0
	END OF HOLE @ 16.0 FT. BGS	930.5					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-55)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-7
DATE COMPLETED: AUGUST 15, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	946.4					
	SP-SAND, some gravel, black, moist, roots, organic matter, slag and debris	945.4		1SS		5	0
2.5	SM-SAND, some silt, dark brown, orange and gray staining, dry, roots - light brown			2SS		12	0
5.0				3SS		12	0
	- trace gravel and red sand	940.4					
7.5	CL-CLAY, some silt, trace sand, light brown, mottled, moist		7" ø BOREHOLE	4SS		20	0
				5SS		26	0
10.0			CUTTINGS/ BENTONITE CHIPS				
12.5	- gray, dry - moist - 2" gravel seam, saturated			6SS		15	0
				7SS		10	0
15.0							
17.5							
				8SS		13	0
20.0	END OF HOLE @ 20.0 FT. BGS	926.4					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-56)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-8
DATE COMPLETED: AUGUST 16, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	948.2					
	CL-CLAY, some silt, gray and light brown, moist	947.2		1SS		8	0
2.5	SM-SAND, some silt, trace gravel, black, roots, slag debris - petroleum odor			2SS		21	0.3
5.0		942.7	7"ø BOREHOLE	3SS		12	217
	CL-CLAY, some silt, trace gravel, mottled, moist			4SS			365
7.5	- sand seam, petroleum odor						
	- 10" sand and silt seam, wood, organic matter, roots			5SS		13	64
10.0			CUTTINGS/ BENTONITE CHIPS	6SS		9	0.5
12.5				7SS		15	0
	- little silt, gray, dry						
15.0				8SS		10	0
	END OF HOLE @ 16.0 FT. BGS	932.2					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-57)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-9
DATE COMPLETED: AUGUST 16, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	948.9					
2.5	CL-CLAY, little silt, dark brown, moist - 6" sand and gravel seam, some silt, asphalt appearance, wood chips			1SS		7	0
				2SS		18	0
5.0	- some silt, trace sand, gray, moist		7" ø BOREHOLE	3SS		9	1.2
7.5				4SS		12	0
10.0	- trace gravel, dry		CUTTINGS/ BENTONITE CHIPS	5SS		24	
12.5				6SS		11	0
15.0	END OF HOLE @ 14.0 FT. BGS	934.9					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

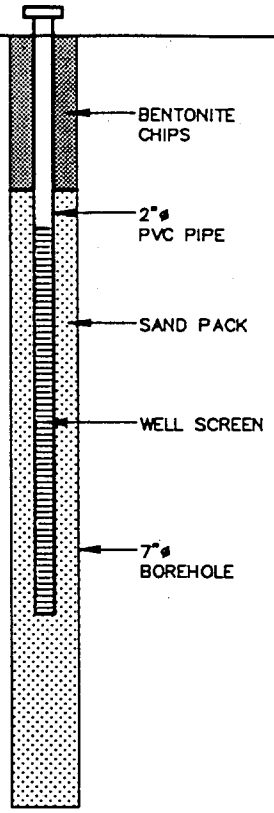
(L-58)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-10/MW-1
DATE COMPLETED: AUGUST 16, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	949.8
	GROUND SURFACE	947.6
	CL/ML-CLAY and SILT, light brown, moist	947.1
	SW/GW-SAND and GRAVEL, black, debris, slag	
2.5		
5.0		
	- saturated	
	- saturated with thick black oil-like liquid	940.6
7.5	SP-SAND, little silt, fine grained, poorly graded, gray green, saturated, petroleum odor	
10.0		
		935.6
12.5	ML/SM-SILT and SAND, gray green, saturated, petroleum odor	935.5
	ML-SILT, some clay, trace gravel, brown, moist, petroleum odor	933.6
15.0	CL-CLAY, some silt, brown, moist	
17.5	- trace gravel, gray	
20.0	END OF HOLE @ 20.0 FT. BGS	927.6
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
5.0 to 15.0' BGS
Length -10.0'
Diameter -2.0"
Slot # 10
Material -PVC
Sand pack interval:
4.0 to 20.0' BGS
Material -#5 Sand

SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		13	0
2SS		12	0
3SS		4	122
4SS			56
5SS		9	500
6SS		10	132
7SS		13	24
8SS		10	1.7
9SS		23	0.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

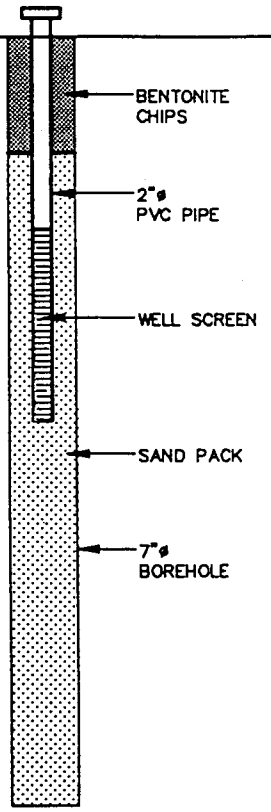
(L-59)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-11/MW-2
DATE COMPLETED: AUGUST 17, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	REFERENCE POINT (Top of Riser)	950.1
	GROUND SURFACE	947.1
2.5	SM/ML-SAND and SILT, black, dry, slag and burned wood debris	
5.0	– moist, petroleum odor	
	CL-CLAY, some silt, gray, moist, wood chips	942.1
	GM-GRAVEL, some silt, saturated with thick black liquid	941.1
7.5	SM/ML-SAND and SILT, soft, gray green, wet	940.1
10.0	– brown, moist	
12.5	ML/CL-SILT and CLAY, brown, moist	935.1
15.0	CL-CLAY, some silt, trace gravel, gray, dry	932.1
17.5		
20.0	END OF HOLE @ 20.0 FT. BGS	927.1
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
5.0 to 10.0' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -PVC
Sand pack interval:
3.0 to 20.0' BGS
Material -#5 Sand

SAMPLE

NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		10	0.3
2SS		7	510
3SS		5	19
4SS		6	630
5SS		6	58
6SS		8	12
7SS		21	2.6
8SS			0.2
9SS		23	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-60)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-12/MW-3 (Page 1 of 2)
DATE COMPLETED: AUGUST 17, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	977.5					
	GROUND SURFACE	974.6					
	Augered from 0.0 to 23.0 ft BGS						
2.5			BENTONITE CHIPS				
5.0							
7.5			2"ø PVC PIPE				
10.0							
12.5			7"ø BOREHOLE				
15.0							
17.5							
20.0			CUTTINGS/ BENTONITE CHIPS				
22.5							
	CL/SC-CLAY and SAND(FILL), some gravel, stiff, brown, moist, concrete	951.6		1SS		16	0
25.0				2SS		35	0
27.5	- 2" osphalt			3SS		38	0.2
30.0	CL/ML-CLAY and SILT, some sand, brown, dry to moist	944.9		4SS		12	2.9
	SW/CL-SAND and CLAY, medium to coarse grained, well graded, brown, moist, no odor	943.6					
32.5	CL/ML-CLAY and SILT, soft, brown, moist - trace gravel	942.4	BENTONITE CHIPS	5SS		6	0.2
				6SS			1.2

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-60)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BURN PILE LOCATION

HOLE DESIGNATION: SB-12/MW-3 (Page 2 of 2)
DATE COMPLETED: AUGUST 17, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0	GM-GRAVEL, some sand and silt, some clay, brown, saturated	938.8	BENTONITE CHIPS; 2"ø PVC PIPE; SAND PACK	7SS		12	28.6
37.5	GW-GRAVEL, some silt, well graded, wet	936.3		8SS		8	0.2
40.0			WELL SCREEN	9SS		11	0.3
42.5				10SS		9	0
45.0	END OF HOLE @ 45.0 FT. BGS	929.6	7"ø BOREHOLE	11SS		10	0.2
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

SCREEN DETAILS:
Screened Interval:
37.0 to 42.0' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -PVC
Sand pack interval:
34.0 to 45.0' BGS
Material -#5 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-70)

PROJECT NAME: GM PONTIAC CENTRAL
HOLE DESIGNATION: MW-4

PROJECT NO.: 5770
DATE COMPLETED: AUGUST 17, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BETWEEN BOREHOLES SB-6 AND SB-7
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	946.8					
	GROUND SURFACE	946.2					
	For stratigraphy see SB-6 and SB-7		BENTONITE CHIPS; 2"ø PVC PIPE; SAND PACK; WELL SCREEN; 7"ø BOREHOLE				
15.0	END OF HOLE @ 14.5 FT. BGS	931.7					

SCREEN DETAILS:
Screened Interval:
9.5 to 14.5' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -PVC
Sand pack interval:
8.5 to 14.5' BGS
Material -#5 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX C

WELL DEVELOPMENT LOGS

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN P/E
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/25/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-1
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 8.59
BOTTOM DEPTH: 15.70
WATER COLUMN LENGTH: 7.11
SCREENED INTERVAL:
WELL VOLUME: 1.1 GALLONS

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1.3	2.6	3.9	5.2		
FIELD pH	7.30	7.32	7.34	7.28		
FIELD TEMPERATURE	61.4	58.7	58.2	58.1		
FIELD CONDUCTIVITY mS/cm	1.56	1.57	1.61	1.61		
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN	BROWN		
ODOR	NONE	NONE	NONE	NONE		
COMMENTS	cloudy	cloudy	cloudy	cloudy		

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN PILE PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/25/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-2
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION: ELEVATION
STATIC WATER DEPTH: 8.91'
BOTTOM DEPTH: 12.15' ELEVATION
WATER COLUMN LENGTH: 3.24'
SCREENED INTERVAL:
WELL VOLUME: 0.5 GALLONS

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1	2	3	4	5	
FIELD pH	8.30	8.32	7.80	7.84	7.76	
FIELD TEMPERATURE	63.1	60.8	60.8	59.0	59.0	
FIELD CONDUCTIVITY mS/cm	1.94	1.62	1.60	1.49	1.62	
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN	BROWN	BROWN	
ODOR	SLIGHT SOLVENT	SLIGHT SOLVENT	SLIGHT SOLVENT	SLIGHT SOLVENT	SLIGHT SOLVENT	
COMMENTS	VERY SILTY	VERY SILTY	VERY SILTY	VERY SILTY	VERY SILTY	

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN P/E
PROJECT NO.: 5770
DATE OF WELL DEVELOPMENT: 8/25/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-3
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 39.24'
BOTTOM DEPTH: 45.15'
WATER COLUMN LENGTH: 5.91'
SCREENED INTERVAL:
WELL VOLUME: 0.9 gallons

ELEVATION:
ELEVATION:

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/~~tot. volume~~) gallons	1	2	3	4	5	
FIELD pH	6.74					
FIELD TEMPERATURE	61.0					
FIELD CONDUCTIVITY µS/cm	8.05					
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN	BROWN	BROWN	
ODOR	NONE	NONE	NONE	NONE	NONE	
COMMENTS	SHEEN	SHEEN	SHEEN	SHEEN	SHEEN	

~~COPIES TO:~~ PH CONDUCTIVITY, TEMPERATURE METER MALFUNCTIONING

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC-BURN P/E
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/25/94
DEVELOPMENT CREW MEMBERS: FRANK King / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-4
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 8.50'
ELEVATION
BOTTOM DEPTH: 15.26'
ELEVATION
WATER COLUMN LENGTH: 6.76'
SCREENED INTERVAL:
WELL VOLUME: 1.1 GALLONS

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/tot~~. volume~~) GALLONS	1.5	3.0	4.5	6.0		
FIELD pH	8.6	8.97	9.27	9.32		
FIELD TEMPERATURE	57.4	55.1	55.4	55.2		
FIELD CONDUCTIVITY	1.87	1.66	1.69	1.72		
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN	BROWN		
ODOR	NONE	NONE	NONE	NONE		
COMMENTS	cloudy	cloudy	cloudy	cloudy		

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN A/E
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/26/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-1
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 8.58'
BOTTOM DEPTH: 15.7'
WATER COLUMN LENGTH: 7.28'
SCREENED INTERVAL:
WELL VOLUME: 1.2 GALLONS

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1.3	2.6	3.9			
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN			
ODOR	SOLVENT	SOLVENT	SOLVENT			
COMMENTS	SHEEN	SHEEN	SHEEN			

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN PIT PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/26/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HEMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-2
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION: ELEVATION
STATIC WATER DEPTH: 8.90'
BOTTOM DEPTH: 12.15' ELEVATION
WATER COLUMN LENGTH: 3.25'
SCREENED INTERVAL:
WELL VOLUME: 0.5 GALLONS

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOTALS
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1	2	3			
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN GREY	BROWN GREY	BROWN GREY			
ODOR	SOLVENT	SOLVENT	SOLVENT			
COMMENTS	SHEEN	SHEEN	SHEEN			

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN P.I.E
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/26/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-3
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 39.25'
BOTTOM DEPTH: 45.15'
WATER COLUMN LENGTH: 5.90'
SCREENED INTERVAL:
WELL VOLUME: 0.84 GALLONS

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1	2	3			
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN			
ODOR	NONE	NONE	NONE			
COMMENTS	SHEEN	SHEEN	SHEEN			

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: GM PONTIAC - BURN PIT
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 8/26/94
DEVELOPMENT CREW MEMBERS: FRANK RING / HANS HOLMBERG
SUPERVISOR:
PURGING METHOD: SS BAILER

WELL INFORMATION

WELL NUMBER: MW-4
WELL TYPE (diameter/material): 2" PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: 8.51'
ELEVATION
BOTTOM DEPTH: 15.26'
ELEVATION
WATER COLUMN LENGTH: 6.75'
SCREENED INTERVAL:
WELL VOLUME: 1.1 gallon

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/[illegible]G
VOLUME PURGED (# bails/~~tot. volume~~) GALLONS	1.3	2.6	3.9			
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN			
ODOR	NONE	NONE	NONE			
COMMENTS	NONE	NONE	NONE			

COPIES TO:

CRA

APPENDIX D

LABORATORY ANALYTICAL DATA

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR ACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

September 23, 1994

BURN PILE WATER

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on August 29, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH941750	Client Project#	25770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Thomas M. Bauer
Laboratory Manager
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
W-082694-FR-001	941750001
W-082694-FR-002	941750002
W-082694-FR-003	941750003
W-082694-FR-004	941750004
TRIP BLANK	941750005

IEA
An Aquarion Company

CASE NARRATIVE

IEA JOB#: CH941750

The dilutions at 1:1000 for samples FR-001 and FR-002 were performed out of sample hold time.

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941750
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / L

Matrix: WATER
Method: 8240

Dilution Factor (DF)	5	250	1000	5	250	
Method Blank	VW090794	VW090794	VW090794	VW090794	VW090794	
Client ID	FR – 001	FR – 001	FR – 001	FR – 002	FR – 002	PQL
Analyte Lab ID	941750 001	941750 001DL1	941750 001DL2	941750 002	941750 002DL1	
Chloromethane	UD	UD	UD	UD	UD	1
Bromomethane	UD	UD	UD	UD	UD	1
Vinyl Chloride	1400E	2800	1600	1300E	4300	1
Chloroethane	UD	UD	UD	UD	UD	1
Methylene Chloride	UD	UD	UD	UD	UD	1
Acetone	UD	UD	UD	UD	UD	50
Carbon Disulfide	UD	UD	UD	UD	UD	50
1,1–Dichloroethene	20	UD	UD	31	UD	1
1,1–Dichloroethane	UD	UD	UD	UD	UD	1
cis–1,2–Dichloroethene	5200E	7300	4400	5100E	12000E	1
Chloroform	UD	UD	UD	UD	UD	1
1,2–Dichloroethane	UD	UD	UD	UD	UD	1
2–Butanone	UD	UD	UD	UD	UD	50
1,1 1–Trichlorethane	UD	UD	UD	UD	UD	1
Carbon Tetrachloride	UD	UD	UD	UD	UD	1
Vinyl Acetate	UD	UD	UD	UD	UD	2
Bromodichloromethane	UD	UD	UD	UD	UD	1
1,2–Dichloropropane	UD	UD	UD	UD	UD	1
Trans–1,3–dichloropropene	UD	UD	UD	UD	UD	1
Trichloroethylene	UD	UD	UD	UD	UD	1
Dibromochloromethane	UD	UD	UD	UD	UD	1
1,1,2–Trichloroethane	UD	UD	UD	UD	UD	1
Benzene	130	UD	UD	190	UD	1
cis–1,3–Dichloropropene	UD	UD	UD	UD	UD	1
2–Chloroethylvinylether	UD	UD	UD	UD	UD	1
Bromoform	UD	UD	UD	UD	UD	1
4–Methyl–2–Pentanone	UD	UD	UD	UD	UD	50
2–Hexanone	UD	UD	UD	UD	UD	50
Tetrachloroethylene	UD	UD	UD	UD	UD	1
1,1,2,2–Tetrachloroethane	UD	UD	UD	UD	UD	1
Toluene	3000E	33000E	26000	2100E	28000E	1
Chlorobenzene	UD	UD	UD	UD	UD	1
Ethylbenzene	3600E	7000	5700	2600E	6500	1
Styrene	UD	UD	UD	UD	UD	1
Total Xylenes	6500E	29000	23000	5200E	26000	3
Trans–1,2–Dichloroethene	13	UD	UD	22	UD	1
Date Analyzed	9/6/94	9/7/94	9/13/94	9/6/94	9/7/94	

PQL = Practical Quantitation Limit

To obtain sample–specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client:CRA – MI
IEA Job#:CH941750
Project #:5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / L

Matrix: WATER
Method: 8240

Dilution Factor (DF)	500	1000	1	5	50	PQL
Method Blank	VW090894	VW092194	VW090894	VW090894	VW090894	
Client ID	FR – 002	FR – 002	FR – 003	FR – 004	FR – 004	
	941750	941750	941750	941750	941750	
Analyte Lab ID	002DL2	002DL3	003	004	004DL	
Chloromethane	UD	UD	U	UD	UD	1
Bromomethane	UD	UD	U	UD	UD	1
Vinyl Chloride	4000	UD	3	41	UD	1
Chloroethane	UD	UD	U	UD	UD	1
Methylene Chloride	UD	UD	1	UD	UD	1
Acetone	UD	UD	U	UD	UD	50
Carbon Disulfide	UD	UD	U	UD	UD	50
1,1–Dichloroethene	UD	UD	U	UD	UD	1
1,1–Dichloroethane	UD	UD	U	UD	UD	1
cis–1,2–Dichloroethene	13000	5600	U	53	UD	1
Chloroform	UD	UD	U	UD	UD	1
1,2–Dichloroethane	UD	UD	U	UD	UD	1
2–Butanone	UD	UD	U	UD	UD	50
1,1 1–Trichlorethane	UD	UD	U	UD	UD	1
Carbon Tetrachloride	UD	UD	U	UD	UD	1
Vinyl Acetate	UD	UD	U	UD	UD	2
Bromodichloromethane	UD	UD	U	UD	UD	1
1,2–Dichloropropane	UD	UD	U	UD	UD	1
Trans–1,3–dichloropropene	UD	UD	U	UD	UD	1
Trichloroethylene	UD	UD	U	UD	UD	1
Dibromochloromethane	UD	UD	U	UD	UD	1
1,1,2–Trichloroethane	UD	UD	U	UD	UD	1
Benzene	UD	UD	3	UD	UD	1
cis–1,3–Dichloropropene	UD	UD	U	UD	UD	1
2–Chloroethylvinylether	UD	UD	U	UD	UD	1
Bromoform	UD	UD	U	UD	UD	1
4–Methyl–2–Pentanone	UD	UD	U	UD	UD	50
2–Hexanone	UD	UD	U	UD	UD	50
Tetrachloroethylene	UD	UD	U	UD	UD	1
1,1,2,2–Tetrachloroethane	UD	UD	U	UD	UD	1
Toluene	30000E	28000	U	250E	51	1
Chlorobenzene	UD	UD	U	UD	UD	1
Ethylbenzene	6100	UD	U	46	UD	1
Styrene	UD	UD	U	UD	UD	1
Total Xylenes	29000	25000	8	200	UD	3
Trans–1,2–Dichloroethene	UD	UD	U	UD	UD	1
Date Analyzed	9/08/94	9/21/94	9/08/94	9/06/94	9/07/94	

PQL = Practical Quantitation Limit

To obtain sample–specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941750
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / L

Matrix: WATER
Method: 8240

Analyte	Lab ID						PQL
Dilution Factor (DF)		1					
Method Blank		VW090894					
Client ID		TRIP BLANK					
	Lab ID	941750 005					
Chloromethane		U					1
Bromomethane		U					1
Vinyl Chloride		U					1
Chloroethane		U					1
Methylene Chloride		U					1
Acetone		U					50
Carbon Disulfide		U					50
1,1-Dichloroethene		U					1
1,1-Dichloroethane		U					1
cis-1,2-Dichloroethene		U					1
Chloroform		U					1
1,2-Dichloroethane		U					1
2-Butanone		U					50
1,1 1-Trichlorethane		U					1
Carbon Tetrachloride		U					1
Vinyl Acetate		U					2
Bromodichloromethane		U					1
1,2-Dichloropropane		U					1
Trans-1,3-dichloropropene		U					1
Trichloroethylene		U					1
Dibromochloromethane		U					1
1,1,2-Trichloroethane		U					1
Benzene		U					1
cis-1,3-Dichloropropene		U					1
2-Chloroethylvinylether		U					1
Bromoform		U					1
4-Methyl-2-Pentanone		U					50
2-Hexanone		U					50
Tetrachloroethylene		U					1
1,1,2,2-Tetrachloroethane		U					1
Toluene		U					1
Chlorobenzene		U					1
Ethylbenzene		U					1
Styrene		U					1
Total Xylenes		U					3
Trans-1,2-Dichloroethene		U					1
Date Analyzed		9/7/94					

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941750
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / L

Matrix: WATER
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	PQL
		1	SW0901	FR-001	
				941750	
				001	
Phenol		U			10
Bis (2-Chloroethyl) ether		U			10
2-Chlorophenol		U			10
1,3-Dichlorobenzene		U			10
1,4-Dichlorobenzene		U			10
Benzyl Alcohol		U			10
1,2-Dichlorobenzene		U			10
2-Methylphenol		36			10
bis (2-Chloroisopropyl) ether		U			10
4-Methylphenol		54			10
N-Nitroso-di-n-propylamine		U			10
Hexachloroethane		U			10
Nitrobenzene		U			10
Isophorone		U			10
2-Nitrophenol		U			10
2,4-Dimethylphenol		26			10
Benzoic Acid		U			50
bis (2-Chloroethoxy) methane		U			10
2,4-Dichlorophenol		U			10
1,2,4-Trichlorobenzene		U			10
Napththalene		88			10
4 Chloroaniline		U			10
Hexachlorobutadiene		U			10
4 Chloro-3-methylphenol		U			10
2-Methylnaphthalene		U			10
Hexachlorocyclopentadiene		U			10
2,4,6-Trichlorophenol		U			10
2,4,5-Trichlorophenol		U			50
2-Chloronapthalene		U			10
2-Nitroaniline		U			50
Dimethyphthalate		U			10
Acenaphthylene		U			10
2,6-Dinitrotoluene		U			10

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	PQL
		1	SW0901	FR-002	
				941750	
				002	
Phenol		U			10
Bis (2-Chloroethyl) ether		U			10
2-Chlorophenol		U			10
1,3-Dichlorobenzene		U			10
1,4-Dichlorobenzene		U			10
Benzyl Alcohol		U			10
1,2-Dichlorobenzene		U			10
2-Methylphenol		56			10
bis (2-Chloroisopropyl) ether		U			10
4-Methylphenol		130			10
N-Nitroso-di-n-propylamine		U			10
Hexachloroethane		U			10
Nitrobenzene		U			10
Isophorone		U			10
2-Nitrophenol		U			10
2,4-Dimethylphenol		44			10
Benzoic Acid		U			50
bis (2-Chloroethoxy) methane		U			10
2,4-Dichlorophenol		U			10
1,2,4-Trichlorobenzene		U			10
Napththalene		84			10
4 Chloroaniline		U			10
Hexachlorobutadiene		U			10
4 Chloro-3-methylphenol		U			10
2-Methylnaphthalene		11			10
Hexachlorocyclopentadiene		U			10
2,4,6-Trichlorophenol		U			10
2,4,5-Trichlorophenol		U			50
2-Chloronapthalene		U			10
2-Nitroaniline		U			50
Dimethyphthalate		U			10
Acenaphthylene		U			10
2,6-Dinitrotoluene		U			10

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	PQL
		1	SW0901	FR-003	
				941750	
				003	
Phenol		U			10
Bis (2-Chloroethyl) ether		U			10
2-Chlorophenol		U			10
1,3-Dichlorobenzene		U			10
1,4-Dichlorobenzene		U			10
Benzyl Alcohol		U			10
1,2-Dichlorobenzene		U			10
2-Methylphenol		U			10
bis (2-Chloroisopropyl) ether		U			10
4-Methylphenol		U			10
N-Nitroso-di-n-propylamine		U			10
Hexachloroethane		U			10
Nitrobenzene		U			10
Isophorone		U			10
2-Nitrophenol		U			10
2,4-Dimethylphenol		U			10
Benzoic Acid		U			50
bis (2-Chloroethoxy) methane		U			10
2,4-Dichlorophenol		U			10
1,2,4-Trichlorobenzene		U			10
Napththalene		U			10
4 Chloroaniline		U			10
Hexachlorobutadiene		U			10
4 Chloro-3-methylphenol		U			10
2-Methylnaphthalene		U			10
Hexachlorocyclopentadiene		U			10
2,4,6-Trichlorophenol		U			10
2,4,5-Trichlorophenol		U			50
2-Chloronapthalene		U			10
2-Nitroaniline		U			50
Dimethyphthalate		U			10
Acenaphthylene		U			10
2,6-Dinitrotoluene		U			10

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	PQL
		1	SW0901	FR-004	
				941750	
				004	
Phenol		U			10
Bis (2-Chloroethyl) ether		U			10
2-Chlorophenol		U			10
1,3-Dichlorobenzene		U			10
1,4-Dichlorobenzene		U			10
Benzyl Alcohol		U			10
1,2-Dichlorobenzene		U			10
2-Methylphenol		U			10
bis (2-Chloroisopropyl) ether		U			10
4-Methylphenol		U			10
N-Nitroso-di-n-propylamine		U			10
Hexachloroethane		U			10
Nitrobenzene		U			10
Isophorone		U			10
2-Nitrophenol		U			10
2,4-Dimethylphenol		U			10
Benzoic Acid		U			50
bis (2-Chloroethoxy) methane		U			10
2,4-Dichlorophenol		U			10
1,2,4-Trichlorobenzene		U			10
Napththalene		U			10
4 Chloroaniline		U			10
Hexachlorobutadiene		U			10
4 Chloro-3-methylphenol		U			10
2-Methylnaphthalene		U			10
Hexachlorocyclopentadiene		U			10
2,4,6-Trichlorophenol		U			10
2,4,5-Trichlorophenol		U			50
2-Chloronapthalene		U			10
2-Nitroaniline		U			50
Dimethyphthalate		U			10
Acenaphthylene		U			10
2,6-Dinitrotoluene		U			10

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	PQL
		1	SW0901	Method Blank	
				SW0901	
Phenol		U			10
Bis (2-Chloroethyl) ether		U			10
2-Chlorophenol		U			10
1,3-Dichlorobenzene		U			10
1,4-Dichlorobenzene		U			10
Benzyl Alcohol		U			10
1,2-Dichlorobenzene		U			10
2-Methylphenol		U			10
bis (2-Chloroisopropyl) ether		U			10
4-Methylphenol		U			10
N-Nitroso-di-n-propylamine		U			10
Hexachloroethane		U			10
Nitrobenzene		U			10
Isophorone		U			10
2-Nitrophenol		U			10
2,4-Dimethylphenol		U			10
Benzoic Acid		U			50
bis (2-Chloroethoxy) methane		U			10
2,4-Dichlorophenol		U			10
1,2,4-Trichlorobenzene		U			10
Napththalene		U			10
4 Chloroaniline		U			10
Hexachlorobutadiene		U			10
4 Chloro-3-methylphenol		U			10
2-Methylnaphthalene		U			10
Hexachlorocyclopentadiene		U			10
2,4,6-Trichlorophenol		U			10
2,4,5-Trichlorophenol		U			50
2-Chloronapthalene		U			10
2-Nitroaniline		U			50
Dimethyphthalate		U			10
Acenaphthylene		U			10
2,6-Dinitrotoluene		U			10

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941750
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / L

Matrix: WATER
Method: 8270

Dilution Factor (DF)	1	1	1	1	1	
Method Blank	SW0901	SW0901	SW0901	SW0901	SW0901	
Client ID	FR-001	FR-002	FR-003	FR-004	Method Blank	PQL
Analyte Lab ID	941750 001	941750 002	941750 003	941750 004	SW0901	
3-Nitroaniline	U	U	U	U	U	50
Acenaphthene	U	U	U	U	U	10
2,4-Dinitrophenol	U	U	U	U	U	50
4-Nitrophenol	U	U	U	U	U	50
Dibenzofuran	U	U	U	U	U	10
2,4-Dinitrotoluene	U	U	U	U	U	10
Diethylphthalate	U	U	U	U	U	10
4-Chlorophenyl phenyl ether	U	U	U	U	U	10
Fluorene	U	U	U	U	U	10
4-Nitroaniline	U	U	U	U	U	50
4,6-Dinitro-2-methylphenol	U	U	U	U	U	50
N-Nitrosodiphenylamine (1)	U	U	U	U	U	10
4-Bromophenyl phenyl ether	U	U	U	U	U	10
Hexachlorobenzene	U	U	U	U	U	10
Pentachlorophenol	U	U	U	U	U	50
Phenanthrene	U	U	U	U	U	10
Anthracene	U	U	U	U	U	10
Di-n-butylphthalate	U	11	U	U	U	10
Fluoranthene	U	U	U	U	U	10
Pyrene	U	U	U	U	U	10
Butyl benzyl phthalate	U	U	U	U	U	10
3,3'-Dichlorobenzidine	U	U	U	U	U	20
Benzo (a) anthracene	U	U	U	U	U	10
Chrysene	U	U	U	U	U	10
bis (2-ethylhexyl) phthalate	U	U	U	U	U	10
Di-n-octylphthalate	U	U	U	U	U	10
Benzo (b) fluoranthene	U	U	U	U	U	10
Benzo (k) fluoranthene	U	U	U	U	U	10
Benzo (a) pyrene	U	U	U	U	U	10
Indeno (1,2,3-cd) pyrene	U	U	U	U	U	10
Dibenz (a,h) anthracene	U	U	U	U	U	10
Benzo (g,h,i) perylene	U	U	U	U	U	10
Date Extracted	9/1/94	9/1/94	9/1/94	9/1/94	9/1/94	
Date Analyzed	9/3/94	9/3/94	9/3/94	9/4/94	9/3/94	

(1) - Cannot be separated from Diphenylamine
PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

WATER VOLATILE SURROGATE RECOVERY

Lab Name: IEA - Illinois Contract:

Lab code: IEAIL Case No.: CH941750 SAS No.: SDG No.:

	EPA SAMPLE NO.	S1 (DCE)#	S2 (TOL)#	S3 (BFB)#	S4 ( )#	TOT OUT
01	VBLK1	109	105	106		0
02	VBLK2	100	108	102		0
03	VBLK3	95	96	110		0
04	VBLK4	114	92	86		0
05	QCCHK1	106	98	108		0
06	QCCHK2	114	98	107		0
07	QCCHK3	107	96	102		0
08	QCCHK4	114	102	89		0
09	QCCHK5	101	102	91		0
10	FR-001	102	89	114		0
11	FR-001DL1	92	103	91		0
12	FR-001DL2	85	96	86		0
13	FR-002	94	88	108		0
14	FR-002DL1	93	98	95		0
15	FR-002DL2	100	106	108		0
16	FR-002DL3	110	109	87		0
17	FR-003	82	106	101		0
18	FR-004	109	108	108		0
19	FR-004DL	99	109	99		0
20	FR-005	100	95	102		0
21	FR-001MS	111	110	101		0
22	FR-001MD	113	108	99		0
23						
24						
25						
26						
27						
28						
29						
30						

	QC LIMITS
S1 (DCE) = 1,2-Dichloroethane-d4	(76-114)
S2 (TOL) = Toluene-d8	(88-110)
S3 (BFB) = Bromofluorobenzene	(86-115)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogates diluted out

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

September 23, 1994

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on August 17, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH941622	Client Project#	[redacted]5770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

for Thomas M. Bauer
Laboratory Manager
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-081094-FR-100	941622001
S-081094-FR-101	941622002
S-081294-FR-102	941622003
S-081294-FR-103	941622004
S-081294-FR-104	941622005
S-081294-FR-105	941622006
S-081594-FR-106	941622007
S-081594-FR-107	941622008
S-081694-FR-108	941622009
S-081694-FR-109	941622010
S-081694-FR-110	941622011
S-081694-FR-201	941622012
S-081694-FR-202	941622013
S-081694-FR-203	941622014
S-081694-FR-204	941622015

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug/kg Dry Weight

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	1	1	5	1	PQL
	Method Blank	VS 082294	VS 082394	VS 082294	VS 082294	VS 082294	
	Client ID	FR-105	FR-106	FR-107	FR-108	FR-109	
	Lab ID	941622 006	941622 007	941622 008	941622 009	941622 010	
Trans-1,2-Dichloroethene		U	U	U	UD	U	10
Chloromethane		U	U	U	UD	U	10
Bromomethane		U	U	U	UD	U	10
Vinyl Chloride		U	U	U	UD	U	10
Chloroethane		U	U	U	UD	U	10
Methylene Chloride		U	U	U	UD	U	10
Acetone		U	U	U	UD	U	100
Carbon Disulfide		U	U	U	UD	U	100
1,1-Dichloroethene		U	U	U	UD	U	10
1,1-Dichloroethane		U	U	U	UD	U	10
cis-1,2-Dichloroethene		U	U	U	UD	U	10
Chloroform		U	U	U	UD	U	10
1,2-Dichloroethane		U	U	U	UD	U	10
2-Butanone		U	U	U	UD	U	100
1,1 1-Trichlorethane		U	U	U	UD	U	10
Carbon Tetrachloride		U	U	U	UD	U	10
Vinyl Acetate		U	U	U	UD	U	10
Bromodichloromethane		U	U	U	UD	U	10
1,2-Dichloropropane		U	U	U	UD	U	10
Trans-1,3-dichloropropene		U	U	U	UD	U	10
Trichloroethylene		U	U	U	UD	U	10
Dibromochloromethane		U	U	U	UD	U	10
1,1,2-Trichloroethane		U	U	U	UD	U	10
Benzene		U	U	U	UD	U	10
cis-1,3-Dichloropropene		U	U	U	UD	U	10
2-Chloroethylvinylether		U	U	U	UD	U	10
Bromoform		U	U	U	UD	U	10
4-Methyl-2-Pentanone		U	U	U	UD	U	100
2-Hexanone		U	U	U	UD	U	100
Tetrachloroethylene		U	U	U	UD	U	10
1,1,2,2-Tetrachloroethane		U	U	U	UD	U	10
Toluene		U	U	U	UD	U	10
Chlorobenzene		U	U	U	UD	U	10
Ethylbenzene		U	U	U	130	U	10
Styrene		U	U	U	UD	U	10
Total Xylenes		U	U	U	940	U	30
DATE ANALYZED		08/22/94	08/23/94	08/23/94	08/23/94	08/23/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug/kg Dry Weight

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	5	1	1	1	1	PQL
	Method Blank	VS 082494	VS 082394	VS 082494	VS 082494	VS 082394	
	Client ID	FR-110	FR-201	FR-202	FR-203	FR-204	
	Lab ID	941622 011	941622 012	941622 013	941622 014	941622 015	
Trans-1,2-Dichloroethene		UD	U	U	UD	U	10
Chloromethane		UD	U	U	UD	U	10
Bromomethane		UD	U	U	UD	U	10
Vinyl Chloride		36	U	U	UD	U	10
Chloroethane		UD	U	U	UD	U	10
Methylene Chloride		UD	U	U	UD	U	10
Acetone		UD	U	U	UD	U	100
Carbon Disulfide		UD	U	U	UD	U	100
1,1-Dichloroethene		UD	U	U	UD	U	10
1,1-Dichloroethane		UD	U	U	UD	U	10
cis-1,2-Dichloroethene		27	U	U	UD	U	10
Chloroform		UD	U	U	UD	U	10
1,2-Dichloroethane		UD	U	U	UD	U	10
2-Butanone		UD	U	U	UD	U	100
1,1 1-Trichlorethane		UD	U	U	UD	U	10
Carbon Tetrachloride		UD	U	U	UD	U	10
Vinyl Acetate		UD	U	U	UD	U	10
Bromodichloromethane		UD	U	U	UD	U	10
1,2-Dichloropropane		UD	U	U	UD	U	10
Trans-1,3-dichloropropene		UD	U	U	UD	U	10
Trichloroethylene		UD	U	U	UD	U	10
Dibromochloromethane		UD	U	U	UD	U	10
1,1,2-Trichloroethane		UD	U	U	UD	U	10
Benzene		15	U	U	UD	U	10
cis-1,3-Dichloropropene		UD	U	U	UD	U	10
2-Chloroethylvinylether		UD	U	U	UD	U	10
Bromoform		UD	U	U	UD	U	10
4-Methyl-2-Pentanone		UD	U	U	UD	U	100
2-Hexanone		UD	U	U	UD	U	100
Tetrachloroethylene		UD	U	U	UD	U	10
1,1,2,2-Tetrachloroethane		UD	U	U	UD	U	10
Toluene		370,000	U	U	UD	U	10
Chlorobenzene		UD	U	U	UD	U	10
Ethylbenzene		170,000	U	U	130	U	10
Styrene		UD	U	U	UD	U	10
Total Xylenes		760,000	U	U	940	U	30
DATE ANALYZED		08/24/94	08/23/94	08/25/94	08/24/94	08/23/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug/kg Dry Weight

Matrix: SOIL
Method: 8240

Analyte / Lab ID	Method Blank					PQL
Dilution Factor (DF)	1	1	1	1		
Method Blank	VS 082294	VS 082394	VS 082494	VS 082694		
Client ID	Method Blank	Method Blank	Method Blank	Method Blank		
Lab ID	VS082294	VS082394	VS082494	VS082694		
Trans-1,2-Dichloroethene	U	U	U	U		10
Chloromethane	U	U	U	U		10
Bromomethane	U	U	U	U		10
Vinyl Chloride	U	U	U	U		10
Chloroethane	U	U	U	U		10
Methylene Chloride	U	U	U	U		10
Acetone	U	U	U	U		100
Carbon Disulfide	U	U	U	U		100
1,1-Dichloroethene	U	U	U	U		10
1,1-Dichloroethane	U	U	U	U		10
cis-1,2-Dichloroethene	U	U	U	U		10
Chloroform	U	U	U	U		10
1,2-Dichloroethane	U	U	U	U		10
2-Butanone	U	U	U	U		100
1,1 1-Trichlorethane	U	U	U	U		10
Carbon Tetrachloride	U	U	U	U		10
Vinyl Acetate	U	U	U	U		10
Bromodichloromethane	U	U	U	U		10
1,2-Dichloropropane	U	U	U	U		10
Trans-1,3-dichloropropene	U	U	U	U		10
Trichloroethylene	U	U	U	U		10
Dibromochloromethane	U	U	U	U		10
1,1,2-Trichloroethane	U	U	U	U		10
Benzene	U	U	U	U		10
cis-1,3-Dichloropropene	U	U	U	U		10
2-Chloroethylvinylether	U	U	U	U		10
Bromoform	U	U	U	U		10
4-Methyl-2-Pentanone	U	U	U	U		100
2-Hexanone	U	U	U	U		100
Tetrachloroethylene	U	U	U	U		10
1,1,2,2-Tetrachloroethane	U	U	U	U		10
Toluene	U	U	U	U		10
Chlorobenzene	U	U	U	U		10
Ethylbenzene	U	U	U	U		10
Styrene	U	U	U	U		10
Total Xylenes	U	U	U	U		30
DATE ANALYZED	08/22/94	08/23/94	08/24/94	08/26/94		

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weights

SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
		1	SS0823	FR-100	941622 001	
Phenol		U	U	U	U	330
Bis (2-Chloroethyl) ether		U	U	U	U	330
2-Chlorophenol		U	U	U	U	330
1,3-Dichlorobenzene		U	U	U	U	330
1,4-Dichlorobenzene		U	U	U	U	330
Benzyl Alcohol		U	U	U	U	330
1,2-Dichlorobenzene		U	U	U	U	330
2-Methylphenol		U	U	U	U	330
bis (2-Chloroisopropyl) ether		U	U	U	U	330
4-Methylphenol		U	U	U	U	330
)-Nitroso-di-n-propylamine		U	U	U	U	330
Hexachloroethane		U	U	U	U	330
Nitrobenzene		U	U	U	U	330
Isophorone		U	U	U	U	330
2-Nitrophenol		U	U	U	U	330
2,4-Dimethylphenol		U	U	U	U	330
Benzoic Acid		U	U	U	U	1700
bis (2-Chloroethoxy) methane		U	U	U	U	330
2,4-Dichlorophenol		U	U	U	U	330
1,2,4-Trichlorobenzene		U	U	U	U	330
Naphthalene		U	U	U	1300	330
4 Chloroaniline		U	U	U	U	330
Hexachlorobutadiene		U	U	U	U	330
4 Chloro-3-methylphenol		U	U	U	U	660
2-Methylnaphthalene		U	U	U	560	330
Hexachlorocyclopentadiene		U	U	U	U	330
2,4,6-Trichlorophenol		U	U	U	U	330
2,4,5-Trichlorophenol		U	U	U	U	1700
2-Chloronaphthalene		U	U	U	U	330
2-Nitroaniline		U	U	U	U	1700
Dimethyphthalate		U	U	U	U	330
Acenaphthylene		U	U	U	U	330
2,6-Dinitrotoluene		U	U	U	U	330

MDL (Minimum Detection Limit) = LLD x DF

printed on recycled paper

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg Dry Weight

SOIL
Method: 8270

Analyte / Lab ID	Method Blank SS0823	FR-100 941622 001	FR-101 941622 002	FR-102 941622 003	FR-103 941622 004	FR-1-4 941622 005	Lower Limits Quantitation (LLD) with no Dilution*
Dilution Factor (DF)	1	1	1	1	1		
3-Nitroaniline	U	U	U	U	U		1700
Acenaphthene	U	U	U	U	U		330
2,4-Dinitrophenol	U	U	U	U	U		1700
4-Nitrophenol	U	U	U	U	U		1700
Dibenzofuran	U	U	U	U	U		330
2,4-Dinitrotoluene	U	U	U	U	U		330
Diethylphthalate	U	U	U	U	U		330
4-Chlorophenyl phenyl ether	U	U	U	U	U		330
Fluorene	U	U	U	U	U		330
4-Nitroaniline	U	U	U	U	U		1700
4,6-Dinitro-2-methylphenol	U	U	U	U	U		1700
N-Nitrosodiphenylamine (1)	U	U	U	U	U		330
4-Bromophenyl phenyl ether	U	U	U	U	U		330
Hexachlorobenzene	U	U	U	U	U		330
Pentachlorophenol	U	U	U	U	U		1700
Phenanthrene	440	U	U	U	U		330
Anthracene	U	U	U	U	U		330
Di-n-butylphthalate	U	U	U	690	U		330
Fluoranthene	620	U	U	U	U		330
Pyrene	530	U	U	380	U		330
Butyl benzyl phthalate	U	U	U	U	U		330
3,3'-Dichlorobenzidine	U	U	U	U	U		2000
Benzo (a) anthracene	U	U	U	U	U		330
Chrysene	U	U	U	U	U		330
bis (2-ethylhexyl) phthalate	U	U	U	U	U		330
Di-n-octylphthalate	U	U	U	U	U		330
Benzo (b) fluoranthene	U	U	U	U	U		330
Benzo (k) fluoranthene	U	U	U	U	U		330
Benzo (a) pyrene	U	U	U	U	U		330
Indeno (1,2,3-cd) pyrene	U	U	U	U	U		330
Dibenz (a,h) anthracene	U	U	U	U	U		330
Benzo (g,h,i) perylene	U	U	U	U	U		330
Date Extracted	08/23/94	08/23/94	08/23/94	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/23/94	08/24/94	08/24/94	08/25/94		

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weights

SOIL
Method: 8270

Analyte	Dilution Factor (DF)	1	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0823	SS0823	SS0823	SS0823	SS0823	
	Client ID	FR-105	FR-106	FR-107	FR-108	FR-109	
	Lab ID	941622 006	941622 007	941622 008	941622 009	941622 010	
Phenol		U	U	U	U	U	330
Bis (2-Chloroethyl) ether		U	U	U	U	U	330
2-Chlorophenol		U	U	U	U	U	330
1,3-Dichlorobenzene		U	U	U	U	U	330
1,4-Dichlorobenzene		U	U	U	U	U	330
Benzyl Alcohol		U	U	U	U	U	330
1,2-Dichlorobenzene		U	U	U	U	U	330
2-Methylphenol		U	U	U	U	U	330
bis (2-Chloroisopropyl) ether		U	U	U	U	U	330
4-Methylphenol		U	U	U	U	U	330
N-Nitroso-di-n-propylamine		U	U	U	U	U	330
Hexachloroethane		U	U	U	U	U	330
Nitrobenzene		U	U	U	U	U	330
Isophorone		U	U	U	U	U	330
2-Nitrophenol		U	U	U	U	U	330
2,4-Dimethylphenol		U	U	U	U	U	330
Benzoic Acid		U	U	U	U	U	1700
bis (2-Chloroethoxy) methane		U	U	U	U	U	330
2,4-Dichlorophenol		U	U	U	U	U	330
1,2,4-Trichlorobenzene		U	U	U	U	U	330
Naphthalene		U	U	U	4800	U	330
4 Chloroaniline		U	U	U	U	U	330
Hexachlorobutadiene		U	U	U	U	U	330
4 Chloro-3-methylphenol		U	U	U	U	U	660
2-Methylnaphthalene		U	U	U	2000	U	330
Hexachlorocyclopentadiene		U	U	U	U	U	330
2,4,6-Trichlorophenol		U	U	U	U	U	330
2,4,5-Trichlorophenol		U	U	U	U	U	1700
2-Chloronaphthalene		U	U	U	U	U	330
2-Nitroaniline		U	U	U	U	U	1700
Dimethyphthalate		U	U	U	U	U	330
Acenaphthylene		U	U	U	U	U	330
2,6-Dinitrotoluene		U	U	U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg Dry Weights

SOIL
Method: 8270

Analyte / Lab ID	Method Blank SS0823	SS0823	SS0823	SS0823	SS0823	Lower Limits Quantitation (LLD) with no Dilution*
Dilution Factor (DF)	1	1	1	1	1	
Client ID	FR-105	FR-106	FR-107	FR-108	FR-109	
Lab ID	941622 006	941622 007	941622 008	941622 009	941622 010	
3-Nitroaniline	U	U	U	U	U	1700
Acenaphthene	U	U	U	800	U	330
2,4-Dinitrophenol	U	U	U	U	U	1700
4-Nitrophenol	U	U	U	U	U	1700
Dibenzofuran	U	U	U	660	U	330
2,4-Dinitrotoluene	U	U	U	U	U	330
Diethylphthalate	U	U	U	U	U	330
4-Chlorophenyl phenyl ether	U	U	U	U	U	330
Fluorene	U	U	U	750	U	330
4-Nitroaniline	U	U	U	U	U	1700
4,6-Dinitro-2-methylphenol	U	U	U	U	U	1700
N-Nitrosodiphenylamine (1)	U	U	U	U	U	330
4-Bromophenyl phenyl ether	U	U	U	U	U	330
Hexachlorobenzene	U	U	U	U	U	330
Pentachlorophenol	U	U	U	U	U	1700
Phenanthrene	U	U	U	2400	U	330
Anthracene	U	U	U	360	U	330
Di-n-butylphthalate	U	U	U	2600	U	330
Fluoranthene	U	U	U	1400	U	330
Pyrene	U	U	U	2100	U	330
Butyl benzyl phthalate	U	U	U	U	U	330
3,3'-Dichlorobenzidine	U	U	U	U	U	2000
Benzo (a) anthracene	U	U	U	840	U	330
Chrysene	U	U	U	670	U	330
bis (2-ethylhexyl) phthalate	U	U	U	U	U	330
Di-n-octylphthalate	U	U	U	U	U	330
Benzo (b) fluoranthene	U	U	U	850	U	330
Benzo (k) fluoranthene	U	U	U	410	U	330
Benzo (a) pyrene	U	U	U	420	U	330
Indeno (1,2,3-cd) pyrene	U	U	U	460	U	330
Dibenz (a,h) anthracene	U	U	U	U	U	330
Benzo (g,h,i) perylene	U	U	U	460	U	330
Date Extracted	08/23/94	08/23/94	08/23/94	08/23/94	08/23/94	
Date Analyzed	08/25/94	08/25/94	08/25/94	08/25/94	08/25/94	

(1) – Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weight

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	1	1				Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0823	SS0823				
	Client ID	FR-110	Method Blank				
	Lab ID	941622 011	SS0823				
Phenol		U	U				330
Bis (2-Chloroethyl) ether		U	U				330
2-Chlorophenol		U	U				330
1,3-Dichlorobenzene		U	U				330
1,4-Dichlorobenzene		U	U				330
Benzyl Alcohol		U	U				330
1,2-Dichlorobenzene		U	U				330
2-Methylphenol		U	U				330
bis (2-Chloroisopropyl) ether		U	U				330
4-Methylphenol		U	U				330
N-Nitroso-di-n-propylamine		U	U				330
Hexachloroethane		U	U				330
Nitrobenzene		U	U				330
Isophorone		U	U				330
2-Nitrophenol		U	U				330
2,4-Dimethylphenol		U	U				330
Benzoic Acid		U	U				1700
bis (2-Chloroethoxy) methane		U	U				330
2,4-Dichlorophenol		U	U				330
1,2,4-Trichlorobenzene		U	U				330
Naphthalene		930	U				330
4 Chloroaniline		U	U				330
Hexachlorobutadiene		U	U				330
4 Chloro-3-methylphenol		U	U				660
2-Methylnaphthalene		870	U				330
Hexachlorocyclopentadiene		U	U				330
2,4,6-Trichlorophenol		U	U				330
2,4,5-Trichlorophenol		U	U				1700
2-Chloronaphthalene		U	U				330
2-Nitroaniline		U	U				1700
Dimethyphthalate		U	U				330
Acenaphthylene		U	U				330
2,6-Dinitrotoluene		U	U				330

* MDL (Minimum Detection Limit) = LLD x DF

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg Dry Weight

Method: SOIL 8270

Analyte / Lab ID	Method Blank SS0823	Client ID FR-110 941622 011	Method Blank SS0823				Lower Limits Quantitation (LLD) with no Dilution*
Dilution Factor (DF)	1	1					
3-Nitroaniline	U	U					1700
Acenaphthene	U	U					330
2,4-Dinitrophenol	U	U					1700
4-Nitrophenol	U	U					1700
Dibenzofuran	U	U					330
2,4-Dinitrotoluene	U	U					330
Diethylphthalate	U	U					330
4-Chlorophenyl phenyl ether	U	U					330
Fluorene	U	U					330
4-Nitroaniline	U	U					1700
4,6-Dinitro-2-methylphenol	U	U					1700
N-Nitrosodiphenylamine (1)	U	U					330
4-Bromophenyl phenyl ether	U	U					330
Hexachlorobenzene	U	U					330
Pentachlorophenol	U	U					1700
Phenanthrene	1800	U					330
Anthracene	360	U					330
Di-n-butylphthalate	600	U					330
Fluoranthene	1600	U					330
Pyrene	2900	U					330
Butyl benzyl phthalate	U	U					330
3,3'-Dichlorobenzidine	U	U					2000
Benzo (a) anthracene	840	U					330
Chrysene	830	U					330
bis (2-ethylhexyl) phthalate	U	U					330
Di-n-octylphthalate	U	U					330
Benzo (b) fluoranthene	800	U					330
Benzo (k) fluoranthene	610	U					330
Benzo (a) pyrene	530	U					330
Indeno (1,2,3-cd) pyrene	730	U					330
Dibenz (a,h) anthracene	U	U					330
Benzo (g,h,i) perylene	690	U					330
Date Extracted	08/23/94	08/23/94					
Date Analyzed	08/25/94	08/23/94					

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug/kg Dry Weight

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	1	5	5	1	PQL
	Method Blank	VS 082294	VS 082394	VS 082294	VS 082294	VS 082494	
	Client ID	FR-100	FR-101	FR-102	FR-103	FR-104	
	Lab ID	941622 001	941622 002	941622 003	941622 004	941622 005	
Trans-1,2-Dichloroethene		U	U	UD	UD	U	10
Chloromethane		U	U	UD	UD	U	10
Bromomethane		U	U	UD	UD	U	10
Vinyl Chloride		U	U	UD	UD	U	10
Chloroethane		U	U	UD	UD	U	10
Methylene Chloride		U	U	UD	UD	U	10
Acetone		U	U	UD	UD	U	100
Carbon Disulfide		U	U	UD	UD	U	100
1,1-Dichloroethene		U	U	UD	UD	U	10
1,1-Dichloroethane		U	U	UD	UD	U	10
cis-1,2-Dichloroethene		U	U	UD	UD	U	10
Chloroform		U	U	UD	UD	U	10
1,2-Dichloroethane		U	U	UD	UD	U	10
2-Butanone		U	U	UD	UD	U	100
1,1 1-Trichlorethane		U	U	UD	UD	U	10
Carbon Tetrachloride		U	U	UD	UD	U	10
Vinyl Acetate		U	U	UD	UD	U	10
Bromodichloromethane		U	U	UD	UD	U	10
1,2-Dichloropropane		U	U	UD	UD	U	10
Trans-1,3-dichloropropene		U	U	UD	UD	U	10
Trichloroethylene		U	U	UD	UD	U	10
Dibromochloromethane		U	U	UD	UD	U	10
1,1,2-Trichloroethane		U	U	UD	UD	U	10
Benzene		U	U	UD	UD	U	10
cis-1,3-Dichloropropene		U	U	UD	UD	U	10
2-Chloroethylvinylether		U	U	UD	UD	U	10
Bromoform		U	U	UD	UD	U	10
4-Methyl-2-Pentanone		U	U	UD	UD	U	100
2-Hexanone		U	U	UD	UD	U	100
Tetrachloroethylene		U	U	UD	UD	U	10
1,1,2,2-Tetrachloroethane		U	U	UD	UD	U	10
Toluene		U	U	UD	UD	U	10
Chlorobenzene		U	U	UD	UD	U	10
Ethylbenzene		U	U	53	UD	U	10
Styrene		U	U	UD	UD	U	10
Total Xylenes		U	U	430	74,000	U	30
DATE ANALYZED		08/22/94	08/23/94	08/22/94	08/22/94	08/24/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

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IEA
An Aquarion Company

CLIENT: CRA
IEA PROJECT#: CH941622
CLIENT PROJECT ID: 5770
MATRIX: Soil
ANALYSIS BY: JR 08/25/94

POLYNUCLEAR AROMATIC
HYDROCARBONS (PNA)
SW-846 METHOD 8310
(ug/kg) Dry Weight

CLIENT ID	S-081694-FR-201	S-081694-FR-202	S-081694-FR-203	S-081694-FR-204	Method Blank	PQL
LAB ID	941622 012	941622 013	941622 014	941622 015	SS0823	
COMPOUNDS						
Naphthalene	U	U	U	U	U	330
Acenaphthylene	U	U	U	U	U	330
Acenaphthene	U	U	U	U	U	330
Fluorene	U	U	U	U	U	330
Phenanthrene	U	U	U	U	U	330
Anthracene	U	U	U	U	U	330
Fluoranthene	U	U	U	U	U	330
Pyrene	U	U	U	U	U	330
Benzo(a)anthracene	U	U	U	U	U	330
Chrysene	U	U	U	U	U	330
Benzo(b)fluoranthene	U	U	U	U	U	330
Benzo(k)fluoranthene	U	U	U	U	U	330
Benzo(a)pyrene	U	U	U	U	U	330
Indeno(1,2,3-cd)pyrene	U	U	U	U	U	330
Dibenzo(a,h)anthracene	U	U	U	U	U	330
Benzo(g,h,i)perylene	U	U	U	U	U	330
DATE SAMPLED	08/16/94	08/16/94	08/16/94	08/16/94		
DATE EXTRACTED	08/23/94	08/23/94	08/23/94	08/23/94	08/23/94	
DATE ANALYZED	08/24/94	08/24/94	08/24/94	08/24/94	08/24/94	
DILUTION FACTOR	1	1	1	1	1	

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
PESTICIDES / PCB'S
ug/kg Dry Weights

SOIL
Method: 8080

Analyte	Dilution Factor (DF)	1	1				Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	PS0825	PS0825				
	Client ID	FR-110	Method Blank				
	Lab ID	941622 011	PS0825				
alpha-BHC		U	U				1.7
beta-BHC		U	U				1.7
delta-BHC		U	U				1.7
gamma-BHC (Lindane)		U	U				1.7
Heptachlor		U	U				1.7
Aldrin		U	U				1.7
Heptachlor epoxide		U	U				1.7
Endosulfan I		U	U				3.3
Dieldrin		U	U				3.3
4,4'-DDE		U	U				3.3
Endrin		U	U				3.3
Endosulfan II		U	U				3.3
4,4'-DDD		U	U				3.3
Endosulfan sulfate		U	U				3.3
4,4'-DDT		U	U				3.3
Endrin Ketone		U	U				3.3
alpha-Chlordane		U	U				1.7
gamma-Chlordane		U	U				1.7
Toxaphene		U	U				170
Aroclor - 1016		U	U				80
Aroclor - 1221		U	U				80
Aroclor - 1232		U	U				80
Aroclor - 1242		U	U				80
Aroclor - 1248		U	U				80
Aroclor - 1254		U	U				160
Aroclor - 1260		U	U				160
Date Extracted		08/25/94	08/25/94				
Date Analyzed		08/25/94	08/25/94				

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941622
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

Analyte	Client ID / Lab ID	S-081694 FR-110 941622 011	S-081294 FR-105 941622 006	S-081594 FR-106 941622 007	S-081594 FR-107 941622 008		PQL
Aluminum - 6010		4100					10
Antimony - 7041		11					6.0
Arsenic - 7060		6.1					0.20
Barium - 6010		280					5.0
Beryllium - 6010		0.24					0.50
Cadmium - 7131		32					0.50
Calcium - 6010		39000					20
Chromium - 6010		68					1.0
Cobalt - 6010		8.3					5.0
Copper - 6010		310					2.5
Iron - 6010		55000					5.0
Lead - 7421		400*	6.4	11	6.3		0.20
Magnesium - 6010		7700					20
Manganese - 6010		400					1.5
Mercury - 7471		<0.023					0.02
Nickel - 6010		54					3.0
Potassium - 6010		490					100
Selenium - 7741		<1.7					2.0
Silver - 7761		2.2					1.0
Sodium - 6010		130					20
Thallium - 7841		<0.23					0.20
Vanadium - 6010		6.7					5.0
Zinc - 6010		460					2.0

PQL = Practical Quantitation Limit

*Analyzed using method 6010

Date Analyzed:
ICP Metals 08/23/94
Selenium 08/23/94
Arsenic 08/23/94
Lead 08/24/94
Mecury 08/21/94
Thallium 08/24/94
Cadmium 08/23/94
Silver 08/23/94
Antimony 08/24/94

Mercury 08/21/94

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

ANALYTE LIST

Matrix: Soil

		S-081094	S-081094	S-081294	S-081294	S-081294		
	Client ID	FR-100	FR-101	FR-102	FR-103	FR-104		
		941622	941622	941622	941622	941622	Date	PQL
	Lab ID	001	002	003	004	005	Analyzed	
Analyte	Method							
Total Solids	160.3	90	90	88	86	89	08/19/94	%

PQL = Practical Quantitation Limit

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IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

ANALYTE LIST

Matrix: Soil

Client ID	S-081294 FR-105	S-081594 FR-106	S-081594 FR-107	S-081694 FR-108	S-081694 FR-109		
Lab ID	941622 006	941622 007	941622 008	941622 009	941622 010	Date Analyzed	PQL
Analyte	Method						
Total Solids	160.3	89	89	90	87	88	08/19/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

ANALYTE LIST

Matrix: Soil

Client ID	S-081694 FR-110	S-081694 FR-201	S-081694 FR-202	S-081694 FR-203	S-081694 FR-204		
Lab ID	941622 011	941622 012	941622 013	941622 014	941622 015	Date Analyzed	PQL
Analyte / Method							
Total Solids / 160.3	84	88	88	90	88	08/19/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

September 23, 1994

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on August 22, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH941661	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

for Thomas M. Bauer
Laboratory Manager
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-081794-FR-111	941661001
S-081794-FR-112	941661002
S-081794-FR-113	941661003
S-081794-FR-114	941661004

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg dry wght

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	1	1	5	5	PQL
	Method Blank	VS 082594	VS 082694	VS 082594	VS 082694	VS 082594	
	Client ID	Method Blank	Method Blank	FR-111	FR-112	FR-113	
	Lab ID	VS082594	VS082694	941661 001	941661 002	941661 003	
Trans-1,2-Dichloroethene		U	U	U	UD	UD	10
Chloromethane		U	U	U	UD	UD	10
Bromomethane		U	U	U	UD	UD	10
Vinyl Chloride		U	U	U	UD	UD	10
Chloroethane		U	U	U	UD	UD	10
Methylene Chloride		U	U	66	UD	UD	10
Acetone		U	U	U	UD	UD	100
Carbon Disulfide		U	U	U	UD	UD	100
1,1-Dichloroethene		U	U	U	UD	UD	10
1,1-Dichloroethane		U	U	U	UD	UD	10
cis-1,2-Dichloroethene		U	U	U	380	UD	10
Chloroform		U	U	U	UD	UD	10
1,2-Dichloroethane		U	U	U	UD	UD	10
2-Butanone		U	U	U	UD	UD	100
1,1 1-Trichlorethane		U	U	U	UD	UD	10
Carbon Tetrachloride		U	U	U	UD	UD	10
Vinyl Acetate		U	U	U	UD	UD	10
Bromodichloromethane		U	U	U	UD	UD	10
1,2-Dichloropropane		U	U	U	UD	UD	10
Trans-1,3-dichloropropene		U	U	U	UD	UD	10
Trichloroethylene		U	U	U	UD	UD	10
Dibromochloromethane		U	U	U	UD	UD	10
1,1,2-Trichloroethane		U	U	U	UD	UD	10
Benzene		U	U	U	UD	UD	10
cis-1,3-Dichloropropene		U	U	U	UD	UD	10
2-Chloroethylvinylether		U	U	U	UD	UD	10
Bromoform		U	U	U	UD	UD	10
4-Methyl-2-Pentanone		U	U	U	UD	UD	100
2-Hexanone		U	U	U	UD	UD	100
Tetrachloroethylene		U	U	U	UD	UD	10
1,1,2,2-Tetrachloroethane		U	U	U	UD	UD	10
Toluene		U	U	U	15000	UD	10
Chlorobenzene		U	U	U	UD	UD	10
Ethylbenzene		U	U	70	10000	74	10
Styrene		U	U	U	UD	UD	10
Total Xylenes		U	U	990	46000	1500	30
DATE ANALYZED		08/25/94	08/26/94	08/25/94	08/26/94	08/25/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg (dry weight)

Matrix: SOIL
Method: 8240

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID				PQL
	1	VS092694	FR-403	941866 002			
	1	VS092994	FR-403	941866 002RE			
	1	VS092694	FR-406	941866 005			
	1	VS092794	FR-408	941866 007			
	1	VS092694	FR-410	941866 009			
Trans-1,2-Dichloroethene		U	U	U	U	U	10
Chloromethane		U	U	U	U	U	10
Bromomethane		U	U	U	U	U	10
Vinyl Chloride		U	U	U	U	U	10
Chloroethane		U	U	U	U	U	10
Methylene Chloride		U	U	U	U	U	10
Acetone		U	U	U	U	U	100
Carbon Disulfide		U	U	U	U	U	100
1,1-Dichloroethene		U	U	U	U	U	10
1,1-Dichloroethane		U	U	U	U	U	10
cis-1,2-Dichloroethene		U	U	U	U	U	10
Chloroform		U	U	U	U	U	10
1,2-Dichloroethane		U	U	U	U	U	10
2-Butanone		U	U	U	U	U	100
1,1 1-Trichlorethane		U	U	U	U	U	10
Carbon Tetrachloride		U	U	U	U	U	10
Vinyl Acetate		U	U	U	U	U	10
Bromodichloromethane		U	U	U	U	U	10
1,2-Dichloropropane		U	U	U	U	U	10
Trans-1,3-dichloropropene		U	U	U	U	U	10
Trichloroethylene		8	13	U	U	U	10
Dibromochloromethane		U	U	U	U	U	10
1,1,2-Trichloroethane		U	U	U	U	U	10
Benzene		U	U	U	U	U	10
cis-1,3-Dichloropropene		U	U	U	U	U	10
2-Chloroethylvinylether		U	U	U	U	U	10
Bromoform		U	U	U	U	U	10
4-Methyl-2-Pentanone		U	U	U	U	U	100
2-Hexanone		U	U	U	U	U	100
Tetrachloroethylene		U	U	U	U	U	10
1,1,2,2-Tetrachloroethane		U	U	U	U	U	10
Toluene		U	U	U	U	U	10
Chlorobenzene		U	U	U	U	U	10
Ethylbenzene		U	U	U	U	U	10
Styrene		U	U	U	U	U	10
Total Xylenes		U	U	U	U	U	30
DATE ANALYZED		9/26/94	9/29/94	9/26/94	9/27/94	9/26/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg (dry weight)

Matrix: SOIL
Method: 8240

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID				PQL
		1	VS092694	FR-412	941866 011			
		1	VS092294	FR-414	941866 013			
		1	VS092294	FR-416	941866 015			
Trans-1,2-Dichloroethene		U	U	U				10
Chloromethane		U	U	U				10
Bromomethane		U	U	U				10
Vinyl Chloride		U	U	U				10
Chloroethane		U	U	U				10
Methylene Chloride		U	U	U				10
Acetone		U	U	U				100
Carbon Disulfide		U	U	U				100
1,1-Dichloroethene		U	U	U				10
1,1-Dichloroethane		U	U	U				10
cis-1,2-Dichloroethene		U	U	U				10
Chloroform		U	U	U				10
1,2-Dichloroethane		U	U	U				10
2-Butanone		U	U	U				100
1,1,1-Trichlorethane		U	U	U				10
Carbon Tetrachloride		U	U	U				10
Vinyl Acetate		U	U	U				10
Bromodichloromethane		U	U	U				10
1,2-Dichloropropane		U	U	U				10
Trans-1,3-dichloropropene		U	U	U				10
Trichloroethylene		U	U	U				10
Dibromochloromethane		U	U	U				10
1,1,2-Trichloroethane		U	U	U				10
Benzene		U	U	U				10
cis-1,3-Dichloropropene		U	U	U				10
2-Chloroethylvinylether		U	U	U				10
Bromoform		U	U	U				10
4-Methyl-2-Pentanone		U	U	U				100
2-Hexanone		U	U	U				100
Tetrachloroethylene		U	U	U				10
1,1,2,2-Tetrachloroethane		U	U	U				10
Toluene		U	U	U				10
Chlorobenzene		U	U	U				10
Ethylbenzene		U	U	U				10
Styrene		U	U	U				10
Total Xylenes		U	U	U				30
DATE ANALYZED		9/26/94	9/22/94	9/22/94				

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg (dry weight)

Matrix: SOIL
Method: 8240

Analyte / Lab ID	Dilution Factor (DF)	1	1	1	1		PQL
	Method Blank	VS092294	VS092694	VS092794	VS092994		
	Client ID	Method Blank	Method Blank	Method Blank	Method Blank		
	Lab ID	VS092294	VS092694	VS092794	VS092994		
Trans-1,2-Dichloroethene		U	U	U	U		10
Chloromethane		U	U	U	U		10
Bromomethane		U	U	U	U		10
Vinyl Chloride		U	U	U	U		10
Chloroethane		U	U	U	U		10
Methylene Chloride		U	U	U	U		10
Acetone		U	U	U	U		100
Carbon Disulfide		U	U	U	U		100
1,1-Dichloroethene		U	U	U	U		10
1,1-Dichloroethane		U	U	U	U		10
cis-1,2--Dichloroethene		U	U	U	U		10
Chloroform		U	U	U	U		10
1,2-Dichloroethane		U	U	U	U		10
2-Butanone		U	U	U	U		100
1,1 1-Trichlorethane		U	U	U	U		10
Carbon Tetrachloride		U	U	U	U		10
Vinyl Acetate		U	U	U	U		10
Bromodichloromethane		U	U	U	U		10
1,2-Dichloropropane		U	U	U	U		10
Trans-1,3-dichloropropene		U	U	U	U		10
Trichloroethylene		U	U	U	U		10
Dibromochloromethane		U	U	U	U		10
1,1,2-Trichloroethane		U	U	U	U		10
Benzene		U	U	U	U		10
cis-1,3-Dichloropropene		U	U	U	U		10
2-Chloroethylvinylether		U	U	U	U		10
Bromoform		U	U	U	U		10
4-Methyl-2-Pentanone		U	U	U	U		100
2-Hexanone		U	U	U	U		100
Tetrachloroethylene		U	U	U	U		10
1,1,2,2-Tetrachloroethane		U	U	U	U		10
Toluene		U	U	U	U		10
Chlorobenzene		U	U	U	U		10
Ethylbenzene		U	U	U	U		10
Styrene		U	U	U	U		10
Total Xylenes		U	U	U	U		30
DATE ANALYZED		9/22/94	9/26/94	9/27/94	9/29/94		

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091294–FR–402
LAB ID: 941866001
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/26/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/26/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/26/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/26/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/26/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/26/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/26/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/26/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/26/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/26/94	0.2	0.002	<0.002

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg dry wght

Matrix: SOIL
Method: 8240

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID					PQL
		1	VS 082594	FR-114					
				941661 004					
Trans-1,2-Dichloroethene		U							10
Chloromethane		U							10
Bromomethane		U							10
Vinyl Chloride		U							10
Chloroethane		U							10
Methylene Chloride		U							10
Acetone		U							100
Carbon Disulfide		U							100
1,1-Dichloroethene		U							10
1,1-Dichloroethane		U							10
cis-1,2-Dichloroethene		U							10
Chloroform		U							10
1,2-Dichloroethane		U							10
2-Butanone		U							100
1,1 1-Trichlorethane		U							10
Carbon Tetrachloride		U							10
Vinyl Acetate		U							10
Bromodichloromethane		U							10
1,2-Dichloropropane		U							10
Trans-1,3-dichloropropene		U							10
Trichloroethylene		U							10
Dibromochloromethane		U							10
1,1,2-Trichloroethane		U							10
Benzene		13							10
cis-1,3-Dichloropropene		U							10
2-Chloroethylvinylether		U							10
Bromoform		U							10
4-Methyl-2-Pentanone		U							100
2-Hexanone		U							100
Tetrachloroethylene		U							10
1,1,2,2-Tetrachloroethane		U							10
Toluene		U							10
Chlorobenzene		U							10
Ethylbenzene		U							10
Styrene		U							10
Total Xylenes		31							30
DATE ANALYZED		08/25/94							

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / kg dry wght

Matrix: SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID			PQL
		1	SS0824	FR-111	941661 001	1	SS0824	330
Phenol		U	U	U	U			330
Bis (2-Chloroethyl) ether		U	U	U	U			330
2-Chlorophenol		U	U	U	U			330
1,3-Dichlorobenzene		U	U	U	U			330
1,4-Dichlorobenzene		U	U	U	U			330
Benzyl Alcohol		U	U	U	U			330
1,2-Dichlorobenzene		U	U	U	U			330
2-Methylphenol		U	U	U	U			330
bis (2-Chloroisopropyl) ether		U	U	U	U			330
4-Methylphenol		U	U	U	U			330
N-Nitroso-di-n-propylamine		U	U	U	U			330
Hexachloroethane		U	U	U	U			330
Nitrobenzene		U	U	U	U			330
Isophorone		U	U	U	U			330
2-Nitrophenol		U	U	U	U			330
2,4-Dimethylphenol		U	U	U	U			330
Benzoic Acid		U	U	U	U			1600
bis (2-Chloroethoxy) methane		U	U	U	U			330
2,4-Dichlorophenol		U	U	U	U			330
1,2,4-Trichlorobenzene		U	U	U	U			330
Naphthalene		U	U	U	U			330
4 Chloroaniline		U	U	U	U			330
Hexachlorobutadiene		U	U	U	U			330
4 Chloro-3-methylphenol		U	U	U	U			660
2-Methylnaphthalene		U	U	U	U			330
Hexachlorocyclopentadiene		U	U	U	U			330
2,4,6-Trichlorophenol		U	U	U	U			330
2,4,5-Trichlorophenol		U	U	U	U			1600
2-Chloronapthalene		U	U	U	U			330
2-Nitroaniline		U	U	U	U			1600
Dimethylphthalate		U	U	U	U			330
Acenaphthylene		U	U	U	U			330
2,6-Dinitrotoluene		U	U	U	U			330

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / kg dry wght

Matrix: SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID			PQL
		1	SS0824	FR-111	941661 001		
		1	SS0824	FR-113	941661 003		
		1	SS0824	FR-114	941661 004		
		1	SS0824	Method Blank	SS0824		
3-Nitroaniline		U	U	U	U		1600
Acenaphthene		U	U	U	U		330
2,4-Dinitrophenol		U	U	U	U		1600
4-Nitrophenol		U	U	U	U		1600
Dibenzofuran		U	U	U	U		330
2,4-Dinitrotoluene		U	U	U	U		330
Diethylphthalate		U	U	U	U		330
4-Chlorophenyl phenyl ether		U	U	U	U		330
Fluorene		U	U	U	U		330
4-Nitroaniline		U	U	U	U		1600
4,6-Dinitro-2-methylphenol		U	U	U	U		1600
N-Nitrosodiphenylamine (1)		U	U	U	U		330
4-Bromophenyl phenyl ether		U	U	U	U		330
Hexachlorobenzene		U	U	U	U		330
Pentachlorophenol		U	U	U	U		1600
Phenanthrene		540	U	U	U		330
Anthracene		U	U	U	U		330
Di-n-butylphthalate		U	U	U	U		330
Fluoranthene		1100	U	U	U		330
Pyrene		1400	U	U	U		330
Butyl benzyl phthalate		U	U	U	U		330
3,3'-Dichlorobenzidine		U	U	U	U		660
Benzo (a) anthracene		850	U	U	U		330
Chrysene		1200	U	U	U		330
bis (2-ethylhexyl) phthalate		U	U	U	U		330
Di-n-octylphthalate		U	U	U	U		330
Benzo (b) fluoranthene		1400	U	U	U		330
Benzo (k) fluoranthene		470	U	U	U		330
Benzo (a) pyrene		640	U	U	U		330
Indeno (1,2,3-cd) pyrene		620	U	U	U		330
Dibenz (a,h) anthracene		U	U	U	U		330
Benzo (g,h,i) perylene		890	U	U	U		330
Date Extracted		08/24/94	08/24/94	08/24/94	08/24/94		
Date Analyzed		08/28/94	08/26/94	08/26/94	08/26/94		

(1) - Cannot be separated from Diphenylamine
PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

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IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weight

SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID					Lower Limits Quantitation (LLD) with no Dilution*
		1	SS0829	FR-112					
		1	SS0829	METHOD BLANK					
			941661 002	SS0829					
Phenol		U	U						330
Bis (2-Chloroethyl) ether		U	U						330
2-Chlorophenol		U	U						330
1,3-Dichlorobenzene		U	U						330
1,4-Dichlorobenzene		U	U						330
Benzyl Alcohol		U	U						330
1,2-Dichlorobenzene		U	U						330
2-Methylphenol		U	U						330
bis (2-Chloroisopropyl) ether		U	U						330
4-Methylphenol		U	U						330
N-Nitroso-di-n-propylamine		U	U						330
Hexachloroethane		U	U						330
Nitrobenzene		U	U						330
Isophorone		U	U						330
2-Nitrophenol		U	U						330
2,4-Dimethylphenol		U	U						330
Benzoic Acid		U	U						1700
bis (2-Chloroethoxy) methane		U	U						330
2,4-Dichlorophenol		U	U						330
1,2,4-Trichlorobenzene		U	U						330
Naphthalene		800	U						330
4 Chloroaniline		U	U						330
Hexachlorobutadiene		U	U						330
4 Chloro-3-methylphenol		U	U						660
2-Methylnaphthalene		630	U						330
Hexachlorocyclopentadiene		U	U						330
2,4,6-Trichlorophenol		U	U						330
2,4,5-Trichlorophenol		U	U						1700
2-Chloronaphthalene		U	U						330
2-Nitroaniline		U	U						1700
Dimethyphthalate		U	U						330
Acenaphthylene		U	U						330
2,6-Dinitrotoluene		U	U						330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg dry wght

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID				Lower Limits Quantitation (LLD) with no Dilution*
	1	SSD0829	FR-112				
	1	SS0829	METHOD BLANK				
	941661 002	SS0829					
3-Nitroaniline	U	U					1700
Acenaphthene	U	U					330
2,4-Dinitrophenol	U	U					1700
4-Nitrophenol	U	U					1700
Dibenzofuran	U	U					330
2,4-Dinitrotoluene	U	U					330
Diethylphthalate	U	U					330
4-Chlorophenyl phenyl ether	U	U					330
Fluorene	U	U					330
4-Nitroaniline	U	U					1700
4,6-Dinitro-2-methylphenol	U	U					1700
N-Nitrosodiphenylamine (1)	U	U					330
4-Bromophenyl phenyl ether	U	U					330
Hexachlorobenzene	U	U					330
Pentachlorophenol	U	U					1700
Phenanthrene	U	U					330
Anthracene	U	U					330
Di-n-butylphthalate	1300	U					330
Fluoranthene	U	U					330
Pyrene	U	U					330
Butyl benzyl phthalate	U	U					330
3,3'-Dichlorobenzidine	U	U					2000
Benzo (a) anthracene	U	U					330
Chrysene	U	U					330
bis (2-ethylhexyl) phthalate	410	U					330
Di-n-octylphthalate	U	U					330
Benzo (b) fluoranthene	U	U					330
Benzo (k) fluoranthene	U	U					330
Benzo (a) pyrene	U	U					330
Indeno (1,2,3-cd) pyrene	U	U					330
Dibenz (a,h) anthracene	U	U					330
Benzo (g,h,i) perylene	U	U					330
Date Extracted	08/29/94	08/29/94					
Date Analyzed	08/29/94	08/29/94					

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
PESTICIDES / PCB'S
ug/kg Dry Weight

Matrix: SOIL
Method: 8080

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID					PQL
		1	PS0824	FR-111	941661 001	1	PS0824	FR-112	941661 002	1	PS0824	METHOD BLANK	PS0824			
alpha-BHC		U		U		U										1.7
beta-BHC		U		U		U										1.7
delta-BHC		U		U		U										1.7
gamma-BHC (Lindane)		U		U		U										1.7
Heptachlor		U		U		U										1.7
Aldrin		U		U		U										1.7
Heptachlor epoxide		U		U		U										1.7
Endosulfan I		U		U		U										3.3
Dieldrin		U		U		U										3.3
4,4'-DDE		U		U		U										3.3
Endrin		U		U		U										3.3
Endosulfan II		U		U		U										3.3
4,4'-DDD		U		U		U										3.3
Endosulfan sulfate		U		U		U										3.3
4,4'-DDT		U		U		U										3.3
Methoxyclor		U		U		U										3.3
Endrin Ketone		U		U		U										3.3
alpha-Chlordane		U		U		U										1.7
gamma-Chlordane		U		U		U										1.7
Toxaphene		U		U		U										170
Aroclor - 1016		U		U		U										80
Aroclor - 1221		U		U		U										80
Aroclor - 1232		U		U		U										80
Aroclor - 1242		U		U		U										80
Aroclor - 1248		U		U		U										80
Aroclor - 1254		U		U		U										160
Aroclor - 1260		U		U		U										160
Date Extracted		08/24/94		08/24/94		08/24/94										
Date Analyzed		08/26/94		08/26/94		08/25/94										

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

Analyte / Lab ID	S-081794 FR-111 941661 001	S-081794 FR-112 941661 002				PQL
Aluminum - 6010	4100	5100				2.5
Antimony - 7041	37	0.14				0.12
Arsenic - 7060	8.9	6.6				0.1
Barium - 6010	450	33				1.2
Beryllium - 6010	0.18	0.45				0.12
Cadmium - 7131	18*	0.40				0.02
Calcium - 6010	27000	64000				5
Chromium - 6010	55	10				0.25
Cobalt - 6010	9.1	6.6				1.2
Copper - 6010	110	13				0.6
Iron - 6010	11000	11000				1.2
Lead - 7421	1100*	14				0.15
Magnesium - 6010	12000	18000				5
Manganese - 6010	200	280				0.38
Mercury - 7471	0.019	<0.011				0.02
Nickel - 6010	43	13				0.75
Potassium - 6010	520	790				25
Selenium - 7741	2.0	<2.4				2.0
Silver - 7761	0.29	0.043				0.03
Sodium - 6010	120	93				5
Thallium - 7841	<0.92	<0.78				1.0
Vanadium - 6010	38	13				1.2
Zinc - 6010	480	39				0.5

PQL = Practical Quantitation Limit, varies with sample weight and total solids

Date Analyzed: ICP Metals 08/26/94
Selenium 08/26/94
Arsenic 08/26/94
Lead 08/30/94
Mercury 08/26/94
Thallium 08/30/94
Cadmium 08/25/94
Silver 08/25/94
Antimony 08/29/94

*Analyzed by ICP

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941661
Project #: 5770

ANALYTE LIST

Matrix: Soil

Client ID	S-081794 FR-111	S-081794 FR-112	S-081794 FR-113	S-081794 FR-114			
Lab ID	941661 001	941661 002	941661 003	941661 004		Date Analyzed	PQL
Analyte	Method						
Total Solids	160.3	80	88	81	88	08/25/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA-MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

October 17, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on September 15, 1994.This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH941866	Client Project#	[redacted]5770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Thomas M. Bauer
Laboratory Manager
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

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SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-091294-FR-402	941866001
S-091294-FR-403	941866002
S-091294-FR-404	941866003
S-091294-FR-405	941866004
S-091394-FR-406	941866005
S-091394-FR-407	941866006
S-091394-FR-408	941866007
S-091394-FR-409	941866008
S-091394-FR-410	941866009
S-091394-FR-411	941866010
S-091394-FR-412	941866011
S-091394-FR-413	941866012
S-091394-FR-414	941866013
S-091394-FR-415	941866014
S-091394-FR-416	941866015

IEA
An Aquarion Company

CASE NARRATIVE

IEA JOB#: CH941866

Samples FR-403, FR-406, FR-410 and FR-412 did not initially meet VOA surrogate QC limits. Samples were rerun out of holdtime and QC limits for surrogates were met. The single hit that was detected for FR-403 was confirmed and both sets of data are reported. The remaining samples were also rerun, QC limits for surrogate recoveries were acceptable, and the results confirmed the initial analysis.

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S-091294-FR-403
LAB ID: 941866002
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	0.002
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091294–FR–404
LAB ID: 941866003
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091294–FR–405
LAB ID: 941866004
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/22/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/22/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/22/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/22/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/22/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/22/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/22/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/22/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CL T ID: S-091394-FR-406
LAB ID: 941866005
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquanon Company

CLIENT: CRA – MI
CLIENT ID: S-091394-FR-407
LAB ID: 941866006
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091394–FR–408
LAB ID: 941866007
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquanon Company

CLIENT: CRA-MI
CLIENT SAMPLE ID: S091394-FR-409
LAB ID: 941866008
PROJECT: 5770

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT DATE LEACHED: 09/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGANICS				
D018	Benzene	09/29/94	0.5	0.001	<0.001
D019	Carbon Tetrachloride	09/29/94	0.5	0.001	<0.001
D021	Chlorobenzene	09/29/94	100.0	0.001	<0.001
D022	Chloroform	09/29/94	6.0	0.001	<0.001
D028	1,2-Dichloroethane	09/29/94	0.5	0.001	<0.001
D029	1,1-Dichloroethylene	09/29/94	0.7	0.001	<0.001
D035	Methyl Ethyl Ketone	09/29/94	200.0	0.002	<0.002
D039	Tetrachloroethylene	09/29/94	0.7	0.001	<0.001
D040	Trichloroethylene	09/29/94	0.5	0.001	<0.001
D043	Vinyl Chloride	09/29/94	0.2	0.002	<0.002

IEA
An Aquanon Company

CLIENT: CRA – MI
CLIENT ID: S–091394–FR–410
LAB ID: 941866009
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/24/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S-091394-FR-411
LAB ID: 941866010
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/24/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquanon Company

CLIENT: CRA – MI
CL T ID: S-091394-FR-412
LAB ID: 941866011
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/24/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091394–FR–413
LAB ID: 941866012
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/24/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S-091394-FR-414
LAB ID: 941866013
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/22/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/22/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/22/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/22/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/22/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/22/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/22/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/22/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: S–091394–FR–415
LAB ID: 941866014
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/22/94	0.5	0.001	0.002
D019	CARBON TETRACHLORIDE	9/22/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/22/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/22/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/22/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/22/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/22/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/22/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CUI ID: S–091394–FR–416
LAB ID: 941866015
PROJECT: 5770

TCLP ANALYTICAL RESULTS

METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.	9/22/94			
D018	BENZENE	9/22/94	0.5	0.001	0.001
D019	CARBON TETRACHLORIDE	9/22/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/22/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/22/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/22/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/22/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/22/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/22/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: ZHE BLANK
LAB ID: QZ0239
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/22/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/22/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/22/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/22/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/22/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/22/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/22/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/22/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/22/94	0.2	0.002	<0.002

IEA
An Aquanon Company

CLIENT: CRA – MI
CLIE ID: ZHE BLANK
Lab ID: QZ0240
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/21/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/21/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/21/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/21/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/21/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/21/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/21/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/21/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/21/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/21/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/21/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
C IT ID: ZHE BLANK
LAB ID: QZ0241
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/29/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/29/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/29/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/29/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/29/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/29/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/29/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/29/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/29/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/29/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLI ID: ZHE BLANK
LAB ID: QZ0241
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/24/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: Method Blank
LAB ID: VW092294
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: –	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE		0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE		0.5	0.001	<0.001
D021	CHLOROBENZENE		100.0	0.001	<0.001
D022	CHLOROFORM		6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE		0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE		0.7	0.001	<0.001
D035	METHYL ETHYL KETONE		200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE		0.7	0.001	<0.001
D040	TRICHLOROETHYLENE		0.5	0.001	<0.001
D043	VINYL CHLORIDE		0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – M
CLIENT ID: Method Blank
LAB ID: VW092894
PROJECT: 5770

TCLP ANALYTICAL RESULTS
METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: N/A	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/28/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/28/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/28/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/28/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/28/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/28/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/28/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/28/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/28/94	0.2	0.002	<0.002

IEA
An Aquarion Company

CLIENT: CRA – MI
CLIENT ID: Method Blank
LAB ID: VW092994
PROJECT: 5770

TCLP ANALYTICAL RESULTS

METHOD: 8240

EPA WASTE #	CONTAMINANT/ DATE LEACH: N/A	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.				
D018	BENZENE	9/29/94	0.5	0.001	<0.001
D019	CARBON TETRACHLORIDE	9/29/94	0.5	0.001	<0.001
D021	CHLOROBENZENE	9/29/94	100.0	0.001	<0.001
D022	CHLOROFORM	9/29/94	6.0	0.001	<0.001
D028	1,2 – DICHLOROETHANE	9/29/94	0.5	0.001	<0.001
D029	1,2 – DICHLOROETHYLENE	9/29/94	0.7	0.001	<0.001
D035	METHYL ETHYL KETONE	9/29/94	200.0	0.002	<0.002
D039	TETRACHLOROETHYLENE	9/29/94	0.7	0.001	<0.001
D040	TRICHLOROETHYLENE	9/29/94	0.5	0.001	<0.001
D043	VINYL CHLORIDE	9/29/94	0.2	0.002	<0.002

IEA
An Aquanon Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg (dry weight)

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	1	1	2	10	1	Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0920	SS0920	SS0920	SS0920	SS0920	
	Client ID	FR-403	FR-406	FR-408	FR-410	FR-412	
	Lab ID	941866 002	941866 005	941866 007	941866 009	941866 011	
Phenol		U	U	UD	UD	U	330
Bis (2-Chloroethyl) ether		U	U	UD	UD	U	330
2-Chlorophenol		U	U	UD	UD	U	330
1,3-Dichlorobenzene		U	U	UD	UD	U	330
1,4-Dichlorobenzene		U	U	UD	UD	U	330
Benzyl Alcohol		U	U	UD	UD	U	330
1,2-Dichlorobenzene		U	U	UD	UD	U	330
2-Methylphenol		U	U	UD	UD	U	330
bis (2-Chloroisopropyl) ether		U	U	UD	UD	U	330
4-Methylphenol		U	U	UD	UD	U	330
N-Nitroso-di-n-propylamine		U	U	UD	UD	U	330
Hexachloroethane		U	U	UD	UD	U	330
Nitrobenzene		U	U	UD	UD	U	330
Isophorone		U	U	UD	UD	U	330
2-Nitrophenol		U	U	UD	UD	U	330
2,4-Dimethylphenol		U	U	UD	UD	U	330
Benzoic Acid		U	U	UD	UD	U	1700
bis (2-Chloroethoxy) methane		U	U	UD	UD	U	330
2,4-Dichlorophenol		U	U	UD	UD	U	330
1,2,4-Trichlorobenzene		U	U	UD	UD	U	330
Naphthalene		U	U	UD	UD	U	330
4 Chloroaniline		U	U	UD	UD	U	330
Hexachlorobutadiene		U	U	UD	UD	U	330
4 Chloro-3-methylphenol		U	U	UD	UD	U	660
2-Methylnaphthalene		U	U	UD	UD	U	330
Hexachlorocyclopentadiene		U	U	UD	UD	U	330
2,4,6-Trichlorophenol		U	U	UD	UD	U	330
2,4,5-Trichlorophenol		U	U	UD	UD	U	1700
2-Chloronaphthalene		U	U	UD	UD	U	330
2-Nitroaniline		U	U	UD	UD	U	1700
Dimethyphthalate		U	U	UD	UD	U	330
Acenaphthylene		U	U	UD	UD	U	330
2,6-Dinitrotoluene		U	U	UD	UD	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquanon Company

Client: Cnn
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS — SOIL
ug/kg dry weight — Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	1	SS0920	FR-403	941866 002	
3-Nitroaniline	U				1700
Acenaphthene	U				330
2,4-Dinitrophenol	U				1700
4-Nitrophenol	U				1700
Dibenzofuran	U				330
2,4-Dinitrotoluene	U				330
Diethylphthalate	U				330
4-Chlorophenyl phenyl ether	U				330
Fluorene	U				330
4-Nitroaniline	U				1700
4,6-Dinitro-2-methylphenol	U				1700
N-Nitrosodiphenylamine (1)	U				330
4-Bromophenyl phenyl ether	U				330
Hexachlorobenzene	U				330
Pentachlorophenol	U				1700
Phenanthrene	U				330
Anthracene	U				330
Di-n-butylphthalate	U				330
Fluoranthene	U				330
Pyrene	U				330
Butyl benzyl phthalate	U				330
3,3'-Dichlorobenzidine	U				2000
Benzo (a) anthracene	U				330
Chrysene	U				330
bis (2-ethylhexyl) phthalate	U				330
Di-n-octylphthalate	U				330
Benzo (b) fluoranthene	U				330
Benzo (k) fluoranthene	U				330
Benzo (a) pyrene	U				330
Indeno (1,2,3-cd) pyrene	U				330
Dibenz (a,h) anthracene	U				330
Benzo (g,h,i) perylene	U				330
Date Extracted	9/20/94				
Date Analyzed	9/20/94				

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	1	SS0920	FR-406	941866 005	
3-Nitroaniline	U				1700
Acenaphthene	U				330
2,4-Dinitrophenol	U				1700
4-Nitrophenol	U				1700
Dibenzofuran	U				330
2,4-Dinitrotoluene	U				330
Diethylphthalate	U				330
4-Chlorophenyl phenyl ether	U				330
Fluorene	U				330
4-Nitroaniline	U				1700
4,6-Dinitro-2-methylphenol	U				1700
N-Nitrosodiphenylamine (1)	U				330
4-Bromophenyl phenyl ether	U				330
Hexachlorobenzene	U				330
Pentachlorophenol	U				1700
Phenanthrene	1500				330
Anthracene	340				330
Di-n-butylphthalate	U				330
Fluoranthene	1900				330
Pyrene	2200				330
Butyl benzyl phthalate	U				330
3,3'-Dichlorobenzidine	U				2000
Benzo (a) anthracene	700				330
Chrysene	660				330
bis (2-ethylhexyl) phthalate	2500				330
Di-n-octylphthalate	U				330
Benzo (b) fluoranthene	730				330
Benzo (k) fluoranthene	360				330
Benzo (a) pyrene	360				330
Indeno (1,2,3-cd) pyrene	380				330
Dibenz (a,h) anthracene	U				330
Benzo (g,h,i) perylene	U				330
Date Extracted	9/20/94				
Date Analyzed	9/20/94				

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	2	SS0920	FR-408	941866 007	
3-Nitroaniline	UD				1700
Acenaphthene	UD				330
2,4-Dinitrophenol	UD				1700
4-Nitrophenol	UD				1700
Dibenzofuran	UD				330
2,4-Dinitrotoluene	UD				330
Diethylphthalate	UD				330
4-Chlorophenyl phenyl ether	UD				330
Fluorene	680				330
4-Nitroaniline	UD				1700
4,6-Dinitro-2-methylphenol	UD				1700
N-Nitrosodiphenylamine (1)	UD				330
4-Bromophenyl phenyl ether	UD				330
Hexachlorobenzene	UD				330
Pentachlorophenol	UD				1700
Phenanthrene	6200				330
Anthracene	1500				330
Di-n-butylphthalate	UD				330
Fluoranthene	8200				330
Pyrene	8300				330
Butyl benzyl phthalate	UD				330
3,3'-Dichlorobenzidine	UD				2000
Benzo (a) anthracene	3700				330
Chrysene	3700				330
bis (2-ethylhexyl) phthalate	UD				330
Di-n-octylphthalate	UD				330
Benzo (b) fluoranthene	2000				330
Benzo (k) fluoranthene	3400				330
Benzo (a) pyrene	1700				330
Indeno (1,2,3-cd) pyrene	1300				330
Dibenz (a,h) anthracene	UD				330
Benzo (g,h,i) perylene	1200				330
Date Extracted	9/20/94				
Date Analyzed	9/21/94				

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	10	SS0920	FR-410	941866 009	
3-Nitroaniline	UD				1700
Acenaphthene	UD				330
2,4-Dinitrophenol	UD				1700
4-Nitrophenol	UD				1700
Dibenzofuran	UD				330
2,4-Dinitrotoluene	UD				330
Diethylphthalate	UD				330
4-Chlorophenyl phenyl ether	UD				330
Fluorene	UD				330
4-Nitroaniline	UD				1700
4,6-Dinitro-2-methylphenol	UD				1700
N-Nitrosodiphenylamine (1)	UD				330
4-Bromophenyl phenyl ether	UD				330
Hexachlorobenzene	UD				330
Pentachlorophenol	UD				1700
Phenanthrene	20000				330
Anthracene	5600				330
Di-n-butylphthalate	UD				330
Fluoranthene	29000				330
Pyrene	34000				330
Butyl benzyl phthalate	UD				330
3,3'-Dichlorobenzidine	UD				2000
Benzo (a) anthracene	16000				330
Chrysene	18000				330
bis (2-ethylhexyl) phthalate	UD				330
Di-n-octylphthalate	UD				330
Benzo (b) fluoranthene	14000				330
Benzo (k) fluoranthene	12000				330
Benzo (a) pyrene	11000				330
Indeno (1,2,3-cd) pyrene	7900				330
Dibenz (a,h) anthracene	3900				330
Benzo (g,h,i) perylene	6900				330
Date Extracted	9/20/94				
Date Analyzed	9/22/94				

Analyte / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits Quantitation (LLD) with no Dilution*
	1	SS0920	FR-412	941866 011	
3-Nitroaniline	U				1700
Acenaphthene	U				330
2,4-Dinitrophenol	U				1700
4-Nitrophenol	U				1700
Dibenzofuran	U				330
2,4-Dinitrotoluene	U				330
Diethylphthalate	U				330
4-Chlorophenyl phenyl ether	U				330
Fluorene	U				330
4-Nitroaniline	U				1700
4,6-Dinitro-2-methylphenol	U				1700
N-Nitrosodiphenylamine (1)	U				330
4-Bromophenyl phenyl ether	U				330
Hexachlorobenzene	U				330
Pentachlorophenol	U				1700
Phenanthrene	770				330
Anthracene	U				330
Di-n-butylphthalate	U				330
Fluoranthene	910				330
Pyrene	1400				330
Butyl benzyl phthalate	U				330
3,3'-Dichlorobenzidine	U				2000
Benzo (a) anthracene	430				330
Chrysene	410				330
bis (2-ethylhexyl) phthalate	U				330
Di-n-octylphthalate	U				330
Benzo (b) fluoranthene	520				330
Benzo (k) fluoranthene	330				330
Benzo (a) pyrene	U				330
Indeno (1,2,3-cd) pyrene	U				330
Dibenz (a,h) anthracene	U				330
Benzo (g,h,i) perylene	U				330
Date Extracted	9/20/94				
Date Analyzed	9/20/94				

(1) – Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug / kg dry weight

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	1	2	1			Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0920	SS0920	SS0920			
	Client ID	FR-414	FR-416	METHOD BLANK			
	Lab ID	941866 013	941866 015	941866 SS0920			
Phenol		U	UD	U			330
Bis (2-Chloroethyl) ether		U	UD	U			330
2-Chlorophenol		U	UD	U			330
1,3-Dichlorobenzene		U	UD	U			330
1,4-Dichlorobenzene		U	UD	U			330
Benzyl Alcohol		U	UD	U			330
1,2-Dichlorobenzene		U	UD	U			330
2-Methylphenol		U	UD	U			330
bis (2-Chloroisopropyl) ether		U	UD	U			330
4-Methylphenol		U	UD	U			330
N-Nitroso-di-n-propylamine		U	UD	U			330
Hexachloroethane		U	UD	U			330
Nitrobenzene		U	UD	U			330
Isophorone		U	UD	U			330
2-Nitrophenol		U	UD	U			330
2,4-Dimethylphenol		U	UD	U			330
Benzoic Acid		U	UD	U			1700
bis (2-Chloroethoxy) methane		U	UD	U			330
2,4-Dichlorophenol		U	UD	U			330
1,2,4-Trichlorobenzene		U	UD	U			330
Naphthalene		U	870	U			330
4 Chloroaniline		U	UD	U			330
Hexachlorobutadiene		U	UD	U			330
4 Chloro-3-methylphenol		U	UD	U			660
2-Methylnaphthalene		U	UD	U			330
Hexachlorocyclopentadiene		U	UD	U			330
2,4,6-Trichlorophenol		U	UD	U			330
2,4,5-Trichlorophenol		U	UD	U			1700
2-Chloronaphthalene		U	UD	U			330
2-Nitroaniline		U	UD	U			1700
Dimethyphthalate		U	UD	U			330
Acenaphthylene		U	UD	U			330
2,6-Dinitrotoluene		U	UD	U			330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CR
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg dry weight

SOIL
Method: 8270

Analyte / Lab ID	Dilution Factor (DF)	1	2	1			Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0920	SS0920	SS0920			
	Client ID	FR-414	FR-416				
	Lab ID	941866 013	941866 015	SS0920			
3-Nitroaniline		U	UD	U			1700
Acenaphthene		U	800	U			330
2,4-Dinitrophenol		U	UD	U			1700
4-Nitrophenol		U	UD	U			1700
Dibenzofuran		U	UD	U			330
2,4-Dinitrotoluene		U	UD	U			330
Diethylphthalate		U	UD	U			330
4-Chlorophenyl phenyl ether		U	UD	U			330
Fluorene		U	750	U			330
4-Nitroaniline		U	UD	U			1700
4,6-Dinitro-2-methylphenol		U	UD	U			1700
N-Nitrosodiphenylamine (1)		U	UD	U			330
4-Bromophenyl phenyl ether		U	UD	U			330
Hexachlorobenzene		U	UD	U			330
Pentachlorophenol		U	UD	U			1700
Phenanthrene		U	4400	U			330
Anthracene		U	1100	U			330
Di-n-butylphthalate		U	UD	U			330
Fluoranthene		U	4300	U			330
Pyrene		U	4300	U			330
Butyl benzyl phthalate		U	UD	U			330
3,3'-Dichlorobenzidine		U	UD	U			2000
Benzo (a) anthracene		U	1900	U			330
Chrysene		U	2000	U			330
bis (2-ethylhexyl) phthalate		U	UD	U			330
Di-n-octylphthalate		U	UD	U			330
Benzo (b) fluoranthene		U	1200	U			330
Benzo (k) fluoranthene		U	1500	U			330
Benzo (a) pyrene		U	930	U			330
Indeno (1,2,3-cd) pyrene		U	840	U			330
Dibenz (a,h) anthracene		U	UD	U			330
Benzo (g,h,i) perylene		U	1000	U			330
Date Extracted		9/20/94	9/20/94	9/20/94			
Date Analyzed		9/21/94	9/21/94	9/20/94			

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-402
LAB ID: 41866001

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-404
LAB ID: 41866003

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-403
LAB ID: 41866002

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-405
LAB ID: 41866004

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/22/94 DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/23/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-406
LAB ID: 41866005

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-407
LAB ID: 41866006

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-408
LAB ID: 41866007

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-409
LAB ID: 41866008

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquanon Company

CLIENT: CRA
CLIENT ID: FR-410
LAB ID: 41866009

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-411
LAB ID: 41866010

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/27/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-412
LAB ID: 41866011

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/27/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-413
LAB ID: 41866012

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/27/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquanon Company

CLIENT: CRA
CLIENT ID: FR-414
LAB ID: 41866013

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/22/94 DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/23/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-415
LAB ID: 41866014

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/22/94 DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/25/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: FR-416
LAB ID: 41866015

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/22/94 DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/23/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

CLIENT: CRA
CLIENT ID: METHOD BLANK
LAB ID: SW0923

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquanon Company

CLIENT: CRA
CLIENT ID: METHOD BLANK
LAB ID: SWO922

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/23/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307
PCB's
ug / kg (Dry Weight)

Matrix: SOIL
Method: 8080

Compound / Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	Lower Limits of Detection (LLD) with no Dilution
	1	PS0922	FR-403	941866 002	
	1	PS0922	FR-406	941866 005	
	1	PS0922	FR-408	941866 007	
	1	PS0922	FR-410	941866 009	
	1	PS0922	FR-412	941866 011	
Aroclor – 1016	U	U	U	U	U	330
Aroclor – 1221	U	U	U	U	U	330
Aroclor – 1232	U	U	U	U	U	330
Aroclor – 1242	U	U	U	U	U	330
Aroclor – 1248	U	U	U	U	U	330
Aroclor – 1254	870	480	U	810	670	330
Aroclor – 1260	U	U	680	U	400	330
Date Extracted	9/22/94	9/22/94	9/22/94	9/22/94	9/22/94	
Date Analyzed	9/23/94	9/23/94	9/23/94	9/23/94	9/23/94	

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941866
Project #: 5770

MICHIGAN ACT 307
PCB's
ug / kg (Dry Weight)

Matrix: SOIL
Method: 8080

Compound / Lab ID	Dilution Factor (DF)	Method Blank	Client ID				Lower Limits of Detection (LLD) with no Dilution
	1	PS0922	FR-414	941866 013			
	1	PS0922	FR-416	941866 015			
	1	PS0922	METHOD BLANK	PS0922			
Aroclor – 1016	U	U	U				330
Aroclor – 1221	U	U	U				330
Aroclor – 1232	U	U	U				330
Aroclor – 1242	U	U	U				330
Aroclor – 1248	U	U	U				330
Aroclor – 1254	U	U	U				330
Aroclor – 1260	U	U	U				330
Date Extracted	9/22/94	9/22/94	9/22/94				
Date Analyzed	9/23/94	9/23/94	9/23/94				

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941866
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: Soil

Analyte / Client ID / Lab ID	S091394 FR-403 941866 002	S091394 FR-406 941866 005	S091394 FR-408 941866 007	S091394 FR-410 941866 009	S091394 FR-412 941866 011	PQL
Aluminum – 6010	4300	5100	5200	4800	6000	2.5
Antimony – 7041	1.0	0.63	0.51	0.33	0.65	1.2
Arsenic – 7060	5.0	4.0	6.3	6.6	6.5	0.025
Barium – 6010	62	92	51	130	65	1.25
Beryllium – 6010	0.14	0.26	0.26	0.27	0.27	0.125
Cadmium – 7131	2.3	2.1	0.84	1.8	1.8	0.125
Calcium – 6010	58000	53000	48000	61000	49000	5
Chromium – 6010	17	28	21	24	31	0.25
Cobalt – 6010	3.7	4.9	4.9	4.8	5.0	1.25
Copper – 6010	22	42	24	28	27	0.625
Iron – 6010	9400	11000	12000	12000	13000	1.25
Lead – 6010	62	95	170	73	68	1.25
Magnesium – 6010	12000	14000	12000	14000	11000	5
Manganese – 6010	170	250	250	270	260	0.375
Mercury – 7471	<0.072	<0.093	<0.069	0.36	<0.10	0.1
Nickel – 6010	11	16	15	19	19	0.75
Potassium – 6010	650	620	560	600	110	25
Selenium – 7740	<1.6	0.27	<8.1	<7.6	<7.8	0.025
Silver – 7761	0.067	0.067	0.46	1.4	0.49	0.25
Sodium – 6010	100	120	110	140	110	5
Thallium – 7841	<0.11	<0.10	<0.11	<0.10	<0.10	0.1
Vanadium – 6010	10	11	11	10	12	1.25
Zinc – 6010	160	140	74	140	130	0.5

PQL = Practical Quantitation Limit

Date Analyzed:

ICP Metals	09/24/94	Cadmium	09/30/94
Selenium	09/25/94	Silver	09/30/94
Arsenic	09/25/94	Antimony	09/29/94
Mercury	09/29/94	Calcium	09/30/94
Thallium	09/25/94		

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941866
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: Soil

Analyte	Client ID / Lab ID	S091394 FR-414 941866 013	S091394 FR-416 941866 015				PQL
Aluminum – 6010		5500	5100				2.5
Antimony – 7041		0.14	0.38				1.2
Arsenic – 7060		5.2	5.6				0.025
Barium – 6010		32	36				1.25
Beryllium – 6010		0.28	0.27				0.125
Cadmium – 7131		0.29	0.37				0.125
Calcium – 6010		67000	52000				5
Chromium – 6010		9.7	9.4				0.25
Cobalt – 6010		5.3	4.2				1.25
Copper – 6010		14	14				0.625
Iron – 6010		12000	10000				1.25
Lead – 6010		12	23				1.25
Magnesium – 6010		17000	14000				5
Manganese – 6010		270	280				0.375
Mercury – 7471		<0.092	0.14				0.1
Nickel – 6010		14	9.8				0.75
Potassium – 6010		810	550				25
Selenium – 7740		<6.9	<6.4				0.025
Silver – 7761		0.063	0.38				0.25
Sodium – 6010		470	420				5
Thallium – 7841		<0.097	<0.086				0.1
Vanadium – 6010		13	12				1.25
Zinc – 6010		40	41				0.5

PQL = Practical Quantitation Limit

Dates Analyzed

ICP Metals	09/24/94	Cadmium	09/30/94
Selenium	09/25/94	Silver	09/30/94
Arsenic	09/25/94	Antimony	09/29/94
Mercury	09/29/94	Calcium	09/30/94
Thallium	09/25/94		

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091294-FR-402

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866001

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	2.8
D006	Cadmium	6010	09/30/94	1.0	0.005	0.089
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/24/94	5.0	0.003	0.28
D009	Mercury	7471	09/24/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	0.060
D013	Nickel	6010	09/24/94	0.03	0.03	0.25
D014	Zinc	6010	09/24/94	0.02	0.02	2.4

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJE .D: 5770
CLIENT SAMPLE ID: S-091294-FR-403

A PROJECT ID: CH941866
IEA SAMPLE ID: 941866002

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG. LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.1
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0025
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/24/94	5.0	0.003	0.0033
D009	Mercury	7471	09/24/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.32

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJ. ID: 5770
CLIENT SAMPLE ID: S-091294-FR-404

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866003

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.8
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.13
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	1.0
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	0.15
D013	Nickel	6010	09/24/94	0.03	0.03	0.21
D014	Zinc	6010	09/24/94	0.02	0.02	2.2

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091294-FR-405

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866004

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS Method				
D004	Arsenic	09/24/94	5.0	0.002	<0.002
D005	Barium	09/24/94	100.0	0.05	1.2
D006	Cadmium	09/30/94	1.0	0.0004	0.0031
D007	Chromium	09/24/94	5.0	0.01	<0.01
D008	Lead	09/26/94	5.0	0.003	0.014
D009	Mercury	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	09/24/94	1.0	0.003	<0.003
D011	Silver	09/30/94	5.0	0.0006	<0.0006
D012	Copper	09/24/94	0.025	0.025	<0.025
D013	Nickel	09/24/94	0.03	0.03	<0.03
D014	Zinc	09/24/94	0.02	0.02	0.53

No Regs

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PRO. T ID: 5770
CLIENT SAMPLE ID: S-091394-FR-406

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866005

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH:09/22/94 DATE EXTRACT:03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.1
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0017
D007	Chromium	6010	09/24/94	5.0	0.01	0.0075
D008	Lead	6010	09/26/94	5.0	0.003	<0.0002
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.003
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.43

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJE' D: 5770
CLIENT SAMPLE ID: S-091394-FR-407

A PROJECT ID: CH941866
IEA SAMPLE ID: 941866006

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.2
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0011
D007	Chromium	6010	09/24/94	5.0	0.01	0.015
D008	Lead	6010	09/26/94	5.0	0.003	0.0049
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.39

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJE D: 5770
CLIENT SAMPLE ID: S-091394-FR-408

PROJECT ID: CH941866
IEA SAMPLE ID: 941866007

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT / DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.8
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0093
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.027
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	0.026
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.64

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091394-FR-409

PROJECT ID: CH941866
IEA SAMPLE ID: 941866008

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT / DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.6
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0073
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.015
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.56

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091394-FR-410

A PROJECT ID: CH941866
IEA SAMPLE ID: 941866009

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.2
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0035
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.0068
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.40

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091394-FR-411

PROJECT ID: CH941866
IEA SAMPLE ID: 941866010

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH:09/22/94 DATE EXTRACT:03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.1
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0014
D007	Chromium	6010	09/24/94	5.0	0.01	0.010
D008	Lead	6010	09/26/94	5.0	0.003	0.0094
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.42

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJE ID: 5770
CLIENT SAMPLE ID: S-091394-FR-412

A PROJECT ID: CH941866
IEA SAMPLE ID: 941866011

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	9/24/94	5.0	0.002	<0.002
D005	Barium	6010	9/24/94	100.0	0.05	1.1
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.00075
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.0058
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.36

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJ ... ID: 5770
CLIENT SAMPLE ID: S-091394-FR-413

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866012

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	0.78
D006	Cadmium	6010	09/30/94	1.0	0.0004	<0.0004
D007	Chromium	6010	09/24/94	5.0	0.01	0.095
D008	Lead	6010	09/26/94	5.0	0.003	0.0046
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	9.7
D013	Nickel	6010	09/24/94	0.03	0.03	1.0
D014	Zinc	6010	09/24/94	0.02	0.02	14.1

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJ ID: 5770
CLIENT SAMPLE ID: S-091394-FR-414

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866013

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	0.24
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0019
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.011
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.69

IEA
An Aquanon Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091394-FR-415

IEA PROJECT ID: CH941865
IEA SAMPLE ID: 941866014

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT / DATE LEACH: 09/22/94 DATE EXTRACT: 03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	1.3
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0015
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	9/26/94	5.0	0.003	0.0042
D009	Mercury	7471	9/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.02
D014	Zinc	6010	09/24/94	0.02	0.02	0.33

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJECT ID: 5770
CLIENT SAMPLE ID: S-091394-FR-416

IEA PROJECT ID: CH941866
IEA SAMPLE ID: 941866015

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 09/22/94 DATE EXTRACT: 09/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/24/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	0.77
D006	Cadmium	6010	09/30/94	1.0	0.0004	0.0037
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	0.009
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/24/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	0.18

IEA
An Aquarion Company

CLIENT: CRA
CLIENT PROJE ID: 5770
CLIENT SAMPLE ID: –

IEA PROJECT ID: CH941866
IEA SAMPLE ID: Method Blank

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH:09/22/94 DATE EXTRACT:03/23/94		DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	METALS	Method				
D004	Arsenic	7060	09/25/94	5.0	0.002	<0.002
D005	Barium	6010	09/24/94	100.0	0.05	<0.05
D006	Cadmium	6010	09/30/94	1.0	0.0004	<0.0004
D007	Chromium	6010	09/24/94	5.0	0.01	<0.01
D008	Lead	6010	09/26/94	5.0	0.003	<0.003
D009	Mercury	7471	09/29/94	0.2	0.0002	<0.0002
D010	Selenium	7741	09/25/94	1.0	0.003	<0.003
D011	Silver	6010	09/30/94	5.0	0.0006	<0.0006
D012	Copper	6010	09/24/94	0.025	0.025	<0.025
D013	Nickel	6010	09/24/94	0.03	0.03	<0.03
D014	Zinc	6010	09/24/94	0.02	0.02	<0.02

IEA
An Aquanon Company

Client: CRA – MI
IEA Job#: CH941866
Project #: 5770

ANALYTE LIST Matrix: SOIL

		S-091394 FR	S-091394 FR	S-091394 FR	S-091394 FR	S-091394 FR		
	Client ID	402	403	404	405	406		
	Lab ID	941866 001	941866 002	941866 003	941866 004	941866 005	Date Analyzed	PQL
Analyte	Method							
T. Solids	160.3	88	90	87	91	90	9/23/94	%
O.C. Flashpoint	1010	>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1	<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2	<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941866
Project #: 5770

ANALYTE LIST Matrix: SOIL

		S-091394 FR	S-091394 FR	S-091394 FR	S-091394 FR	S-091394 FR		
	Client ID	407	408	409	410	411		
		941866	941866	941866	941866	941866	Date	PQL
	Lab ID	006	007	008	009	010	Analyzed	
Analyte	Method							
T. Solids	160.3	73	90	88	88	89	9/23/94	%
O.C. Flashpoint	1010	>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1	<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2	<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941866
Project #: 5770

ANALYTE LIST

Matrix: SOIL

	Client ID	S-091394 FR 412	S-091394 FR 413	S-091394 FR 414	S-091394 FR 415	S-091394 FR 416	Date Analyzed	PQL
	Lab ID	941866 011	941866 012	941866 013	941866 014	941866 015		
Analyte	Method							
T. Solids	160.3	91	90	91	90	91	9/23/94	%
O.C. Flashpoint	1010	>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1	<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2	<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

CLIENT: CRA – MI
IEA JOB#: CH941866
DATE: 9/26/94
ANALYST: E.Q./ C.W.
PREP BLANK: 10 mg/kg

QUALITY CONTROL

PARAMETER REACTIVE SULFIDE

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
941880-009	<10 mg/kg	<10 mg/kg	0.0%

SPIKE

SAMPLE #	SAMPLE CONCENTRATION	AMOUNT SPIKED	SPIKED SAMPLE CONCENTRATION	%RECOVERY
941931-001	<10 mg/kg	400 mg/kg	380 mg/kg	95%

QC CHECK

SAMPLE #	SAMPLE CONCENTRATION	AMOUNT SPIKED	SPIKED SAMPLE CONCENTRATION	% RECOVERY
ICV	<10 mg/L	740 mg/L	740 mg/kg	100%

IEA
An Aquarion Company

CLIENT: CRA – MI
IEA JOB#: CH941866
DATE: 9/26/94
ANALYST: E.Q.
PREP BLANK: <1 mg/kg

QUALITY CONTROL

PARAMETER REACTIVE CYANIDE

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
941880–009	<1 mg/kg	<1 mg/kg	

IEA
An Aquanon Company

CLIENT: CRA – MI
IEA JOB#: CH941866
DATE: 9/23/94
ANALYST: C.W.
PREP BLANK: _____

QUALITY CONTROL

PARAMETER OPEN CUP FLASHPOINTS

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
941866–010	>200 F	>200 F	

QC CHECK

SAMPLE	SAMPLE CONCENTRATION	AMOUNT SPIKED	SPIKED SAMPLE CONCENTRATION	%RECOVERY
STD	103 F		103 F	100%

WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 113802
Prepared For:

Conestoga-Rovers & Associates
Lou Almeida
651 Colby Dr
Waterloo Ontario, OT N2VIC2

Date: 12/07/94

Thomas J Geyer, CIH
Signature

12/7/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *113802*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

____

Sample No.(s): 1-13 Parameter: Sb Reason: 3
Explanation:

Sample No.(s): 11(*) Parameter: BNAs Reason: 10
Explanation: Benzo(k)fluoranthene coeluted with benzo(b)fluoranthene. Total value is reported as benzo(b)fluoranthene.

Sample No.(s): 3,5,7,11 Parameter: Volatiles Reason: 3
Explanation:

Sample No.(s): 9 Parameter: Ca & Mn Reason: 5
Explanation:

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-001
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0001
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	11	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Bromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	320	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	21	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	740	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	119	0	%	74-121 %		
Toluene-d8	114	0	%	81-117 %		
Dibromofluoromethane	102	0	%			
Date Analyzed:	10/19/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-001
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0001
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	730	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-001
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0001
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	570	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	600	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	47	0	%	31-115 %		
2-Fluorophenol	45	0	%	25-131 %		
Nitrobenzene-d5	41	0	%	23-120 %		
Phenol-d6	48	0	%	24-113 %		
Terphenyl-d14	57	0	%	18-137 %		
2,4,6-Tribromophenol	56	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	4900	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	3.9	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	28	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.33	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	70000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-001
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0001
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	9.1	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	17	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	12	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	12000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	5.6	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	20000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	290	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	14	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	850	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	53	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	14	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	33	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	91	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-002
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0002
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
oromethane	ND	10	ug/kg			
oromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	20	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	117	0	%	74-121 %		
Toluene-d8	101	0	%	81-117 %		
Dibromofluoromethane	87	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-002
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0002
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-002
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0002
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	54	0	%	25-131 %		
Nitrobenzene-d5	49	0	%	23-120 %		
Phenol-d6	60	0	%	24-113 %		
Terphenyl-d14	79	0	%	18-137 %		
2,4,6-Tribromophenol	64	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	5800	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	5.2	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	23	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.36	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	72000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-002
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0002
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	11	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	18	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	11	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	12000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	4.8	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	20000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	230	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	15	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	1100	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	68	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	18	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	35	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	90	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-003
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0003
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	5500	ug/kg			
Benzene	ND	550	ug/kg			
Bromodichloromethane	ND	550	ug/kg			
Bromoform	ND	550	ug/kg			
Bromomethane	ND	550	ug/kg			
2-Butanone	ND	5500	ug/kg			
Carbon disulfide	ND	5500	ug/kg			
Carbon tetrachloride	ND	550	ug/kg			
Chlorobenzene	ND	550	ug/kg			
Chloroethane	ND	550	ug/kg			
Chloroform	ND	550	ug/kg			
oromethane	ND	550	ug/kg			
oromochloromethane	ND	550	ug/kg			
1,1-Dichloroethane	ND	550	ug/kg			
1,2-Dichloroethane	ND	550	ug/kg			
1,1-Dichloroethene	ND	550	ug/kg			
trans-1,2-Dichloroethene	ND	550	ug/kg			
1,2-Dichloropropane	ND	550	ug/kg			
cis-1,3-Dichloropropene	ND	550	ug/kg			
trans-1,3-Dichloropropene	ND	550	ug/kg			
Ethylbenzene	15000	550	ug/kg			
2-Hexanone	ND	5500	ug/kg			
Methylene chloride	ND	550	ug/kg			
4-Methyl-2-pentanone	ND	5500	ug/kg			
Styrene	ND	550	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	550	ug/kg			
Tetrachloroethene	ND	550	ug/kg			
Toluene	ND	550	ug/kg			
1,1,1-Trichloroethane	ND	550	ug/kg			
1,1,2-Trichloroethane	ND	550	ug/kg			
Trichloroethene	ND	550	ug/kg			
Vinyl chloride	ND	550	ug/kg			
Xylenes (o,m & p)	45000	1650	ug/kg			
Vinyl acetate	ND	5500	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
Toluene-d8	93	0	%	81-117 %		
Dibromofluoromethane	99	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-003
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0003
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	420	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-003
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0003
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	55	0	%	31-115 %		
2-Fluorophenol	53	0	%	25-131 %		
Nitrobenzene-d5	51	0	%	23-120 %		
Phenol-d6	54	0	%	24-113 %		
Terphenyl-d14	75	0	%	18-137 %		
2,4,6-Tribromophenol	60	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	5800	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	3.1	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	25	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.37	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	68000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-003
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0003
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	9.9	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	19	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	11	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	13000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	6.1	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	20000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	210	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	15	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	990	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	56	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	16	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	34	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	91	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-004
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0004
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	31	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
Toluene-d8	117	0	%	81-117 %		
Dibromofluoromethane	107	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-004
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0004
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-004
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0004
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	31-115 %		
2-Fluorophenol	51	0	%	25-131 %		
Nitrobenzene-d5	49	0	%	23-120 %		
Phenol-d6	52	0	%	24-113 %		
Terphenyl-d14	78	0	%	18-137 %		
2,4,6-Tribromophenol	59	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	5100	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	3.8	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	24	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.34	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	72000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-004
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0004
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	8.8	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	18	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	11	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	11000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	5.0	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	23000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	270	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	14	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	920	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	50	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	15	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	32	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	91	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-005
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0005
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	56000	ug/kg			
Benzene	ND	5600	ug/kg			
Bromodichloromethane	ND	5600	ug/kg			
Bromoform	ND	5600	ug/kg			
Bromomethane	ND	5600	ug/kg			
2-Butanone	ND	56000	ug/kg			
Carbon disulfide	ND	56000	ug/kg			
Carbon tetrachloride	ND	5600	ug/kg			
Chlorobenzene	ND	5600	ug/kg			
Chloroethane	ND	5600	ug/kg			
Chloroform	ND	5600	ug/kg			
Chloromethane	ND	5600	ug/kg			
Dibromochloromethane	ND	5600	ug/kg			
1,1-Dichloroethane	ND	5600	ug/kg			
1,2-Dichloroethane	ND	5600	ug/kg			
1,1-Dichloroethene	ND	5600	ug/kg			
trans-1,2-Dichloroethene	ND	5600	ug/kg			
1,2-Dichloropropane	ND	5600	ug/kg			
cis-1,3-Dichloropropene	ND	5600	ug/kg			
trans-1,3-Dichloropropene	ND	5600	ug/kg			
Ethylbenzene	78000	5600	ug/kg			
2-Hexanone	ND	56000	ug/kg			
Methylene chloride	ND	5600	ug/kg			
4-Methyl-2-pentanone	ND	56000	ug/kg			
Styrene	ND	5600	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	5600	ug/kg			
Tetrachloroethene	ND	5600	ug/kg			
Toluene	ND	5600	ug/kg			
1,1,1-Trichloroethane	ND	5600	ug/kg			
1,1,2-Trichloroethane	ND	5600	ug/kg			
Trichloroethene	ND	5600	ug/kg			
Vinyl chloride	ND	5600	ug/kg			
Xylenes (o,m & p)	400000	16800	ug/kg			
Vinyl acetate	ND	56000	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
Toluene-d8	103	0	%	81-117 %		
Dibromofluoromethane	86	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-005
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0005
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	420	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	540	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-005
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0005
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	850	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	560	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	59	0	%	31-115 %		
2-Fluorophenol	56	0	%	25-131 %		
Nitrobenzene-d5	53	0	%	23-120 %		
Phenol-d6	60	0	%	24-113 %		
Terphenyl-d14	70	0	%	18-137 %		
2,4,6-Tribromophenol	63	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	7300	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	4.5	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	32	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.46	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	66000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-005
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0005
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	12	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	21	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	12	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	14000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	7.2	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	19000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	260	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	16	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	1400	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	72	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	21	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	37	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	89	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-006
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0006
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Dibromomethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
Toluene-d8	99	0	%	81-117 %		
Dibromofluoromethane	114	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-006
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0006
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-006
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0006
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	55	0	%	31-115 %		
2-Fluorophenol	50	0	%	25-131 %		
Nitrobenzene-d5	50	0	%	23-120 %		
Phenol-d6	51	0	%	24-113 %		
Terphenyl-d14	74	0	%	18-137 %		
2,4,6-Tribromophenol	49	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	4600	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	1.7	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	17	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.33	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	82000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-006
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0006
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	7.3	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	16	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	10	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	11000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	5.0	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	24000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	240	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	13	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	780	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	49	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	13	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	37	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	90	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-1D1894-FR-007
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0007
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	600	ug/kg			
Benzene	ND	60	ug/kg			
Bromodichloromethane	ND	60	ug/kg			
Bromoform	ND	60	ug/kg			
Bromomethane	ND	60	ug/kg			
2-Butanone	ND	600	ug/kg			
Carbon disulfide	ND	600	ug/kg			
Carbon tetrachloride	ND	60	ug/kg			
Chlorobenzene	ND	60	ug/kg			
Chloroethane	ND	60	ug/kg			
Chloroform	ND	60	ug/kg			
Chloromethane	ND	60	ug/kg			
Bromochloromethane	ND	60	ug/kg			
1,1-Dichloroethane	ND	60	ug/kg			
1,2-Dichloroethane	ND	60	ug/kg			
1,1-Dichloroethene	ND	60	ug/kg			
trans-1,2-Dichloroethene	ND	60	ug/kg			
1,2-Dichloropropane	ND	60	ug/kg			
cis-1,3-Dichloropropene	ND	60	ug/kg			
trans-1,3-Dichloropropene	ND	60	ug/kg			
Ethylbenzene	ND	60	ug/kg			
2-Hexanone	ND	600	ug/kg			
Methylene chloride	ND	60	ug/kg			
4-Methyl-2-pentanone	ND	600	ug/kg			
Styrene	ND	60	ug/kg			
1,1,2,2,-Tetrachloroethane	NO	60	ug/kg			
Tetrachloroethene	ND	60	ug/kg			
Toluene	ND	60	ug/kg			
1,1,1-Trichloroethane	ND	60	ug/kg			
1,1,2-Trichloroethane	ND	60	ug/kg			
Trichloroethene	ND	60	ug/kg			
Vinyl chloride	ND	60	ug/kg			
Xylenes (o,m & p)	2100	180	ug/kg			
Vinyl acetate	ND	600	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
Toluene-d8	98	0	%	81-117 %		
Dibromofluoromethane	111	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-007
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0007
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-007
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0007
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	65	0	%	31-115 %		
2-Fluorophenol	55	0	%	25-131 %		
Nitrobenzene-d5	54	0	%	23-120 %		
Phenol-d6	53	0	%	24-113 %		
Terphenyl-d14	79	0	%	18-137 %		
2,4,6-Tribromophenol	48	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	6400	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	4.1	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	25	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.42	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	64000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-007
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0007
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Chromium (Total)	10	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	19	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	11	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	13000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	5.8	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	18000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	230	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	15	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	1400	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	63	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	19	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	35	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	90	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-008
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0008
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Dibromomethane	ND	10	ug/kg			
Bromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
Toluene-d8	109	0	%	81-117 %		
Dibromofluoromethane	117	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-008
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0008
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-008
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0008
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	53	0	%	25-131 %		
Nitrobenzene-d5	58	0	%	23-120 %		
Phenol-d6	57	0	%	24-113 %		
Terphenyl-d14	74	0	%	18-137 %		
2,4,6-Tribromophenol	54	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	5000	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	4.9	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	27	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.38	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	74000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-008
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0008
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	9.5	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	16	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	13000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	12	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	20000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	260	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	16	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	1200	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	92	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	16	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	76	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	93	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-009
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0009
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
loromethane	ND	10	ug/kg			
oromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	115	0	%	74-121 %		
Toluene-d8	99	0	%	81-117 %		
Dibromofluoromethane	109	0	%			
Date Analyzed:	10/19/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-009
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0009
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-009
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0009
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	47	0	%	31-115 %		
2-Fluorophenol	45	0	%	25-131 %		
Nitrobenzene-d5	41	0	%	23-120 %		
Phenol-d6	48	0	%	24-113 %		
Terphenyl-d14	57	0	%	18-137 %		
2,4,6-Tribromophenol	56	0	%	19-122 %		
Date Analyzed:	10/21/94	0	Month/Day/Year			
Aluminum (Total)	4500	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	1.9	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	13	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	0.07	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	980	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-009
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0009
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	7.8	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	9.3	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	3.4	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	6600	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	3.4	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	990	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	130	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	5.6	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	250	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	22	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	13	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	12	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	98	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-010
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0010
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Dibromomethane	ND	10	ug/kg			
Bromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	119	0	%	74-121 %		
Toluene-d8	116	0	%	81-117 %		
Dibromofluoromethane	97	0	%			
Date Analyzed:	10/19/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-010
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0010
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-010
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0010
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	54	0	%	25-131 %		
Nitrobenzene-d5	58	0	%	23-120 %		
Phenol-d6	56	0	%	24-113 %		
Terphenyl-d14	75	0	%	18-137 %		
2,4,6-Tribromophenol	56	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	2900	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	0.34	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	2.0	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	8.8	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.21	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	57000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-010
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0010
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	5.1	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	11	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	7.2	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	6800	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	2.2	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	16000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	210	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	6.9	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	600	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	47	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	12	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	25	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	82	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	300	ug/kg			
Benzene	ND	30	ug/kg			
Bromodichloromethane	ND	30	ug/kg			
Bromoform	ND	30	ug/kg			
Bromomethane	ND	30	ug/kg			
2-Butanone	ND	300	ug/kg			
Carbon disulfide	ND	300	ug/kg			
Carbon tetrachloride	ND	30	ug/kg			
Chlorobenzene	ND	30	ug/kg			
Chloroethane	ND	30	ug/kg			
Chloroform	ND	30	ug/kg			
oromethane	ND	30	ug/kg			
Bromochloromethane	ND	30	ug/kg			
1,1-Dichloroethane	ND	30	ug/kg			
1,2-Dichloroethane	ND	30	ug/kg			
1,1-Dichloroethene	ND	30	ug/kg			
trans-1,2-Dichloroethene	ND	30	ug/kg			
1,2-Dichloropropane	ND	30	ug/kg			
cis-1,3-Dichloropropene	ND	30	ug/kg			
trans-1,3-Dichloropropene	ND	30	ug/kg			
Ethylbenzene	410	30	ug/kg			
2-Hexanone	ND	300	ug/kg			
Methylene chloride	ND	30	ug/kg			
4-Methyl-2-pentanone	ND	300	ug/kg			
Styrene	ND	30	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	30	ug/kg			
Tetrachloroethene	ND	30	ug/kg			
Toluene	140	30	ug/kg			
1,1,1-Trichloroethane	ND	30	ug/kg			
1,1,2-Trichloroethane	ND	30	ug/kg			
Trichloroethene	ND	30	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	1700	90	ug/kg			
Vinyl acetate	ND	300	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	111	0	%	74-121 %		
Toluene-d8	97	0	%	81-117 %		
Dibromofluoromethane	97	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	810	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	2300	330	ug/kg			
Benzo(a)pyrene	1100	330	ug/kg			
Benzo(b)fluoranthene	2200	330	ug/kg			
Benzo(k)Fluoranthene	*	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	660	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	1200	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	4800	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	600	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	3100	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	3600	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	54	0	%	25-131 %		
Nitrobenzene-d5	49	0	%	23-120 %		
Phenol-d6	60	0	%	24-113 %		
Terphenyl-d14	79	0	%	18-137 %		
2,4,6-Tribromophenol	64	0	%	19-122 %		
Date Analyzed:	10/21/94	0	Month/Day/Year			
Aluminum (Total)	6000	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	1.4	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	5.9	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	130	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.39	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	1.6	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	50000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	33	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	21	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	55	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	15000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	250	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	15000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	280	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	23	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	720	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	1.1	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	0.31	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	110	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	17	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	220	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	89	0.01	%		10/20/94	TN

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-012
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0012
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
promethane	ND	10	ug/kg			
romochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	410	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
Toluene-d8	93	0	%	81-117 %		
Dibromofluoromethane	102	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-012
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0012
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-012
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0012
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	31-115 %		
2-Fluorophenol	47	0	%	25-131 %		
Nitrobenzene-d5	54	0	%	23-120 %		
Phenol-d6	41	0	%	24-113 %		
Terphenyl-d14	70	0	%	18-137 %		
2,4,6-Tribromophenol	29	0	%	19-122 %		
Date Analyzed:	10/20/94	0	Month/Day/Year			
Aluminum (Total)	5300	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	4.7	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	20	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.31	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	70000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-012
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0012
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	11	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	18	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	11	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	12000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	4.0	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	19000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	200	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	14	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	900	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	96	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	17	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	35	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	89	0.01	%		10/20/94	TN

12649 Richfield Court
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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-013
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0013
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Bromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	36	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	170	30	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
Toluene-d8	116	0	%	81-117 %		
Dibromofluoromethane	111	0	%			
Date Analyzed:	10/19/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	JMK
Acenaphthene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-013
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D....: 113802-0013
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-013
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0013
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
Nitrosodiphenylamine	ND	330	ug/kg			
Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	RECOVERY	0	%	Control Limits		
2-Fluorobiphenyl	55	0	%	31-115 %		
2-Fluorophenol	53	0	%	25-131 %		
Nitrobenzene-d5	51	0	%	23-120 %		
Phenol-d6	54	0	%	24-113 %		
Terphenyl-d14	75	0	%	18-137 %		
2,4,6-Tribromophenol	60	0	%	19-122 %		
Date Analyzed:	10/21/94	0	Month/Day/Year			
Aluminum (Total)	5300	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	<0.25	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	3.3	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	29	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.32	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	<0.05	0.05	mg/kg	USEPA 6010	10/20/94	GR
Calcium (Total)	70000	10	mg/kg	USEPA 6010	10/20/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-013
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0013
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Chromium (Total)	9.9	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	16	0.20	mg/kg	USEPA 6010	10/20/94	GR
Copper (Total)	13	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	11000	2.0	mg/kg	USEPA 6010	10/20/94	GR
Lead (Total)	12	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	22000	10	mg/kg	USEPA 6010	10/20/94	GR
Manganese (Total)	260	0.20	mg/kg	USEPA 6010	10/20/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/20/94	
Nickel (Total)	12	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	810	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	<0.50	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	<0.20	0.20	mg/kg	USEPA 6010	10/20/94	GR
Sodium (Total)	53	10	mg/kg	USEPA 6010	10/20/94	GR
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/20/94	GR
Vanadium (Total)	18	2.0	mg/kg	USEPA 6010	10/20/94	GR
Zinc (Total)	38	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	92	0.01	%		10/20/94	TN

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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113907
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/05/94

Thomas J Geyer, CIH
Signature

12/5/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *CONESTOGA-ROVERS & ASSOCIATES, INC.*

JOB NUMBER: *113907*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 Parameter: PEST/PCB Reason: 10,3
Explanation: Surrogate results were diluted out of range.

Sample No.(s): Batch 113931-1 Parameter: BNA Reason 10
Explanation: Insufficient sample volume to analyze for MS/MSD.

Sample No.(s): --- Parameter: Tetrachloroethene Reason: 4
Explanation:

Sample No.(s): LS Parameter: Phenols Reason: 4
Explanation: Exhibited recoveries slightly above acceptable limits.

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

CASE NARRATIVE

CLIENT: CONESTOGA-ROVERS & ASSOCIATES, INC.

JOB NUMBER: 113907

The list of compounds for the Burn Pile was provided by Frank Ring of CRA. The list included one compound that could not be analyzed, 1,2-diphenylhydrazine. A forward library search was performed on TCDD and it was found to be ND. Mr. Ring was contacted concerning the two compounds and informed Earth Tech to go ahead and analyze the sample.

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/05/94

JOB NUMBER: 113907 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-103194-BP-001
DATE SAMPLED.....: 10/31/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Burn Pile 5770

LABORATORY I.D...: 113907-0001
DATE RECEIVED....: 10/31/94
TIME RECEIVED....: 17:40
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/04/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	20	ug/l			
Bromodichloromethane	ND	20	ug/l			
Bromoform	ND	20	ug/l			
Bromomethane	ND	20	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	20	ug/l			
Chlorobenzene	ND	20	ug/l			
Chloroethane	ND	20	ug/l			
Chloroform	ND	20	ug/l			
Chloromethane	ND	20	ug/l			
Dibromochloromethane	ND	20	ug/l			
1,1-Dichloroethane	ND	20	ug/l			
1,2-Dichloroethane	ND	20	ug/l			
1,1-Dichloroethene	ND	20	ug/l			
trans-1,2-Dichloroethene	ND	20	ug/l			
1,2-Dichloropropane	ND	20	ug/l			
cis-1,3-Dichloropropene	ND	20	ug/l			
trans-1,3-Dichloropropene	ND	20	ug/l			
Ethylbenzene	ND	20	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	20	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	20	ug/l			
1,1,2,2,-Tetrachloroethane	ND	20	ug/l			
Tetrachloroethene	ND	20	ug/l			
Toluene	81	20	ug/l			
1,1,1-Trichloroethane	ND	20	ug/l			
1,1,2-Trichloroethane	ND	20	ug/l			
Trichloroethene	ND	20	ug/l			
Vinyl acetate	<50	50	ug/l			
Vinyl chloride	96	20	ug/l			
Xylenes (o,m & p)	790	60	ug/l			
cis-1,2-Dichloroethene	ND	20	ug/l			
1,2-Dichlorobenzene	ND	20	ug/l			
1,3-Dichlorobenzene	ND	20	ug/l			
1,4-Dichlorobenzene	ND	20	ug/l			
Acrolein	ND	50	ug/l			
Acrylonitrile	11/04/94	50	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	92	0	%	70-121%		

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LABORATORY TESTS RESULTS
12/05/94

JOB NUMBER: 113907 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-103194-BP-001
DATE SAMPLED.....: 10/31/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Burn Pile 5770

LABORATORY I.D...: 113907-0001
DATE RECEIVED....: 10/31/94
TIME RECEIVED....: 17:40
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/04/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/06/94	RDC
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
?o(b)fluoranthene	ND	5.0	ug/l			
?o(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	<50	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	9.5	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	5.0	ug/l			
1,3-Dichlorobenzene	ND	5.0	ug/l			
1,4-Dichlorobenzene	ND	5.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	6.3	5.0	ug/l			
Dimethylphthalate	23	5.0	ug/l			
Di-n-Butylphthalate	16	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS

12/05/94

JOB NUMBER: 113907 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-103194-BP-001
DATE SAMPLED.....: 10/31/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Burn Pile 5770

LABORATORY I.D...: 113907-0001
DATE RECEIVED....: 10/31/94
TIME RECEIVED....: 17:40
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	20	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	<5.0	5.0	ug/l			
2-Methylphenol	<5.0	5.0	ug/l			
4-Methylphenol	<5.0	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	<5.0	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	5.0	ug/l			
Phenanthrene	<5.0	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	88	0	%	43-116 %		
2-Fluorophenol	24	0	%	21-100 %		
Nitrobenzene-d5	88	0	%	35-114 %		
Phenol-d6	107	0	%	10-94 %		
Terphenyl-d14	94	0	%	33-141 %		
2,4,6-Tribromophenol	90	0	%	10-123 %		
Date Analyzed:	11/06/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/14/94	GR
Aldrin	ND	0.48	ug/l			
alpha-BHC	ND	0.48	ug/l			
beta-BHC	1.2	0.48	ug/l			
delta-BHC	ND	0.48	ug/l			
gamma-BHC (Lindane)	ND	0.48	ug/l			

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LABORATORY TESTS RESULTS

12/05/94

JOB NUMBER: 113907 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-103194-BP-001
DATE SAMPLED.....: 10/31/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Burn Pile 5770

LABORATORY I.D...: 113907-0001
DATE RECEIVED....: 10/31/94
TIME RECEIVED....: 17:40
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
4,4'-DDD	ND	0.48	ug/l			
4,4'-DDE	ND	0.48	ug/l			
4,4'-DDT	ND	0.48	ug/l			
Dieldrin	ND	0.48	ug/l			
Endosulfan I	ND	0.48	ug/l			
Endosulfan II	ND	0.48	ug/l			
Endosulfan sulfate	ND	1.1	ug/l			
Endrin	ND	0.48	ug/l			
Endrin aldehyde	ND	0.48	ug/l			
Heptachlor	ND	0.48	ug/l			
Heptachlor epoxide	ND	0.48	ug/l			
Toxaphene	ND	1.0	ug/l			
Methoxychlor	ND	0.5	ug/l			
Endrin ketone	ND	0.48	ug/l			
alpha-Chlordane	ND	0.48	ug/l			
gamma-Chlordane	ND	0.48	ug/l			
PCB Aroclor 1016	ND	1.0	ug/l			
PCB Aroclor 1221	ND	1.0	ug/l			
PCB Aroclor 1232	ND	1.0	ug/l			
PCB Aroclor 1242	ND	1.0	ug/l			
PCB Aroclor 1248	ND	1.0	ug/l			
PCB Aroclor 1254	ND	1.0	ug/l			
PCB Aroclor 1260	ND	1.0	ug/l			
Date Analyzed:	11/14/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/02/94		Month/Day/Year	USEPA 3510	11/02/94	KLZ
BNAs in Water Extraction Date:	11/02/94		Month/Day/Year	USEPA 3510	11/03/94	PWB

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QUALITY CONTROL REPORT
12/05/94

JOB NUMBER: 113907 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

USEPA 8270 Water DATE ANALYZED: 11/06/94 TIME ANALYZED: 11:49 METHOD: EPA Method 8270 QC NUMBER:138538

BLANKS

TEST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Acenaphthene	MB	103094	1	<5.0	5.0	ug/l
	MB110394	A9483	1	<5.0	5.0	ug/l
	MB110794	A9524	1	<5.0	5.0	ug/l
Acenaphthylene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Aniline	.	.	1	<20	20	ug/l
	.	.	1	<20	20	ug/l
	.	.	1	<20	20	ug/l
Anthracene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Benzidine	.	.	1	<50	50	ug/l
	.	.	1	<50	50	ug/l
	.	.	1	<50	50	ug/l
Benzo(a)anthracene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Benzo(a)pyrene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Benzo(b)fluoranthene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Benzo(k)Fluoranthene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<50	50	ug/l
Benzoic Acid	.	.	1	<50	50	ug/l
	.	.	1	<50	50	ug/l
	.	.	1	<5.0	5.0	ug/l
Benzo(ghi)perylene	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<50	50	ug/l
Benzyl Alcohol	.	.	1	<50	50	ug/l
	.	.	1	<50	50	ug/l
	.	.	1	<5.0	5.0	ug/l
Bis(2-Chloroethoxy)methane	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Bis(2-Chloroethyl)ether	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Bis(2-Chloroisopropyl)ether	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
	.	.	1	<5.0	5.0	ug/l
Bis(2-Ethylhexyl)phthalate	.	.	1	<5.0	5.0	ug/l

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Verify Samples

REC'D CRA

JAN 0 1 1995

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114372
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/29/94

REC'D CRA

9 1995

Thomas J Geyer, CIH
Signature

Date: 12/29/94

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114372*

X All analyses have been validated and comply with our Quality Control Program. No qualifications required.

____ The following analyses have been qualified for the reasons cited.

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

Sample No.(s): _____ Parameter: _____ Reason: _____
Explanation: _____

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/29/94

JOB NUMBER: 114372 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-122094-BP-001
DATE SAMPLED.....: 12/20/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: CRA

LABORATORY I.D...: 114372-0001
DATE RECEIVED....: 12/20/94
TIME RECEIVED....: 22:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	12/28/94	RDC
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	<330	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	340	330	ug/kg			
Benzo(a)pyrene	<330	330	ug/kg			
Benzo(b)fluoranthene	370	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	340	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	650	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/29/94

JOB NUMBER: 114372 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-122094-BP-001
DATE SAMPLED.....: 12/20/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: CRA

LABORATORY I.D...: 114372-0001
DATE RECEIVED....: 12/20/94
TIME RECEIVED....: 22:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	480	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	640	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	72	0	%	25-131 %		
Nitrobenzene-d5	66	0	%	23-120 %		
Phenol-d6	76	0	%	24-113 %		
Terphenyl-d14	92	0	%	18-137 %		
2,4,6-Tribromophenol	72	0	%	19-122 %		
Date Analyzed:	12/28/94	0	Month/Day/Year			
BNAs in Soil Extraction Date:	12/21/94		Month/Day/Year	USEPA 3550	12/21/94	

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Livonia, MI 48150
(313) 462-3900

APPENDIX E

CHAIN OF CUSTODY RECORDS

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5270

PROJECT NAME: GM Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: VOC	PARAMETERS: SVOC	REMARKS
1	8-26-94		W-082694-FR-001	water	4	X	X	
2			W-082694-FR-002	water	4	X	X	
3			W-082694-FR-003	water	4	X	X	
4			W-082694-FR-004	water	4	X	X	
5			TRIP	water	1	X		

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. Frank W. Ring	DATE: 8/26/94 TIME: 1900	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY: Jim Dowse
DATE: 8/27/94 TIME: 9:32

No. 1110

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name): IEA, INC., SCHAUMBERG, IL.

REFERENCE NUMBER: 5770

PROJECT NAME: GM-PONTIAC

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: FRANK RING

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: VOCs	SVOCs	PCB/PESTICIDES	TAL METALS	PAHs	REMARKS
1	8/10/94		S-081094-FR-100	Soil	2	✓	✓				
2	8/10/94		S-081094-FR-101	Soil	2	✓	✓				
3	8/12/94		S-081294-FR-102	"	2	✓	✓				
4	8/12/94		S-081294-FR-103	"	2	✓	✓				
5	8/12/94		S-081294-FR-104	"	2	✓	✓				
6	8/12/94		S-081294-FR-105	"	2	✓	✓				
7	8/15/94		S-081594-FR-106	"	2	✓	✓				
8	8/15/94		S-081594-FR-107	"	2	✓	✓				
9	8/16/94		S-081694-FR-108	"	2	✓	✓				
10	8/16/94		S-081694-FR-109	"	3	✓	✓	✓	✓		
11	8/16/94		S-081694-FR-110	"	2	✓				✓	
12	8/16/94		S-081694-FR-201	"	2	✓				✓	
13	8/16/94		S-081694-FR-202	"	2	✓				✓	
14	8/16/94		S-081694-FR-203	"	2	✓				✓	

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. Frank W. Ring — DATE: 8/16/94 TIME: 2100
RECEIVED BY: 1. — DATE: TIME:

RELINQUISHED BY: 2. — DATE: TIME:
RECEIVED BY: 2. — DATE: TIME:

RELINQUISHED BY: 3. — DATE: TIME:
RECEIVED BY: 1. — DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No. 939555 4641

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: FRANK RING

RECEIVED FOR LABORATORY BY:
DATE: TIME:

No 0857

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CRA

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11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name): IEA Inc, Schaumberg, IL

REFERENCE NUMBER: S + C

PROJECT NAME: G11 Pontiac

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: FRANK RING

SEQ. No	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: VOCs, SVOCs, PCBs/Pesticides, Total Metals, PAHs	REMARKS
15	8/16/94		S-08161 4-1K-204	Soil	2	✓ ✓	

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
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Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: VOC	SVOC	PCBs/Pest	TAL Metals	REMARKS
1	8/17		S-081794-FR-011	SOIL	3	✓	✓	✓	✓	
2	8/17		-112	↓	3	✓	✓	✓	✓	
3	8/17		-113	↓	2	✓	✓			
4	8/17		-114	SOIL	1	✓	✓			
			TOTAL NUMBER OF CONTAINERS		9					

RELINQUISHED BY: 1. Frank W. Ring	DATE: 8/19/94 TIME: 1600	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No. 939555425 4

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0750

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

DATE 8/20/94 TIME: 10:23

1001 (FORMS)-APRIL 29, 93-REV 0-(C)(F-01)

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CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	TCLP: MI metals	TCLP: VOC	TCLP: SVOC	Ignitability	cN reactivity	Sulphide reactivity	TAL metals	TCL VOC	TCL SVOC	TCL PCB	REMARKS
1	9/12/94		S-091294-FR-402	SOIL	3	✓	✓	✓	✓	✓	✓					
2	↓		-403	↓	6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3			-404		3	✓	✓	✓	✓	✓	✓					
4	↓		-405		3	✓	✓	✓	✓	✓	✓					
5	9/13/94		S-091394-FR-406		8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
6	↓		-407		5	✓	✓	✓	✓	✓	✓					
7			-408		8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
8			-409		5	✓	✓	✓	✓	✓	✓					
9			-410		10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
10			-411		5	✓	✓	✓	✓	✓	✓					
11			-412		10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
12			-413		5	✓	✓	✓	✓	✓	✓					
13			-414		10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
14	↓		-415	↓	5	✓	✓	✓	✓	✓	✓					
			TOTAL NUMBER OF CONTAINERS		1											

RELINQUISHED BY: 1. Frank W. Ring	DATE: 9/13/94 TIME: 2100	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: Frank Ring

RECEIVED FOR LABORATORY BY:

DATE: 9-15-94 TIME: 10:00 AM

№ 1107

1001 (FORMS)-APRIL 29-93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac City

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCLP:MI metals	TCLP:VOC	TCLP:SVOC	Ignitability	CN reactivity	Sulphide reactivity	TAL Metals	TCL VOC	TCL SVOC	TCL PCB	REMARKS
15	9/13/94		S-091394-FR-4/6	SOIL	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

10 DAY TURN AROUND

TOTAL NUMBER OF CONTAINERS 96

RELINQUISHED BY: 1. Frank W. Ring	DATE: 9/13/94 TIME: 2100	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FED EX AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY: [signature]
DATE: 9-15-94 TIME: 10:00AM

TO 1108

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

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CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): W+W - EARTHTECH

Conestoga Rovers & Associates
Waterloo Ontario, OF NOVICE
ATTN: Lou Almeida

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TAL Metals	TCL VOC	TCL SVOC	REMARKS
1	10/18/94		S-101894-FR-001	SOIL	2	✓	✓	✓	
2			-002						
3			-003						72 hr. turn around
4			-004						
5			-005						
6			-006						
7			-007						
8			-008						
9			-009						
10			-010						
11			-011						
12			-012						
13			-013						

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. Frank W. Ring	DATE: 10/18/94 TIME: 1900	RECEIVED BY: 1.	DATE: 10/19/94 TIME: 1900
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Hand delivery AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

DATE: TIME:

№ 1200

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

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11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): W+W / EARTHTE

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac / Burn Pile

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TCL SVOC	TCL PCB/PEST	Metal Finishing Compounds	REMARKS
1	10/31/94		W-103194-BP-001	Water	7	✓	✓	✓	✓	

TOTAL NUMBER OF CONTAINERS: 7

RELINQUISHED BY: 1. Ben Hollrod	DATE: 10/31/94 TIME:	RECEIVED BY: 1.	DATE: 10/31/94 TIME: 5:40
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in person AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

No 1180

SAMPLE TEAM: Frank Ring

RECEIVED FOR LABORATORY BY:

DATE: 10/31/94 TIME: 5:40

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

114372
Conestoga-Rovers & Associates, Inc

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): EARTHTECH

Romulus, MI 48174
ATTN: Jack Lindsay

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: PCBs	REMARKS
1	12/20/94		S-122094-BP-001	SOIL	2		

7 Day Turn Around

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. Frank W. Ring	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:
RELINQUISHED BY: 2.	DATE: / TIME:	RECEIVED BY: 2.	DATE: / TIME:
RELINQUISHED BY: 3.	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:

METHOD OF SHIPMENT: Hand Delivery

AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: Frank W. Ring

RECEIVED FOR LABORATORY BY:

DATE: 12/20/94 TIME: 2200

№ 1182

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX F

VALIDATION REPORTS

MEMO

TO: Frank Ring REFERENCE NO: 5770

FROM: Lou Almeida/dm/6 DATE: January 26, 1995

RE: Analytical Data and Quality Assurance Review
Burn Pile Excavation
General Motors Pontiac Manufacturing Facility
Pontiac, Michigan

1.0 OVERVIEW

Twenty-nine soil samples and four groundwater samples and one wastewater sample was collected between August 26, 1994 and December 20, 1994 at the General Motors Pontiac Manufacturing Facility Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); pesticides/polychlorinated biphenyls (Pest/PCBs) and metals.

This memo presents an analytical assessment and validation of results obtained in two analytical reports from IEA Inc. (IEA) located in Schaumburg, Illinois and three analytical reports from Earth Tech Analytical Services (Earth Tech) located in Lavonia, Michigan, resulting from the analysis of the soil and water samples collected from the Site.

Analytical results were received in reports provided by IEA and Earth Tech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and each laboratories quality control criteria. IEA and Earth Tech completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (Revised 1994), and "National Functional Guidelines for

Inorganic Data Review", (Revised 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries and matrix spike/matrix spike duplicate (MS/MSD) recoveries.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by IEA and Earth Tech. Analytical methods and holding time criteria are presented in Table 1.

Samples submitted for analysis were analyzed prior to expiration of the prescribed holding time with two exceptions. The final dilutions for samples W-082694-FR-001 and W-082694-FR-002 were analyzed for VOCs out of sample holding time. Therefore, the results obtained from these two dilutions are qualified as estimated. Qualifications are presented on Table 2.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene and 1,2-dichloroethane-d_4. Samples submitted for SVOC analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5 and terphenyl-d_{14}, 2-fluorophenol,

phenol-d_6 and 2,4,6-tribromophenol surrogate compounds. Sample submitted for Pest/PCB analysis were spike with 2,4,5,6-tetrachloro-m-xylene and decachlorobiphenyl surrogates. Surrogate recovery limits, as established by the laboratory, are summarized in Table 3.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with two exceptions. The terphenyl-d_{14} surrogate recovery for sample W-082694-FR-002 SVOC analysis fell below control limits. The phenol-d_6 surrogate recovery for sample W-103194-BP-001 SVOC analysis fell below control limits. In both cases, as only one of three surrogates were out for each SVOC fraction, therefore, qualifications were not required. Unacceptable surrogate recoveries are presented in Table 4.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants. Consequently, data qualifications were not necessary.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. IEA and Earth Tech prepared and analyzed check samples with the investigative samples, for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology for organic analyses. No action is normally taken on MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE INORGANIC ANALYSES

Matrix spike MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

All MS recoveries fell within review limits (75-125%). Qualifications were not required on this basis.

2.7 COMPOUND IDENTIFICATION

As noted in Earth Tech's report 113802, the benzo(b)fluoroanthene result for sample S-10194-FR-011 was reported as a total value, benzo(k)fluoranthene coeluted with benzo(b)fluoranthene. The result for benzo(b)fluoranthene should therefore be qualified as estimated, as individual quantitation was not possible for this sample. The result for benzo(k)fluoranthene should be qualified as unusable for this sample. The qualifications are presented in Table 2.

3.0 CONCLUSION

The data provided by IEA and Earth Tech is acceptable for use noting the qualifications resulting from unacceptable holding times and an unacceptable quantitation.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIMES
BURN PILE EXCAVATION
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

		Holding time Criteria	
Analysis	*Method*	*Water Matrix (days)*	*Solid Matrix (days)*
VOCs	SW-846 8240	14	14
SVOCS	SW-846 8270	7/40	7/40
Metals	SW-846 6010	6 months	6 months
Pest/PCBs	SW-846 8080	7/40	14/40

Notes:

VOCs - Volatile Organic Compounds
SVOCs - Semi-volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
SW-846 - USEPA's document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, September 1986.
14/40 - 14 days from the sample collection date to the sample extraction date, 40 days from the sample extraction date to the sample analysis date
14 - 14 days from the sample collection date to the sample analysis date

TABLE 2

SUMMARY OF DATA QUALIFICATIONS
BURN PILE EXCAVATION
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Matrix*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
W-082694-FR-001 (1:1000 Dilution)	VOCs	Water	Vinyl Chloride	1600	1600J	2.1
			cis-1,2-Dichloroethene	4400	4400J	2.1
			Toluene	26000	26000J	2.1
			Ethylbenzene	5700	5700J	2.1
			Total Xylenes	23000	23000J	2.1
W-082694-FR-002 (1:1000 Dilution)	VOCs	Water	cis-1,2-Dichloroethene	4400	4400J	2.1
			Toluene	26000	26000J	2.1
			Total Xylenes	23000	23000J	2.1
S-101894-FR-011	SVOCs	Soil	Benzo(b)fluoranthene	2200 µg/kg	2200J µg/kg	2.7
			Benzo(k)fluoranthene	*	R	2.7

Notes:

VOCs - Volatile Organic Compounds.
SVOCs - Semi-volatile Organic Compounds.
J - The reported results is estimated.
* - Parameter coeluted.
R - The result is unusable.

TABLE 3

SUMMARY OF SURROGATE CONTROL LIMITS
BURN PILE EXCAVATION
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits*	
		Water Matrix	*Solid Matrix*
VOCs	Bromofluorobenzene	74-121	74-121
	1,2-Dichloroethane-d_4	70-121	70-121
	Toluene-d_8	81-117	81-117
SVOCs	2-Fluorobiphenyl	43-116	43-116
	Nitrobenzene-d_5	35-114	35-114
	Terphenyl-d_{14}	33-141	33-141
	2-Fluorophenol	21-100	21-100
	Phenol-d_6	10-94	10-94
	2,4,6-Tribromophenol	10-123	10-123
Pest/PCBs	2,4,5,6-Tetrachloro-m-xylene	60-150	60-150
	Decachlorobiphenyl	60-150	60-150

Notes:

SVOCs - Semi-volatile Organic Compounds
VOCs - Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls

TABLE 4

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
BURN PILE EXCAVATION
GENERAL MOTORS PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
W-082694-FR-002	SVOCs	Terphenyl-d_{14}	25	33-141
W-103194-BP-001	SVOCs	Phenol-d_6	107	10-94

Note:

SVOCs - Semi-volatile Organic Compounds

APPENDIX G

MEMORANDUM PRESENTING ANALYTICAL DATA FOR DISPOSAL OF SOIL AT EAGLE VALLEY RECYCLING AND DISPOSAL FACILITY

CRA
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: John Spokaeski
Rich Paajanen

REFERENCE NO: 5770

FROM: Frank Ring

DATE: October 4, 1994

RE: Analytical Data for Disposal of Soil at Eagle Valley Disposal Facility
General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

This memorandum presents the analytical data necessary for the disposal of approximately 7500 cubic yards of soil from the General Motors Pontiac Central Manufacturing Facility to Waste Management's Eagle Valley Disposal Facility. A completed Generator's Waste Profile Sheet is included in Attachment A.

Soil samples were collected from stockpiled and in-situ soil and analyzed for various parameters. Soil samples were collected and analyzed as identified on Table 1. Analytical data are provided in Attachments B, C, D, and E as outlined in Table 1.

Item 1 from Table 1 is not related to items 2, 3, or 4 on Table 1 or the "Burn Pile" area.

Items 2, 3, and 4 from Table 1 are from the "Burn Pile" area and are thus related.

Part of the "Burn Pile" area was excavated and stockpiled to create items 2 and 3 on Table 1. Prior to this excavation soil samples were collected and analyzed for TCLP and total lead concentrations. A summary of those analytical results are presented in Attachment F. However, it should be noted that the stockpiled soils, items 2 and 3 on Table 1, were later sampled and analyzed for disposal as outlined in Table 1.

If any questions or comments arise please contact Frank Ring at (810) 456-7510 or (313) 942-0909.

TABLE 1

SUMMARY OF SOIL TO BE DISPOSED AT EAGLE VALLEY
GENERAL MOTORS PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	DESCRIPTION OF SOIL	ESTIMATED VOLUME	NUMBER OF SAMPLES	ANALYSIS PERFORMED
1)	Stockpiled soil w/ debris	1000 yd^3	1	TCLP voc, svoc, MI metals, total PCB, flash point, and reactive cyanide and sulfide (see Attachment B)
2)	Stockpiled soil from the "Burn Pile"	3000 yd^3	1	TCLP voc, svoc, MI metals, total PCB, flash point, and reactive cyanide and sulfide (see Attachment C)
3)	Stockpiled soil from the "Burn Pile"	500 yd^3	1	TCLP voc, svoc, MI metals, total PCB, flash point, and reactive cyanide and sulfide (see Attachment D)
4)	In-situ soil from the "Burn Pile"	3000 yd^3	3	TCLP lead and cadmium, total voc, svoc, metals, PCB/pesticides (see Attachment E)

ATTACHMENT A

Generator's Waste Profile Sheet

GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Waste Profile Sheet Code: WMNA 251739

This form is to be used to comply with the requirements of a waste agreement.

INSTRUCTIONS FOR COMPLETING THIS FORM ARE ATTACHED

(Shaded Areas For Generator Use Only)

Decision Expiration Date: / /

Contractor Sales Rep#: _____

Service Agr. Renewal Date: / /

A. WASTE GENERATOR INFORMATION

1. Generator Name: GENERAL MOTORS PONTIAC CENTRAL MFG. FACILITY
2. SIC Code: _____
3. Facility Address (site of waste generation): 700 S. BLVD.
4. Generator City, State/Province: PONTIAC, MICHIGAN
5. Zip/Postal Code: 48341
6. Generator USEPA/Federal ID #: —
7. State/Province ID #: —
8. Technical Contact: KEITH WEST
9. Phone: (313) 556 - 0821

B. WASTE STREAM INFORMATION (See Instructions)

1. Name of Waste: SOIL - CONTAMINATED
2. Process Generating Waste: EXCAVATION FOR CONSTRUCTION OF ROADWAY
3. Annual Amount/Units: 7500 CUBIC YARDS
4. Type A ☒ Type B ☐
5. Special Handling Instructions/Supplemental Information: ANALYTICAL DATA IS ATTACHED
6. Incidental Waste Types and Amounts: NONE

C. TRANSPORTATION INFORMATION

1. Method of Shipment: ☐ Bulk Liquid ☐ Bulk Sludge ☒ Bulk Solid ☐ Drum/Box ☐ Other _____
2. Supplemental Shipping Information: NONE
3. Is this a DOT hazardous material? ☒ No ☐ Yes (If yes, complete 4, 5 & 6) 4. Hazard Class/ID #: _____
5. Reportable Quantity/Units (lb/kg): _____ 6. Shipping Name: _____

D. TECHNICAL MANAGER DECISION (Check One) ☐ APPROVED ☐ DISAPPROVED ☐ Check if additional information is attached

If Disapproved, Explain: _____

If Approved, Continue.

1. Management Method(s) _____
2. Precautions, Conditions, or Limitations on Approval: _____
3. For Type A Wastes, Laboratory Analysis of a Representative Sample Was: ☐ Waived ☒ Attached
   If waived, explain why: _____
4. List Non-WMI Facility that is Approved to Manage this Waste: _____ Date: _____

Tech. Mgr. Signature: _____ Name (Print): _____ Date: _____

E. MANAGEMENT FACILITY INFORMATION / DECISION

1. Proposed Management Facility: _____
2. Proposed Intermediate Transfer Facility: _____ 3. Transporter: _____
4. Management Facility Gen. Mgr. Decision (Check One) ☐ APPROVED ☐ DISAPPROVED

If Disapproved, Explain: _____

If Approved, List Precautions, Conditions, or Limitations on Approval: _____

General Mgr. Signature: _____ Name (Print): _____ Date: _____

Turn Page and Complete Side 2 (If Type B Special Waste, only complete Part J of Side 2)

Side 1 of 2
WMRA-4131 (rev4)

GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

F. PHYSICAL CHARACTERISTICS OF WASTE (See Instructions)

1. Color	2. Does the waste have a strong incidental odor?	3. Physical State @ 70 F/21°C:	4. Layers	5. Specific Gravity	6. Free Liquids:
BROWN	☒ No ☐ Yes; If so, describe:	☒ Solid ☐ Semi-Solid ☐ Liquid ☐ Powder ☐ Other:	☐ Multi-layered ☐ Bi-layered ☒ Single Phased	Range:	☐ Yes ☒ No Volume: %

7. pH: ☐ ≤2 ☐ > 2-4 ☐ 4-7 ☐ 7 ☐ 7-10 ☐ 10- <12.5 ☐ ≥12.5 ☐ Range ☒ NA

8. Flash Point: ☐ None ☐ <140°F/60°C ☐ 140 - 199°F/60 - 93°C ☒ ≥200°F/93°C ☐ Closed Cup ☒ Open Cup

G. CHEMICAL COMPOSITION (RANGE (NON-HAZ))

1. SEE ATTACHED ANALYTICAL DATA — %
Total: %

2. Does the waste contain any of the following? (provide concentration if known):

	NO	or	LESS THAN	or	ACTUAL
PCBs	☒		☐ < 50 ppm		<1 ppm
Cyanides	☒		☐ < 30 ppm		ppm
Sulfides	☒		☐ < 500 ppm		ppm

Please note: Unless analytical results are attached, the chemical composition identification should include, at a minimum, Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium, Silver, Pesticides, Herbicides, and any other TCLP constituents that may be present in the waste. The total composition must be greater than or equal to 100%. (.0001% = 1 ppm or 1 mg/l)

3. Indicate method used to determine composition (if provided): ☒ TCLP ☒ Total ☐ Other:

H. SAMPLING SOURCE (e.g., Drum, Lagoon, Pit, Pond, Tank, Vat) STOCKPILED SOIL/INSITE SOIL

I. REPRESENTATIVE SAMPLE CERTIFICATION

1. Print Sampler's Name: FRANK RING
2. Sample Date: 8/10/94 - 9/30/94
3. Sampler's Title: ENVIRONMENTAL ENGINEER
4. Sampler's Employer (if other than Generator): CONESTOGA-ROVERS AND ASSOCIATES

The sampler's signature certifies that any sample submitted is representative of the waste described above pursuant to 40 CFR 261.20(c) or equivalent rules.

5. Sampler's Signature: Frank W. Ring

J. GENERATOR CERTIFICATION

By signing this profile sheet, the Generator certifies:

1. This waste is not a "Hazardous Waste" as defined by USEPA or Canadian Federal regulation and/or the state/province.
2. This waste does not contain regulated radioactive materials or regulated concentrations of PCB's (Polychlorinated Biphenyls).
3. The unshaded portions of this sheet and the attachments contain true and accurate descriptions of the waste material. All relevant information regarding known or suspected hazards in the possession of the Generator has been disclosed.
4. The Generator has read and understands the Contractor's Definition of Special Waste included in Part B.5. of the attached instructions form. All types and amounts of special wastes provided in incidental amounts have been identified in section B.6. of this form.
5. The analytical data presented herein or attached hereto were derived from testing a representative sample taken in accordance with 40 CFR 261.20(c) or equivalent rules.
6. If any changes occur in the character of the waste, the Generator shall notify the Contractor prior to providing the waste to the Contractor.

7. Signature: ON BEHALF OF GENERAL MOTORS G. Keith West
8. Title: Project Manager
9. Name (Type or Print): G. KEITH WEST
10. Date: 10/5/94

Sheet 1 of 2
WMNA-4(5) (02/92)

ATTACHMENT B

Analytical Data for Item 1

CLIENT: CRA - MI

CLIENT ID: S - 09294 - FR - 405

LAB ID: 9418660004

PROJECT: 5770

TCLP ANALYTICAL RESULTS

METHOD: 8240

EPA WASTE	CONTAMINANT	DATE ANALYZED	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	VOLATILE ESTIMATED REQ.
	VOLATILE ORGAN. 9-21-94					
D018	Benzene	9-22-94	0.5	~~0.05~~ 0.001	< 0.001	
D019	Carbon Tetrachloride		0.5	~~0.05~~		
D021	Chlorobenzene		100.0	~~0.05~~		
D022	Chloroform		6.0	~~0.05~~		
D028	1,2-Dichloroethane		0.5	~~0.05~~		
D029	1,1-Dichloroethylene		0.7	~~0.05~~		
D035	Methyl Ethyl Ketone		200.0	~~0.10~~ 0.002	< 0.002	
D039	Tetrachloroethylene		0.7	~~0.05~~ 0.001	< 0.001	
D040	Trichloroethylene		0.5	~~0.05~~		
D043	Vinyl Chloride		0.2	~~0.10~~ 0.002	< 0.002	

O.K.

9-23-94

CLIENT: CRA
CLIENT ID: FR-405
LAB ID: 41866004

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/22/94 DATE EXTRACTED: 9/22/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/23/94	200.0	0.02	<0.02
D024	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

✓ Burned Roofing Insulation
Pile 11

CLIENT: CLA
PROJECT NUMBER: C5770
CLIENT ID: S-61294-FR-405
LAB NUMBER: CH4186004

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9-22 DATE EXTRACT: 9-23	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS					
D004	Arsenic	9-24	5.0	0.002 ~~0.1~~	<0.002	
D005	Barium	9-24	100.0	0.05	1.2	
D006	Cadmium	↓	1.0	0.005	<0.005 P	
D007	Chromium		5.0	0.01	<0.01	
D008	Lead	9-26	5.0	0.05	0.014	
D009	Mercury	9-29	0.2	0.0002	~~<0.0002~~	
D010	Selenium	9-24	1.0	0.003 ~~0.1~~	<0.003	
D011	Silver		5.0	0.01	<0.01 P	
	Copper			0.025	<0.025	
	Nickel			0.03	<0.03 ~~<0.0200~~	
	Zinc	↓		0.02	0.53	

✓

Client: CRA - MI

IEA Job#: CH941866

Project #: 5770

Matrix: SOIL

ANALYTE LIST

mg/kg dry weight

		Client ID	S-091394 FR 402	S-091394 FR 403	S-091394 FR 404	S-091394 FR 405	S-091394 FR 406		
		Lab ID	941866 001	941866 002	941866 003	941866 004	941866 005	Date Analyzed	PQL
Analyte	Method								
T. Solids	160.3		88	90	87	91	90	9/23/94	%
O.C. Flashpoint	1010		>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1		<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2		<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

LABOR

ORY TESTS RESULTS

10/04/94

JOB NUMBER: 113653 CUSTOMER: Conestoga-

Rovers & Associates ATTN: Lou Alvino

CLIENT I.D. .....: Sample ID: S-093094-FR-503
DATE SAMPLED.....: 09/30/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Center

LABORATORY I.D... 113653-0003
DATE RECEIVED....: 09/30/94
TIME RECEIVED....: 19:00
REMARKS.....: Soil

nt

TEST DESCRIPTION	FINAL RESUL	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Polychlorinated Biphenyls in Soil		*1		EPA Method 8080	10/04/94	SB
PCB Aroclor 1016	ND	366	ug/kg			
PCB Aroclor 1221	ND	366	ug/kg			
PCB Aroclor 1232	ND	366	ug/kg			
PCB Aroclor 1242	<366	366	ug/kg			
PCB Aroclor 1248	ND	366	ug/kg			
PCB Aroclor 1254	590	366	ug/kg			
PCB Aroclor 1260	ND	366	ug/kg			
PCBs in Soil Extraction Date:	N/A		Month/Day/Year	USEPA 3550	N/A	N/A
% Solids	N/A	0.01	%		N/A	N/A

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/05/94

JOB NUMBER: 113653 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Alesida

CLIENT I.D.....: Sample ID: 9-093094-FR-501
DATE SAMPLED.....: 09/30/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Center Point

LABORATORY I.D...: 113653-0001
DATE RECEIVED....: 09/30/94
TIME RECEIVED....: 19:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Polychlorinated Biphenyls in Soil		*1		EPA Method 8080	10/04/94	SB
PCB Aroclor 1016	ND	360	ug/kg			
PCB Aroclor 1221	ND	360	ug/kg			
PCB Aroclor 1232	ND	360	ug/kg			
PCB Aroclor 1242	ND	360	ug/kg			
PCB Aroclor 1248	ND	360	ug/kg			
PCB Aroclor 1254	1800	360	ug/kg			
PCB Aroclor 1260	<360	360	ug/kg			
PCBs in Soil Extraction Date:	10/04/94		Month/Day/Year	USEPA 3550	10/05/94	PWB
% Solids	93	0.01	%		10/05/94	PWB

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

ATTACHMENT C

Analytical Data for Item 2

CLIENT: CLA-MI
CLIENT ID: FR-402
LAB ID: 9418600 1
PROJECT: 5770

TCLP ANALYTICAL RESULTS

METHOD: 8240

EPA WASTE #	CONTAMINANT	DATE LEACHED: 9/23/94 DATE ANALYZED	REG LIMIT (mg/l)	DETECTION LIMIT (mg/l)	AMOUNT DETECTED (mg/l)
	VOLATILE ORGAN.	9/24/94			
D018	Benzene		0.5	~~0.05~~ 0.001	< 0.001
D019	Carbon Tetrachloride		0.5	~~0.05~~	
D021	Chlorobenzene		100.0	~~0.05~~	
D022	Chloroform		6.0	~~0.05~~	
D028	1,2-Dichloroethane		0.5	~~0.05~~	
D029	1,1-Dichloroethylene		0.7	~~0.05~~	
D035	Methyl Ethyl Ketone		200.0	~~0.10~~ 0.002	< 0.002
D039	Tetrachloroethylene		0.7	~~0.05~~ 0.001	< 0.001
D040	Trichloroethylene		0.5	~~0.05~~	
D043	Vinyl Chloride		0.2	~~0.10~~ 0.002	< 0.002

[redacted]

CLIENT: CRA
CLIENT ID: FR-402
LAB ID: 41866001

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
DO24	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

CLIENT: CRA
PROJECT NUMBER: 5770
CLIENT ID: S-091294-FR-402
LAB NUMBER: CH94186001

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9-22 DATE EXTRACT: 9-23		DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS						
D004	Arsenic	7060	9/24 ~~9/25~~	5.0	0.002 ~~0.1~~	<0.002	
D005	Barium	6010	9/23 ~~24~~	100.0	0.05	2.8	
D006	Cadmium	↓	↓	1.0	0.005	0.089	
D007	Chromium	↓	↓	5.0	0.01	<0.01	
D008	Lead	6010 ~~7421~~	↓	5.0	0.05	0.28	
D009	Mercury	7471	9/24	0.2	0.0002	<0.0002	
D010	Selenium	7741 ~~7760~~	9/19/24 ~~9/23~~	1.0	0.003 ~~0.1~~	<0.003	
D011	Silver	6010	9/23 ~~24~~	5.0	0.01	<0.01 P	
	Copper	↓	↓		0.025	0.060	
	Nickel				0.03	0.25	
	Zinc				0.02	2.4	

Met 0200

Client: CRA - MI
IEA Job#: CH941866
Project #: 5770

ANALYTE LIST
~~mg/kg dry weight~~

Matrix: SOIL

Analyte	Method	Client ID	S-091394 FR 402	S-091394 FR 403	S-091394 FR 404	S-091394 FR 405	S-091394 FR 406	Date Analyzed	PQL
		Lab ID	941866 001	941866 002	941866 003	941866 004	941866 005		
T. Solids	160.3		88	90	87	91	90	9/23/94	%
O.C. Flashpoint	1010		>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1		<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2		<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

ATTACHMENT D

Analytical Data for Item 3

CLIENT: CLA - MI
CLIENT ID: FL-104
LAB ID: 9466003
PROJECT: 5770

TCLP ANALYTICAL RESULTS

METHOD: 8240

EPA WASTE #	CONTAMINANT	DATE ANALYZED	REG. LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	VOLATILE ORGAN.	9/28/94			
D018	Benzene		0.5	~~0.05~~ 0.001	<0.001
D019	Carbon Tetrachloride		0.5	~~0.05~~	
D021	Chlorobenzene		100.0	~~0.05~~	
D022	Chloroform		6.0	~~0.05~~	
D028	1,2-Dichloroethane		0.5	~~0.05~~	
D029	1,1-Dichloroethylene		0.7	~~0.05~~	
D035	Methyl Ethyl Ketone		200.0	~~0.10~~ 0.002	<0.002
D039	Tetrachloroethylene		0.7	~~0.05~~ 0.001	<0.001
D040	Trichloroethylene		0.5	~~0.05~~	
D043	Vinyl Chloride		0.2	~~0.10~~ 0.002	<0.002

[redacted]

LAB ID: 41866003

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACHED: 9/23/94 DATE EXTRACTED: 9/23/94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)
	SEMIVOLATILE ORGAN.				
D023	o-Cresol	9/26/94	200.0	0.02	<0.02
D024	m+p-Cresol		200.0	0.02	<0.02
D026	Cresols		200.0	0.02	<0.02
D027	1,4-Dichlorobenzene		7.5	0.02	<0.02
D030	2,4-Dinitrotoluene		0.13	0.02	<0.02
D032	Hexachlorobenzene		0.13	0.02	<0.02
D033	Hexachloro-1,3-Butadiene		0.5	0.02	<0.02
D034	Hexachloroethane		3.0	0.02	<0.02
D036	Nitrobenzene		2.0	0.02	<0.02
D037	Pentachlorophenol		100.0	0.1	<0.1
D038	Pyridine		5.0	0.02	<0.02
D041	2,4,5-Trichlorophenol		400.0	0.1	<0.1
D042	2,4,6-Trichlorophenol		2.0	0.02	<0.02

P:1c x3

✓

CLIENT: CHA

PROJECT NUMBER: 5770

CLIENT ID: S-09894-FR-404

LAB NUMBER: CH9418606003

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 9/22 DATE EXTRACT: 9/23		DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS						
D004	Arsenic	7060	9/24	5.0	~~0.002~~ 0.1	<0.002	
D005	Barium	6010	9/23 pc	100.0	0.05	1.8	
D006	Cadmium	↓	↓	1.0	0.005	0.13 P	
D007	Chromium	↓	↓	5.0	0.01	<0.01	
D008	Lead	6010 ~~7421~~	9/23	5.0	0.05	1.0	
D009	Mercury	7470	9/20	0.2	0.0002	<0.0002	
D010	Selenium	~~7760~~ 7741	9/24	1.0	~~0.1~~ 0.003	<0.003	
D011	Silver	6010	~~9/23~~ 9/23 pc	5.0	0.01	<0.01 P	
	Copper	↓	↓		0.025	0.15	
	Nickel				0.03	0.21	
	Zinc				0.02	2.2	

Met 0200

✓

Client: CRA - MI

IEA Job#: CH941866

Project #: 5770

Matrix: SOIL

ANALYTE LIST

~~mg/kg dry weight~~

	Client ID	S-091394 FR 402	S-091394 FR 403	S-091394 FR 404	S-091394 FR 405	S-091394 FR 406		
	Lab ID	941866 001	941866 002	941866 003	941866 004	941866 005	Date Analyzed	PQL
Analyte	Method							
T. Solids	160.3	88	90	87	91	90	9/23/94	%
O.C. Flashpoint	1010	>200	>200	>200	>200	>200	9/23/94	degrees F
R. Sulfide	7.3.4.1	<10	<10	<10	<10	<10	9/26/94	10 mg/kg
R. Cyanide	7.3.3.2	<1	<1	<1	<1	<1	9/26/94	1 mg/kg

PQL = Practical Quantitation Limit

LABOR

DRY TESTS RESULTS
10/04/94

JOB NUMBER: 113633 CUSTOMER: Conestoga-

rs & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-093094-FR-502
DATE SAMPLED.....: 09/30/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac Center

LABORATORY I.D... 113633-0002
DATE RECEIVED.... 09/30/94
TIME RECEIVED.... 19:00
REMARKS.....: Soil

nt

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Polychlorinated Biphenyls in Soil		*1		EPA Method 8080	10/04/94	SB
PCB Aroclor 1016	ND	366	ug/kg			
PCB Aroclor 1221	ND	366	ug/kg			
PCB Aroclor 1232	ND	366	ug/kg			
PCB Aroclor 1242	ND	366	ug/kg			
PCB Aroclor 1248	ND	366	ug/kg			
PCB Aroclor 1254	730	366	ug/kg			
PCB Aroclor 1260	ND	366	ug/kg			
PCBs in Soil Extraction Date:	N/A		Month/Day/Year	USEPA 3550	N/A	N/A
% Solids	N/A	0.01	%		N/A	N/A

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

ATTACHMENT E

Analytical Data for Item 4

IEA
An Aquarion Company

Client. [illegible]
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug/kg Dry Weight

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	1	5	5	1	PQL
	Method Blank	VS 082294	VS 082394	VS 082294	VS 082294	VS 082494	
	Client ID	FR-100	FR-101	FR-102	FR-103	FR-104	
	Lab ID	941622 001	941622 002	941622 003	941622 004	941622 005	
Trans-1,2-Dichloroethene		U	U	UD	UD	U	10
Chloromethane		U	U	UD	UD	U	10
Bromomethane		U	U	UD	UD	U	10
Vinyl Chloride		U	U	UD	UD	U	10
Chloroethane		U	U	UD	UD	U	10
Methylene Chloride		U	U	UD	UD	U	10
Acetone		U	U	UD	UD	U	100
Carbon Disulfide		U	U	UD	UD	U	100
1,1-Dichloroethene		U	U	UD	UD	U	10
1,1-Dichloroethane		U	U	UD	UD	U	10
cis-1,2-Dichloroethene		U	U	UD	UD	U	10
Chloroform		U	U	UD	UD	U	10
1,2-Dichloroethane		U	U	UD	UD	U	10
2-Butanone		U	U	UD	UD	U	100
1,1 1-Trichlorethane		U	U	UD	UD	U	10
Carbon Tetrachloride		U	U	UD	UD	U	10
Vinyl Acetate		U	U	UD	UD	U	10
Bromodichloromethane		U	U	UD	UD	U	10
1,2-Dichloropropane		U	U	UD	UD	U	10
Trans-1,3-dichloropropene		U	U	UD	UD	U	10
Trichloroethylene		U	U	UD	UD	U	10
Dibromochloromethane		U	U	UD	UD	U	10
1,1,2-Trichloroethane		U	U	UD	UD	U	10
Benzene		U	U	UD	UD	U	10
cis-1,3-Dichloropropene		U	U	UD	UD	U	10
2-Chloroethylvinylether		U	U	UD	UD	U	10
Bromoform		U	U	UD	UD	U	10
4-Methyl-2-Pentanone		U	U	UD	UD	U	100
2-Hexanone		U	U	UD	UD	U	100
Tetrachloroethylene		U	U	UD	UD	U	10
1,1,2,2-Tetrachloroethane		U	U	UD	UD	U	10
Toluene		U	U	UD	UD	U	10
Chlorobenzene		U	U	UD	UD	U	10
Ethylbenzene		U	U	58	UD	U	10
Styrene		U	U	UD	UD	U	10
Total Xylenes		U	U	430	74,000	U	30
DATE ANALYZED		08/22/94	08/23/94	08/22/94	08/22/94	08/24/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weights

SOIL
Method: 8270

Analyte	Dilution Factor (DF)	1	1	1	1	1	Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0823	SS0823	SS0823	SS0823	SS0823	
	Client ID	FR-100	FR-101	FR-102	FR-103	FR-104	
	Lab ID	941622 001	941622 002	941622 003	941622 004	941622 005	
Phenol		U	U	U	U	U	330
Bis (2-Chloroethyl) ether		U	U	U	U	U	330
2-Chlorophenol		U	U	U	U	U	330
1,3-Dichlorobenzene		U	U	U	U	U	330
1,4-Dichlorobenzene		U	U	U	U	U	330
Benzyl Alcohol		U	U	U	U	U	330
1,2-Dichlorobenzene		U	U	U	U	U	330
2-Methylphenol		U	U	U	U	U	330
bis (2-Chloroisopropyl) ether		U	U	U	U	U	330
4-Methylphenol		U	U	U	U	U	330
N-Nitroso-di-n-propylamine		U	U	U	U	U	330
Hexachloroethane		U	U	U	U	U	330
Nitrobenzene		U	U	U	U	U	330
Isophorone		U	U	U	U	U	330
2-Nitrophenol		U	U	U	U	U	330
2,4-Dimethylphenol		U	U	U	U	U	330
Benzoic Acid		U	U	U	U	U	1700
bis (2-Chloroethoxy) methane		U	U	U	U	U	330
2,4-Dichlorophenol		U	U	U	U	U	330
1,2,4-Trichlorobenzene		U	U	U	U	U	330
Naphthalene		U	U	U	1300	U	330
4 Chloroaniline		U	U	U	U	U	330
Hexachlorobutadiene		U	U	U	U	U	330
4 Chloro-3-methylphenol		U	U	U	U	U	660
2-Methylnaphthalene		U	U	U	560	U	330
Hexachlorocyclopentadiene		U	U	U	U	U	330
2,4,6-Trichlorophenol		U	U	U	U	U	330
2,4,5-Trichlorophenol		U	U	U	U	U	1700
2-Chloronaphthalene		U	U	U	U	U	330
2-Nitroaniline		U	U	U	U	U	1700
Dimethyphthalate		U	U	U	U	U	330
Acenaphthylene		U	U	U	U	U	330
2,6-Dinitrotoluene		U	U	U	U	U	330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquanon Company

Client: [illegible]
IEA Job#: CH941622
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg Dry Weight

SOIL
Method: 8270

Analyte / Lab ID	Method Blank	Client ID	Dilution Factor (DF)	Lower Limits Quantitation (LLD) with no Dilution*
	SS0823	FR-100	1	
		941622 001		
3-Nitroaniline	U	U		1700
Acenaphthene	U	U		330
2,4-Dinitrophenol	U	U		1700
4-Nitrophenol	U	U		1700
Dibenzofuran	U	U		330
2,4-Dinitrotoluene	U	U		330
Diethylphthalate	U	U		330
4-Chlorophenyl phenyl ether	U	U		330
Fluorene	U	U		330
4-Nitroaniline	U	U		1700
4,6-Dinitro-2-methylphenol	U	U		1700
N-Nitrosodiphenylamine (1)	U	U		330
4-Bromophenyl phenyl ether	U	U		330
Hexachlorobenzene	U	U		330
Pentachlorophenol	U	U		1700
Phenanthrene	440	U		330
Anthracene	U	U		330
Di-n-butylphthalate	U	U		330
Fluoranthene	620	U		330
Pyrene	530	U		330
Butyl benzyl phthalate	U	U		330
3,3'-Dichlorobenzidine	U	U		2000
Benzo (a) anthracene	U	U		330
Chrysene	U	U		330
bis (2-ethylhexyl) phthalate	U	U		330
Di-n-octylphthalate	U	U		330
Benzo (b) fluoranthene	U	U		330
Benzo (k) fluoranthene	U	U		330
Benzo (a) pyrene	U	U		330
Indeno (1,2,3-cd) pyrene	U	U		330
Dibenz (a,h) anthracene	U	U		330
Benzo (g,h,i) perylene	U	U		330
Date Extracted	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/23/94		

Analyte / Lab ID	Method Blank	Client ID	Dilution Factor (DF)	Lower Limits Quantitation (LLD) with no Dilution*
	SS0823	FR-101	1	
		941622 002		
3-Nitroaniline	U	U		1700
Acenaphthene	U	U		330
2,4-Dinitrophenol	U	U		1700
4-Nitrophenol	U	U		1700
Dibenzofuran	U	U		330
2,4-Dinitrotoluene	U	U		330
Diethylphthalate	U	U		330
4-Chlorophenyl phenyl ether	U	U		330
Fluorene	U	U		330
4-Nitroaniline	U	U		1700
4,6-Dinitro-2-methylphenol	U	U		1700
N-Nitrosodiphenylamine (1)	U	U		330
4-Bromophenyl phenyl ether	U	U		330
Hexachlorobenzene	U	U		330
Pentachlorophenol	U	U		1700
Phenanthrene	U	U		330
Anthracene	U	U		330
Di-n-butylphthalate	U	U		330
Fluoranthene	U	U		330
Pyrene	U	U		330
Butyl benzyl phthalate	U	U		330
3,3'-Dichlorobenzidine	U	U		2000
Benzo (a) anthracene	U	U		330
Chrysene	U	U		330
bis (2-ethylhexyl) phthalate	U	U		330
Di-n-octylphthalate	U	U		330
Benzo (b) fluoranthene	U	U		330
Benzo (k) fluoranthene	U	U		330
Benzo (a) pyrene	U	U		330
Indeno (1,2,3-cd) pyrene	U	U		330
Dibenz (a,h) anthracene	U	U		330
Benzo (g,h,i) perylene	U	U		330
Date Extracted	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/23/94		

Analyte / Lab ID	Method Blank	Client ID	Dilution Factor (DF)	Lower Limits Quantitation (LLD) with no Dilution*
	SS0823	FR-102	1	
		941622 003		
3-Nitroaniline	U	U		1700
Acenaphthene	U	U		330
2,4-Dinitrophenol	U	U		1700
4-Nitrophenol	U	U		1700
Dibenzofuran	U	U		330
2,4-Dinitrotoluene	U	U		330
Diethylphthalate	U	U		330
4-Chlorophenyl phenyl ether	U	U		330
Fluorene	U	U		330
4-Nitroaniline	U	U		1700
4,6-Dinitro-2-methylphenol	U	U		1700
N-Nitrosodiphenylamine (1)	U	U		330
4-Bromophenyl phenyl ether	U	U		330
Hexachlorobenzene	U	U		330
Pentachlorophenol	U	U		1700
Phenanthrene	U	U		330
Anthracene	U	U		330
Di-n-butylphthalate	U	U		330
Fluoranthene	U	U		330
Pyrene	U	U		330
Butyl benzyl phthalate	U	U		330
3,3'-Dichlorobenzidine	U	U		2000
Benzo (a) anthracene	U	U		330
Chrysene	U	U		330
bis (2-ethylhexyl) phthalate	U	U		330
Di-n-octylphthalate	U	U		330
Benzo (b) fluoranthene	U	U		330
Benzo (k) fluoranthene	U	U		330
Benzo (a) pyrene	U	U		330
Indeno (1,2,3-cd) pyrene	U	U		330
Dibenz (a,h) anthracene	U	U		330
Benzo (g,h,i) perylene	U	U		330
Date Extracted	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/24/94		

Analyte / Lab ID	Method Blank	Client ID	Dilution Factor (DF)	Lower Limits Quantitation (LLD) with no Dilution*
	SS0823	FR-103	1	
		941622 004		
3-Nitroaniline	U	U		1700
Acenaphthene	U	U		330
2,4-Dinitrophenol	U	U		1700
4-Nitrophenol	U	U		1700
Dibenzofuran	U	U		330
2,4-Dinitrotoluene	U	U		330
Diethylphthalate	U	U		330
4-Chlorophenyl phenyl ether	U	U		330
Fluorene	U	U		330
4-Nitroaniline	U	U		1700
4,6-Dinitro-2-methylphenol	U	U		1700
N-Nitrosodiphenylamine (1)	U	U		330
4-Bromophenyl phenyl ether	U	U		330
Hexachlorobenzene	U	U		330
Pentachlorophenol	U	U		1700
Phenanthrene	U	U		330
Anthracene	U	U		330
Di-n-butylphthalate	690	U		330
Fluoranthene	U	U		330
Pyrene	380	U		330
Butyl benzyl phthalate	U	U		330
3,3'-Dichlorobenzidine	U	U		2000
Benzo (a) anthracene	U	U		330
Chrysene	U	U		330
bis (2-ethylhexyl) phthalate	U	U		330
Di-n-octylphthalate	U	U		330
Benzo (b) fluoranthene	U	U		330
Benzo (k) fluoranthene	U	U		330
Benzo (a) pyrene	U	U		330
Indeno (1,2,3-cd) pyrene	U	U		330
Dibenz (a,h) anthracene	U	U		330
Benzo (g,h,i) perylene	U	U		330
Date Extracted	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/24/94		

Analyte / Lab ID	Method Blank	Client ID	Dilution Factor (DF)	Lower Limits Quantitation (LLD) with no Dilution*
	SS0823	FR-1-4	1	
		941622 005		
3-Nitroaniline	U	U		1700
Acenaphthene	U	U		330
2,4-Dinitrophenol	U	U		1700
4-Nitrophenol	U	U		1700
Dibenzofuran	U	U		330
2,4-Dinitrotoluene	U	U		330
Diethylphthalate	U	U		330
4-Chlorophenyl phenyl ether	U	U		330
Fluorene	U	U		330
4-Nitroaniline	U	U		1700
4,6-Dinitro-2-methylphenol	U	U		1700
N-Nitrosodiphenylamine (1)	U	U		330
4-Bromophenyl phenyl ether	U	U		330
Hexachlorobenzene	U	U		330
Pentachlorophenol	U	U		1700
Phenanthrene	U	U		330
Anthracene	U	U		330
Di-n-butylphthalate	U	U		330
Fluoranthene	U	U		330
Pyrene	U	U		330
Butyl benzyl phthalate	U	U		330
3,3'-Dichlorobenzidine	U	U		2000
Benzo (a) anthracene	U	U		330
Chrysene	U	U		330
bis (2-ethylhexyl) phthalate	U	U		330
Di-n-octylphthalate	U	U		330
Benzo (b) fluoranthene	U	U		330
Benzo (k) fluoranthene	U	U		330
Benzo (a) pyrene	U	U		330
Indeno (1,2,3-cd) pyrene	U	U		330
Dibenz (a,h) anthracene	U	U		330
Benzo (g,h,i) perylene	U	U		330
Date Extracted	08/23/94	08/23/94		
Date Analyzed	08/24/94	08/25/94		

(1) – Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

CLIENT: CRA-MF
PROJECT NUMBER: 6790
CLIENT ID: S-08294-FR-103
LAB NUMBER: 94/622R004

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 10-3-94 DATE EXTRACT: 10-3-94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS					
D004	Arsenic		5.0	0.1		
D005	Barium		100.0	0.05		
D006	Cadmium 6010	10-3-94	1.0	0.005	<0.005	
D007	Chromium		5.0	0.01		
D008	Lead 6010	10-3-94	5.0	0.05	<0.050	
D009	Mercury		0.2	0.0002		
D010	Selenium		1.0	0.1		
D011	Silver		5.0	0.01		

P = preliminary results

Met0200

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941622
Project #: 5770

ANALYTE LIST

Matrix: Soil

		S-081094	S-081094	S-081294	S-081294	S-081294		
	Client ID	FR-100	FR-101	FR-102	FR-103	FR-104		
	Lab ID	941622 001	941622 002	941622 003	941622 004	941622 005	Date Analyzed	PQL
Analyte	Method							
Total Solids	160.3	90	90	88	86	89	08/19/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client. ERA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307
EPA TARGET COMPOUND LIST (TCL)
VOLATILE COMPOUNDS
ug / kg dry wght

Matrix: SOIL
Method: 8240

Analyte	Dilution Factor (DF)	1	1	1	5	5	PQL
	Method Blank	VS 082594	VS 082694	VS 082594	VS 082694	VS 082594	
	Client ID	Method Blank	Method Blank	FR-111	FR-112	FR-113	
	Lab ID	VS082594	VS082694	941661 001	941661 002	941661 003	
Trans-1,2-Dichloroethene		U	U	U	UD	UD	10
Chloromethane		U	U	U	UD	UD	10
Bromomethane		U	U	U	UD	UD	10
Vinyl Chloride		U	U	U	UD	UD	10
Chloroethane		U	U	U	UD	UD	10
Methylene Chloride		U	U	66	UD	UD	10
Acetone		U	U	U	UD	UD	100
Carbon Disulfide		U	U	U	UD	UD	100
1,1-Dichloroethene		U	U	U	UD	UD	10
1,1-Dichloroethane		U	U	U	UD	UD	10
cis-1,2-Dichloroethene		U	U	U	380	UD	10
Chloroform		U	U	U	UD	UD	10
1,2-Dichloroethane		U	U	U	UD	UD	10
2-Butanone		U	U	U	UD	UD	100
1,1 1-Trichlorethane		U	U	U	UD	UD	10
Carbon Tetrachloride		U	U	U	UD	UD	10
Vinyl Acetate		U	U	U	UD	UD	10
Bromodichloromethane		U	U	U	UD	UD	10
1,2-Dichloropropane		U	U	U	UD	UD	10
Trans-1,3-dichloropropene		U	U	U	UD	UD	10
Trichloroethylene		U	U	U	UD	UD	10
Dibromochloromethane		U	U	U	UD	UD	10
1,1,2-Trichloroethane		U	U	U	UD	UD	10
Benzene		U	U	U	UD	UD	10
cis-1,3-Dichloropropene		U	U	U	UD	UD	10
2-Chloroethylvinylether		U	U	U	UD	UD	10
Bromoform		U	U	U	UD	UD	100
4-Methyl-2-Pentanone		U	U	U	UD	UD	100
2-Hexanone		U	U	U	UD	UD	10
Tetrachloroethylene		U	U	U	UD	UD	10
1,1,2,2-Tetrachloroethane		U	U	U	15000	UD	10
Toluene		U	U	U	UD	UD	10
Chlorobenzene		U	U	70	10000	74	10
Ethylbenzene		U	U	U	UD	UD	10
Styrene		U	U	990	46000	1500	30
Total Xylenes							
DATE ANALYZED		08/25/94	08/26/94	08/25/94	08/26/94	08/25/94	

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CHA-MI
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / kg dry wght

Matrix: SOIL
Method: 8270

Analyte	Dilution Factor (DF)	Method Blank	Client ID	Lab ID			PQL
	1	SS0824	FR-111	941661 001	1	SS0824	330
Phenol	U	U	U	U	U	U	330
Bis (2-Chloroethyl) ether	U	U	U	U	U	U	330
2-Chlorophenol	U	U	U	U	U	U	330
1,3-Dichlorobenzene	U	U	U	U	U	U	330
1,4-Dichlorobenzene	U	U	U	U	U	U	330
Benzyl Alcohol	U	U	U	U	U	U	330
1,2-Dichlorobenzene	U	U	U	U	U	U	330
2-Methylphenol	U	U	U	U	U	U	330
bis (2-Chloroisopropyl) ether	U	U	U	U	U	U	330
4-Methylphenol	U	U	U	U	U	U	330
N-Nitroso-di-n-propylamine	U	U	U	U	U	U	330
Hexachloroethane	U	U	U	U	U	U	330
Nitrobenzene	U	U	U	U	U	U	330
Isophorone	U	U	U	U	U	U	330
2-Nitrophenol	U	U	U	U	U	U	330
2,4-Dimethylphenol	U	U	U	U	U	U	1600
Benzoic Acid	U	U	U	U	U	U	330
bis (2-Chloroethoxy) methane	U	U	U	U	U	U	330
2,4-Dichlorophenol	U	U	U	U	U	U	330
1,2,4-Trichlorobenzene	U	U	U	U	U	U	330
Naphthalene	U	U	U	U	U	U	330
4 Chloroaniline	U	U	U	U	U	U	660
Hexachlorobutadiene	U	U	U	U	U	U	330
4 Chloro-3-methylphenol	U	U	U	U	U	U	330
2-Methylnaphthalene	U	U	U	U	U	U	1600
Hexachlorocyclopentadiene	U	U	U	U	U	U	330
2,4,6-Trichlorophenol	U	U	U	U	U	U	1600
2,4,5-Trichlorophenol	U	U	U	U	U	U	330
2-Chloronapthalene	U	U	U	U	U	U	330
2-Nitroaniline	U	U	U	U	U	U	330
Dimethylphthalate	U	U	U	U	U	U	330
Acenaphthylene	U	U	U	U	U	U	330
2,6-Dinitrotoluene	U	U	U	U	U	U	

PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: C.A-MI
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
BASE NEUTRAL ACIDS
ug / kg dry wght

Matrix: SOIL
Method: 8270

Analyte	Lab ID	Dilution Factor (DF)	Method Blank	Client ID	Lab ID	PQL
		1	SS0824	FR-111	941661 001	
		1	SS0824	FR-113	941661 003	
		1	SS0824	FR-114	941661 004	
		1	SS0824	Method Blank	SS0824	
3-Nitroaniline			U	U	U	U	1600
Acenaphthene			U	U	U	U	330
2,4-Dinitrophenol			U	U	U	U	1600
4-Nitrophenol			U	U	U	U	1600
Dibenzofuran			U	U	U	U	330
2,4-Dinitrotoluene			U	U	U	U	330
Diethylphthalate			U	U	U	U	330
4-Chlorophenyl phenyl ether			U	U	U	U	330
Fluorene			U	U	U	U	330
4-Nitroaniline			U	U	U	U	1600
4,6-Dinitro-2-methylphenol			U	U	U	U	1600
N-Nitrosodiphenylamine (1)			U	U	U	U	330
4-Bromophenyl phenyl ether			U	U	U	U	330
Hexachlorobenzene			U	U	U	U	330
Pentachlorophenol			U	U	U	U	1600
Phenanthrene			540	U	U	U	330
Anthracene			U	U	U	U	330
Di-n-butylphthalate			U	U	U	U	330
Fluoranthene			1100	U	U	U	330
Pyrene			1400	U	U	U	330
Butyl benzyl phthalate			U	U	U	U	330
3,3'-Dichlorobenzidine			U	U	U	U	660
Benzo (a) anthracene			850	U	U	U	330
Chrysene			1200	U	U	U	330
bis (2-ethylhexyl) phthalate			U	U	U	U	330
Di-n-octylphthalate			U	U	U	U	330
Benzo (b) fluoranthene			1400	U	U	U	330
Benzo (k) fluoranthene			470	U	U	U	330
Benzo (a) pyrene			640	U	U	U	330
Indeno (1,2,3-cd) pyrene			620	U	U	U	330
Dibenz (a,h) anthracene			U	U	U	U	330
Benzo (g,h,i) perylene			890	U	U	U	330
Date Extracted			08/24/94	08/24/94	08/24/94	08/24/94	
Date Analyzed			08/28/94	08/26/94	08/26/94	08/26/94	

(1) - Cannot be separated from Diphenylamine
PQL = Practical Quantitation Limit
To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
PESTICIDES / PCB'S
ug/kg Dry Weight

Matrix: SOIL
Method: 8080

Dilution Factor (DF)	1	1	1			PQL
Method Blank	PS0824	PS0824	PS0824			
Client ID	FR-111	FR-112	METHOD BLANK			
Lab ID	941661 001	941661 002	PS0824			
Analyte						
alpha-BHC	U	U	U			1.7
beta-BHC	U	U	U			1.7
delta-BHC	U	U	U			1.7
gamma-BHC (Lindane)	U	U	U			1.7
Heptachlor	U	U	U			1.7
Aldrin	U	U	U			1.7
Heptachlor epoxide	U	U	U			1.7
Endosulfan I	U	U	U			3.3
Dieldrin	U	U	U			3.3
4,4'-DDE	U	U	U			3.3
Endrin	U	U	U			3.3
Endosulfan II	U	U	U			3.3
4,4'-DDD	U	U	U			3.3
Endosulfan sulfate	U	U	U			3.3
4,4'-DDT	U	U	U			3.3
Methoxyclor	U	U	U			3.3
Endrin Ketone	U	U	U			3.3
alpha-Chlordane	U	U	U			1.7
gamma-Chlordane	U	U	U			1.7
Toxaphene	U	U	U			170
Aroclor - 1016	U	U	U			80
Aroclor - 1221	U	U	U			80
Aroclor - 1232	U	U	U			80
Aroclor - 1242	U	U	U			80
Aroclor - 1248	U	U	U			80
Aroclor - 1254	U	U	U			160
Aroclor - 1260	U	U	U			160
Date Extracted	08/24/94	08/24/94	08/24/94			
Date Analyzed	08/26/94	08/26/94	08/25/94			

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

Analyte	Client ID / Lab ID	S-081794 FR-111 941661 001	S-081794 FR-112 941661 002				PQL
Aluminum - 6010		4100	5100				2.5
Antimony - 7041		37	0.14				0.12
Arsenic - 7060		8.9	6.6				0.1
Barium - 6010		450	33				1.2
Beryllium - 6010		0.18	0.45				0.12
Cadmium - 7131		18*	0.40				0.02
Calcium - 6010		27000	64000				5
Chromium - 6010		55	10				0.25
Cobalt - 6010		9.1	6.6				1.2
Copper - 6010		110	13				0.6
Iron - 6010		11000	11000				1.2
Lead - 7421		1100*	14				0.15
Magnesium - 6010		12000	18000				5
Manganese - 6010		200	280				0.38
Mercury - 7471		0.019	<0.011				0.02
Nickel - 6010		43	13				0.75
Potassium - 6010		520	790				25
Selenium - 7741		2.0	<2.4				2.0
Silver - 7761		0.29	0.043				0.03
Sodium - 6010		120	93				5
Thallium - 7841		<0.92	<0.78				1.0
Vanadium - 6010		38	13				1.2
Zinc - 6010		480	39				0.5

PQL = Practical Quantitation Limit, varies with sample weight and total solids

Date Analyzed: ICP Metals 08/26/94
Selenium 08/26/94
Arsenic 08/26/94
Lead 08/30/94
Mercury 08/26/94
Thallium 08/30/94
Cadmium 08/25/94
Silver 08/25/94
Antimony 08/29/94

*Analyzed by ICP

CLIENT: CRA-MI
PROJECT NUMBER: 5770
CLIENT ID: 508794-FR-111
LAB NUMBER: 94661000 1

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 10-3-94 DATE EXTRACT: 10-3-94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS					
D004	Arsenic	~~10-3-94~~ OK	5.0	0.1		
D005	Barium		100.0	0.05		
D006	Cadmium 6010	10-3-94	1.0	0.005	<0.005	
D007	Chromium		5.0	0.01		
D008	Lead 6010	10-3-94	5.0	0.05	<0.050	
D009	Mercury		0.2	0.0002		
D010	Selenium		1.0	0.1		
D011	Silver		5.0	0.01		

P= Preliminary results

Met 0200

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307 COMPOUND LIST
BASE NEUTRAL ACIDS
ug/kg Dry Weight

SOIL
Method: 8270

Analyte	Dilution Factor (DF)	1	1				Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SS0829	SS0829				
	Client ID	FR-112	METHOD BLANK				
	Lab ID	941661 002	SS0829				
Phenol		U	U				330
Bis (2-Chloroethyl) ether		U	U				330
2-Chlorophenol		U	U				330
1,3-Dichlorobenzene		U	U				330
1,4-Dichlorobenzene		U	U				330
Benzyl Alcohol		U	U				330
1,2-Dichlorobenzene		U	U				330
2-Methylphenol		U	U				330
bis (2-Chloroisopropyl) ether		U	U				330
4-Methylphenol		U	U				330
N-Nitroso-di-n-propylamine		U	U				330
Hexachloroethane		U	U				330
Nitrobenzene		U	U				330
Isophorone		U	U				330
2-Nitrophenol		U	U				330
2,4-Dimethylphenol		U	U				330
Benzoic Acid		U	U				1700
bis (2-Chloroethoxy) methane		U	U				330
2,4-Dichlorophenol		U	U				330
1,2,4-Trichlorobenzene		U	U				330
Naphthalene		800	U				330
4 Chloroaniline		U	U				330
Hexachlorobutadiene		U	U				330
4 Chloro-3-methylphenol		U	U				660
2-Methylnaphthalene		630	U				330
Hexachlorocyclopentadiene		U	U				330
2,4,6-Trichlorophenol		U	U				330
2,4,5-Trichlorophenol		U	U				1700
2-Chloronaphthalene		U	U				330
2-Nitroaniline		U	U				1700
Dimethyphthalate		U	U				330
Acenaphthylene		U	U				330
2,6-Dinitrotoluene		U	U				330

* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: RA-MI
IEA Job#: CH941661
Project #: 5770

MICHIGAN ACT 307 COMPOUND
BASE NEUTRAL ACIDS
ug/kg dry wght

Method: SOIL 8270

Analyte	Dilution Factor (DF)	1	1				Lower Limits Quantitation (LLD) with no Dilution*
	Method Blank	SSD0829	SS0829				
	Client ID	FR-112	METHOD BLANK				
	Lab ID	941661 002	SS0829				
3-Nitroaniline		U	U				1700
Acenaphthene		U	U				330
2,4-Dinitrophenol		U	U				1700
4-Nitrophenol		U	U				1700
Dibenzofuran		U	U				330
2,4-Dinitrotoluene		U	U				330
Diethylphthalate		U	U				330
4-Chlorophenyl phenyl ether		U	U				330
Fluorene		U	U				330
4-Nitroaniline		U	U				1700
4,6-Dinitro-2-methylphenol		U	U				1700
N-Nitrosodiphenylamine (1)		U	U				330
4-Bromophenyl phenyl ether		U	U				330
Hexachlorobenzene		U	U				330
Pentachlorophenol		U	U				1700
Phenanthrene		U	U				330
Anthracene		U	U				330
Di-n-butylphthalate		1300	U				330
Fluoranthene		U	U				330
Pyrene		U	U				330
Butyl benzyl phthalate		U	U				330
3,3'-Dichlorobenzidine		U	U				2000
Benzo (a) anthracene		U	U				330
Chrysene		U	U				330
bis (2-ethylhexyl) phthalate		410	U				330
Di-n-octylphthalate		U	U				330
Benzo (b) fluoranthene		U	U				330
Benzo (k) fluoranthene		U	U				330
Benzo (a) pyrene		U	U				330
Indeno (1,2,3-cd) pyrene		U	U				330
Dibenz (a,h) anthracene		U	U				330
Benzo (g,h,i) perylene		U	U				330
Date Extracted		08/29/94	08/29/94				
Date Analyzed		08/29/94	08/29/94				

(1) - Cannot be separated from Diphenylamine
* MDL (Minimum Detection Limit) = LLD x DF

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH941661
Project #: 5770

EPA TARGET COMPOUND LIST (TCL)
PESTICIDES / PCB'S
ug/kg Dry Weight

Matrix: SOIL
Method: 8080

Analyte	Lab ID	Dilution Factor (DF)	1	1			PQL
		Method Blank	PS0824	PS0824	PS0824		
		Client ID	FR-111	FR-112	METHOD BLANK		
			941661 001	941661 002	PS0824		
alpha-BHC			U	U	U		1.7
beta-BHC			U	U	U		1.7
delta-BHC			U	U	U		1.7
gamma-BHC (Lindane)			U	U	U		1.7
Heptachlor			U	U	U		1.7
Aldrin			U	U	U		1.7
Heptachlor epoxide			U	U	U		1.7
Endosulfan I			U	U	U		3.3
Dieldrin			U	U	U		3.3
4,4'-DDE			U	U	U		3.3
Endrin			U	U	U		3.3
Endosulfan II			U	U	U		3.3
4,4'-DDD			U	U	U		3.3
Endosulfan sulfate			U	U	U		3.3
4,4'-DDT			U	U	U		3.3
Methoxyclor			U	U	U		3.3
Endrin Ketone			U	U	U		3.3
alpha-Chlordane			U	U	U		1.7
gamma-Chlordane			U	U	U		1.7
Toxaphene			U	U	U		170
Aroclor - 1016			U	U	U		80
Aroclor - 1221			U	U	U		80
Aroclor - 1232			U	U	U		80
Aroclor - 1242			U	U	U		80
Aroclor - 1248			U	U	U		80
Aroclor - 1254			U	U	U		160
Aroclor - 1260			U	U	U		160
Date Extracted			08/24/94	08/24/94	08/24/94		
Date Analyzed			08/26/94	08/26/94	08/25/94		

PQL = Practical Quantitation Limit

To obtain sample-specific quantitation limit, multiply the PQL by the Dilution Factor.

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941661
Project #: 5770

TARGET ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

Analyte	Client ID / Lab ID	S-081794 FR-111 941661 001	S-081794 FR-112 941661 002				PQL
Aluminum – 6010		4100	5100				2.5
Antimony – 7041		37	0.14				0.12
Arsenic – 7060		8.9	6.6				0.1
Barium – 6010		450	33				1.2
Beryllium – 6010		0.18	0.45				0.12
Cadmium – 7131		18*	0.40				0.02
Calcium – 6010		27000	64000				5
Chromium – 6010		55	10				0.25
Cobalt – 6010		9.1	6.6				1.2
Copper – 6010		110	13				0.6
Iron – 6010		11000	11000				1.2
Lead – 7421		1100*	14				0.15
Magnesium – 6010		12000	18000				5
Manganese – 6010		200	280				0.38
Mercury – 7471		0.019	<0.011				0.02
Nickel – 6010		48	13				0.75
Potassium – 6010		520	790				25
Selenium – 7741		2.0	<2.4				2.0
Silver – 7761		0.29	0.043				0.03
Sodium – 6010		120	93				5
Thallium – 7841		<0.92	<0.78				1.0
Vanadium – 6010		38	13				1.2
Zinc – 6010		480	39				0.5

PQL = Practical Quantitation Limit, varies with sample weight and total solids

Date Analyzed: ICP Metals 08/26/94
Selenium 08/26/94
Arsenic 08/26/94
Lead 08/30/94
Mercury 08/26/94
Thallium 08/30/94
Cadmium 08/25/94
Silver 08/25/94
Antimony 08/29/94

*Analyzed by ICP

CLIENT: CRA-mJ
PROJECT NUMBER: 5770
CLIENT ID: 5081754-FR-1102
LAB NUMBER: 94/661R002

TCLP ANALYTICAL RESULTS

EPA WASTE #	CONTAMINANT/ DATE LEACH: 10-3-94 DATE EXTRACT: 10-3-94	DATE ANALY	REG LIMIT (mg/L)	DETECTION LIMIT (mg/L)	AMOUNT DETECTED (mg/L)	MTRX SPIK REC%
	METALS					
D004	Arsenic		5.0	0.1		
D005	Barium		100.0	0.05		
D006	Cadmium 6010	10-3-94	1.0	0.005	<0.005	
D007	Chromium		5.0	0.01		
D008	Lead 6010	10-3-94	5.0	0.05	<0.050	
D009	Mercury		0.2	0.0002		
D010	Selenium		1.0	0.1		
D011	Silver		5.0	0.01		

P= Preliminary results

Met 0200

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH941661
Project #: 5770

ANALYTE LIST

Matrix: Soil

	Client ID	S-081794 FR-111	S-081794 FR-112	S-081794 FR-113	S-081794 FR-114		Date Analyzed	PQL
	Lab ID	941661 001	941661 002	941661 003	941661 004			
Analyte	Method							
Total Solids	160.3	80	88	81	88		08/25/94	%

PQL = Practical Quantitation Limit

ATTACHMENT F

Analytical Data for "Burn Pile" Prior to Partial Excavation

TABLE 1

DATA SUMMARY

Date(s) Sampled	*Sampled By*	*Location(s) Sampled*	*Analysis Conducted*	*Results*	*Data Validation*
Unknown (possibly November 93)	GM	4-foot depth at unknown location by GM	TCLP Parameters	Lead had a leachate concentration of 11 mg/L. All other parameters below regulatory criteria	- Not provided - Schrader Laboratory used
March 94	GM	Boreholes A1-A5, B3-B4, C1-C5, D2-D4, E1-E5 by GM	Total Lead	Range 3.2 - 17,200 mg/L	- Not Provided - Schrader Laboratory used
April 94	GM/CRA	Boreholes F2-F5, G2-GF, H2-H4 by GM	Total Lead	Range 2.2 - 5,220 mg/L	- Not provided - Schrader Laboratory used
May 94	CRA	Borehole D3, split in four	TCLP Lead and Total Lead	*Sample* / *Total* / *TCLP* 1) 7,000 mg/L 0.91 mg/L 2) 5,200 mg/L 1.1 mg/L 3) 8,800 mg/L 4.6 mg/L 4) 6,000 mg/L 4.6 mg/L	- Data validated
May 94	GM/CRA	Boreholes E6, F6, G5-G6, I2-I6, J2-J6 by GM	Total Lead	Range 4.2 - 6,650 mg/L	- Not provided - Schrader Laboratory used
June 94	GM/CRA	Boreholes K4, K7, L3-L4, L7, M3-M4, M7, N3, N7 by GM	Total Lead	Range 3.5 - 3,480 mg/L	- Not provided - Schrader Laboratory used
June 6-10/94	CRA	Boreholes K2-K3, K5-K6, L2, L5-L6, M2, M5-M6, CRA N2-N3, N5-N6, O6, P6, R3, U1, X2N	Total Lead	Range 3.7 - 6,200 mg/L	- Validation in process - IEA Laboratory used by
June 14/94	CRA	Combined sample from several boreholes across CRA Burn-Pile, split in four	TCLP Lead and Total Lead	*Sample* / *Total* / *TCLP* 1) 150 mg/L 0.021 mg/L 2) 190 mg/L 0.031 mg/L 3) 110 mg/L 0.029 mg/L 4) 140 mg/L 0.022 mg/L	- Validation in process - IEA Laboratory used by

CRA
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174
(313) 942-0909

MEMO

TO: Rich Paaganen

REFERENCE NO: 5770

c.c.: Keith West
Glenn Turchan
Renato Pasqualoni

FROM: Frank W. Ring/4/Det.

DATE: November 29, 1994

RE: Disposal of Additional Soil
General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

This letter presents a Representative Sample Certification and the associated analytical data necessary for the disposal of approximately 20 cubic yards of soil from the "burn pile" area of the site indicated above.

Soil from the "burn pile" area was excavated and disposed by General Motors at the Eagle Valley Recycle and Disposal Facility in October 1994 (waste profile sheet code 251739). Upon completion of the excavation soil samples were collected from the floor and sidewalls of the excavation. One sidewall sample, S-101894-FR-011, indicated elevated levels of Benzo (a) anthrocene, Benzo (a) pyrene, and Benzo (b) flouranthene. Approximately 20 cubic yards of soil is to be excavated, from the area where sample S-101894-FR-011 was collected, and disposed of by General Motors at the Eagle Valley Recycle and Disposal Facility.

A Representative Sample Certification and the analytical results for sample S-101894-FR-011 are presented in Attachment A.

If you have any questions please contact Mr. Frank Ring at (313) 942-0909.

ATTACHMENT A

REPRESENTATIVE SAMPLE CERTIFICATION AND LABORATORY ANALYTICAL DATA FOR SAMPLE S-101894-FR-011

- REPRESENTATIVE SAMPLE CERTIFICATION -

1. Generator Name: General Motors Pontiac Central Mfg. Facility

2. Generator Location: 700 S. Blvd. Pontiac, Michigan

3. Profile Number: 251739

4. Print Sampler's Name: Frank W. Ring

5. Sample Date: 10/18/94

6. Sampler's Employer (if other than Generator):

   Conestoga-Rovers and Associates

The sampler's signature certifies that any sample submitted is representative of the waste described above pursuant to 40 CFR 261.20(c) or equivalent rules.

7. Sampler's Signature: Frank W. Ring

EARTH TECH
12549 Richfield Court
Livonia, MI 48150

FACSIMILE

FINAL

To: Lou Almeida
Company: CRA

From: Karen Corran
Location: Livonia, MI

Date: 11/1/94
Fax #: 319-725-1394

Ext #:
Sending From Fax #:
(313) 462-3911

Project #: 113802
Subject:

Comments:

If you do not receive 53 pages (including cover page), please call us as soon as possible @ (313) 462-3900

EARTH TECH

LABORATORY TESTS RESULTS
10/27/94

JOB NUMBER: 113602 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113602-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	10/19/94	TN
Acetone	ND	500	ug/kg			
Benzene	ND	30	ug/kg			
Bromodichloromethane	ND	30	ug/kg			
Bromoform	ND	30	ug/kg			
Bromomethane	ND	30	ug/kg			
2-Butanone	ND	500	ug/kg			
Carbon disulfide	ND	300	ug/kg			
Carbon tetrachloride	ND	30	ug/kg			
Chlorobenzene	ND	30	ug/kg			
Chloroethane	ND	30	ug/kg			
Chloroform	ND	30	ug/kg			
Chloromethane	ND	30	ug/kg			
Dibromochloromethane	ND	30	ug/kg			
1,1-Dichloroethane	ND	30	ug/kg			
1,2-Dichloroethane	ND	30	ug/kg			
1,1-Dichloroethene	ND	30	ug/kg			
trans-1,2-Dichloroethene	ND	30	ug/kg			
1,2-Dichloropropane	ND	30	ug/kg			
cis-1,3-Dichloropropene	ND	30	ug/kg			
trans-1,3-Dichloropropene	ND	30	ug/kg			
Ethylbenzene	410	30	ug/kg			
2-Hexanone	ND	500	ug/kg			
Methylene chloride	ND	30	ug/kg			
4-Methyl-2-pentanone	ND	300	ug/kg			
Styrene	ND	30	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	30	ug/kg			
Tetrachloroethene	ND	30	ug/kg			
Toluene	140	30	ug/kg			
1,1,1-Trichloroethane	ND	30	ug/kg			
1,1,2-Trichloroethene	ND	30	ug/kg			
Trichloroethene	ND	30	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	1700	90	ug/kg			
Vinyl acetate	ND	300	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	111	0	%	74-121 %		
Toluene-d8	97	0	%	81-117 %		
Dibromofluoromethane	97	0	%			
Date Analyzed:	10/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	10/21/94	GR
Acenaphthene	ND	330	ug/kg			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/27/94

JOB NUMBER: 113602 CUSTOMER: Gores/Loga Rovers & Associates SITE: Los Angeles

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113602-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMIT/SPECIFICATION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	810	330	ug/kg			
Benzidine	ND	5000	ug/kg			
Benzo(a)anthracene	2300	330	ug/kg			
Benzo(a)pyrene	1100	330	ug/kg			
Benzo(b)fluoranthene	2200	330	ug/kg			
Benzo(k)fluoranthene	*	330	ug/kg			
Benzoic Acid	ND	3300	ug/kg			
Benzo(ghi)perylene	660	330	ug/kg			
Benzyl Alcohol	ND	1300	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	1300	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	1200	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	2000	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	4800	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			
Hexachloroethane	ND	330	ug/kg			

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Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/27/94

JOB NUMBER: 113802 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Indeno (1,2,3-cd)pyrene	600	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	3100	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	3600	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	1700	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
Aluminum (Total)	6000	4.0	mg/kg	USEPA 6010	10/20/94	GR
Antimony (Total)	1.4	0.25	mg/kg	USEPA 7041	10/20/94	GR
Arsenic (Total)	5.9	0.1	mg/kg	USEPA 7060	10/20/94	GR
Barium (Total)	130	0.40	mg/kg	USEPA 6010	10/20/94	GR
Beryllium (Total)	0.39	0.20	mg/kg	USEPA 6010	10/20/94	GR
Cadmium (Total)	1.6	0.05	mg/kg	USEPA 7131	10/20/94	GR
Calcium (Total)	50000	10	mg/kg	USEPA 6010	10/20/94	GR
Chromium (Total)	33	1.6	mg/kg	USEPA 6010	10/20/94	GR
Cobalt (Total)	21	0.20	mg/kg	USEPA 7200	10/20/94	GR
Copper (Total)	55	0.60	mg/kg	USEPA 6010	10/20/94	GR
Iron (Total)	15000	2.0	mg/kg	USEPA 6010	10/20/94	GR

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Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
10/27/94

JOB NUMBER: 113802 CUSTOMER: Cowercoper Rovers & Associates ATTN: Lou Alexander

CLIENT I.D.....: Sample ID: S-101894-FR-011
DATE SAMPLED.....: 10/18/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 113802-0011
DATE RECEIVED....: 10/18/94
TIME RECEIVED....: 19:00
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	DETCN
Lead (Total)	250	1.0	mg/kg	USEPA 6010	10/20/94	GR
Magnesium (Total)	15000	10	mg/kg	USEPA 6010	10/21/94	GR
Manganese (Total)	250	0.20	mg/kg	USEPA 6010	10/21/94	GR
Mercury (Total)	<0.10	0.10	mg/kg	USEPA 7471	10/21/94	GR
Nickel (Total)	23	0.20	mg/kg	USEPA 6010	10/20/94	GR
Potassium (Total)	720	10	mg/kg	USEPA 6010	10/20/94	GR
Selenium (Total)	1.1	0.50	mg/kg	USEPA 7740	10/20/94	GR
Silver (Total)	0.31	0.20	mg/kg	USEPA 7761	10/21/94	GR
Sodium (Total)	110	10	mg/kg	USEPA 6010	10/20/94	
Thallium (Total)	<0.25	0.25	mg/kg	USEPA 7841	10/24/94	GR
Vanadium (Total)	17	2.0	mg/kg	USEPA 6010	10/21/94	GR
Zinc (Total)	220	1.0	mg/kg	USEPA 6010	10/20/94	GR
% Solids	89	0.01	%		10/20/94	TH

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APPENDIX J

DUCO STORES FUEL LINE STUDY AREA

DUCO STORES - FUEL LINE STUDY AREA

FINAL REPORT

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

JUNE 1994
REF. NO. 5770 (7)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding the fuel line associated with DUCO Stores (Study Area) at the GM Facility.

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for the DUCO Stores - Fuel Line is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the DUCO Stores - Fuel Line area with regards to the outstanding environmental issues identified in the W.W. Engineering and Science (WWES) Phase II Site Investigation Report dated June 19, 1993, and to present the results of additional investigations conducted to resolve outstanding issues.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area were the result of the operation of an underground storage tank (UST) fuel delivery system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g., final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmentally contaminated sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g., sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29)

and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This section presents a summary of available information from GM files regarding the former DUCO Stores - Fuel Line.

An underground distribution network for gasoline and fuel oil was installed in 1927 with the original plant buildings. The gasoline pipeline started at DUCO Stores (near Building 21) and terminated at a fuel dispenser located outside Building 11 at the west end of Building 27. The gasoline line passes under Buildings 21, 63, 37, 16, 12 and 11. A spur line leaves the main distribution line at Building 12 and passes under Buildings 9, 3 and 40, terminating at the north end of Building 40.

The fuel (gasoline and fuel oil) distribution networks are presented on Figure 1.3.

3.1 HISTORY OF DUCO STORES - FUEL LINE

A suspected gasoline release was discovered during site assessment activities performed by WWES in 1992.

WWES installed 12 soil borings and three monitoring wells in Building 11, in the north end of Building 12, and within Building 27. Samples were collected and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX) and lead (water samples only). The locations of the wells and soil borings are presented on Figure 1.3. Appendix A contains borehole stratigraphic descriptions for the soil borings and monitoring wells installed by WWES.

The results of the analytical work by WWES identified BTEX constituents at levels in excess of Type B soil cleanup levels for soil in five soil borings (22-4 through 22-8). These elevated concentrations were found in both a clay layer and underlying sand lens. The clay layer and sand lens occur approximately between 5 to 15 feet bgs. Analysis of perched water samples collected from three monitoring wells identified concentrations of

BTEX constituents and lead above Type B Drinking Water criteria, however these are not significant since the perched water zone is not an aquifer and is limited in extent. The analytical results from the WWES report are reproduced in Appendix B.

The DUCO Stores - Fuel Line has been out of service for approximately 30 years. Since the perched water has remained in the vicinity of the fuel line, WWES suggested that it may be trapped and immovable (e.g., within the original excavation for the fuel line). The extent of BTEX constituents and lead in the soil and groundwater were not, however, sufficiently defined to support this conclusion.

3.2 PAST REMEDIAL ACTIVITIES

No remedial activities are known to have occurred in this area or along the alignment of the fuel lines.

3.3 GEOLOGY

The geology in the area of the gasoline release (Building 11) was defined by the WWES soil borings. The building floor is underlain by 4 to 8 feet of engineered fill material (sand and clay) which is underlain by a clay layer which varies in thickness from 0 to 2.5 feet. The clay layer is underlain by a wet sand lens which varies in thickness from 3 to 8 feet. The sand varies from clean sand to sand containing some clay within this lens. The sand lens is underlain by clay till which, based on the CDM hydrogeologic investigation, extends to a minimum depth of approximately 120 feet bgs.

The extent of the sand lens to the north and west was not defined.

3.4 HYDROGEOLOGY

The hydrogeologic information available for this area is based upon the work performed by CDM.

Based on the presence of the clay till layer, which extends from the bottom of the sand lens to the 120-foot aquifer, the perched water in the sand lens is not considered to be in hydraulic contact with the 120-foot aquifer. The perched water table zone would not be considered to be a usable aquifer consistent with Act 307 due to its shallow depth and very low yield.

4.0 ADDITIONAL INVESTIGATIVE ACTIVITIES

In order to further define the extent of the sand lens in which evidence of a gasoline release was detected, seven boreholes were installed by CRA in the vicinity of the fuel line in January 1994.

One borehole was installed north of Building 11 in the parking lot area BHFL7-94, and three boreholes were installed surrounding the previous WWES boreholes in Building 11.

Three additional boreholes were installed by CRA along the alignment of the fuel line further to the south in order to assess the extent of possible, residual gasoline along the length of the fuel line. The locations of these boreholes are identified on Figure 4.1. Borehole stratigraphic logs are presented in Appendix C. Samples were collected from each borehole for chemical analysis for BTEX and lead. Analytical data, a data validation memorandum and chain-of-custody forms for the samples analyzed are presented in Appendix D.

As part of the redevelopment of the property, a storm sewer was installed through the study area, at a depth of approximately 20 feet, in March 1994. Based on WWES findings, the excavation should have intersected perched water. However, the excavation remained dry indicating that the perched water is minor in extent and/or seasonally dependent. In order to further confirm that perched water did not extend significantly, CRA installed three test excavations in the area. The findings of the test excavations are presented in the Test Pit Stratigraphy Logs in Appendix E.

Section 5.0 of this report provides an evaluation of the data obtained during the installation of additional boreholes and test pits.

5.0 EVALUATION OF RESULTS

5.1 GEOLOGY

Seven boreholes were installed by CRA along the alignment of the fuel line and in the area of soils as identified by WWES to contain BTEX compounds. The purpose of these boreholes was to further delineate the extent of residual gasoline identified by WWES, and to further define the surficial geology in the area of the fuel line.

Borehole logs for the seven boreholes completed by CRA are presented in Appendix C.

Boreholes BHFL3-94, BHFL4-94, BHFL5-94 and BHFL7-94 were completed in the area which contained residual gasoline identified by WWES. The geologic information obtained from the borings installed by CRA verified the information reported in WWES's borehole logs, which is summarized in Section 3.3 of this report.

Boreholes BHFL1-94, BHFL2-94 and BHFL6-94 were completed along the alignment of the fuel line to the south of Building 11, in the locations identified on Figure 4.1. The near surface geology at BHFL2-94 consisted of 6 inches of concrete at the surface underlain by approximately 5 feet of fill material, which is underlain by approximately 3 inches of concrete. Interbedded layers of clay, sand and gravel and silt extend approximately 10.5 feet below the second concrete layer to a depth of 16.5 feet bgs. A sand and gravel layer 2.2 feet thick (12.2 to 14.4 feet bgs) was found to contain perched groundwater. All other sand layers were found to be dry. Clay till was found to extend from 16.5 feet bgs to the end of the borehole at 24.0 feet bgs.

The near surface geology at BHFL1-94 consists of an 8-inch concrete slab at the surface underlain by a 3.3-foot layer of sand and gravel fill material. A second 3-inch thick, concrete slab was encountered at 4 feet bgs and was underlain by 5.3 feet of sand and gravel fill material. Native clay till underlies this fill layer and extends from 9.6 to 24.0 feet bgs (end of borehole)

with the exception of a layer of fine grained sand from 15 to 17.8 feet bgs. Groundwater was not encountered in this borehole.

The geology at BHFL6-94 consists of a 1.5-foot thick concrete pad at the surface underlain by a 2-foot thick sand and gravel fill layer and a 2.5-foot thick clay fill layer containing some sand and gravel. Below the fill layers, native clay till was found to extend from 6 to 24 feet bgs (end of the borehole). Groundwater was not encountered in this borehole.

Four test pits were excavated in the area in which the WWES monitoring wells had previously been installed. The locations of the test pits are presented on Figure 4.2. Test pit TP-3 was abandoned at a depth of 3.5 feet bgs as concrete was encountered.

The near surface geology at TP-1 consists of a 2.5-foot layer of sand fill material underlain by a 4-foot layer of grey clay and a 1.5-foot layer of peat. The peat layer is underlain by 5 feet of dry blue/grey clay. Sand underlies this clay and extended at least 3.5 feet to the bottom of the test pit at a depth of 16.5 feet bgs. No petroleum odors were detected in this test pit. There was no accumulation of groundwater in TP-1.

The near surface geology at TP-2 consists of a 4-foot layer of fill material (predominantly clay) underlain by a 10-foot moist sand seam and an 8-foot layer of moist grey clay. The clay layer is underlain by a 1.5-foot layer of peat and at least 1-foot of grey moist clay which extended to the end of the test pit at 16.0 feet bgs. Neither groundwater nor petroleum odors were encountered in TP-2.

TP-4 was completed to 16.0 feet bgs. The near surface geology at TP-4 consists of 9 inches of reinforced concrete underlain by 6.0 feet 3 inches of sand and clay fill (slightly moist). The fill material is underlain by a 1-foot layer of peat which is in turn underlain by a slightly moist sand layer. The sand layer extends from 8.0 feet bgs to the end of the test pit at 16.0 feet bgs. A slight petroleum odor was noted in the sand layer from 8.0 to 16.0 feet bgs, however, no groundwater was encountered.

5.2 ANALYTICAL RESULTS

DUCO Stores fuel line samples were analyzed for BTEX and lead. Table 5.1 presents the Type A and Type B criteria for soil. Table 5.2 summarizes the analytical results from CRA's additional investigative activities.

Lead was detected in all samples submitted for analysis however, all concentrations were below the Michigan Type A criteria for soil.

The perched water encountered in the Study Area is not an aquifer. Additionally, perched water zones at depths of less than 25 feet bgs may not be used for potable water supplies pursuant to Michigan Department of Public Health regulations. The first usable aquifer is located at a depth of 120 feet below grade. The soils between the surficial materials and the first aquifer at 120 feet, consist of very low permeability clay. Therefore, the reported concentrations should be compared to Michigan Type B direct contact values. The only exceedance of Michigan Type B direct contact values was for benzene in BHFL5-94 (10'-12' bgs) at a concentration or 18 mg/kg (compared to the Type B direct contact value which is 13 mg/kg). This isolated exceedance is considered to be excessive.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the information presented herein, the following conclusions may be made regarding the former DUCO Stores - Fuel Line Study Area:

- the fuel line was used to deliver gasoline from the DUCO Stores Tank area to a fuel dispenser located outside Building 11 at the west end of Building 27;

- the fuel line was abandoned approximately 30 years ago;

- investigative samples collected by WWES in the area of Building 11 identified concentrations of BTEX constituents in soil at levels below the Type B direct contact value;

- four boreholes installed in January 1994, in the area of the WWES investigation identified BTEX constituents, in all four boreholes at the 10 to 12-foot bgs interval at reported concentrations below Type B direct contact values;

- perched water was identified to be in a relatively thin zone at a shallow depth. Observations during the installation of the storm sewer main and test pits showed the shallow groundwater to be seasonal and miner in extent. This perched water zone would not be considered an aquifer due to its limited thickness, discontinuous nature and very low yield (pursuant to Act 307). In addition, MDPH regulations generally prohibit the development of water supplies from perched water zones identified at depths of less than 25 feet;

- since the first aquifer is protected by 120 feet of clay, Michigan Type B direct contact soil cleanup levels should be utilized to assess the level of BTEX constituents in the soils;

- three boreholes drilled in January 1994 along the alignment of the fuel line to the south of Building 11 did not identify any further areas of residual BTEX constituents in soil at levels of concern; and

- based on Type B direct contact values, the only exceedance was for benzene in BHFL5-94, 10-12 bgs at 18 mg/kg. The Type B direct contact value is 13 mg/kg for benzene and as such the exceedance is isolated and minor.

Based on the foregoing, no additional investigation or remediation is required or warranted within the Study Area.

7.0 REFERENCES

1. Phase II Site Investigation Report, W.W. Engineering & Science (WWES), June 1993

2. Enrolled Senate Bill No. 645, State of Michigan, October 1993

3. Enrolled Senate Bill No. 644, State of Michigan, October 1993

4. Enrolled House Bill No. 4783, State of Michigan, October 1993

5. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

6. MERA Operational Memorandum #8, Revision 2 - Type B Criteria, July 16, 1993

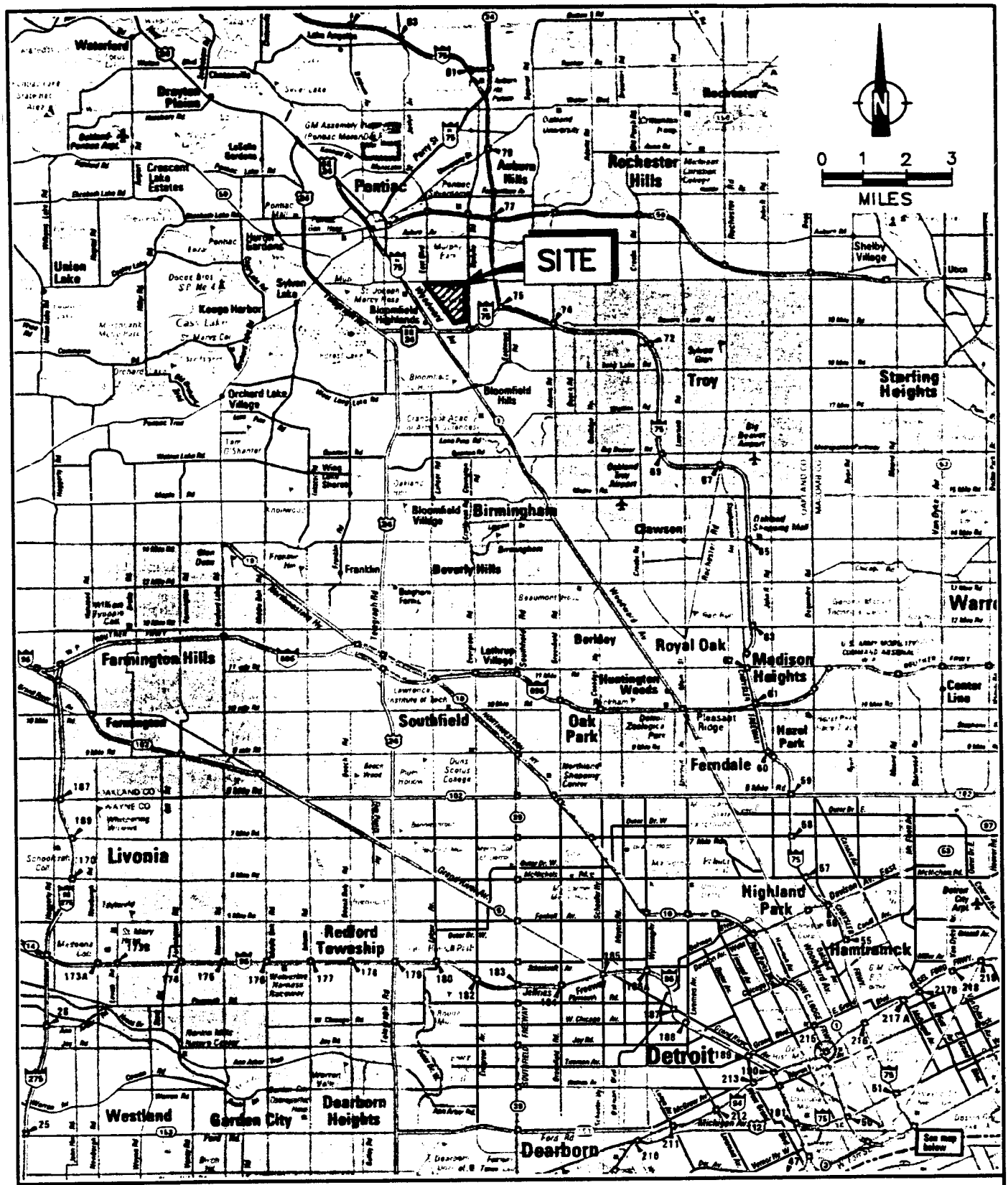
7. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

8. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

9. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

10. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

11. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



MICHIGAN

CRA

5770 (7) DEC 17/93 (W) REV.0

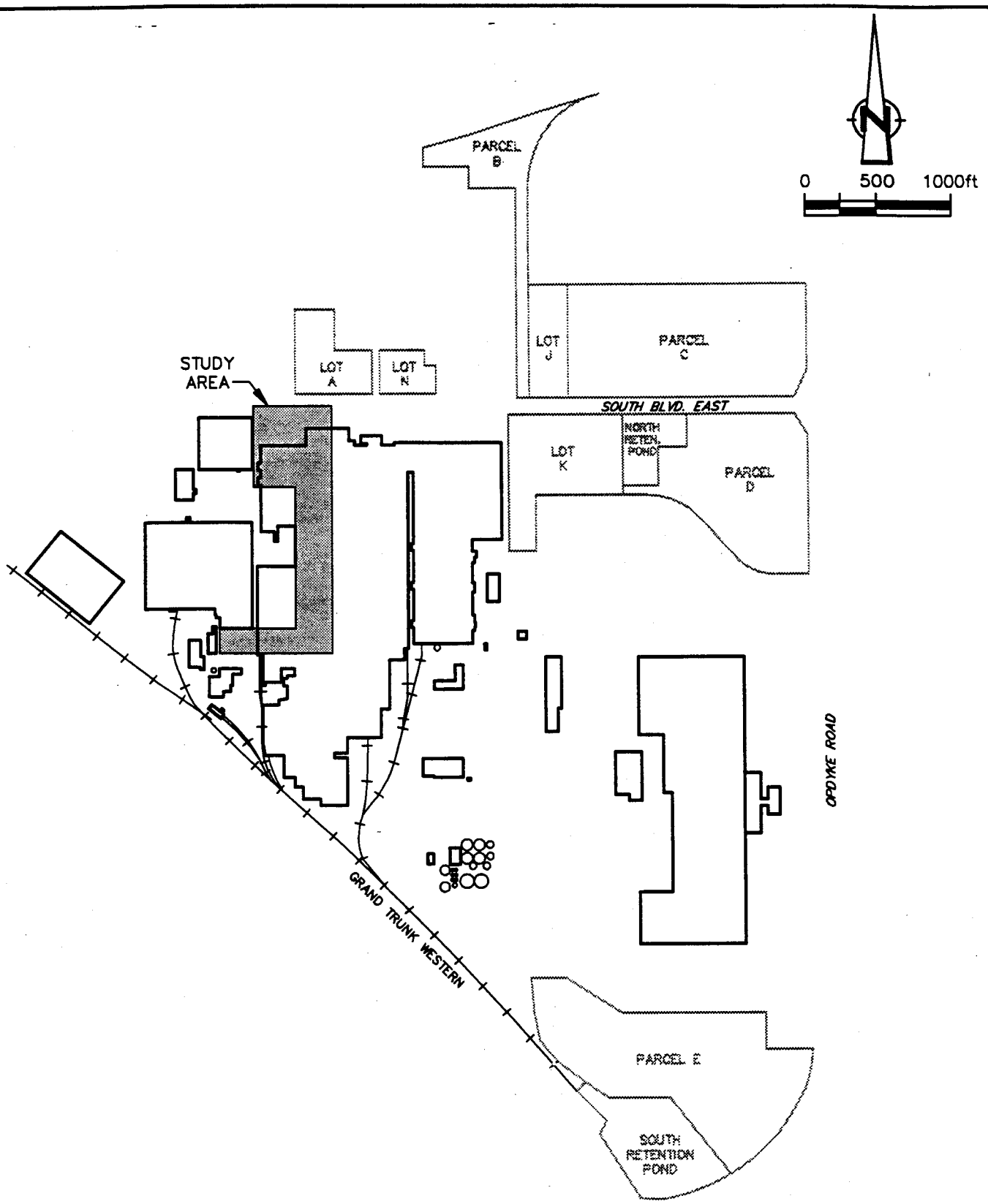


figure 1.2

SITE PLAN
DUCO STORES – FUEL LINE – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (7) JAN 27/94(W) REV.0 (P-14)

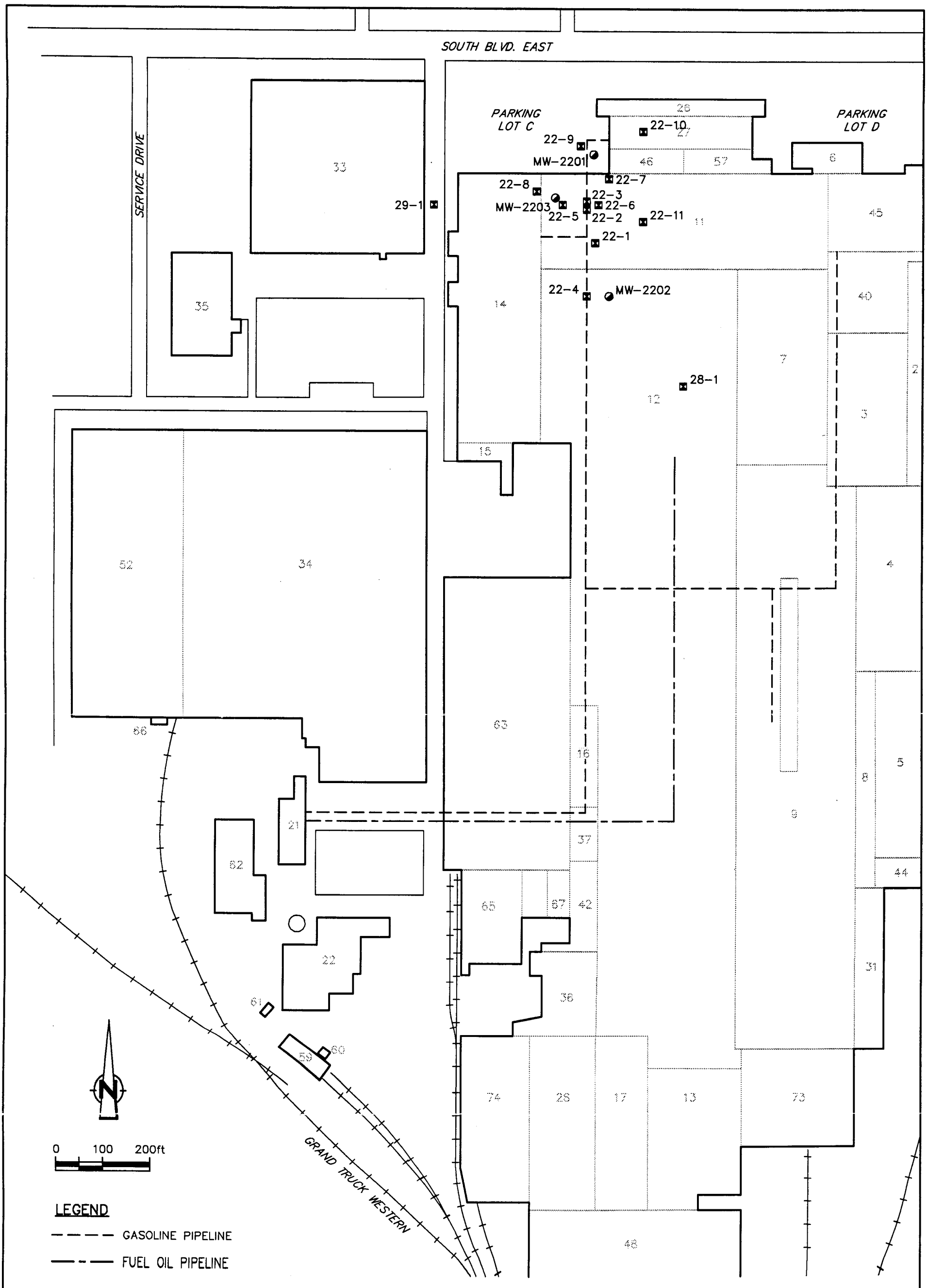


figure 1.3

DUCO STORES – FUEL LINE – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (7) FEB 17/94(W) REV.1 (P-01)

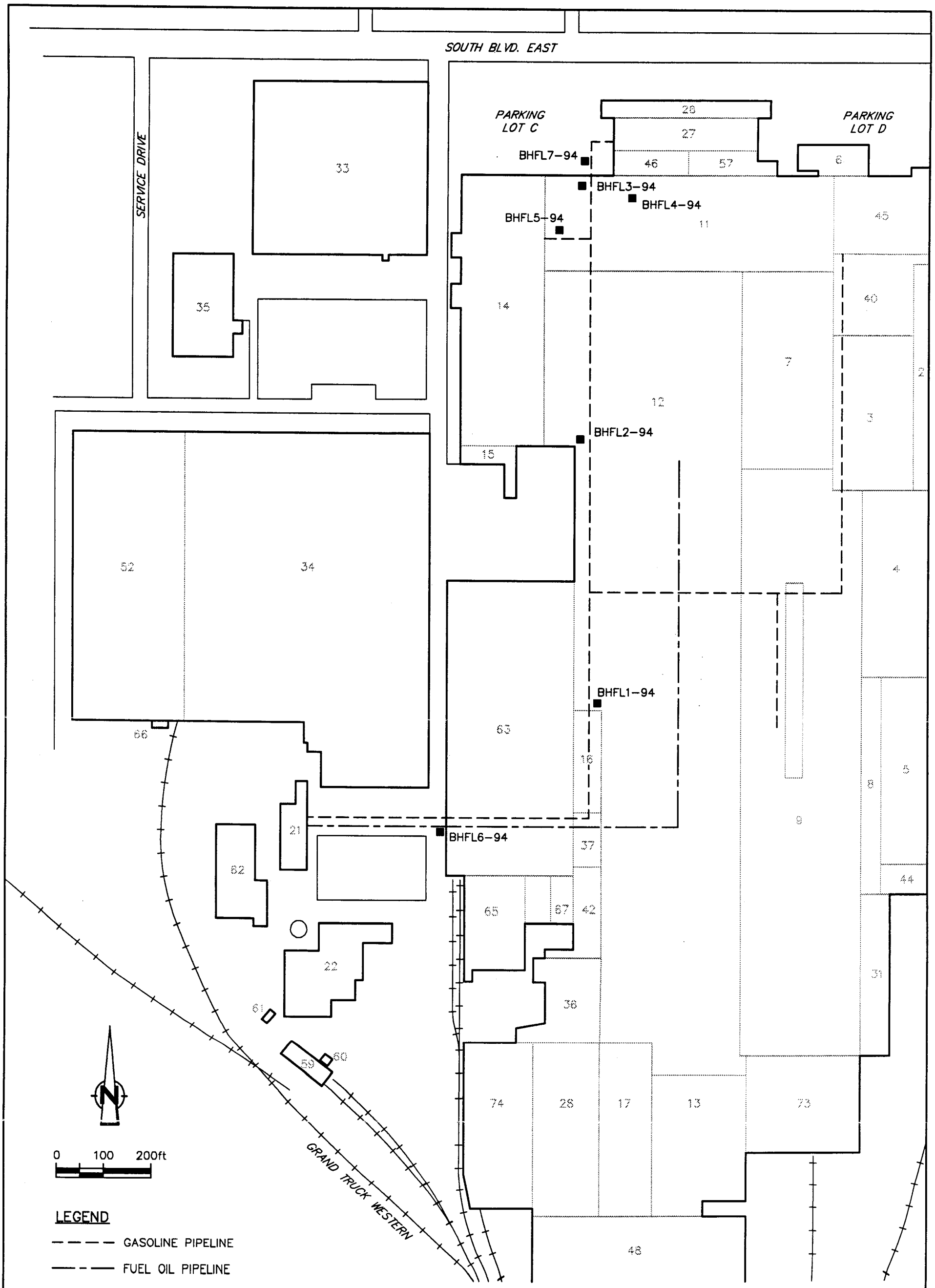


figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES
DUCO STORES – FUEL LINE – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (7) JAN 27/94(W) REV.1 (P-17)

SOUTH BLVD. EAST

SERVICE DRIVE

PARKING LOT C

PARKING LOT D

33

29-1

35

29

27

46

57

6

22-10

22-9

MW-2201

TP-1

22-8

22-7

TP-4

22-3

MW-2203

22-6

22-5

22-2

22-11

11

45

TP-2

22-1

22-4

MW-2202

14

40

TP-3

7

28-1

12

3

2

15

52

34

4

63

16

66

8

5

9

21

37

62

44

65

67

42

22

31

61

36

60

59

74

28

17

13

73

48

GRAND TRUNK WESTERN

N

0 100 200ft

LEGEND

GASOLINE PIPELINE

FUEL OIL PIPELINE

57 BUILDING NUMBER

WWES BOREHOLE

WWES MONITORING WELL

TEST PIT

figure 4.2

TEST PIT LOCATIONS – DUCO STORES – FUEL LINE
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (7) JUNE 09/94(W) REV.0 (P-27)

TABLE 5.1

ACT 307 - TYPE A AND TYPE B CRITERIA
DUCO STORES - FUEL LINE - STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Type A Criteria Soil (ppb)*	*Soil Type B Criteria (ppb)*		
		20X Drinking Water	*20X GSI Value*	*Direct Contact*
BTEX				
Benzene		24	1,200	13,000
Toluene		16,000	2,200	1.7E+07
Ethylbenzene		1,500	620	7.5E+06
Xylene		46,000	1,600	8.6E+07
Metals				
Lead	21,000	-- (1)	-- (1)	4.00E+05

Notes:

-- = chemical has not yet been evaluated.
(1) = background concentration may be substituted if it is higher than the Type B criteria.

TABLE 5.2

ANALYTICAL RESULTS - ADDITIONAL INVESTIGATIVE ACTIVITIES
DUCO STORES - FUEL LINE - STUDY AREA
PONTIAC MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Sample Concentration (µg/kg)													
Parameter	*BHFL1-94 (16'-18')*	*BHFL1-94 (22'-24')*	*BHFL2-94 (12'-14')*	*BHFL2-94 (22'-24')*	*BHFL3-94 (10'-12')*	*BHFL3-94 (22'-24')*	*BHFL4-94 (10'-12')*	*BHFL4-94 (24'-26')*	*BHFL5-94 (10'-12')*	*BHFL5-94 (24'-26')*	*BHFL6-94 (16'-18')*	*BHFL6-94 (22'-24')*	*BHFL7-94 (10'-12')*	*BHFL7-94 (20'-22')*
BTEX														
Benzene	ND (50)	13	12	10	940	29	ND (200)	ND (10)	18,000	ND (10)	ND (10)	ND (10)	480	ND (5)
Toluene	ND (50)	ND (10)	15	ND (10)	750	12	3,300	ND (10)	82,000	ND (10)	ND (10)	ND (10)	7,000	ND (10)
Ethylbenzene	3,000	ND (10)	ND (10)	ND (10)	3,200	ND (10)	1,700	ND (10)	47,000	ND (10)	ND (10)	ND (10)	3,300	ND (10)
Xylene	4,000	ND (30)	ND (30)	ND (30)	22,000	ND (30)	16,000	ND (30)	220,000	ND (30)	ND (30)	ND (30)	22,000	12
Metals														
Lead (mg/kg)	4.4	7.4	4.4	7.4	3.3	6.8	3.7	9.6	4.6	7.5	6.7	7.5	8.6	5.9

Note:

ND ( ) - Compound not detected at method detection limit. The detection limit is indicated in parentheses.

APPENDIX A

BOREHOLE STRATIGRAPHIC LOGS, WWES 1992

WW Engineering & Science, Inc.
Environmental Services Division

Page: 1 of 1
Well/Boring No.: 22-1
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 12/19/91 Finished: 12/20/91

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor Stearns Drilling
Address: Dutton, Mi

Equipment: CME 45
Crew Chief: Duane Daverman
WW Supervisor: M. Christensen

Drilling Method(s) 4 1/4" ID HSA — **Depth** 1.0-30.0'

Grouting/Seal
Depth/To — Material/Method
Tremmie full depth

Location

Bay 7M in Building 11

Boring location is 22' south and 4' west of column 7M.

Remarks Floor Grade Elevation = 934.00.

Water Level 9.0 Ft. Below Floor grade

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Blow Counts Sample Depth	11.7 eV HNU PID 6"	12"	18"	24"	Headspace	Background
1.0	1.0	CONCRETE FLOOR	5.0-10.0'					180	0
7.0	8.0	CLAY CONSTRUCTION FILL	10.0-15.0'					200	0
0.1	8.1	WOOD	15.0-20.0'					20	0
0.7	8.8	CLAY, brown, moist	20.0-25.0'					0	0
0.7	9.5	CLAY, dirty (strong odor), black, moist	25.0-30.0'					0	0
1.5	11.0	SAND, medium, brown, wet							
0.2	11.2	CLAY, brown, moist							
3.7	14.9	SAND, medium, (strong odor), dirty gray, very moist-wet							
2.1	17.0	CLAY, occasional sand lenses, brown, wet							
13.0	30.0	CLAY, brown, damp							
		EOB @ 30.0'							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-2
Client: GM Truck & Bus
Project No.: 83256
Date: 3/11/92 3/11/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor WWES
Address: _____
Grand Rapids, MI
Equipment: Little Beaver/Hand Auger
Crew Chief: Don Johnson
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
Little Beaver	0.0-4.0'
Hand Auger	4.0-8.0'

Grouting/Seal Depth/To	Material/Method
0.0-0.6'	Gravel Mix Cement
0.6-8.0'	Native Soils

Location

Bay 4M in Building 11

Boring location is 33' north and 16' west of column 7M.

Remarks Boring abandoned due to concrete at 8.0 feet.

Floor Grade Elevation ~ 934 feet

Water Level Dry Ft. Below Floor Grade

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	PID/HNU N/A Sample Depth (ft.)	6"	12"	18"	24"	Response	Hr Space
0.6	0.6'	CONCRETE							
7.4	8.0'	SAND, fine to coarse, some fine gravel, brown, dry(fill)	4.0-8.0'					0	0
0	8.0'	CONCRETE REFUSAL							
		EOB @ 8.0'							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-3
Client: GM Truck & Bus
Project No.: 83256
Date: 3/11/92 3/11/92
Started: 10:15a Finished: 10:45a

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor: WWES
Address:
Grand Rapids, MI
Equipment: Little Beaver/Hand Auger
Crew Chief: Don Johnson
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
Little Beaver	0.0-4.0'
Hand Auger	4.0-7.0'

Grouting/Seal Depth/To	Material/Method
0.0-0.6'	Gravel Mix Cement
0.6-7.0'	Native Soils

Location

Bay 4M in Building 11

Boring location is 46' north and 16' west of column 7M.

Boring location is 13' due north of Boring 22-2.

Remarks: Refusal at 7.0 feet, probably due to concrete.

Floor Grade Elevation ~ 934 feet

Water Level Dry Ft. Below Floor Grade

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	PID/HNU Sample Depth (ft.)	6"	12"	18"	24"	Response	Headspace
0.6	0.6'	CONCRETE							
6.4	7.0'	SAND, fine to coarse, some fine gravel, brown, dry(fill)	4.0-7.0'					0	0
		EOB @ 7.0'							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-4
Client: GM Truck & Bus
Project No.: 83256
Date: 3/17/92 3/17/92
Started: 10:10a Finished: 12:00p

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor Stearns Drilling Co
Address: 6974 Hammond
Grand Rapids, MI
Equipment: CME 45
Crew Chief: Duane Daverman
WW Supervisor: Don Johnson

Drilling Method(s)	Depth
Concrete Coring Machine	0.0-0.5'
4 1/4" ID HSA	0.5-29.0'

Grouting/Seal Depth/To	Material/Method
0.0-0.6'	Gravel Mix Cement
0.6-29.0'	Cement/Bentonite Grout

Location

Bay 11M in Building 12

Boring location is 7' south and 12.5' west of column 11M.

Remarks Field blank collected while compositing 5.0-7.0' and 7.0-9.0' sample (Blank #1) also, on to 10.0-14.0' composite (#2)
Garlic-like odor on 12.0-14.0' spoon

Floor Grade Elevation = 934.00'
*10.0' water table is confined with SAND unit.

Water Level 10.0' Ft. Below Floor Grade

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	PID/FID 6"	12"	18"	24"	Response	Space H
0.5	0.5'	CONCRETE							
6.5	7.0'	CLAY CONSTRUCTION FILL, sandy, firm, some fine gravel, gray, dry	5.0-7.0'	3	6	10	7	3	6
1.0	8.0'	CLAY CONSTRUCTION FILL, sandy, soft, gray, slightly moist	7.0-9.0'	1	1	3	3	80	347
1.0	9.0'	PEAT-NATURAL ORGANICS, black, moist	10.0-12.0'	8	9	7	12	18	5
1.5	10.5'	CLAY, very sandy, some fine to coarse gravel, gray, wet	12.0-14.0'	1	2	3	2	8	44
3.0	13.5'	SAND, fine to coarse, some fine gravel, trace medium gravel, occasional sandy	15.0-17.0'	3	3	4	5	8	4
-	-	clay seams, gray, wet	17.0-19.0'	2	3	10	6	6	4
5.5	19.0'	CLAY, sandy, firm, little fine to medium gravel, dry	20.0-22.0'	1	2	4	4	5	3
10.0	29.0'	CLAY, sandy, soft, some fine gravel, trace medium to coarse gravel, gray, dry	22.0-24.0'	1	3	4	6	2	0
			25.0-27.0'	3	5	7	7	0	0
		EOB @ 29.0'	27.0-29.0'	1	3	5	7	0	0

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-5
Client: GM Truck & Bus
Project No.: 83256
Date: 4/14/92 4/14/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor: Stearns Drilling Co
Address: 6974 Hammond
Grand Rapids, MI
Equipment: CME 45 (trailer)
Crew Chief: Darl Decator
WW Supervisor: Kurt Osterman

Drilling Method(s)	Depth
4 1/4" ID HSA	30.0'

Location

Bay 4M in Building 11

Boring location is 44 ft West and 36 ft North of column 7M.

Grouting/Seal Depth/To	Material/Method
0.0-1.0'	Cement Cap
1.0-30.0'	Cement Bentonite Tremmie Grout

Remarks
Composite 1.0-5.0'
Composite 6.0-10.0'
Composite 11.0-15.0'
Composite 16.0-20.0'
Composite 21.0-25.0'
Composite 26.0-30.0'

Water Level 12.5' Ft. Below Floor Grade

Thickness (feet)	Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	PID/FID 6"	12"	18"	24"	Response	Headspace
1.0'	1.0'	CONCRETE	1.0-3.0'		2	5	6	44	0
1.6'	2.6'	CLAY CONSTRUCTION FILL, sandy, occasional fine gravel, brown, dry	3.0-5.0'	3	4	3	3	48	0
3.4'	6.0'	CLAY CONSTRUCTION FILL, trace of silt, medium soft, brown, dry	6.0-8.0'	1	2	2	3	145	0
6.4'	12.4'	CLAY, sandy, brown to gray, dry	8.0-10.0'	1	1	2	2	516	0
0.4'	12.8'	SAND, fine, some gravel, gray, wet	11.0-13.0'	4	7	12	12	865	0
1.2'	14.0'	CLAY, sandy, some fine gravel, gray, wet	13.0-15.0'	4	6	5	9	143	0
3.2'	17.2'	SAND, fine, occasional fine gravel, gray, wet	16.0-18.0'	5	3	7	5	36	0
5.2'	22.4'	CLAY, sandy, trace of gravel, gray, moist	18.0-20.0'	6	5	6	5	0	0
7.6'+	30.0'+	CLAY, silty, medium soft, gray, moist	21.0-23.0'	3	4	6	8	0	0
			23.0-25.0'	3	3	4	6	0	0
		EOB @ 30.0'	26.0-28.0'	4	6	10	4	0	0
			28.0-30.0'	4	5	6	9	0	0

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-6
Client: GM Truck & Bus
Project No.: 83256
Date: 4/13/92 4/14/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor: Stearns Drilling Co
Address: 6974 Hammond
Grand Rapids, MI
Equipment: CME 45 (trailer)
Crew Chief: Darl Decator
WW Supervisor: Kurt Osterman

Drilling Method(s)	Depth
4 1/4" ID HSA	30.0'

Location

Bay 4M in Building 11

Boring location is 4 ft West and 34 ft North of column 7M.

Grouting/Seal Depth/To	Material/Method
0.0-1.0'	Cement Cap
1.0-30.0'	Cement Bentonite Tremmie Grout

Remarks:
Composite 0.0-4.0' above cement pad
Composite 6.0-10.0' below concrete pad
Composite 11.0-15.0' below concrete pad
Composite 16.0-20.0' below concrete pad
Composite 21.0-25.0' below concrete pad
Composite 26.0-30.0' below concrete pad
4.0-6.0' No recovery from split spoon

Water Level 9.0' Ft. Below Floor Grade

Thickness (feet)	Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	PID/FID 6"	12"	18"	24"	Response	Hr Space
1.0'	1.0'	CONCRETE	0.0-2.0'	/	3	4	3	0	0
0.2'	1.2'	SAND CONSTRUCTION FILL, fine, brown, dry	2.0-4.0'	3	1	1	1	0	0
3.8'	5.0'	SAND CONSTRUCTION FILL, medium to fine, some coarse gravel, brown, dry	4.0-6.0'	1	-	-	-	/	/
0.5'	5.5'	CONCRETE	6.0-8.0'	3	2	2	3	891	0
4.0'	9.5'	SAND, clayey, little fine gravel, gray, moist (odor)	8.0-10.0'	2	3	5	7	804	0
3.5'	13.0'	SAND, fine, little silt, occasional fine gravel, gray, moist (odor)	11.0-13.0'	2	2	2	5	87	0
1.0'	14.0'	CLAY, silty, gray, moist (odor)	13.0-15.0'	3	5	7	10	10	0
3.5'	17.5'	CLAY, sandy, occasional gravel, gray, wet	16.0-18.0'	5	5	7	10	9	0
0.5'	18.0'	SAND, fine, medium to fine gravel, gray, wet	18.0-20.0'	9	10	7	11	3	0
3.2'	21.2'	CLAY, sandy, medium soft, gray, wet	21.0-23.0'	4	6	9	11	2	0
0.4'	21.6'	SAND, fine, silty, gray, wet	23.0-25.0'	3	3	4	11	3	0
8.4'+	30.0'+	CLAY, sandy, medium soft, gray, wet	26.0-28.0'	5	6	9	9	45	0
			28.0-30.0'	4	6	9	12	8	0
		EOB @ 30.0'							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-7
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 4/27/92 Finished: 4/27/92

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor: WWES
Address:

Equipment: 11 hp Eager Beaver
Crew Chief: M. Jones
WW Supervisor: S. Tacy

Drilling Method(s)	Depth
4" O.D. SSA	1.0-17.5'
1" O.D. Hand Auger	Various

Grouting/Seal Depth/To	Material/Method
0.0-17.5'	Granular Bentonite

Location

Bay 1L in Building 11

Boring is 12 feet East and 5 feet South of Column 1M.

Remarks: Very strong diesel fuel odor noted in samples, odor increased with depth to 15 feet.

Floor Grade Elevation = 934.00'

Water Level 13.0' Ft. Below Floor Grade

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	HNU 10.2eV PID Sample Depth (ft.)	6"	12"	18"	24"	Headspace	Background
1.0'	1.0'	CONCRETE	1.0-5.0'					6	3
6.0'	7.0'	CLAY CONSTRUCTION FILL, silty, trace sand, brown to dark gray, moist	5.0-10.0'					170	3
0.5'	7.5'	CLAY, silty, trace sand, black, wet	10.0-15.0'					200	3
1.5'	9.0'	CLAY, silty, fine, some sand, gray to green, wet	15.0-17.5'					170	3
2.3'	11.3'	SAND, fine, little silty clay, green to brown, wet							
2.7'	14.0'	SAND, fine, little silt, gray to black, wet-saturated							
1.5'	15.5'	SAND, clayey, gray to black, saturated							
2.0'	17.5'	CLAY, silty, very dense, trace coarse sand, fine gravel, moist							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-8
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 4/28/92 Finished: 4/28/92

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor WWES
Address:

Equipment: 11 hp Little Beaver
Crew Chief: M. Jones
WW Supervisor: S. Tacy

Drilling Method(s)	Depth
4" O.D. SSA	0.75-8.0'
1" O.D. Hand Auger	8.0-10.0'

Grouting/Seal Depth/To	Material/Method
0.0-17.5'	Granular Bentonite

Location

Bay 10 in Building 14

Boring is 6 feet West and 39 feet South of Column 1 "O", in hallway north of door to vault.

Remarks

Floor Grade Elevation = 934.00'

NOTE: No ground water encountered because boring was stopped above the saturated sand lens.

Water Level None Ft. Below Floor Grade

Thick-ness	Depth to Base (feet)	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	HNU 10.2eV PID 6"	12"	18"	24"	Headspace	Background
0.75'	0.75'	CONCRETE	3.0-5.0'					12	3
1.25'	2.0'	RUBBLE/CONCRETE DEBRIS	5.0-10.0'					160	3
2.8'	4.8'	CLAY CONSTRUCTION FILL, silty, trace sand, dark brown, moist-damp (slight							
-	-	odor)							
2.7'	7.5'	CLAY, silty, occasional sand lenses, gray to black, damp (petroleum odor)							
1.0'	8.5'	CLAY, very dense, gray to black, moist							
1.5'	10.0'	CLAY, silty, trace sand, grayish-black, moist to wet							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-9
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 5/1/92 Finished: 5/1/92

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor: Stearns Drilling
Address: Dutton, MI

Equipment: CME-45
Crew Chief: D. Decator
WW Supervisor: S. Tacy

Drilling Method(s) — **Depth**
4 1/4" ID HSA — 0.0-25.0'

Grouting/Seal

Depth/To	Material/Method
0.0-25.0'	Granular Bentonite

Location

Parking Lot C

Boring is 72 feet North of the north wall of Building 11 and 29 feet West of the west wall of Building 27.

Remarks

Parking Lot Grade Elevation = 933.66'

Water Level 13.0' Ft. Below Parking Lot Grade

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	OVA FID Sample Depth (ft.)	6"	12"	18"	24"	Headspace	Background
0.5'	0.5'	ASPHALT	5.0-10.0'					200	8
5.5'	6.0'	SAND, silty, loose, fine, little clay, moist	10.0-15.0'					220	4
3.0'	9.0'	SAND, silty, loose, fine, heavily stained, gray to black, moist	15.0-20.0'					18	5
1.0'	10.0'	SAND, little silt, brown, damp to wet	20.0-25.0'					5	5
1.0'	11.0'	CLAY, silty, some sand, trace gravel, wet							
2.0'	13.0'	SAND, silty, stained black, wet - saturated							
2.0'	15.0'	SAND, silty, occasional silt lenses, trace gravel, brown, saturated							
2.0'	17.0'	CLAY, silty, little sand, occasional gravel pockets, brown, saturated							
8.0'	25.0'	SILT, clayey, dense, some sand, little gravel, light gray, damp - moist							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-10
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 5/1/92 Finished: 5/1/92

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor Stearns Drilling
Address: Dutton, MI

Equipment: CME-45
Crew Chief: D. Decator
WW Supervisor: S. Tacy

Drilling Method(s) 4 1/4" ID HSA — **Depth** 1.0-20.0'

Grouting/Seal

Depth/To	Material/Method
0.0-20.0'	Granular Bentonite

Location

Inside Executive Parking Garage (Building 27)

Boring location is 57 feet East of the west wall of Building 27 and 36 feet South of the south wall of Building 26.

Remarks

No petroleum odor noted.
Floor Grade Elevation = 933.95'

Water Level ~13.0' Ft. Below Floor grade

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	Microtip PID HL-200 6"	12"	18"	24"	Headspace	Background
1.0'	1.0'	CONCRETE	5.0-10.0'					4	4
6.0'	7.0'	SAND, silty, little trace clay and gravel, moist - damp	10.0-15.0'					4	4
1.0'	8.0'	SAND, little silt, brown with orange oxidation stains	15.0-20.0'					4	4
1.0'	9.0'	SAND, silty, silt partings, gray with brown mottles, moist							
3.0'	12.0'	CLAY, gray with brown mottles, moist							
1.0'	13.0'	SAND, silty, loose, brown, saturated							
3.0'	16.0'	SAND, loose, brown, saturated							
4.0'	20.0'	SILT, sandy, little clay, trace gravel, brown to gray, saturated							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 22-11
Client: GM Truck & Bus
Project No.: 83256
Date:
Started: 5/4/92 Finished: 5/4/92

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW 1/4	3	2N	10E

Contractor Stearns Drilling
Address: Dutton, MI

Equipment: CME-45
Crew Chief: D. Decator
WW Supervisor: S. Tacy

Drilling Method(s) 4 1/4" ID HSA
Depth 1.0-20.0'

Grouting/Seal
Depth/To 0.0-20.0'
Material/Method Granular Bentonite

Location

Bay 4K in Building 11

Boring is located 26 feet North and 23 feet West of column 7K.

Remarks

Floor grade elevation ~ 934.0'.

Water Level ~11-20' Ft. Below Floor grade

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	Microtip PID HL-200 6"	12"	18"	24"	Headspace	Background
1.0'	1.0'	CONCRETE	5.0-10.0'					23	5
5.7'	6.7'	SAND CONSTRUCTION FILL, silty, very fine, brown, dry to moist	10.0-15.0'					31	8
0.1'	6.8'	WOOD	15.0-20.0'					8	6
1.0'	7.8'	CONCRETE							
1.2'	9.0'	SAND, silty, very fine, brown, dry to moist							
2.0'	11.0'	SAND, silty, very fine, gray-stained, dry to moist (strong odor)							
9.0'	20.0'	CLAY, silty, little to some sand and fine gravel, gray, wet-saturated							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 28-1
Client: GM Truck & Bus
Project No.: 83256
Date: 3/10/92 3/10/92
Started: 8:55a Finished: 10:45a

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor: Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: CME 55 (truck)
Crew Chief: Darl Decator
WW Supervisor: Don Johnson

Drilling Method(s) — **Depth**
4 1/4" ID HSA — 0.0-20.0'

Grouting/Seal

Depth/To	Material/Method
0.0-20.0'	Cement/Bentonite Grout

Location

Bay 21H in Building 12

Boring location is 4' south and 5' east of column 21J.

Remarks Composites of : 5.0-7.0' & 8.0-10.0' (5.0-10.0' composite) 10.0-12.0' (9:20a) & 13.0-15.0 (10.0-15.0' composite) 9:30a 15.0-17.0' (9:40a) 18.0-20.0' (15.0-20.0 composite) 9:50 a

Floor Grade Elevation = 934.00'

Water Level Dry Ft. Below Floor Grade

Thickness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	10.2 eV PID/HNU Sample Depth (ft.)	6"	12"	18"	24"	Response	Headspace
0.8	0.8'	CONCRETE	5.0-7.0'	6	3	4	4	0	0
2.7	3.5'	CLAY CONSTRUCTION FILL, some medium sands,	8.0-10.0'	9	8	8	9	0	0
-	-	little fine gravel, brown	-	-	-	-	-	-	-
5.5	9.0'	SAND, fine to coarse, trace brown clay, brown, dry	10.0-12.0'	5	5	7	9	0	0
0.5	9.5'	CLAY, sandy, trace gravel, brown, dry	13.0-15.0'	5	7	11	13	0	0
1.0	10.5'	SILT, trace clay, brownish-gray, damp	-	-	-	-	-	-	-
4.3	14.8'	CLAY, very sandy, soft, little fine gravel, brown, moist	15.0-17.0'	4	6	6	11	0	0
0.2	15.0'	SAND, fine to coarse, little fine gravel, brown	18.0-20.0'	4	5	7	12	0	0
5.0	20.0'	CLAY, medium firm, little fine to medium gravel, gray, dry							
		EOB @ 20.0'							

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: 29-1
Client: GM Truck & Bus
Project No.: 83256.00
Date: 3/9/92 3/9/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: CME 55
Crew Chief: D. Daverman
WW Supervisor: Eric Meyers

Drilling Method(s) — **Depth**
4 1/4" ID HSA — 0.0-20.0'

Grouting/Seal
Depth/To: 0.0-20.0' — Material/Method: Cement/Bentonite Grout

Location

Boring is located in the service drive between Buildings 14 and 33

Boring location is 76.0' south of the north wall of Building 14 (extended west) and 36.0' west of the west wall of Building 14.

Remarks *Original boring log was lost. Information was extracted from daily field logs when possible.
Ground Surface Elevation = 933.71feet

Water Level None Ft. Below Ground Surface

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	10.2eVHNU PID Sample Depth (ft.)	6"	12"	18"	24"	Response	Headspace
*	*	*	5.0-7.0'						0
			8.0-10.0'						0
			10.0-12.0'						0
			12.0-15.0'						0
			15.0-17.0'						0
			17.0-20.0'						0

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: MW-2201
Client: GM Truck & Bus
Project No.: 83256.00
Date: 6/2/92 6/2/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor: Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: Dietrich D-25
Crew Chief: D. Daverman
WW Supervisor: S. Tacy

Drilling Method(s) — **Depth**
4 1/4" ID HSA — 0.0-12.0'

Grouting/Seal
Depth/To — Material/Method
4.8' to top of Bentonite Seal

Location

Parking Lot C

Boring and temporary monitoring well are located 17.0' west of the west wall of Building 27 and 50.5' north of the north wall of Building 11.

Remarks Temporary monitoring well installed @ 12.8' BGS. Continuous sampling from 4.0-14.0' using 2-feet splitspoons. No soil samples collected for laboratory testing.

See next page for well construction details.

* The 80 ppm reading on the last SS may be due to sand slough from above causing the higher reading. The actual silty clay appeared clean.

Water Level ~10.0' Ft. Below Pavement

Microtip HL-200PID

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	6"	12"	18"	24"	Response	Headspace
0.6'	0.6'	ASPHALT	4.0-6.0'	2	3	3	4	90	313
4.8'	5.4'	SAND, loose, brown, fine to medium, little silt (odor) moist	6.0-8.0'	2	3	8	12	458	1340
1.0'	6.4'	SAND, medium compact, black, fine, (strong odor), moist	8.0-10.0'	8	12	14	15	380	750
5.6'	12.0'	SAND, medium compact, grey, fine, trace fine gravel, (odor), moist-wet	10.0-12.0'	7	11	11	20	378	1090
2.0'	14.0'	CLAY, silty, stiff, grey to brown, moist to dry	12.0-14.0'	3	5	6	11	80	0
		EOB @ 14.0'							

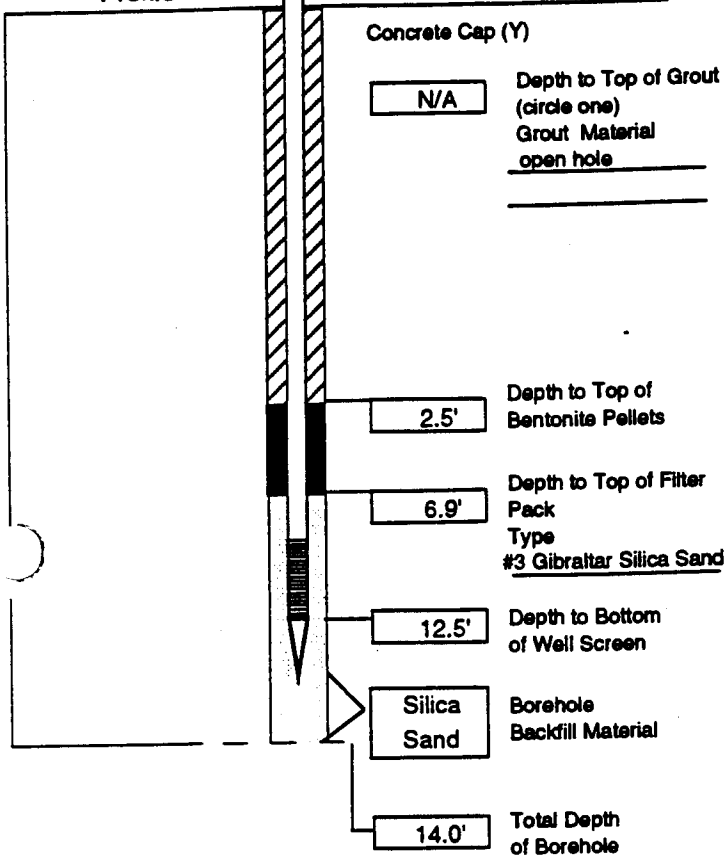
WW Engineering & Science

Project Name: GM Truck & Bus
Pontiac, MI
Project No: 83256.00

Log of Well Installation

Well Designation: MW -2201
Date(s) of Installation: 6/2/92 To: 6/2/92

Generalized Subsurface Profile



Top of Casing Elevation: 932.89'

Ground Surface Elevation: 933.63'

Water Level Data

Date	Water Level Below TOC
6-2-92	10.96'
6-3-92	10.94'
6-9-92	10.97'
6-16-92	10.96'

Development : 6/9/92 Surged and pumped after measuring water level

Survey Reference: Plant Floor at MW-2203=934.00'

Well Casing
Diameter: 2"
Total Length: 8.7'
Material: Schedule 5 Stainless Steel (304)
Cap Type: Locking J-Plug

Well Screen
Diameter: 2"
Length: 3.0'
Slot/Type: #7/wire wrapped
Material: Schedule 5 Stainless Steel(304)

Protective Well Casing
Material: Cast Iron Dia. 7.5"
Height Above Ground: Flush Mounted
Lock Type: P-506 master lock

General Notes: Steam-cleaned well assembly (121 total) was installed in the HSA. Augers were pulled out 5 feet, no native soils collapsed. #3 Silica sand was poured around the well assembly. The augers were removed and one bag of granular Bentonite was used to seal the well screen off from infiltration. The rest of the annules was left open. A cast-iron manway cover and locking cap protect the installation.

Figure

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: MW-2202
Client: GM Truck & Bus
Project No.: 83256.00
Date: 6/2/92 6/2/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor: Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: Dietrich D-25
Crew Chief: D. Daverman
WW Supervisor: S. Tacy

Drilling Method(s)	Depth
4 1/4" ID HSA	0.8-14.0'
Concrete Coring Drill	0.0-0.8'

Grouting/Seal Depth/To	Material/Method
7.0' to top of Bentonite Seal	

Location

Bay 11L in Building 12

Boring and temporary monitoring well are located 10.0' east and 11.0' south of column 11 M.

Remarks: Temporary well installed @ 14.6' BGS. Continuous sampling from 4.0' to 16.0' using 2-feet splitspoons. No soil samples collected for laboratory testing.
See next page for well construction details.
Floor Grade Elevation = 934.00 feet

Water Level ~12.0' Ft. Below Floor Grade

Microtip HL-200PID

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	6"	12"	18"	24"	Response	Hr Space
0.8'	0.8'	CONCRETE FLOOR	4.0-6.0'	3	4	5	7	0	0
5.2'	6.0'	SAND CONSTRUCTION FILL, loose, brown, little gravel, trace clay, dry to moist	6.0-8.0'	3	3	5	7	89	132
0.8'	6.8'	PEAT, loose, black, organic matter i.e. grass (strong odor)	8.0-10.0'	7	6	4	4	50	185
1.3'	8.1'	CLAY, sandy, medium, mottled brown with gray, little silt, trace gravel, moist	10.0-12.0'	3	3	4	4	10	0
-	-	(strong odor)	12.0-14.0'	4	5	5	5	0	0
0.9'	9.0'	SAND, loose, brownish-gray, some gravel, clay lenses, moist	14.0-16.0'	3	3	4	6	0	0
1.0'	10.0'	CLAY, silty, stiff, brown, moist							
0.8'	10.8'	SAND, loose, brownish-gray, some gravel, clay lenses, moist							
1.4'	12.2'	CLAY, silty, medium, mottled brown with gray, sticky, moist							
0.2'	12.4'	SAND, loose, gray, wet							
0.3'	12.7'	CLAY, silty, medium, mottled brown with gray, sticky, moist							
0.8'	13.5'	SAND, loose, gray, wet/saturated							
2.5'	16.0'	CLAY, silty, medium, mottled gray to brown, sticky, moist							
		EOB @ 16.0'							

WW Engineering & Science

Project Name: GM Truck & Bus
Pontiac, MI
Project No: 83256.00

Log of Well Installation

Well Designation: MW -2202
Date(s) of Installation: 6/2/92 To: 6/2/92

Top of Casing Elevation: 933.32'

Ground Surface Elevation: 934.00'

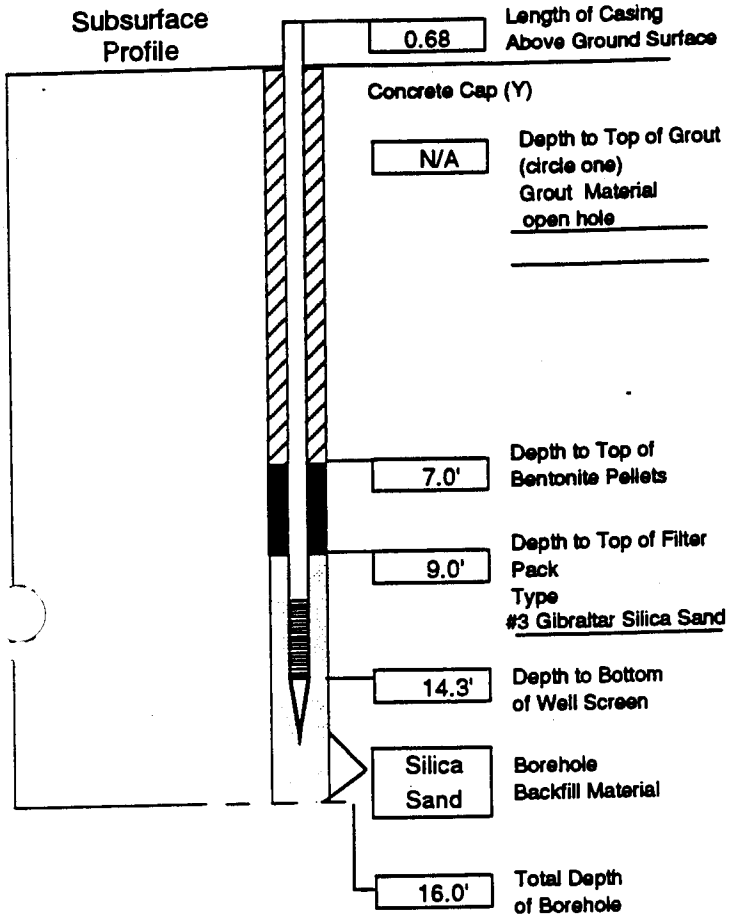
Water Level Data

Date	Water Level Below TOC
6-2-92	10.92'
6-3-92	10.41'
6-9-92	10.46'
6-16-92	10.49'

Development : 6/9/92 Surged and pumped after measuring water depth.

Survey Reference: Plant Floor at MW-2203=934.00'

Generalized Subsurface Profile



Well Casing
- Diameter: 2"
- Total Length: 10.6'
- Material: Schedule 5 Stainless Steel (304)
- Cap Type: Locking J-Plug

Well Screen
- Diameter: 2"
- Length: 3.0'
- Slot/Type: #7/wire wrapped
- Material: Schedule 5 Stainless Steel (304)

Protective Well Casing
- Material: Cast Iron Dia. 9.5"
- Height Above Ground: Flush Mounted
- Lock Type: P-506 Master lock

General Notes: Steam cleaned well assembly (13.9' total length) was installed in the HSA. Augers were pulled out 5-feet and sand pack poured around the well assembly. The rest of the augers were removed and one bag of granular bentonite was used to seal the well screen. The rest of the annulus was left open. A cast iron man-way cover and locking cap protect the installation.

Figure

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: MW-2203
Client: GM Truck & Bus
Project No.: 83256.00
Date: 6/3/92 6/3/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: Dietrich D-25
Crew Chief: D. Daverman
WW Supervisor: M. Vincent

Drilling Method(s)	Depth
4 1/4" ID HSA	0.8-14.0'
Concrete Coring Drill	0.0-0.8'

Grouting/Seal Depth/To	Material/Method
6.6' to top of Bentonite Seal	

Location

Bay 4M in Building 11

Boring and temporary monitoring well are located 21.0' south and 4.0' east of column 4N, 5' East of Photographic Studio Booth.

Remarks Temporary well installed @ 14.5' BGS. Continuous sampling from 4.0' to 16.0' using 2-feet splitspoons. No soil samples collected for laboratory testing. See next page for well construction details. Background PID 5.8ppm to 15ppm
Floor Grade Elevation = 934.00 feet

Water Level ~10.0' Ft. Below Floor Grade

Microtip HL-200PID

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	6"	12"	18"	24"	Response	Hr Space
0.8'	0.8'	CONCRETE FLOOR	4.0-6.0'	4	4	4	5	92	437
5.2'	6.0'	SAND & CLAY CONSTRUCTION FILL, medium, brown to gray, trace fine	6.0-8.0'	4	4	4	6	671	1102
-	-	gravel, dry (odor)	8.0-10.0'	5	5	4	4	52	1020
2.3'	8.3'	SAND, loose, fine, gray, occasional fine gravel, dry (strong odor)	10.0-12.0'	2	3	4	5	40	237
3.7'	12.0'	CLAY, sandy, stiff, black to gray, occasional gravel and sand clay lenses, (odor)	12.0-14.0'	5	5	6	9	33	948
-	-	saturated	14.0-16.0'	5	10	8	8	123	770
4.0'	16.0'	SAND, medium, compact, gray, occasional gravel and sandy clay lenses, (odor)							
-	-	saturated							

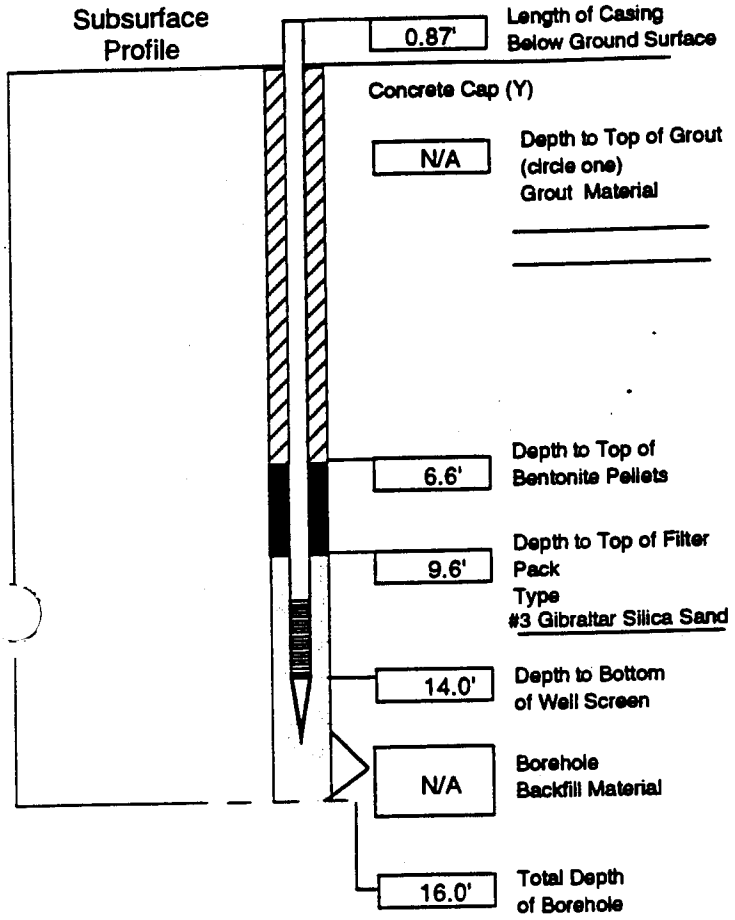
WW Engineering & Science

Project Name: GM Truck & Bus
Pontiac, MI
Project No: 83256.00

Log of Well Installation

Well Designation: MW -2203
Date(s) of Installation: 6/3/92 To: 6/3/92

Generalized Subsurface Profile



Top of Casing Elevation: 933.13'

Ground Surface Elevation: 934.00'

Water Level Data

Date	Water Level Below TOC
6-3-92	10.91'
6-9-92	10.97'
6-16-92	10.99'

Development : 6/9/92 Surged and pumped

Survey Reference: Plant Floor at this location=934.00'

Well Casing
Diameter: 2"
Total Length: 11.0'
Material: Schedule 5 Stainless Steel (304)
Cap Type: Locking J-Plug

Well Screen
Diameter: 2"
Length: 3.0'
Slot/Type: #7/wire wrapped
Material: Schedule 5 Stainless Steel (304)

Protective Well Casing
Material: Cast Iron Dia. 9.5"
Height Above Ground: Flush Mounted
Lock Type: P-506 Master lock

General Notes: Total well assembly, 14.0' long. Well installed in HSA, filter sand pack installed. Augers pulled and 1 bag of granular bentonite placed as plug and hydrated with clean water. The rest of the annulus was left open. A cast iron may-way and locking cap protect the installation.

Figure

WW Engineering & Science, Inc.

Page: 1 of 1
Well/Boring No.: MW-2204
Client: GM Truck & Bus
Project No.: 83256.00
Date: 6/3/92 6/3/92
Started: _____ Finished: _____

Well/Boring Log Sheet

County	Township	Fraction	Section	T	R
Oakland	Bloomfield	NW1/4	3	2N	10E

Contractor: Stearns Drilling
Address: 6974 Hammond
Dutton, MI 49316
Equipment: Dietrich D-25
Crew Chief: D. Daverman
WW Supervisor: M. Vincent

Drilling Method(s)	Depth
4 1/4" ID HSA	0.8-14.0'
Concrete Coring Drill	0.0-0.8'

Grouting/Seal Depth/To	Material/Method
16.0-12.5'	Borehole Collapsed
12.5-0.5'	Granular Bentonite
0.5-0.0'	Concrete

Location

Bay 4K in Building 11

Boring location is 14.0' north and 15.0' west of column 7K.

Remarks: Saturated conditions were not encountered during drilling, no temporary well installed. Continuous sampling from 4.0-16.0' BGS using 2-feet splitspoons. No soil samples collected for laboratory testing.

Background PID ranged from 5 to 7 ppm

Water Level ~10.0' Ft. Below Floor Grade

Microtip HL-200PID

Thick-ness	(feet) Depth to Base	LITHOLOGIC DESCRIPTION	Sample Depth (ft.)	6"	12"	18"	24"	Response	Hr Space
0.8'	0.8'	CONCRETE FLOOR	4.0-6.0'	5	7	7	7	0	0
7.2'	8.0'	SAND & CLAY CONSTRUCTION FILL, medium compact, dark gray to brown,	6.0-8.0'	3	3	4	6	2	0
2.0'	10.0'	trace fine gravel, dry	8.0-10.0'	3	3	5	6	0	7.1
0.05'	10.05'	SAND, loose, light brown to gray, dry	10.0-12.0'	3	5	7	7	0	0
5.95'	16.0'	SAND, medium compact, fine, gray, some fine gravel, wet	12.0-14.0'	3	6	7	8	0	0
		CLAY, silty, stiff, gray, slightly moist	14.0-16.0'	6	9	6	6	0	0
		EOB @ 16.0'							

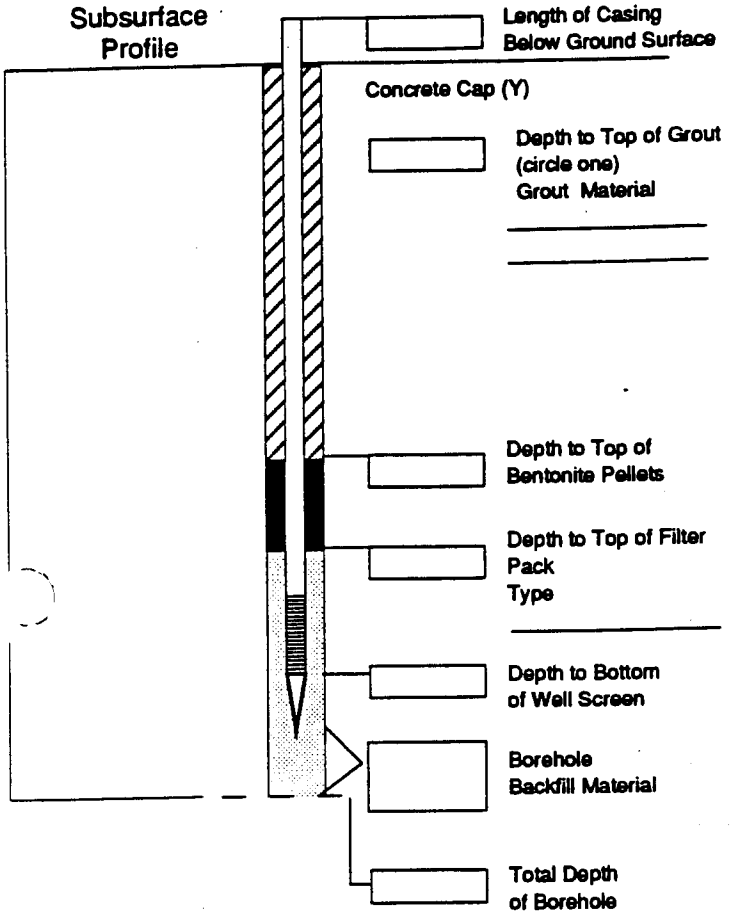
WW Engineering & Science

Project Name: GM Truck & Bus
Pontiac, MI
Project No: 83256.00

Log of Well Installation

Well Designation: MW -2204
Date(s) of Installation: _____ To: _____

Generalized Subsurface Profile



Top of Casing Elevation: _____

Ground Surface Elevation: _____

Water Level Data

Date	Water Level Below TOC

Development : _____

Survey Reference: _____

Well Casing
Diameter: _____
Total Length: _____
Material: _____
Cap Type: _____

Well Screen
Diameter: _____
Length: _____
Slot/Type: _____
Material: _____

Protective Well Casing
Material: _____ Dia. _____
Height Above Ground: _____
Lock Type: _____

General Notes: No temporary well installed. Dry conditions.

Figure

APPENDIX B

SUMMARY OF ANALYTICAL RESULTS, WWES 1992

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification:							22-1	22-1	22-1	22-1	22-1	22-4	22-4	22-4	22-4
Sample Identification:			Type B	Generic			A62316A	A62317A	A62318A	A62319A	A62320A	A82407AR	A82407AP	A82407A	A82409A
Sample Date:		Type A	Residential	Industrial	Soil PRG	Soil PRG	12/23/91	12/23/91	12/20/91	12/20/91	12/20/91	3/19/92	3/19/92	3/19/92	3/19/92
Analyzed By:		Soil	Soil	Soil	(Residential	(Industrial	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader
Depth (ft.):		Criteria	Criteria	Criteria	Population)	Population)	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	5 - 9	5 - 9	5 - 9	10 - 14
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	--	--	--	--	--	--	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	<0.03	<0.06	<0.001	<0.001	<0.002	<0.001	<0.0007	**0.15**	**0.015**
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	**0.82**	**0.5**	<0.008	<0.006	<0.02	**0.088**	**0.11**	**0.49**	**0.0016**
Toluene	mg/kg	0.01	16	29700	54800	2030	**0.15**	<0.1	<0.004	<0.003	<0.009	**0.012**	**0.011**	**0.059**	**0.0078**
Xylene	mg/kg	0.03	6	297000	548000	1000000	**4.5**	**1.5**	<0.007	<0.006	<0.02	**0.61**	**0.78**	**2.3**	**0.012**
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: Sample Identification: Sample Date: Analyzed By: Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-1 A62316A 12/23/91 Shrader 5 - 10	22-1 A62317A 12/23/91 Shrader 10 - 15	22-1 A62318A 12/20/91 Shrader 15 - 20	22-1 A62319A 12/20/91 Shrader 20 - 25	22-1 A62320A 12/20/91 Shrader 25 - 30	22-4 A82407AR 3/19/92 Shrader 5 - 9	22-4 A82407AP 3/19/92 Shrader 5 - 9	22-4 A82407A 3/19/92 Shrader 5 - 9	22-4 A82409A 3/19/92 Shrader 10 - 14
Misc. Organics	***Units***														
Acetone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl cellosolve	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethyl Acetate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,4-Dioxane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Formaldehyde	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isobutanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isopropanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Propylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
TGME*	mg/kg	NA	110 (c)	675000 (c)	205000 (c)	1000000 (c)	--	--	--	--	--	--	--	--	--
Methanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl ethyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl-tert-butyl ether	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methylene chloride	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB's	***Units***														
PCB: aroclor 1016	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1221	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1232	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1242	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1248	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1254	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1260	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-4 A82409AR 3/19/92 Shrader 10 - 14	22-4 A82411A 3/19/92 Shrader 15 - 19	22-4 A82412A 3/19/92 Shrader 20 - 24	22-4 A82413A 3/19/92 Shrader 25 - 29	22-5 A90701A 4/15/92 Shrader 1 - 5	22-5 A90702A 4/15/92 Shrader 6 - 10	22-5 A90703A 4/15/92 Shrader 11 - 15	22-5 A90704A 4/15/92 Shrader 16 - 20	22-5 A90705A 4/15/92 Shrader 21 - 25
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	--	--	--	--	--	--	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	**0.015**	<0.0007	<0.0008	<0.0009	**0.029**	**1.6**	**0.0074**	<0.0008	<0.0008
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	**0.0049**	<0.003	<0.004	<0.006	**0.062**	**4.3**	<0.002	**0.0065**	<0.004
Toluene	mg/kg	0.01	16	29700	54800	2030	**0.0055**	**0.021**	**0.012**	**0.024**	**0.067**	**4.3**	<0.001	**0.0098**	<0.002
Xylene	mg/kg	0.03	6	297000	548000	1000000	**0.014**	**0.0063**	<0.004	<0.006	**0.34**	**21**	**0.0091**	**0.021**	<0.004
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-4 A82409AR 3/19/92 Shrader 10 - 14	22-4 A82411A 3/19/92 Shrader 15 - 19	22-4 A82412A 3/19/92 Shrader 20 - 24	22-4 A82413A 3/19/92 Shrader 25 - 29	22-5 A90701A 4/15/92 Shrader 1 - 5	22-5 A90702A 4/15/92 Shrader 6 - 10	22-5 A90703A 4/15/92 Shrader 11 - 15	22-5 A90704A 4/15/92 Shrader 16 - 20	22-5 A90705A 4/15/92 Shrader 21 - 25
Misc. Organics	***Units***														
Acetone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl cellosolve	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethyl Acetate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,4-Dioxane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Formaldehyde	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isobutanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isopropanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Propylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
TGME*	mg/kg	NA	110 (c)	675000 (c)	205000 (c)	1000000 (c)	--	--	--	--	--	--	--	--	--
Methanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl ethyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl-tert-butyl ether	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methylene chloride	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB's	***Units***														
PCB: aroclor 1016	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1221	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1232	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1242	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1248	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1254	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1260	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-6 A90706A 4/15/92 Shrader 0 - 4	22-6 A90707A 4/15/92 Shrader 6 - 10	22-6 A90708A 4/15/92 Shrader 11 - 15	22-6 A90709A 4/15/92 Shrader 16 - 20	22-6 A90710A 4/15/92 Shrader 21 - 25	22-6 A90711A 4/15/92 Shrader 26 - 30	22-7 A93801A 4/28/92 Shrader 1 - 5	22-7 A93802A 4/28/92 Shrader 5 - 10	22-7 A93803A 4/28/92 Shrader 10 - 15
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	--	--	--	--	--	--	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	<0.0006	<0.08	**0.069**	<0.0008	<0.0008	**0.0058**	<0.004	<0.1	**0.43**
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	<0.002	**1.4**	**0.019**	<0.002	<0.004	**0.011**	<0.01	**4.8**	**2.2**
Toluene	mg/kg	0.01	16	29700	54800	2030	<0.001	**0.92**	**0.0079**	<0.002	<0.002	**0.015**	<0.007	**3.6**	**1.7**
Xylene	mg/kg	0.03	6	297000	548000	1000000	<0.002	**6.5**	**0.072**	<0.003	<0.004	**0.048**	<0.01	**25**	**10**
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Table 1

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification:															
Sample Identification:							22-6	22-6	22-6	22-6	22-6	22-6	22-7	22-7	22-7
Sample Date:							A90706A	A90707A	A90708A	A90709A	A90710A	A90711A	A93801A	A93802A	A93803A
Analyzed By:							4/15/92	4/15/92	4/15/92	4/15/92	4/15/92	4/15/92	4/28/92	4/28/92	4/28/92
Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	Shrader 0 - 4	Shrader 6 - 10	Shrader 11 - 15	Shrader 16 - 20	Shrader 21 - 25	Shrader 26 - 30	Shrader 1 - 5	Shrader 5 - 10	Shrader 10 - 15
Misc. Organics	***Units***														
Acetone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl cellosolve	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethyl Acetate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,4-Dioxane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Formaldehyde	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isobutanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isopropanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Propylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
TGME*	mg/kg	NA	110 (c)	675000 (c)	205000 (c)	1000000 (c)	--	--	--	--	--	--	--	--	--
Methanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl ethyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl-tert-butyl ether	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methylene chloride	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB's	***Units***														
PCB: aroclor 1016	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1221	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1232	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1242	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1248	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1254	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1260	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-7 A93804A 4/28/92 Shrader 15 - 17.5	22-8 A94001A 4/29/92 Shrader .75 - 5	22-8 A94002A 4/29/92 Shrader 5 - 10	22-9 A95301A 5/4/92 Shrader 5 - 10	22-9 A95302A 5/4/92 Shrader 10 - 15	22-9 A95303A 5/4/92 Shrader 15 - 20	22-9 A95304A 5/4/92 Shrader 20 - 25	22-10 A95305A 5/4/92 Shrader 5 - 10	22-10 A95306A 5/4/92 Shrader 10 - 15
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	--	--	--	--	--	--	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	--	--	--	--	--	--	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	<0.1	**0.014**	<0.2	<0.005	<0.005	<0.0008	<0.0007	<0.0007	<0.0006
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	**0.65**	**0.14**	**5.9**	<0.02	**0.11**	<0.005	<0.006	<0.003	<0.003
Toluene	mg/kg	0.01	16	29700	54800	2030	**0.75**	<0.005	<0.3	<0.009	<0.009	<0.002	<0.002	<0.001	<0.001
Xylene	mg/kg	0.03	6	297000	548000	1000000	**2.8**	**0.55**	**11**	<0.02	**0.71**	<0.004	<0.005	<0.003	<0.002
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibe z(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-7 A93804A 4/28/92 Shrader 15 - 17.5	22-8 A94001A 4/29/92 Shrader .75 - 5	22-8 A94002A 4/29/92 Shrader 5 - 10	22-9 A95301A 5/4/92 Shrader 5 - 10	22-9 A95302A 5/4/92 Shrader 10 - 15	22-9 A95303A 5/4/92 Shrader 15 - 20	22-9 A95304A 5/4/92 Shrader 20 - 25	22-10 A95305A 5/4/92 Shrader 5 - 10	22-10 A95306A 5/4/92 Shrader 10 - 15
Misc. Organics	***Units***														
Acetone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl cellosolve	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethyl Acetate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,4-Dioxane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Formaldehyde	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isobutanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isopropanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Propylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
TGME*	mg/kg	NA	110 (c)	675000 (c)	205000 (c)	1000000 (c)	--	--	--	--	--	--	--	--	--
Methanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl ethyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl-tert-butyl ether	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methylene chloride	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB's	***Units***														
PCB: aroclor 1016	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1221	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1232	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1242	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1248	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1254	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1260	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	22-10 A95307A 5/4/92 ,Shrader 15 - 20	22-11 A95907A 5/6/92 Shrader 5 - 10	22-11 A95906A 5/5/92 Shrader 10 - 15	22-11 A95905A 5/5/92 Shrader 15 - 20	23-1 A68101A 1/20/92 Shrader 5 - 10	23-1 C945538 1/20/92 Clayton 5 - 10	24-1 A73603B 2/10/92 Shrader 5 - 10	24-1 C949617 2/7/92 Clayton 5 - 10	24-1 A73603A 2/13/92 Shrader 5 - 10
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	**11**	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	--	--	--	--	--	--	**14**	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	--	--	--	--	**31**	--	**29**	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	--	--	--	--	**10**	--	**13**	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	<0.0006	<0.0006	**0.012**	<0.0006	--	--	<0.2	--	--
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	<0.0009	**0.0051**	<0.003	<0.003	--	--	<0.6	--	--
Toluene	mg/kg	0.01	16	29700	54800	2030	<0.0004	<0.0006	<0.001	<0.001	<0.003	--	<0.3	--	--
Xylene	mg/kg	0.03	6	297000	548000	1000000	<0.0008	**0.0031**	**0.0059**	<0.002	<0.004	--	<0.6	--	--
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification:							22-10	22-11	22-11	22-11	23-1	23-1	24-1	24-1	24-1
Sample Identification:		Type A	Type B	Generic			A95307A	A95907A	A95906A	A95905A	A68101A	C945538	A73603B	C949617	A73603A
Sample Date:		Soil	Residential	Industrial	Soil PRG	Soil PRG	5/4/92	5/6/92	5/5/92	5/5/92	1/20/92	1/20/92	2/10/92	2/7/92	2/13/92
Analyzed By:		Criteria	Soil	Soil	(Residential	(Industrial	Shrader	Shrader	Shrader	Shrader	Shrader	Clayton	Shrader	Clayton	Shrader
Depth (ft.):			Criteria	Criteria	Population)	Population)	15 - 20	5 - 10	10 - 15	15 - 20	5 - 10	5 - 10	5 - 10	5 - 10	5 - 10
Misc. Organics	***Units***														
Acetone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl cellosolve	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	<0.06
Ethyl Acetate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,4-Dioxane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Ethylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Formaldehyde	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isobutanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Isopropanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Propylene glycol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
TGME*	mg/kg	NA	110 (c)	675000 (c)	205000 (c)	1000000 (c)	--	--	--	--	--	--	--	--	--
Methanol	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl ethyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	<0.03	--	--	--	--
Methyl isobutyl ketone	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methyl-tert-butyl ether	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Methylene chloride	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB's	***Units***														
PCB: aroclor 1016	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1221	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1232	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1242	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1248	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1254	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
PCB: aroclor 1260	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant

Units as Given

Site Identification: / Sample Identification: / Sample Date: / Analyzed By: / Depth (ft.):		Type A Soil Criteria	Type B Residential Soil Criteria	Generic Industrial Soil Criteria	Soil PRG (Residential Population)	Soil PRG (Industrial Population)	24-1 A73604B 2/10/92 Shrader 10 - 15	24-1 C949618 2/7/92 Clayton 10 - 15	24-1 A73604A 2/17/92 Shrader 10 - 15	24-1 A73605B 2/10/92 Shrader 15 - 20	24-1 A73605A 2/17/92 Shrader 15 - 20	24-1 C949619 2/7/92 Clayton 15 - 20	24-1 C949620 2/7/92 Clayton 20 - 25	24-1 A73606B 2/10/92 Shrader 20 - 25	24-1 A73606A 2/17/92 Shrader 20 - 25
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	--	14	--	--	--	18	20	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	--	33	--	--	--	36	41	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	--	14	--	--	--	13	12	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	<0.05	--	--	<0.03	--	--	--	<0.04	--
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	<0.2	--	--	<0.1	--	--	--	<0.1	--
Toluene	mg/kg	0.01	16	29700	54800	2030	<0.09	--	--	<0.06	--	--	--	<0.07	--
Xylene	mg/kg	0.03	6	297000	548000	1000000	<0.2	--	--	<0.1	--	--	--	<0.1	--
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant
Units as Given

Site Identification:							26-1	26-1	27-1	27-1	28-1	28-1	29-1	29-1	29-1
Sample Identification:		Type A	Type B	Generic			C949293	A73404A	A73405A	A73406A	A81001A	A81002A	A80801A	A80802A	A80803A
Sample Date:		Soil	Residential	Industrial	Soil PRG	Soil PRG	2/5/92	2/13/92	2/18/92	2/18/92	3/11/92	3/11/92	3/10/92	3/10/92	3/10/92
Analyzed By:		Criteria	Soil	Soil	(Residential	(Industrial	Clayton	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader	Shrader
Depth (ft.):			Criteria	Criteria	Population)	Population)	10 - 15	10 - 15	10 - 15	15 - 20	5 - 10	10 - 15	5 - 10	10 - 15	15 - 20
Inorganics	***Units***														
Arsenic, total	mg/kg	39	0.0004	8.33	0.355	3.17	--	--	--	--	--	--	--	--	--
Barium, total	mg/kg	270	40	63000	19200	135000	--	--	--	--	--	--	--	--	--
Cadmium, total	mg/kg	3.1	0.08	450	137	1020	--	--	--	--	--	--	--	--	--
Chromium, total	mg/kg	54	2	4500	1370	1620	--	--	--	--	--	--	--	--	--
Copper, total	mg/kg	40	20	33400	10200	75900	--	--	--	--	--	--	--	--	--
Lead, total	mg/kg	31	400 (a)	NA	NA	NA	--	--	--	--	--	--	--	--	--
Mercury, total	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Nickel, total	mg/kg	53	2	18000	5480	40900	17	--	--	--	--	--	--	--	--
Selenium, total	mg/kg	0.9	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Silver, total	mg/kg	3.8	0.8	4500	1370	10200	--	--	--	--	--	--	--	--	--
Zinc, total	mg/kg	93	20	270000	82100	613000	64	--	--	--	--	--	--	--	--
Cyanide	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Cyanide, amenable	mg/kg	0.38	2	18000	5480	40900	--	--	--	--	--	--	--	--	--
Percent water	%	NA	NA	NA	NA	NA	11	--	--	--	--	--	--	--	--
BTEX	***Units***														
Benzene	mg/kg	0.01	0.02	85.4	22	1.89	--	--	--	--	<0.0008	<0.001	<0.001	<0.001	<0.001
Ethylbenzene	mg/kg	0.01	1.4	14900	27400	7490	--	--	--	--	<0.003	<0.006	<0.005	<0.003	<0.005
Toluene	mg/kg	0.01	16	29700	54800	2030	--	--	--	--	<0.002	<0.003	<0.003	<0.002	<0.003
Xylene	mg/kg	0.03	6	297000	548000	1000000	--	--	--	--	<0.003	<0.006	<0.005	<0.003	<0.004
PNA's	***Units***														
Acenaphthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Acenaphthylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(ghi)perylene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Butyl benzyl phthalate	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Chrysene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluoranthene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Fluorene	mg/kg	0.33	6	36000	11000	81800	--	--	--	--	--	--	--	--	--
Hexachloroethane	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--
Naphthalene	mg/kg	0.33	5 (b)	36000	11000	81800	--	--	--	--	--	--	--	--	--
Phenanthrene	mg/kg	0.33	0.5 (b)	3600	1100	8180	--	--	--	--	--	--	--	--	--
Pyrene	mg/kg	ND	ND	ND	ND	ND	--	--	--	--	--	--	--	--	--

Summary of Analytical Results for Soil Samples
Collected at the Pontiac Central Manufacturing and Assembly Plant
Units as Given

Footnotes:

* = Triethylene glycol monoethyl ether

The Type A criteria for the inorganic constituents is the upper limit of Michigan background concentrations based on a summation of the mean plus three standard deviations for clay soils derived from the Erie Lobe of the Wisconsinan Glacier (Michigan DNR, Waste Management Division April, 1991). The Type A criteria for the organic chemicals is based on the method detection limit, from MERA Operational Memorandum #6 (revision #2), February 22, 1993, MDNR.

The Type B residential criteria were obtained from the MDNR Operational Memorandum #8, Revision #1 - Type B Criteria. March 16, 1992, unless noted. The Type B criteria shown are the more restrictive of the criteria for the ground water impact (20x Type B GW criteria) or the direct human contact pathways.

(a) Criterion is from MDNR Interoffice Communication, March 11, 1993.

(b) Criterion is from MDNR Interoffice Communication, February 9, 1993.

(c) Criterion was calculated based on an oral rat LD50. See text for discussion.

The generic industrial soil criteria were calculated according to the algorithms presented in the draft May 6, 1993, MDNR memorandum entitled "Generic Industrial Cleanup Criteria Algorithms."

The Risk-based Preliminary Remediation Goals (PRGs) were developed according to the procedures presented in the October 1991 USEPA document entitled "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)". The PRG values presented were calculated assuming the residential and industrial exposure scenarios as indicated..

ND = A cleanup criterion was not presented for this constituent because it was not detected in soil.

NA = Criterion not available for this constituent.

-- = Not Analyzed

Table 2
Summary of Analytical Results for Ground Water Samples Collected at the Pontiac Central Manufacturing and Assembly Plant
Units as Given

Site Identification: / Sample Identification: / Sample Date:		Type A GW Criteria	Type B Residential Criteria	Generic Industrial Criteria	PRG (Residential Population)	Maximum Contaminant Level	MW-2201 B03801A 6/16/92	MW-2202 B03802A 6/16/92	MW-2203 B03803A 6/16/92	MW-2201 C977427 6/16/92	MW-2202 C977428 6/16/92	MW-2203 C977429 6/16/92
Constituent	***Units***											
Benzene	ug/L	1	1	12	0.618	5	8.1	5.1	1300	--	--	--
Ethylbenzene	ug/L	1	70	2090	1580	700	15	7.9	560	--	--	--
Toluene	ug/L	1	800	4170	859	1000	2.5	0.68	230	--	--	--
Xylene	ug/L	1	300	41700	73000	10000	73	26	1700	--	--	--
Lead	ug/L	3	4 (a)	NA	NA	15 (b)	--	--	--	4	72	100

Footnotes:

GW = Ground Water

NA = Criterion not available for this constituent.

-- = Not Analyzed

The Type A criteria are based on the method detection limit, from MERA Operational Memorandum #6 (revision #2), February 22, 1993, MDNR.

The Type B ground water criteria were obtained from MDNR Operational Memorandum #8, Revision #1 - Type B Criteria, March 16, 1992, MDNR, unless noted.

(a) Criterion is from MDNR Interoffice Communication, March 11, 1993.

The generic industrial criteria were calculated according to the algorithms presented in the draft May 6, 1993, MDNR memorandum entitled "Generic Industrial Cleanup Criteria Algorithms."

The Risk-based Preliminary Remediation Goals (PRGs) were developed according to the procedures presented in the October 1991 USEPA document entitled "Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)". The PRG values presented were calculated assuming the residential exposure scenario.

(b) This criterion is an action level.

Shaded concentrations exceed the Type C industrial criteria.

Underlined concentrations exceed the Type B residential criteria.

APPENDIX C

BOREHOLE STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-17)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 12

HOLE DESIGNATION: BHFL1-94
DATE COMPLETED: JANUARY 11, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0.0	Concrete	-0.7					
	SP/GP-SAND and GRAVEL(FILL), brown			1SS		15	
2.5		-4.9					
	Concrete	-4.3		2SS		9	
5.0	SP/GP-SAND and GRAVEL(FILL), trace clay, brown			3SS		5	
7.5			8"ø BOREHOLE	4SS		17	
		-9.6					
10.0	CL/ML-CLAY and SILT(TILL), trace sand, gray			5SS		8	
12.5			CUTTINGS	6SS		10	
		-15.0		7SS		19	
15.0	SP-SAND, fine grained, gray			8SS		30	
17.5		-17.8		9SS		10	
	CL-CLAY(TILL), trace gravel, trace silt, stiff, gray			10SS		11	
20.0							
22.5				11SS		11	
		-24.0					
	END OF HOLE @ 24.0 FT. BGS						
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-18)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 12

HOLE DESIGNATION: BHFL2-94
DATE COMPLETED: JANUARY 11, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Concrete	-0.5					
	SC/GC-SAND and GRAVEL(FILL), some clay, brown			1SS		18	
2.5							
5.0				2SS		11	
		-5.8					
	Concrete	-6.0					
	CL/ML-CLAY and SILT, trace sand, trace gravel, mottled brown and gray			3SS		12	
7.5			8"ø BOREHOLE				
		-8.5					
	SP/GP-SAND and GRAVEL, gray	-9.0		4SS		14	
	CL/ML-CLAY and SILT, some sand seams, gray						
10.0				5SS		25	
		-11.5					
	ML-SILT, gray, moist		CUTTINGS				
		-12.2					
12.5	SC/GC-SAND and GRAVEL, little clay, gray, saturated			(6SS)		24	
		-14.4					
15.0	CL-CLAY, some sand, little gravel, saturated			7SS		13	
		-15.7					
	SC/GC-SAND and GRAVEL, little clay, gray,	-16.5					
	CL/ML-CLAY and SILT, little fine grained sand, trace gravel, gray, saturated			8SS		8	
17.5	- no sand, moist						
				9SS		13	
20.0							
				10SS		16	
22.5							
				(11SS)		16	
		-24.0					
	END OF HOLE @ 24.0 FT. BGS						
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-19)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 12

HOLE DESIGNATION: BHFL3-94
DATE COMPLETED: JANUARY 11, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Concrete	-1.0					
2.5	SC/GC-SAND and GRAVEL(FILL), some clay			1SS		10	
5.0		-5.0		2SS		7	
7.5	CL/ML-CLAY and SILT, trace gravel, stiff, brown, odor - dark gray with green staining		8"ø BOREHOLE	3SS		14	
10.0		-9.7		4SS		10	
12.5	SP-SAND, trace gravel and clay, fine grained, gray - strong odor		CUTTINGS	5SS		15	
15.0	CL/ML-CLAY and SILT, little fine grained sand, trace gravel, saturated - moist	-13.2		6SS		16	
17.5				7SS		12	
20.0				8SS		15	
22.5				9SS		17	
25.0	END OF HOLE ● 24.0 FT. BGS	-24.0		10SS		15	
27.5				11SS		8	
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-20)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: COLUMN L4, BUILDING 11

HOLE DESIGNATION: BHFL4–94
DATE COMPLETED: JANUARY 12, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Concrete	-0.6					
	SC/GC–SAND and GRAVEL(FILL), some clay						
2.5				1SS		5	0
5.0				2SS		4	
	CL–CLAY, some sand seams, little silt, gray	-6.0		3SS		7	6.4
7.5			8"ø BOREHOLE	4SS		6	14.7
10.0				5SS		19	305
	SP/GP–SAND and GRAVEL, trace silt, gray, moist	-11.0	CUTTINGS				
12.5				6SS		27	
15.0	CL/ML–CLAY and SILT, gray, saturated	-15.0		7SS		10	0
17.5				8SS		16	0
	– sand seams, moist			9SS		40	0
20.0	– trace gravel			10SS		18	0
22.5				11SS		9	0
25.0				11SS		12	0
	END OF HOLE @ 26.0 FT. BGS	-26.0					
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-21)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM PONTIAC CENTRAL PLANT
PROJECT NO.: 5770
CLIENT: GM
LOCATION: 10' WEST OF COLUMN N7, BUILDING 11

HOLE DESIGNATION: BHFL5-94
DATE COMPLETED: JANUARY 12, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	Concrete	-0.7					
	GC-GRAVEL(FILL), some clay, brown						
2.5				1SS		4	0
5.0				2SS		5	
	CL-CLAY(FILL), some gravel, little silt, interbedded, brown and gray, black staining	-6.0		3SS		5	230
7.5		-7.8					
	SP-SAND(FILL), trace gravel, trace clay, black	-8.0					
	CL/ML-CLAY and SILT, gray	-9.0	8"ø BOREHOLE	4SS		6	275
10.0	SP/GP-SAND and GRAVEL, trace clay, gray, moist			5SS		10	1789
			CUTTINGS				
12.5	CL/ML-CLAY and SILT, sand seams. gray, saturated	-12.5		6SS		3	7.2
15.0				7SS		16	0
	SM/GM-SAND and GRAVEL, little silt, fine grained, gray, saturated	-15.7		8SS		16	0
17.5							
	CL/ML-CLAY and SILT, gray, saturated	-18.5 -19.0		9SS		26	0
20.0	SP/GP-SAND and GRAVEL, gray, saturated			10SS		16	0
	CL/ML-CLAY and SILT, trace gravel, sand seams, gray, saturated	-21.2		11SS		22	0
22.5	- moist						
25.0				12SS		14	0
	END OF HOLE ● 26.0 FT. BGS	-26.0					
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-22)

PROJECT NAME: GM NORTH AMERICAN TRUCK PLATFORM
HOLE DESIGNATION: BHFL6-94

PROJECT NO.: 5770
DATE COMPLETED: JANUARY 12, 1994

CLIENT: GM
DRILLING METHOD: 4 1/4" ID HSA

LOCATION: ~ 90' SOUTH, 60' WEST OF SOUTH
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
0	Concrete						
	SP/GP-SAND and GRAVEL(FILL)	-1.5					
2.5				1SS		11	0
	CL-CLAY(FILL), some sand and gravel, stiff, gray	-3.5					
5.0				2SS		8	0
	CL/ML-CLAY and SILT, trace sand and gravel, gray	-6.0					
7.5				3SS		9	
			8"ø BOREHOLE				
10.0				4SS		6	0
				5SS		10	0
12.5			CEMENT/ BENTONITE GROUT				
				6SS		9	0
15.0				7SS		10	0
				8SS		9	0
17.5							
				9SS		17	0
20.0				10SS		10	0
22.5				11SS		15	0
	END OF HOLE ● 24.0 FT. BGS	-24.0					
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX D

ANALYTICAL RESULTS

Client: CRA - MI
IEA Job#: C604013 2
Project #: 5770

ANALYTE LIST
mg/Kg Dry

Matrix: SOIL

Client ID	FL1 (16-18)	FL1 (22-24)	FL2 (12-14)	FL2 (22-24)	FL3 (10-12)	Date Analyzed	Approx. PQL
	940132	→	→	→	→		
Lab ID	001	002	003	004	005		
Analyte / Method							
Lead 7421	4.4	9.4	4.4	9.4	3.3	1-18-94	0.2

PQL = Practical Quantitation Limit

Client: CRA - MF
IEA Job#: C-940132
Project #: 5770

ANALYTE LIST mg/kg D14

Matrix: SOIL

Client ID	FL3 (22-24)	FL4 (10-12)	FL4 (24-26)	FL5 (10-12)	FL5 (24-26)		
Lab ID	940132 006	007	008	009	010	Date Analyzed	Approx PQL
Analyte / Method							
Lead 7421	10.8	3.7	9.6	4.6	7.5	1-18-94	0.2

PQL = Practical Quantitation Limit

Client: GM-MI
IEA Job#: CN940132
Project #: 5770

ANALYTE LIST mg/kg Dry

Matrix: SOIL

TDC

Client ID	FL6 (16-18)	FL6 (22-24)					
	940132 →						
Lab ID	011	012				Date Analyzed	Approx PQL
Analyte / Method							
Lead 7421	6.7	9.5				1-18-94	0.2

PQL = Practical Quantitation Limit

IEA
An Aquatech Company

CLIENT PROJECT # 5220
IEA JOB # L4940132
MATRIX = SOIL

* Preliminary

DRY weights

PURGEABLE AROMATICS
BTEX + MTBE EPA 602/8020
ug/kg

CLIENT ID	BHF11 (4-18)	BHF11 (22-24)	BHF12 (12-14)	BHF12 (22-24)	BHF13 (10-12)	
LAB ID	40132001	40132002	40132003	40132004	40132005	PQL
COMPOUNDS						
Benzene	<200	89	44	10	940	10
Toluene	<200	18	56	<10	750	10
Ethylbenzene	730	<10	20	<10	3200	10
Xylene	1200	<30	48	<30	22,000	30
MTBE	-	-	-	-	-	5
DATE SAMPLED	1-11-94	→	→	→	→	
DATE ANALYZED	1-14-94	→	→	1-19-94	→	
DILUTION FACTOR	20	1	1	1	20	

CLIENT ID	BHFL3 (22-24)	BHFL4 (10-12)	BHFL4 (24-26)	BHFL5 (10-12)	BHFL5 (24-26)	
LAB ID	40132006	40132007	40132008	40132009	40132010	PQL
COMPOUNDS						
Benzene	29	<200	<10	18000	<10	10
Toluene	12	3900	<10	52000	<10	10
Ethylbenzene	<10	1700	<10	47000	<10	10
Xylene	<30	16000	<30	220000	<30	30
MTBE	-	-	-	-	-	5
DATE SAMPLED	1-12-94	1-12-94	→	→	→	
DATE ANALYZED	1-17-94	1-17-94	1-17-94	1-17-94	1-17-94	
DILUTION FACTOR	1	20	1	100	1	

Jan 1-18-94

IEA
An Aquarion Company

CLIENT PROJECT # 5770
IEA JOB # 6E1402.2
MATRIX = SOIL

dry weights

PURGEABLE AROMATICS
BTEX + MTBE EPA 602/8020
ug/kg

CLIENT ID	BHP16 (16-18)	BHP16 (22-24)	method 8/4/94 →			
LAB ID	4B132811	4B132812	VBB114	VBB117		PQL
COMPOUNDS						
Benzene	410	410	410	410		1
Toluene	410	410	410	410		2
Ethylbenzene	410	410	410	410		2
Xylene	430	430	430	430		2
MTBE	-	-	-	-		5
DATE SAMPLED	1-13-94 →		-	-		
DATE ANALYZED	1-17-94 →		1-14-94	1-17-94		
DILUTION FACTOR	1	1	1	1		

CLIENT ID						
LAB ID						PQL
COMPOUNDS						
Benzene						1
Toluene						2
Ethylbenzene						2
Xylene						2
MTBE						5
DATE SAMPLED						
DATE ANALYZED						
DILUTION FACTOR						

1-19-94

IEA
An Aquarion Company

IEA PROJECT#: CH940117
CLIENT PROJEC15770
MATRIX: SOIL

PURGEABLE AROMATICS
BTEX–MTBE EPA 602/8020
ug/kg
(Dry Weights)

CLIENT ID	BHDSF 1–94 10'–12'	BHDSF 1–94 22'–24'	Method Blank	Method Blank	
LAB ID	40117 001	40117 002	40104 002R	40104 003	PQL
COMPOUNDS					
Benzene	480	< 5	< 5	< 5	5
Toluene	7000	< 10	< 10	< 10	10
Ethylbenzene	3300	< 10	< 10	< 10	10
Xylene	22,000	12	< 10	< 10	10
MTBE	–	–	–	–	–
DATE SAMPLED	01/06/94	01/06/94	–	–	
DATE ANALYZED	01/10/94	01/08/94	01/08/94	01/10/94	
DILUTION FACTOR	200	1	1	1	

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
1-94 10-12'	940117001
1-94 22-24'	940117002

IEA
An Aquarion Company

SOIL VOLATILE SURROGATE RECOVERIES

PROJECT NO:CH940117

SAMPLE ID	SURR 1 (% RECOV.)
40117001	100
40117002	109
VS0108	95
VS0110	104

QC Limits (65 – 130)

S1 = Bromofluorobenzene

IEA
An Aquarion Company

GC SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: CH940113

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC	QC LIMITS REC
BENZENE	30	2	24	73	70–130
TOLUENE	30	25	46	70	70–130

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC	% RPD	QC LIMITS RPD REC
BENZENE	30	25	77	5	25 70–130
TOLUENE	30	48	77	10	25 70–130

Corresponding Samples: 40117001
40117002

IEA
An Aquarion Company

Client: CRA
IEA Job#: CH940117
Project #: 5770

ANALYTE LIST
mg/Kg
(Dry Weight)

Matrix: SOIL

	BHDSF-1-94	BHDSF-1-94				
Client ID	10'-12'	22'-24'				
	40117	40117			Date	
Lab ID	001	002			Analyzed	PQL
Analyte- Method						
Lead - 7421	8.6	5.9			1/08/94	0.1

GFAA Quality Control Data

Date	1/08/94
Analyst	DOC
Sample	940111007019
Wt/Vol	1g/100ml
Prp.Bat.	721
Units	mg/Kg dry
Element	Matrix Spike

Samples: 940111
940117

	Org.Smp	Spk.Smp	Amt.Spkd	%REC
Lead	19.72	20.91	2.52	47.2

	Initial	Duplicate	%RPD
	19.72	17.83	10.1

Serial Dil Smp #

	Sample	Dilution	RPD
Lead			

Post SpK. Sample #:

	Org.Smp.	Amt.Spkd	Result	%REC

Prep Blk

<0.002

LCS

	Org	Known	%REC
	0.01933	0.020	96.7

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA Labs

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac

SAMPLER'S SIGNATURE: J.L. McClellan PRINTED NAME: J.L. McClellan

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: Lead	REMARKS
1	1-6		BHDSF-1-94- 10-12'	soil	2	X	X	
2	1-6		BHDSF-1-94- 22-24'	soil	2	X	X	

TOTAL NUMBER OF CONTAINERS: 4

RELINQUISHED BY: 1. J.L. McClellan	DATE: 1-7-93 TIME: 6:30pm	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Fed Ex AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

? 0552

SAMPLE TEAM: B. Holbrook - S. Schreiber

RECEIVED FOR LABORATORY BY: David Delach

DATE: 1/8/94 TIME: 8:30

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX E

TEST PIT STRATIGRAPHY LOGS

TEST PIT STRATIGRAPHY LOG

(L-27)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NUMBER: 5770
CLIENT: GM
LOCATION: BUILDING 11

CONTRACTOR: EAGLE EXCAVATION
SURFACE ELEVATION: N/A
TEST PIT METHOD: RUBBER TIRE BACKHOE

TEST PIT DESIGNATION: TP-4
DATE STARTED: MAY 4, 1994
DATE COMPLETED: MAY 4, 1994
CRA SUPERVISOR: J. DANIEL

DEPTH (ft) FROM	AT	TO	SAMPLE DESCRIPTION SOIL SYMBOL, PRIMARY COMPONENT, SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	HNU (ppm)	LOCATION: 50' EAST OF WEST FACE OF BLDG 27, 82.5' SOUTH OF SOUTH FACE OF BLDG 27 GEOLOGIC PROFILE
0.0		0.75	Reinforced concrete			
0.75		7.0	SC/CL-SAND and CLAY(FILL), brown, slightly moist			
7.0		8.0	Pt-PEAT			
8.0		16.0	SM-SAND, some silt, dry to slightly moist, petroleum odor			
			END OF HOLE @ 16.0 ft BGS			
			NOTES: 1. Pit left open for 1 hour 2. No groundwater accumulation			

TEST PIT STRATIGRAPHY LOG

(L-25)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NUMBER: 5770
CLIENT: GM
LOCATION: BUILDING 14 (DEMOLISHED)

CONTRACTOR: EAGLE EXCAVATION
SURFACE ELEVATION: N/A
TEST PIT METHOD: RUBBER TIRE BACKHOE

TEST PIT DESIGNATION: TP-2
DATE STARTED: MAY 4, 1994
DATE COMPLETED: MAY 4, 1994
CRA SUPERVISOR: J. DANIEL

DEPTH (ft) FROM	AT	TO	SAMPLE DESCRIPTION SOIL SYMBOL, PRIMARY COMPONENT, SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	HNu (ppm)	LOCATION: 150' WEST OF EAST FACE OF BLDG 11, 15' NORTH OF SOUTH FACE OF BLDG 33 GEOLOGIC PROFILE
0.0		4.0	CL-CLAY(FILL), some sand, brown, moist			
4.0		5.0	SM-SAND, some silt, brown, moist			
5.0		13.5	CL-CLAY, some sand, gray, moist			
13.5		15.0	Pt-PEAT, dry			
15.0		16.0	CL-CLAY, gray, moist			
			END OF HOLE @ 16.0 ft BGS			
			NOTES: 1. No petroleum odor 2. Pit left open for 1 hour			

TEST PIT STRATIGRAPHY LOG

(L-24)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NUMBER: 5770
CLIENT: GM
LOCATION: BUILDING 14 (DEMOLISHED)

CONTRACTOR: EAGLE EXCAVATION
SURFACE ELEVATION: N/A
TEST PIT METHOD: RUBBER TIRE BACKHOE

TEST PIT DESIGNATION: TP-1
DATE STARTED: MAY 4, 1994
DATE COMPLETED: MAY 4, 1994
CRA SUPERVISOR: J. DANIEL

DEPTH (ft) FROM	DEPTH (ft) AT	DEPTH (ft) TO	SAMPLE DESCRIPTION SOIL SYMBOL, PRIMARY COMPONENT, SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	HNu (ppm)	LOCATION: 33' SOUTH OF NORTH FACE OF BLDG 14, 91' EAST OF WEST FACE OF BLDG 14 GEOLOGIC PROFILE
0.0		2.5	SM-SAND(FILL), some silt and clay, dry to moist			
2.5		6.5	CL-CLAY, some silt, trace sand, gray, moist			
6.5		8.0	Pt-PEAT			
8.0		13.0	CL-CLAY, some sand, blue gray, dry			
13.0		16.5	SM-SAND, some silt, some clay, gray, wet			
			END OF HOLE @ 16.5 ft BGS			
			NOTES: 1. No petroleum odor 2. Pit left open for 1 hour 3. No groundwater accumulation			

TEST PIT STRATIGRAPHY LOG

(L-26)

PROJECT NAME: GM PONTIAC CENTRAL
PROJECT NUMBER: 5770
CLIENT: GM
LOCATION: BUILDING 11

CONTRACTOR: EAGLE EXCAVATION
SURFACE ELEVATION: N/A
TEST PIT METHOD: RUBBER TIRE BACKHOE

TEST PIT DESIGNATION: TP-3
DATE STARTED: MAY 4, 1994
DATE COMPLETED: MAY 4, 1994
CRA SUPERVISOR: J. DANIEL

DEPTH (ft) FROM	DEPTH (ft) AT	DEPTH (ft) TO	SAMPLE DESCRIPTION SOIL SYMBOL, PRIMARY COMPONENT, SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR, MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	HNU (ppm)	LOCATION: 390' SOUTH OF SOUTH FACE OF BLDG 27, 105' EAST OF WEST FACE OF BLDG 26 GEOLOGIC PROFILE
0.0		1.0	Reinforced concrete			
1.0		3.5	SM-SAND(FILL), some silt and clay, brown, moist			
	3.5		Concrete			
			END OF HOLE @ 3.5 ft BGS			
			NOTES: 1. Test pit abandoned			

APPENDIX K

BUILDING 33 STUDY AREA

APPENDIX K.1

DRAFT SUBSURFACE INVESTIGATION/REMEDIAL ALTERNATIVES EVALUATION, BUILDING 33 FREE PRODUCT GASOLINE PLUME

SUBSURFACE INVESTIGATION/REMEDIAL ALTERNATIVES EVALUATION REPORT BUILDING 33 - FREE PRODUCT GASOLINE PLUME

DRAFT

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

APRIL 1995
REF. NO. 5770 (9)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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DRAFT

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DRAFT

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding a gasoline free product plume identified in the soils below Building 33 (Study Area) at the GM Facility.

The Facility is in Pontiac, Michigan as located on Figure 1.1. A plan of the facility, Figure 1.2, identifies the Study Area for the Building 33 free product investigation/evaluation.

The purpose of this report is to present CRA's results developed from the Phase II soil investigation conducted to further define the nature and extent of the gasoline plume below Building 33 in addition to identifying possible alternative for its remediation.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area are suspected to be the result of the operation of an underground storage tank (UST) system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g., final remediation) of a LUST site to be approved by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial and Commercial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of LUST and Act 307, as well as the MDNR Guidance Document, Verification of Soil Remediation (April 1994, Revision 1).

2.0 BACKGROUND INFORMATION

This section provides an overview of the history, geology and hydrogeology of the Facility and Study Area.

2.1 THE FACILITY

2.1.1 Location and History

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Building 33 is utilized as an engineering and testing center for the GM Truck and Bus Group. Activities conducted in Building 33 include:

- stress, fatigue, and wear testing of truck parts;
- welding; and
- general machining.

Manufacturing operations at other portions of the facility were discontinued in 1991 and the property is currently undergoing major redevelopment.

2.1.2 Geology

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the

clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly comprised of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g., sand and gravel), asphalt, concrete or structures.

2.1.3 Hydrogeology

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply Well Number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow perched groundwater has been encountered during past investigations in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not expected to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

2.2 THE STUDY AREA

A plan of the Study Area is presented as Figure 2.1. The plan indicates the location where the gasoline leak was reported to have occurred.

2.2.1 History of Building 33 - Free Product

In 1985, a gasoline release was discovered by GM during the foundation investigation for a planned expansion of Building 33. Twenty geotechnical soil borings were drilled. Free product (gasoline) was found in one borehole, gasoline constituents were found in soils from seven of the borings, gasoline odors were detected in seven borings and the remaining five borings showed no evidence of gasoline. The National Response Center and the Michigan Department of Natural Resources (MDNR) were notified of the gasoline leak. Reports indicated that the source of the gasoline was considered to be a leaking fuel line supplying an abandoned fuel island south of Building 33. The fuel supply line (shown on Figure 2.1) was reported to be leaking in 1968/69. A pressure check was performed on the line. The line held no air pressure, indicating a significant hole in the pipe. The fuel line and fuel station were abandoned in approximately 1969 following the discovery of the leaking pipe, and the fuel lines were capped.

Based on the thickness of gasoline plume which was measured in the monitoring wells, approximately 2,000 gallons of gasoline were believed to have migrated from the fuel line to beneath Building 33. The free product from the release migrated to the northwest and apparently became trapped in a sand lens under Building 33. The depth to the free product is approximately 15 to 20 feet bgs. The free product thickness was estimated to be between 1 and 1.5 feet at the center of the free product plume and tapered to zero thickness at a radius of approximately 30 feet (December 2, 1991 letter from ABB Environmental Services, Inc. to GM).

2.2.2 Past Investigative Activities

Studies have been performed by Gilbert/Commonwealth Inc. of Michigan and E.C. Jordan Co. [now ABB-Environmental Services, Inc. (ABB-ES)] to determine the nature and extent of the free product gasoline plume, the extent of the gasoline vapor plume, and the stratigraphic variations near Building 33.

The results of these studies indicated that gasoline is trapped in a sand lens under Building 33. The gasoline trapped in the sand lens near borehole B-3 was estimated by E.C. Jordan Co. to be 60 feet in diameter. It was estimated by E.C. Jordan Co. that approximately 2,000 gallons of gasoline may exist in this sand lens, assuming a 20 percent sand porosity.

2.2.3 Geology

The geology in the area of Building 33 has been defined by E.C. Jordan, Inc. and from soil borings drilled by others.

The building floor is underlain by approximately 5 to 15 feet of brown silty sand. Below the silty sand there is 5 to 10 feet of silt or clayey silt. Between 17 and 25 feet below the ground surface there is a sand lens which has been reported to contain the gasoline free product plume. A stiff clayey silt till extends 100 feet in thickness below the sand lens. The clay till, in turn, is underlain by alternating aquifer and aquitard overburden stratigraphic units.

E.C. Jordan, Inc. concluded that the migration (both vertically and horizontally) of free product gasoline has not occurred due to the confining affects of clay till surrounding the sand lens.

2.3 EXISTING FREE PRODUCT COLLECTION SYSTEM

2.3.1 Design

Following the historical investigations discussed in Section 2.2, E.C. Jordan was contracted by GM in the summer of 1989 to design and implement a free product recovery system.

E.C. Jordan considered the following options for design:

1. Recovery Trench

2. Skimmer
3. Dual Pumping System
4. Single Submersible Impeller Pump
5. Suction-Lift Pump
6. Automatic Bailers
7. Air-Displacement Pump

All were rejected for safety, feasibility or implementability reasons, except the air-displacement pump system which was designed and implemented.

The system design criteria were; a minimum free product flow rate of 0.2 gpm, and a maximum free product flow rate of 1.0 gpm. The system layout, as constructed, is presented as Figure 2.2. Water and gasoline were to be extracted from recovery wells RW-1 and RW-2 by Ejector Systems, Inc. Total Fluids Pneumatic Pumps. The locations of the recovery wells are provided on Figure 2.1. The pump would utilize standard Ejector Systems, Inc. controls and operate on air supplied by GM. The pumps discharged via overhead piping to a 115-gallon McTighe Ind. Oil/Water Separator, designed for low flow rates. Gasoline and water were separated and discharged to two 1,000-gallon storage tanks, one for gasoline and one for wastewater. The oil/water separator and storage tanks were placed in a fenced containment dyke outside Building 33.

2.3.2 Ejector Systems, Inc. Total Fluids Pump

The Ejector Systems, Inc. Total Fluids Pump is designed to pump low flow rates via compressed air cyclic ejection. A schematic of the pump is presented as part of Figure 2.2 in the Pump Detail.

Fluids enter by top and bottom intakes. Generally, the pump is set such that water enters from the lower intake and gasoline from the upper take. When the chamber is full (sensed by a pressure inducer or after a cyclic time is reached), compressed air is introduced, closing the intake

valves and forcing collected fluids out the discharge hose. A check valve prevents back-flow from the discharge hose.

2.3.3 Historical Pumping

Table 2.1 presents a review of E.C. Jordan's free product recovery system operation for Building 33.

The recovery well RW-1 and pumping equipment was installed in the summer of 1989 and pumping commenced on August 26, 1989. Progress reports for September 1989 and October 1989 revealed that only small amounts of gasoline were being recovered compared to the volume of water being pumped.

In an attempt to increase gasoline recovery, several changes to the pump were made, including plugging the bottom intake and adding 8 inches of hose to the top intake. In another attempt to increase recovery, RW-2 was installed. The design of RW-2 was identical to RW-1. RW-2 experienced similar recovery problems to RW-1. Operation of both extraction wells continued until November 7, 1989 when the lines to the oil/water separator froze.

During July 24 to 26, 1990, pumping tests were conducted by Asea Brown Boveri (ABB) to test recovery of the gasoline layer. The gasoline recovered in the wells RW-1, RW-2, and MW-117 over a several hour period but the gasoline plume was not stressed long enough to determine long-term pumping effects. It was recommended that the system restart with smaller pumps and other minor retrofits, however, changes were not implemented.

Over the history of the free product recovery system, 112 gallons of gasoline and 3,343 gallons of water were recovered in approximately 3 months of operation, as summarized in Table 2.1. The initial estimate of free product gasoline plume volume was 1,800 to 2,000 gallons.

The gasoline collection system was determined to be ineffective by GM and ultimately shutdown in 1990.

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3.0 PHASE II STUDY AREA INVESTIGATION

Following review of all relevant historical data for the Study Area, it was evident that additional data would be required to satisfy the following data gaps:

i) Has the gasoline plume migrated from its former known location (over the last four years)?
ii) Is there a potential future migration pathway?
iii) What is the extent of gasoline-related constituents which may require remediation?
iv) Is the free product gasoline plume recoverable and by what methods?
v) What are the possible remedial alternatives to the gasoline product and dissolved/vapor phases?

The data collection activities included the installation of 19 additional boreholes and a free product pumping test on the existing gasoline recovery well RW-2. These activities are described further in the following subsections.

3.1 BOREHOLE AND MONITORING WELL INSTALLATION

Nineteen boreholes were installed at the locations identified on Figure 3.1. Four boreholes were installed within the building limits, in the vicinity of the previously defined edge of the free product gasoline plume. These boreholes were installed in an attempt to define the present outer limits of the free product plume. An additional 15 boreholes were installed around the perimeter of the Study Area in order to determine if gasoline constituents had a potential for off-Site migration. All borehole locations were accurately surveyed, and the ground surface elevation measured with respect to mean sea level datum.

All boreholes were installed using a trailer-mounted CME drilling rig. Boreholes were advanced using hollow-stem augers. Standard 2-foot long, 2-inch diameter split-spoon samplers were used to obtain soil

samples at continuous depth intervals. Upon opening each split-spoon sampler, soil samples were immediately screened for any volatile organic compounds (VOC) using a photoionization detector (PID).

Boreholes were advanced to a maximum depth of about 20 feet bgs. Samples which exhibited significant PID concentrations were retained, placed in laboratory supplied sample jars, and submittal for chemical analysis. The analysis included benzene, toluene, ethylbenzene and xylene (BTEX), and lead.

A monitoring well was installed at MW33-1-94 to permit measurement of gasoline plume thickness. The well was constructed of 2-inch schedule 40 PVC, with a 5-foot long #10 slot screen. The screened interval was 16 to 21 feet bgs. The screen was provided with a sand pack, and the remaining borehole annulus was backfilled with bentonite chips and powder. A flush mounted surface casing and concrete seal were installed to complete the well. Logs of all boreholes and the monitoring well are presented in Appendix A.

3.2 FREE PRODUCT PUMPING TEST

A free product pumping test was conducted by CRA to determine the feasibility of collecting the gasoline free product utilizing an extraction well method.

The pumping test was conducted using a low flow peristaltic pump in order to determine the optimum gasoline recovery rate. Gasoline was pumped to a 55-gallon drum. The pumping test continued for 7.4 hours in order to stress the hydraulic conditions in the sand lens and to determine possible long-term recovery conditions. The level of gasoline and water were measured continuously during the pumping test. Following pumping, the plume was permitted to recover and was monitored.

4.0 SUBSURFACE CONDITIONS

4.1 SUBSURFACE SOIL CONDITIONS

This section presents a summary of subsurface soil conditions encountered at the Site. Complete details of subsurface soil conditions encountered are presented in the borehole and monitoring well logs presented in Appendix A.

4.1.1 Soils Underlying Building 33

Soils underlying Building 33 are defined by boreholes BH-1-94 to BH-4-94, B-1 to B-7, B-9 and B-10. All borehole locations are presented on Figure 3.1.

The soils below the building are comprised of a heterogeneous mixture of sands, silts and clays. The stratigraphy indicates that the hydrogeologic properties of the subsurface soils are heterogeneous and anisotropic in both the vertical and horizontal directions.

Two cross-sections, one north-south (Figure 4.2), and the other east-west (Figure 4.3), were prepared as located on Figure 4.1. Both cross-sections were prepared using new and historical subsurface data.

4.1.2 Study Area Soils

Study Area soils not overlain by structures are defined by boreholes BH-33-5-94 to BH-33-19-94, BH-8, BH-11, BH-20, BH-23 to BH-28, MW-104 to MW-107, and MW-113 to MW-114. All locations are shown on Figure 4.1. A fine to medium sand layer extends from 0 to 10 feet bgs. The sand is underlain by the stiff clayey silt till that extends to approximately 100 feet bgs. At some areas of the Site, the till unit appears at ground surface. Other areas of the Site have layers of fill overlying the sand or till units. The

stratigraphy is generally heterogeneous and anisotropic in the horizontal and vertical direction.

4.2 ANALYTICAL RESULTS

This subsection presents the analytical results of the subsurface soil samples.

Samples were collected during borehole installation, as described in Section 3.1, and subjected to chemical analysis for BTEX and total lead constituents. Analytical results are tabulated in Table 4.1 and plotted on Figure 4.4.

4.2.1 BTEX

BTEX was reported at each of the boreholes installed inside Building 33. In BH33-1-94, benzene was reported at 21 µg/kg from 11 to 12 feet bgs, at 200,000 µg/kg from 15.5 to 16 feet bgs, at 9,100 µg/kg from 16 to 18 feet bgs and at 8,300 µg/kg from 20 to 22 feet bgs. Toluene was reported at 16, 690,000, 28,000, 1,300 and 1,500 µg/kg at 11 to 12, 15.5 to 16, 16 to 18, 18 to 20 and 20 to 22 feet bgs, respectively. Ethylbenzene was reported at 240,000, 11,000, 820 and 390 µg/kg at 15.5 to 16, 16 to 18, 19 to 20 and 20 to 22 feet bgs, respectively. Xylenes were reported at 1,200,000, 61,000 3,300 and 2,800 µg/kg at 15.5 to 16, 16 to 18, 18 to 20 and 20 to 22 feet bgs, respectively.

In BH33-2-94 benzene was reported at 400 µg/kg at 9.08 to 10 feet bgs, 600 µg/kg at 10.58 to 12 feet bgs and 3,000 µg/kg at 14 to 16 feet bgs. Ethylbenzene was reported at 1,300 µg/kg at 9.08 to 10 feet bgs, 1,600 µg/kg at 10.58 to 12 feet bgs and 3,000 µg/kg at 14 to 16 feet bgs. Toluene was reported at 1,200 µg/kg at 9.08 to 10 feet bgs 2,600 µg/kg at 10.58 to 12 feet bgs and 13,000 µg/kg at 14 to 16 feet bgs. Xylene was reported at 6,800, 11,000, and 5,000 µg/kg at 9.08 to 10, 10.58 to 12 and 14 to 16 feet bgs, respectively.

Benzene was reported in BH33-3-94 at 2,300 µg/kg at 16 to 18 feet bgs. Ethylbenzene, toluene and xylene were reported at 4,400, 1,900 and 7,000 µg/kg at 16 to 18 feet bgs, respectively.

Duplicate samples were taken at 16 to 18 feet bgs for BH33-4-94. Benzene was reported at 320 and 350 µg/kg. Toluene was reported ranging from 12,000 and 18,000 µg/kg. Ethylbenzene was reported to range from 13,000 to 22,000 µg/kg and xylene was reported to range from 67,000 to 96,000 µg/kg.

Outside of the Building 33 footprint, BTEX was reported at three borehole locations, BH33-13-94, BH33-14-94 and BH33-19-94.

Benzene was reported in BH33-13-94 at 180 µg/kg at 15 to 17 feet bgs. Toluene and xylene were reported at 3,500 and 17,000 µg/kg, respectively.

Laboratory duplicates were completed on the sample collected at BH33-14-94 at a depth of 13 to 15 feet bgs. Ethylbenzene was reported at 22 and 45 µg/kg. Toluene was reported at 14 µg/kg and xylene was reported to be below the detection limit and at 24 and 50 µg/kg.

Benzene was reported in BH33-19-94 at 18 to 19.2 feet at 140 µg/kg. Ethylbenzene was reported at 150 and 13 µg/kg at 18 to 19.2 feet bgs and 20 to 22 feet bgs, respectively. Toluene was reported at 18 to 19.2 feet bgs at 22 µg/kg and xylene was reported at 85 µg/kg at 18 to 19.2 feet bgs.

4.2.2 Lead

Lead was reported within all samples at concentrations ranging from 0.48 to 25 mg/kg (see Table 4.1).

4.3 GRAIN SIZE ANALYSIS

Four soil samples were collected and submitted to a geotechnical laboratory for grain size analysis. The laboratory reports for the grain size analyses are presented in Appendix B. All four samples were described as silty sand.

4.4 PUMPING TEST RESULTS

The results of the pumping test are summarized on Table 4.2 and are presented schematically on Figure 4.5. Table 4.3 presents the measured thickness of the gasoline plume at various wells.

At the start of the test, approximately 22 inches of gasoline was measured in RW-1. Despite maintaining very low pumping rates (0.4 to 3.5 gallons per hour), gasoline levels were drawn down to a negligible thickness in about 6 hours. It was also observed that, as the gasoline levels were drawn down, water levels rose.

Following drawdown test completion, gasoline recovery into the well occurred at a very slow rate, recovering only 1.4 inches in about 16 hours.

During the drawdown portion of the test a total of about 7 gallons of gasoline were removed from the well. This is somewhat more than the storage available within the well casing, which was calculated to be about 1.2 gallons. Therefore, the test did remove gasoline from the surrounding geologic formation.

In the 16-hour recovery phase of the test, about 0.08 gallons of gasoline had recovered into the well casing. This constitutes a very slow recovery rate of about 0.005 gallon/hour or 42 gallons/year. At this rate, the collection of the entire plume would require approximately 40 years (utilizing a single recovery well). This approach is considered to be impractical, particularly since the heterogeneous nature of the soils would

not permit collection of all free flowing gasoline (i.e., some free product would remain in the soil pores at residual saturation levels).

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5.0 EXTENT OF GASOLINE FREE PRODUCT AND VAPOR PLUMES

This section presents the extent of gasoline migration in soils, as interpreted from previous and current investigations.

5.1 APPROPRIATE EVALUATION CRITERIA

The current and reasonably foreseeable future land use of the Building 33 Study Area is industrial. As a result, MDNR Type B and Type C (Generic Industrial Cleanup Values) criteria have been used to assess the extent of soil contamination requiring remedial activities.

The contaminant exposure pathways which are of primary concern include:

i) Migration of gasoline constituents outside of the property boundary at concentrations greater than the Type B Direct Contact soil criteria.
ii) Human contact with gasoline constituents at concentrations greater than the generic Type C Direct Contact Criteria (or Site-specific Type C values).
iii) Accumulation of gasoline vapors in confined areas, or spaces, where the threat of ignition is possible (i.e., welding torches, etc.)

Ingestion of gasoline constituents through drinking water is not considered to be a possible exposure pathway. Building 33 is supplied with municipal water and as such local groundwater would not be ingested. Also, the first exploitable aquifer is located 120 feet below grade, and is protected by approximately 100 feet of low permeability clay soils. As such, it is believed that gasoline constituents will not affect the local aquifers.

5.2 EXTENT OF FREE PRODUCT

Figure 5.1 presents the extent of the free product gasoline plume defined during the historical and recent investigations at the Site. The

gasoline was encountered at depths of approximately 15 to 19 feet bgs within sand and/or silt lenses. The size and extent of the plume has not changed significantly since the time of the initial 1985 investigations.

5.3 EXTENT OF GASOLINE VAPORS

Figure 5.1 also presents the extent of soils containing petroleum odors (gasoline vapors) identified at the Site. Gas vapors extended over a large portion of the Study Area, including approximately two thirds of the building area. These odors were verified in the CRA boreholes by means of PID analysis as presented on the borehole logs (see Appendix A).

5.4 ANALYTICAL DATA

Figure 4.4 presented the results of the chemical analysis performed on soil samples obtained from each borehole. The data indicated that there are two sources for BTEX compounds at the Site. The first is the gasoline plume below Building 33. A second source seems to be associated with the existing USTs at Building 35.

Table 5.1 presents the applicable cleanup criteria associated with the BTEX and lead constituents encountered at the Site. Criteria for lead were not surpassed by any of the concentrations reported in the samples.

The concentrations of all BTEX compounds reported for all samples were below both the Type B and Type C Direct Contact criteria. This indicates that BTEX is not a concern to persons coming into direct contact with these soils. Notwithstanding, the gasoline plume is located at approximately 17 feet below grade and, as such, no one could come into contract with it.

The Michigan Type B 20X Drinking Water Soil Cleanup Standards are not considered applicable soil standards at this Site due to the lack of a defined aquifer below the Study Area. It should be noted, however,

that BTEX compounds were identified at the lateral extent of the limit of the sampling investigation and as a result the full horizontal limit of possible contamination is unknown.

At borehole BH33-19-94, the concentration of benzene was reported to be 140 µg/kg at a depth of 18 to 19.2 feet. Currently there is no lateral confirmation to indicate that benzene is confined to the Site. It must also be noted, however, that the 20 to 22-foot sample did not detect benzene. Also, the heterogeneous nature of Site soils would generally restrict the lateral movement of these constituents.

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6.0 REMEDIAL ALTERNATIVES EVALUATION

Gasoline free product was encountered below Building 33 within a sand lens surrounded by silty and clayey soils. This geologic condition has created a hydraulic trap which appears to have controlled the migration of gasoline. This heterogeneous condition, although advantageous with respect to the migration of the gasoline, is generally detrimental to its collection.

This section presents gasoline recovery and control technologies and possible alternatives which were considered potentially feasible for the Site conditions encountered. The advantages and disadvantages of each are discussed.

Each technology will be discussed in terms of its ability to mitigate the exposure pathways described in Section 5.1. It should also be noted that Direct Contact is not a concern based on the reported BTEX and lead concentrations, as presented in Section 5.0.

6.1 TECHNOLOGIES REVIEW

The following presents a review of viable technologies which could be used individually or in combination to formulate remedial alternatives for the Site.

6.1.1 Institutional Controls/Monitoring

The "Institutional Controls" option may be prudent at this time for the Site, due to the poor predicted performance of the extraction remedies, and the infeasible nature of the excavation remedy. Provided that suitable monitoring is conducted to ensure that gasoline vapors do not enter the building, and gasoline free product or vapors do not migrate off Site, then the exposure pathways delineated in Section 5.1 would not be a concern. It is noted that the remedy is limited until the time that significant migration is

identified. At that time an active remedy will be required (dependent upon monitoring).

6.1.2 Free Product Extraction

Free product extraction was conducted by GM in 1991 with limited success. Although this can be partially attributed to the design of the pumping equipment used, the major inhibitor to adequate free product removal was the poor recovery rate of gasoline into the recovery wells. This poor recovery rate, in turn, can be attributed to the low permeability of the soils, and the inability to produce an effective gradient at the gasoline groundwater interface due to the limited sand lense height.

This poor recovery condition was confirmed by a pumping test conducted by CRA, as described in Sections 3.2 and 4.4. Based on the reported rate of recovery a significant period of time would be required to collect the gasoline plume by an extraction method.

To increase the rate of gasoline recovery, additional recovery wells would be required. The installation of additional recovery wells within Building 33 may not be possible due to ongoing operations and limited space. As a result, this option is not considered reasonably feasible or cost effective at present time.

As a result, the extraction technology would not mitigate any of the exposure pathways described in Section 5.1.

6.1.3 In Situ Vapor Extraction (ISVE)

ISVE is not considered to be suitable as an independent remedial technology for this Site because of the significant length of time that would be required to clean up the contaminants. As such, only ISVE control technologies that may be suitable for containing the migration of gaseous contaminants in the subsurface soils will be considered. Determination of the

implementability, effectiveness and cost of these control technologies will require further evaluation.

At least ten years have passed since the original release of liquid gasoline, so it is conceivable that a significant proportion of the gasoline will be present in the subsurface pores at residual saturation levels, thus making it relatively immobile, even under vapor pumping conditions. The absence of continuous groundwater at the Site would indicate that the only significant pathway for gasoline migration is in the soil gas phase.

ISVE control technologies that may be suitable at the Site are in situ soil vapor extraction and injection wells or trenches combined with a soil gas treatment system. Conceptually, the ISVE wells or trenches would be designed to prevent the migration of contaminated soil gas beyond the perimeter of Building 33, and would also be designed to prevent the accumulation of contaminated soil gas below the building. A recirculation system would be established to provide continuous flushing of the contaminated soil pores below the building. The active or passive injection of treated air is very important because it provides a relief point for the pressure buildup that would otherwise occur below the asphalted/concrete surface. It also increases the rate of gas flushing through the affected soil.

The soil vapor extraction and injection trenches would be more suitable at this Site than individual wells because the extensive presence of silt and clay materials will result in highly inefficient wells that may be only locally effective within the vicinity of the wells. A trench system would provide a more effective, efficient and predictable means of flushing soil gas (in addition to providing significantly improved vapor control) below the building than that of a spatially variable well network. However, the ability to construct a trench system must be evaluated based on existing subsurface structures (e.g., utilities).

Utilizing ISVE as a control technology would also result in the capture of contaminated soil gas that may have already migrated beyond the perimeter of Building 33. The asphalt/concrete cover at the ground surface prevents the short-circuiting of clean atmospheric air to the

extraction system that would otherwise require substantially higher soil gas extraction rates. This may be useful in remediating the elevated concentration of BTEX constituents beyond Building 33 (e.g., BH33-19-94).

ISVE control would prevent further migration of gasoline vapors and as such reduce the concern of off-Site migration of BTEX concentrations exceeding MDNR criteria. Although it may reduce the possibility of infiltration of gasoline vapors into the building, it would not eliminate them, and as such some concern would remain with respect to migration of gasoline vapors into the building.

6.1.4 Horizontal Drilling for Product Recovery and/or ISVE

Horizontal drilling is a method which may be used to install a horizontal collection drain into the substratum without the need for extensive excavation. Once drilling is complete, well screen and casing can be installed with dimensions up to 16 inches in diameter.

Horizontal Drilling provides many technical advantages including the ability to place a greater amount of well screen in the contaminated zone which improves well performance and reduces the number of pumps, wells, and connections for a given Site.

Horizontal drilling provides many benefits including; increased surface area/capture zone; reduction in cleanup times; access to traditionally inaccessible Areas; and minimal disruption to on-Site operation.

Horizontal drilling can be attempted at the Building 33 Site for both product recovery and for vapor collection and control. Figure 6.1 presents a cross-section of the Site with a schematic of the installation of product recovery and ISVE wells. The non-homogeneous conditions encountered at the Site would reduce the effectiveness of any individual horizontal installation, similarly to the effects on horizontal borings. As a result, it is necessary to complete a pilot study on a single installation to

determine its effectiveness and in order to determine the number and location of additional horizontal installations.

6.1.5 Excavation

Due to the heterogeneous nature of the soils below Building 33, excavation is considered the most effective means for the removal of gasoline product and vapors below the building. However, this would necessitate either the demolition of the portion of building above the plume, or support of the ceiling to permit excavation.

There would be three options for soil excavation. These options include; demolishing a portion of the building, supporting the ceiling across one bay or supporting the ceiling across several bays. This option may be used for free product removal, or for removal of all affected soils.

Each option would include excavating the soils to remove the gasoline product, replacing the contaminated soils with clean fill and reconstructing the portion of the building that had been demolished.

Excavation and removal of all affected soils from the Site to a licensed landfill or treatment facility would effectively remove all concerns regarding gasoline contact or migration. The only feasible way of accomplishing this and making it most effective would be to demolish a portion of the building, excavate, and reconstruct.

6.2 REMEDIAL ALTERNATIVES EVALUATION

The remediation of the gasoline and related constituents could be conducted utilizing a variety of technologies which may be implemented under varying schedules. Many of the options, and associated remediation schedules, are dependent upon GM's planned use of Building 33. Certain alternatives can not be implemented effectively until after the building has been demolished.

The alternatives evaluation presented in this section has been developed consistent with the MERA Act 307 regulations. The range of alternatives considered includes:

1. No Action:
   - Monitoring only;

2. Institutional Controls:
   - Land use restrictions,
   - Monitoring;

3. Containment with ISVE:
   - ISVE for vapor control,
   - Land use restrictions,
   - Monitoring;

4. Containment with ISVE/Product Collection:
   - Product collection,
   - ISVE for vapor control,
   - Land use restrictions,
   - Monitoring; and

5. Gasoline Recovery and/or ISVE using Horizontal Drilling
   - Horizontal drilling,
   - Product collection,
   - ISVE for vapor control,
   - Land use restrictions,
   - Monitoring; and

6. Excavation/Treatment/Disposal:
   - Excavation of materials exceeding cleanup standards,
   - Treatment and/or disposal,
   - Land use restrictions, if required,
   - Monitoring, if required.

DRAFT

Each alternative will be evaluated based upon environmental compliance, technical feasibility and cost. It should be noted that the costs presented below include capital installation costs only.

1. No Action Alternative

The No Action alternative would involve the completion of no further actions except monitoring of existing wells and new wells, if necessary. This alternative would also include a periodic review of Site conditions such that another alternative could be implemented if Site conditions are determined to degrade.

This alternative would likely include the installation of 4 to 8 shallow wells to a depth of approximately 10 feet, to permit monitoring of the movement of gasoline vapors.

A. Environmental Compliance

- No, does not meet LUST or Act 307 requirements, and
- Safety hazards would remain.

B. Technical Feasibility

- Yes.

C. Cost

- Low (less than $30,000).

2. Institutional Controls

Alternative 2 would involve the implementation of institutional controls to ensure that the presence of free product and vapors below the building is well understood by all persons working within the building and that actions are taken to mitigate contact with the materials. Action would include limiting the activities in the building,

installing automatic alarm systems and implementing emergency plans.

The institutional controls would be implemented to ensure the safety of personnel working inside and outside of the building. Within the Building, several Lower Explosive Limit (LEL) meters, calibrated for gasoline, would be installed at the locations of possible open sparks or flames. Where no LEL meter is present, no open flames or sparks should be permitted. This concept must be introduced into the health and safety training of all workers on Site, including maintenance staff or outside contractors who may be required to excavate soils. Also, a health and safety plan should be prepared which includes details of the monitoring equipment and provides a plan of action in case of emergency.

Alternative 2 would also include the components from Alternative 1, thereby allowing remediation at a later time as warranted.

A. Environment Compliance

- Yes, could meet LUST or Act 307 requirements, and
- Will likely require a contingent remedy to Alternatives 3, 4, 5, or 6.

B. Technical Feasibility

- Yes, and
- Minimum remedial alternative currently required.

C. Cost

- Low to medium ($50,000 to $100,000).

3. Containment with ISVE

Alternative 3 includes the installation of a vapor collection system. The system would be comprised of a series of extraction wells or trench designed to capture vapors within the outside of the Building 33 footings. This alternative would also include the components of Alternative 2.

The design of the ISVE system would require that a vapor extraction zone be developed along the southern perimeter of the building. The extraction zone could include either a group (15 to 20) of evenly spaced wells or a trench system. Based on monitoring conducted during the operation of the system it may become necessary to improve the effectiveness or efficiency of vapor extraction by installing an injection system at strategic locations. This inject system would also consist of either a group of wells or trench(es). The costs presented below represent those which would be incurred by the installation of the vapor extraction system only.

A. Environmental Compliance

- Yes.

B. Technical Feasibility

- Yes,
- More protective than Alternative 2,
- Would support implementation of Alternative 6 at a later date.

C. Cost

- Medium to high ($200,000 to $320,000).

4. Containment with ISVE/Product Collection

Alternative 4 involves the installation of a product collection system in addition to the components of Alternative 3. The additional component of product collection will serve to further contain the contamination, in addition to supporting final remediation activities at a later date [e.g., excavation, treatment and/or disposal (Alternative 6)].

Product collection could be enhanced by the installation of 4 additional extraction wells, similar in construction to the existing wells. The wells would be equipped with gasoline skimmer pumps which would remove gasoline while minimizing the amount of water pumped. The new wells would be connected to the existing system which includes the oil/water separator and product storage facilities. The existing system would also be retrofitted for year-round operation.

A. Environmental Compliance

- Yes.

B. Technical Feasibility

- Yes,
- More protective than Alternatives 2 or 3,
- Would support implementation of Alternative 6 at a later date.

C. Cost

- Medium to high ($35,000 to $470,000).

5. Gasoline Recovery and/or ISVE Using Horizontal Drilling

Alternative 5 involves the installation of a product collection system in addition to Alternative 3 using Horizontal Drilling. Horizontal drilling provides many technical advantages including the ability to

place a greater amount of well screen in the contaminated zone which improves well performance and reduces the number of pumps, wells, and connections for a given Site.

Horizontal drilling could enhance the methods discussed in points 3 and 4, above. A pilot test would be necessary to further evaluate this method for product collection or ISVE.

The costs presented below represent those which would be incurred by using horizontal drilling as a means for installing the ISVE and recovery system.

A. Environmental Compliance

- Yes.

B. Technical Feasibility

- Yes,
- More effective and likely more protective than Alternatives 2, 3, or 4.

C. Cost

- Medium to high ($80,000 to $450,000).

6. Excavation/Treatment/Disposal

Alternative 6 would comprise the final remediation activity for the Site. This alternative is currently limited from implementation due to facility operations.

There were three options considered for the building prior to soil excavation. The first option was demolishing a portion of the building, excavating the contaminated soils, backfilling with clean fill, and rebuilding. This is considered to be a feasible option.

DRAFT

The other options of underpinning the building and supporting the roof, prior to excavating was deemed totally impractical. If this option was attempted, it would cost at least twice the above option. The problems with this method included the cost of support the extensive concrete volumes used in the roof and column members. Also, excavation of soils would be impaired by the small areas inside the building.

Additional costs that would be incurred using option 1 would be the cost removing GM equipment in the building, relocating, and setting up elsewhere.

In order to provide a cost estimate for soil removal, it was assumed that a range of 30,000 to 50,000 cubic yards would require excavation at a cost of between $30 and $100 per cubic yard for disposal or treatment.

A. Environmental Compliance

- Yes.

B. Technical Feasibility

- Yes.

C. Cost

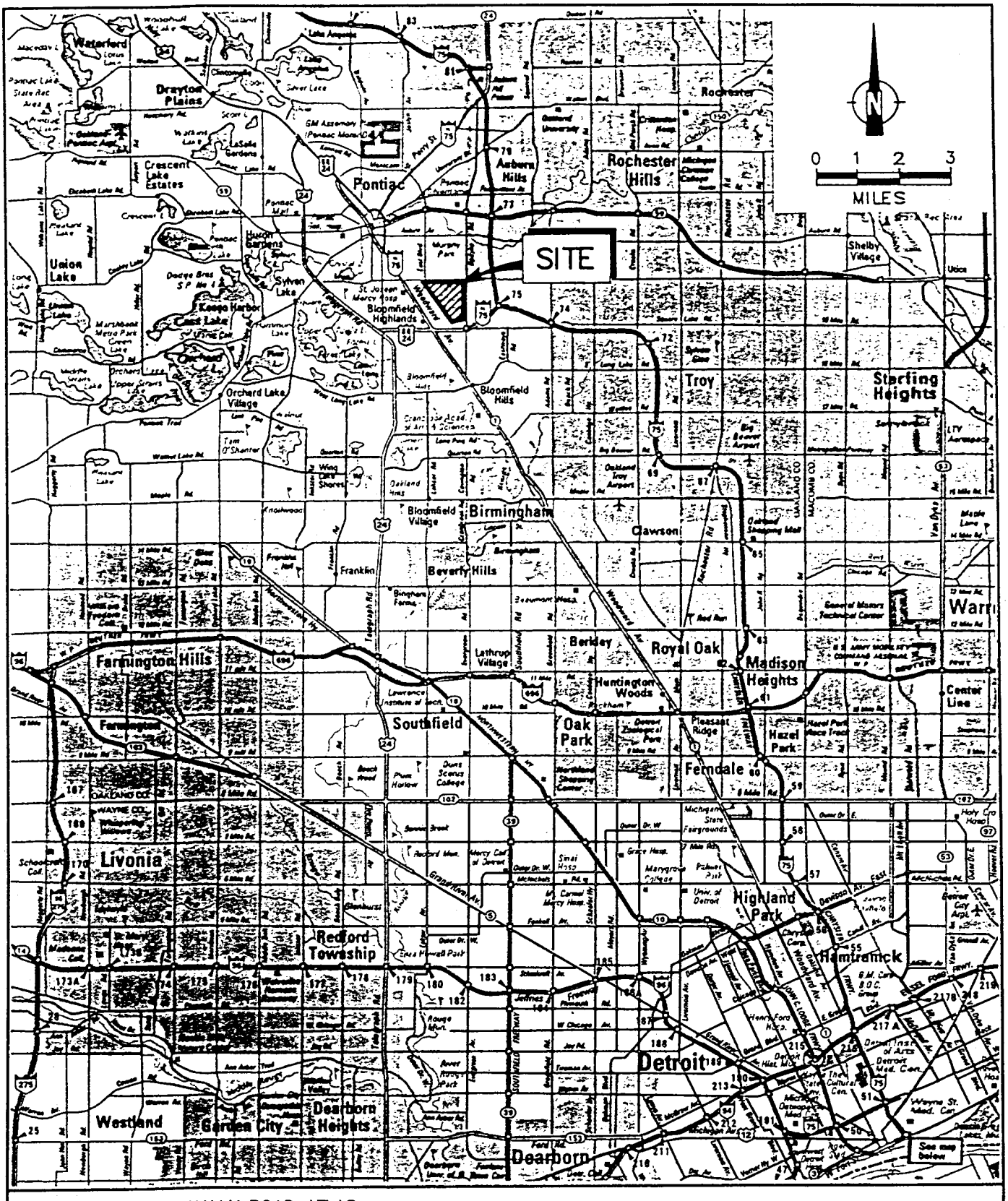
- Very high ($4,000,000 to $8,000,000 for demolition of one quarter of building).

6.3 SUMMARY

The final choice of a remedial or containment technology should be based on the expected long-term use of the building. It should be noted that a combination of technologies may be appropriate to accomplish

maximum control of the gasoline plume and vapors. Such a combination could include excavation and removal of vapor contaminated soils outside of the building footprint, testing and closure of unused USTs, installation of ISVE as a vapor control technology, monitoring of vapors within and outside the building, and free product collection by the horizontal drilling method.

DRAFT



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 3/94 (W) REV.0

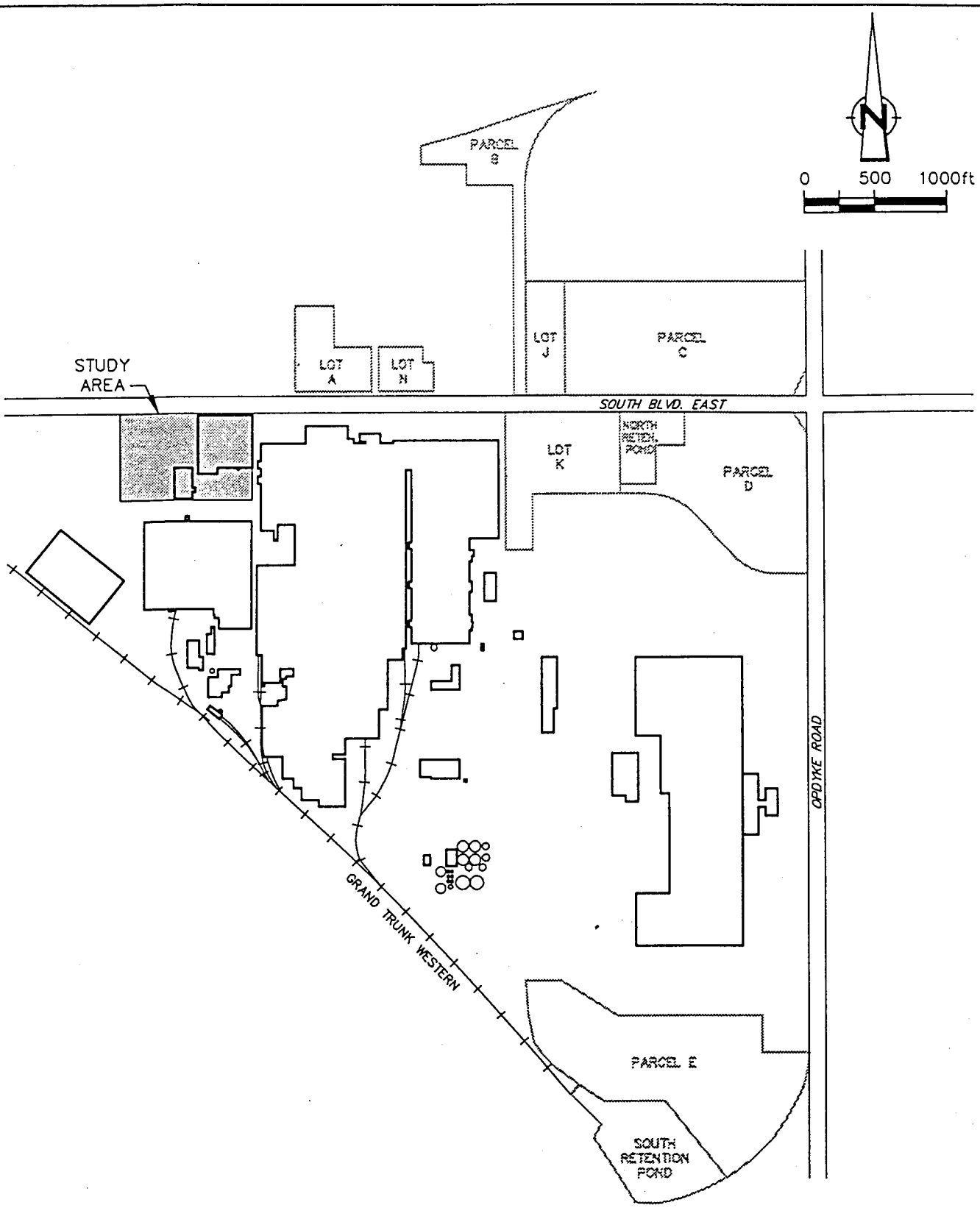


figure 1.2

SITE PLAN
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (P-29)

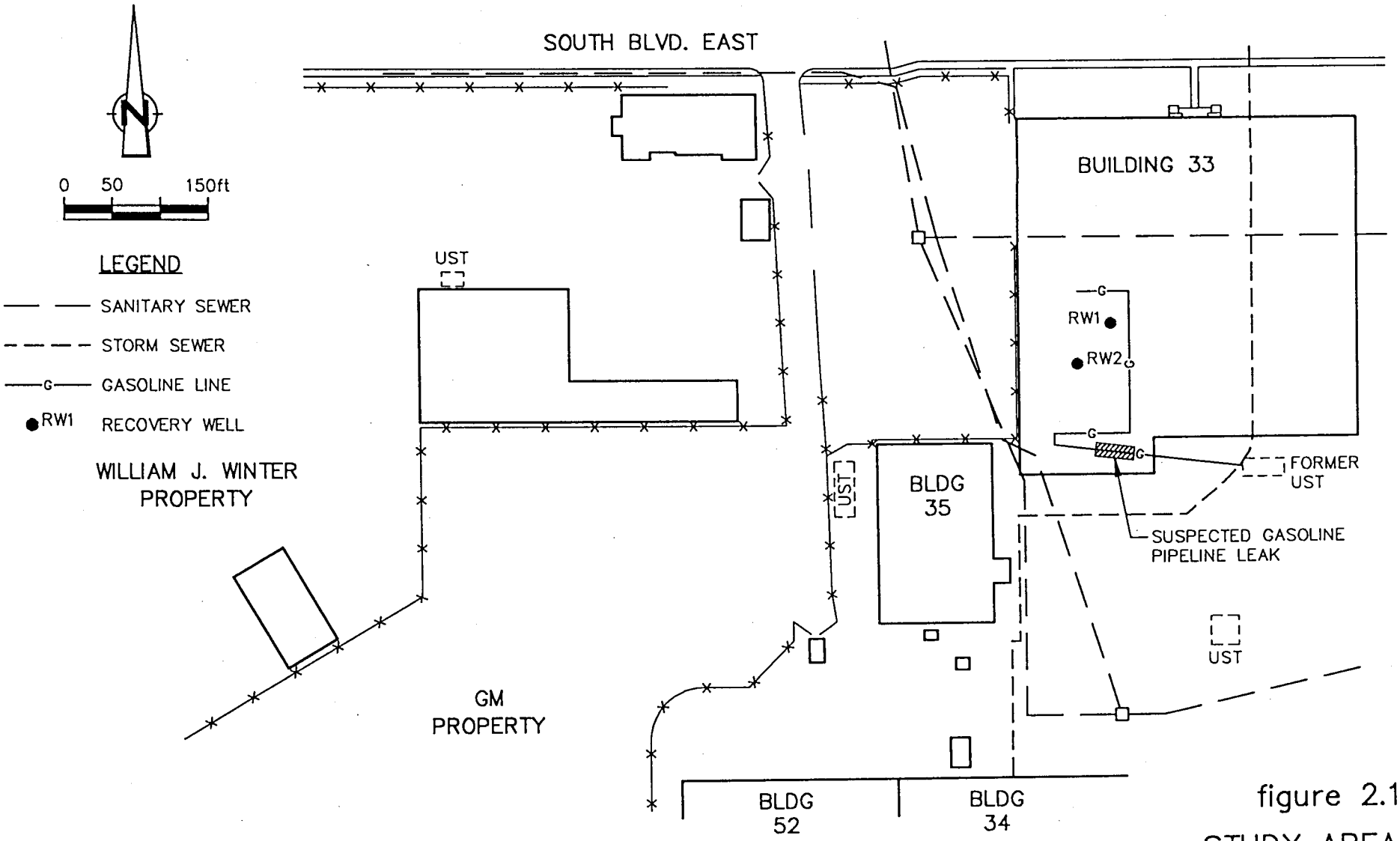
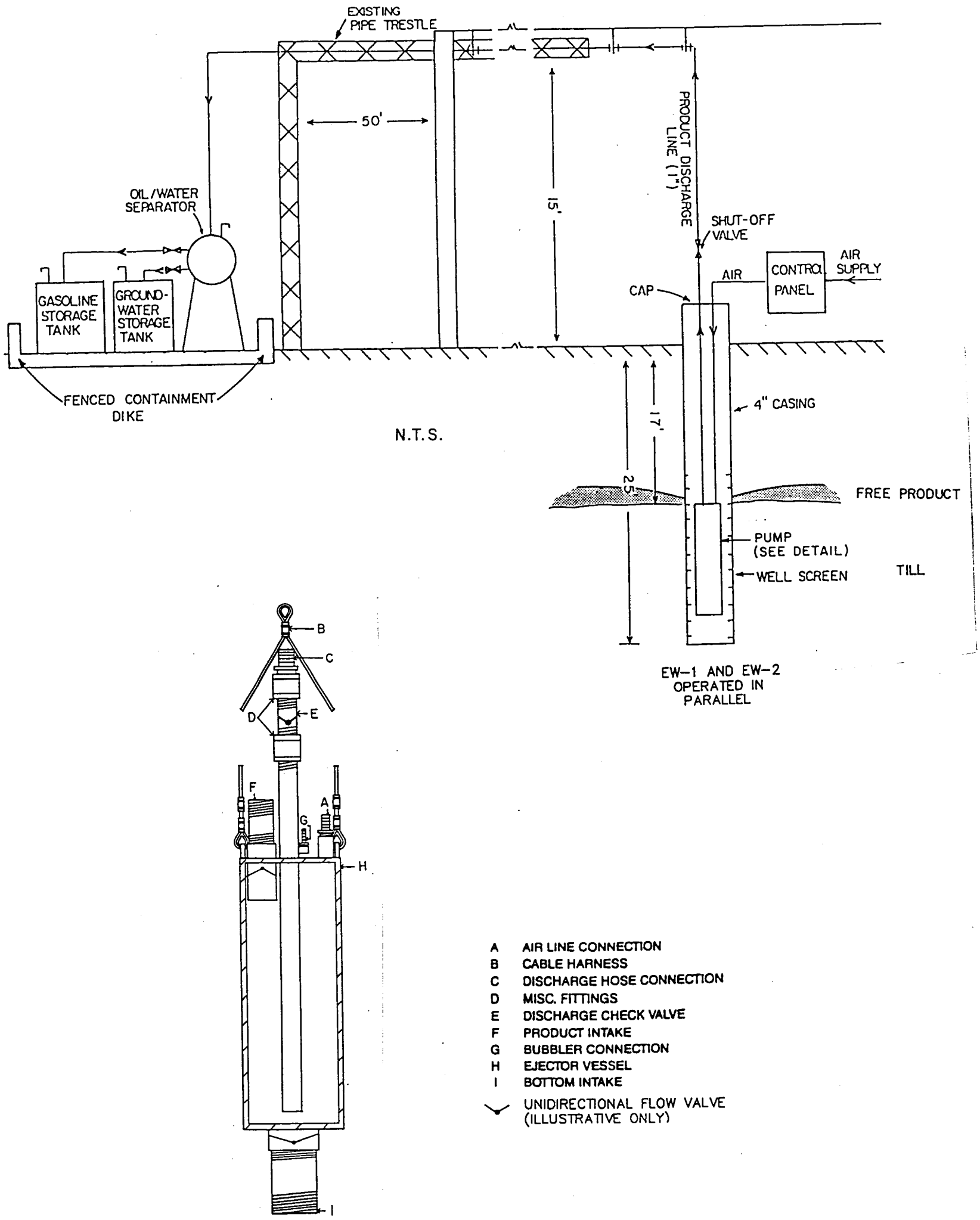


figure 2.1

STUDY AREA
BUILDING 33 – FRREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (P-30)



N.T.S.

EW-1 AND EW-2 OPERATED IN PARALLEL

PUMP DETAIL

A AIR LINE CONNECTION
B CABLE HARNESS
C DISCHARGE HOSE CONNECTION
D MISC. FITTINGS
E DISCHARGE CHECK VALVE
F PRODUCT INTAKE
G BUBBLER CONNECTION
H EJECTOR VESSEL
I BOTTOM INTAKE

UNIDIRECTIONAL FLOW VALVE (ILLUSTRATIVE ONLY)

SOURCE: CONCEPTUAL DESIGN OF FREE PRODUCT RECOVERY SYSTEM, E.C. JORDAN Co., APRIL 1988. FREE PRODUCT RECOVERY SYSTEM DESIGN MANUAL, C-E ENVIRONMENTAL, INC., JUNE 1989.

figure 2.2

EXTRACTION SYSTEM SCHEMATIC
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 3/94 (W) REV.0

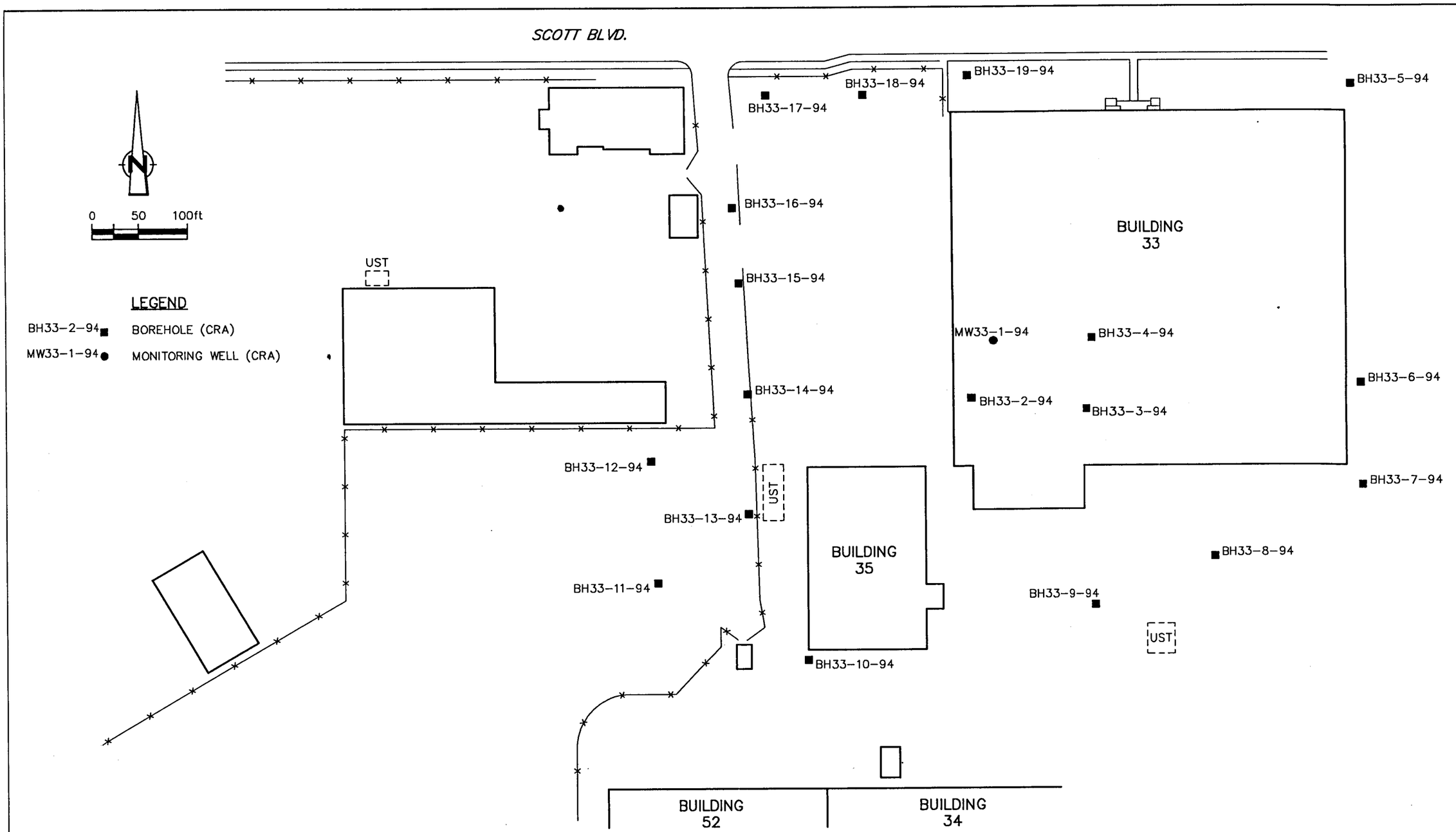


figure 3.1

SURVEYED BOREHOLE AND MONITORING WELL LOCATIONS
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (P-31)

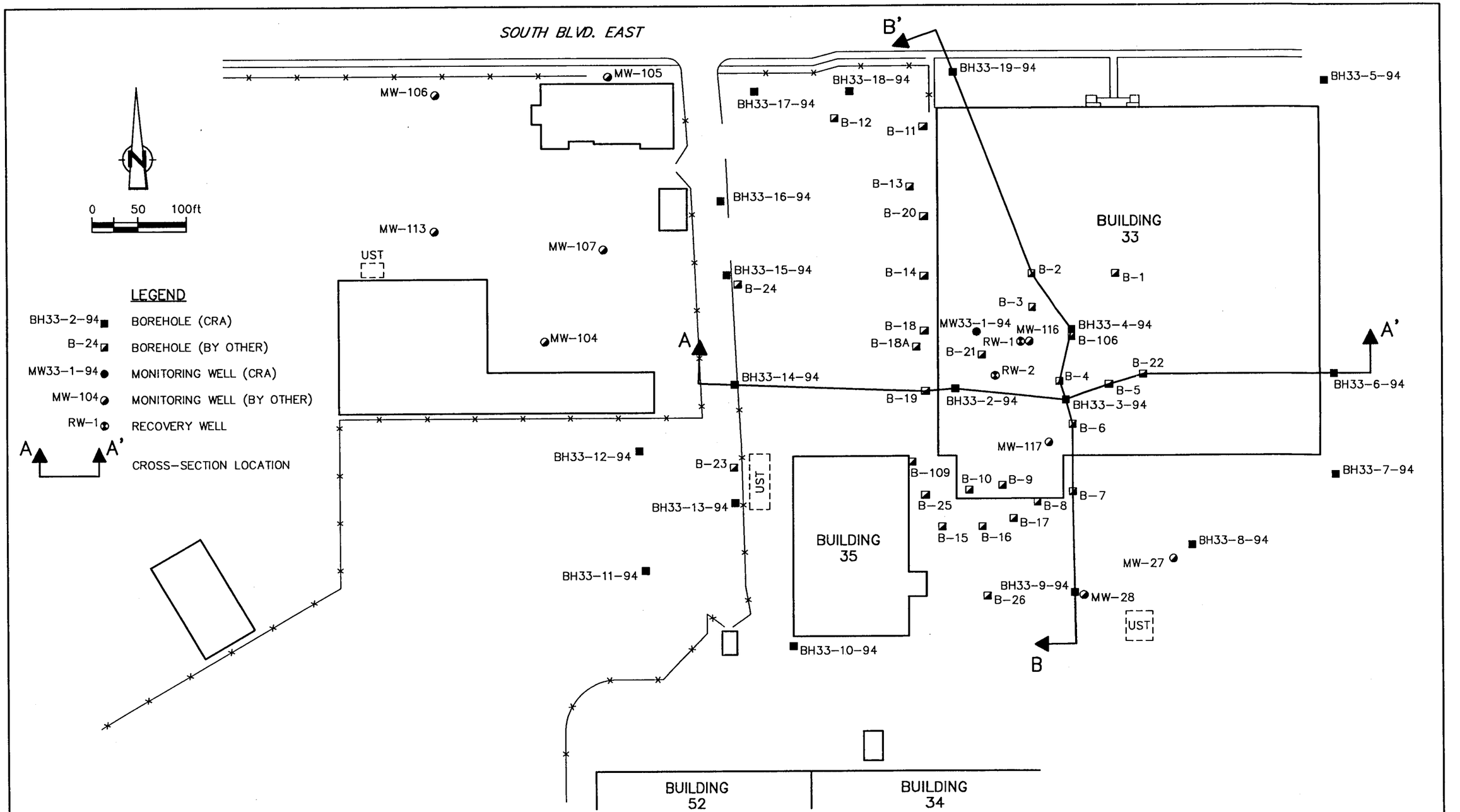
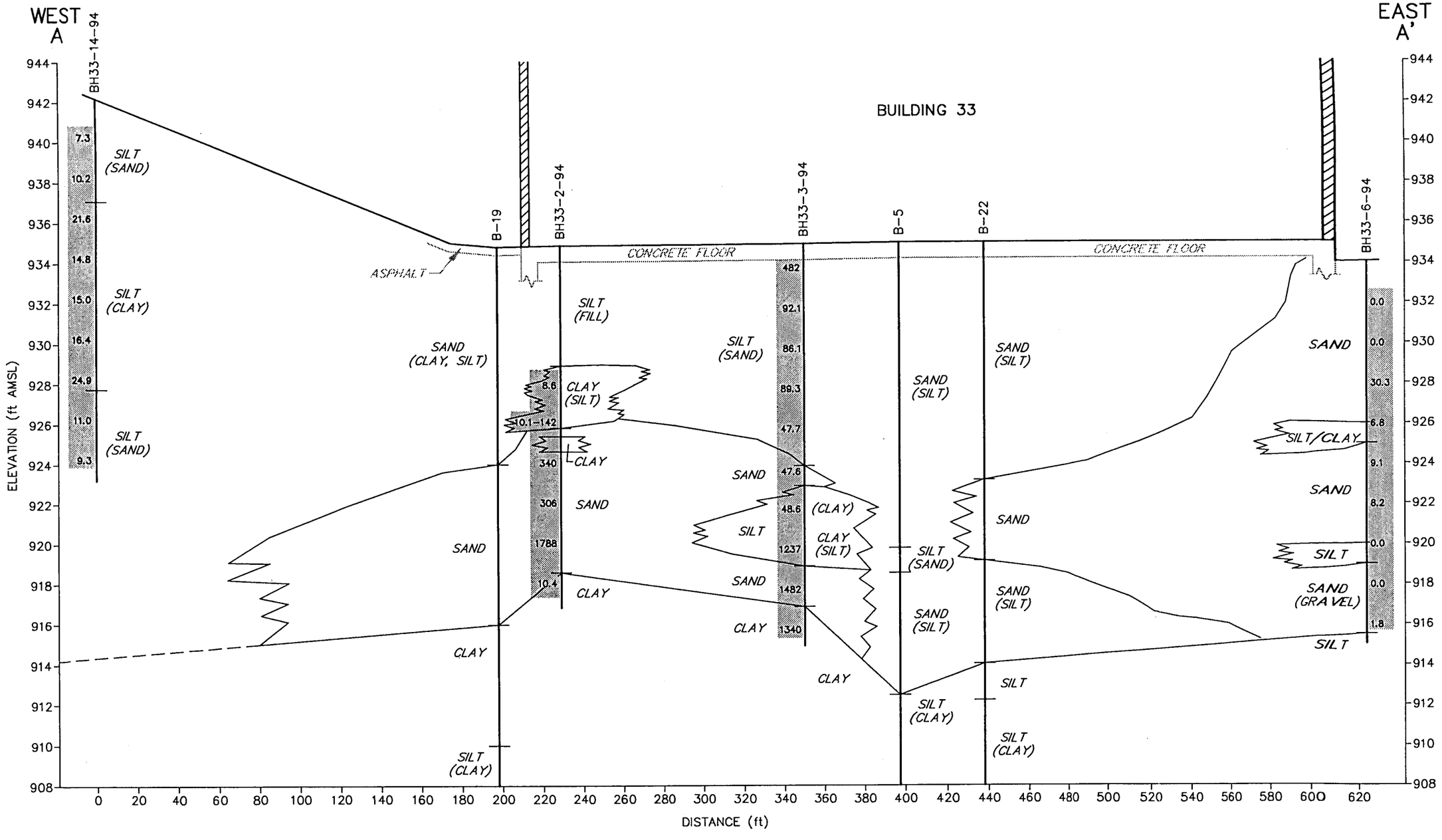


figure 4.1

CROSS-SECTION LOCATIONS
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (P-32)



LEGEND

10.4 PID READING (ppm)

figure 4.2

CROSS-SECTION A-A'
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (X-08)

SOUTH
B

NORTH
B'

BUILDING 33

BH33-9-94 | B-7 | B-6 | BH33-3-94 | B-4 | BH33-4-94 | B-2 | BH33-19-94

CONCRETE FLOOR

ASPHALT

TOPSOIL

BH33-9-94		BH33-3-94		BH33-4-94		BH33-19-94	
4.5	SILT (CLAY)	482	SILT (SAND)	14.0	SAND (SILT)	0.0	SAND (CLAY)
0.0		92.1		7.9		0.0	CLAY
49.1		86.1	SAND (SILT)	0.2		0.0	SAND (CLAY)
19.5		89.3		7.3		1.2	CLAY
42.0	SAND	47.7	SILT (CLAY)	2.2	CLAY (SILT)	0.0	
6.9	COARSE SAND	47.6	SAND	6.5	SAND	5.9	SAND
2.9	SILT (CLAY)	48.6	SILT (CLAY)	11.9	CLAY	0.3	
10.9	SAND	1237	CLAY (SILT)			1.0	CLAY (SAND)
24.9		1482	SAND	1548	SILT (SAND)	0.0	SAND
1.1	CLAY (SILT)	1340	CLAY	1300	SILT (CLAY)	0.1	CLAY (SAND)
22.8						0.2	
0.0	CLAY						
2.1							

SILT (CLAY) — CLAY (SAND) — SAND (GRAVEL CINDERS SILT) — SILT (CLAY) — SILT (SAND) — SAND (SILT) — SILT (CLAY) — SAND (SILT) — SAND (CLAY,SILT) — SILT (CLAY)

ELEVATION (ft AMSL)

944 942 940 938 936 934 932 930 928 926 924 922 920 918 916 914 912 910 908

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 400 420 440 460 480 500 520 540

DISTANCE (ft)

LEGEND

24.9 PID READING (ppm)

figure 4.3

CROSS-SECTION B-B'
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 05/94(W) REV.0 (X-09)

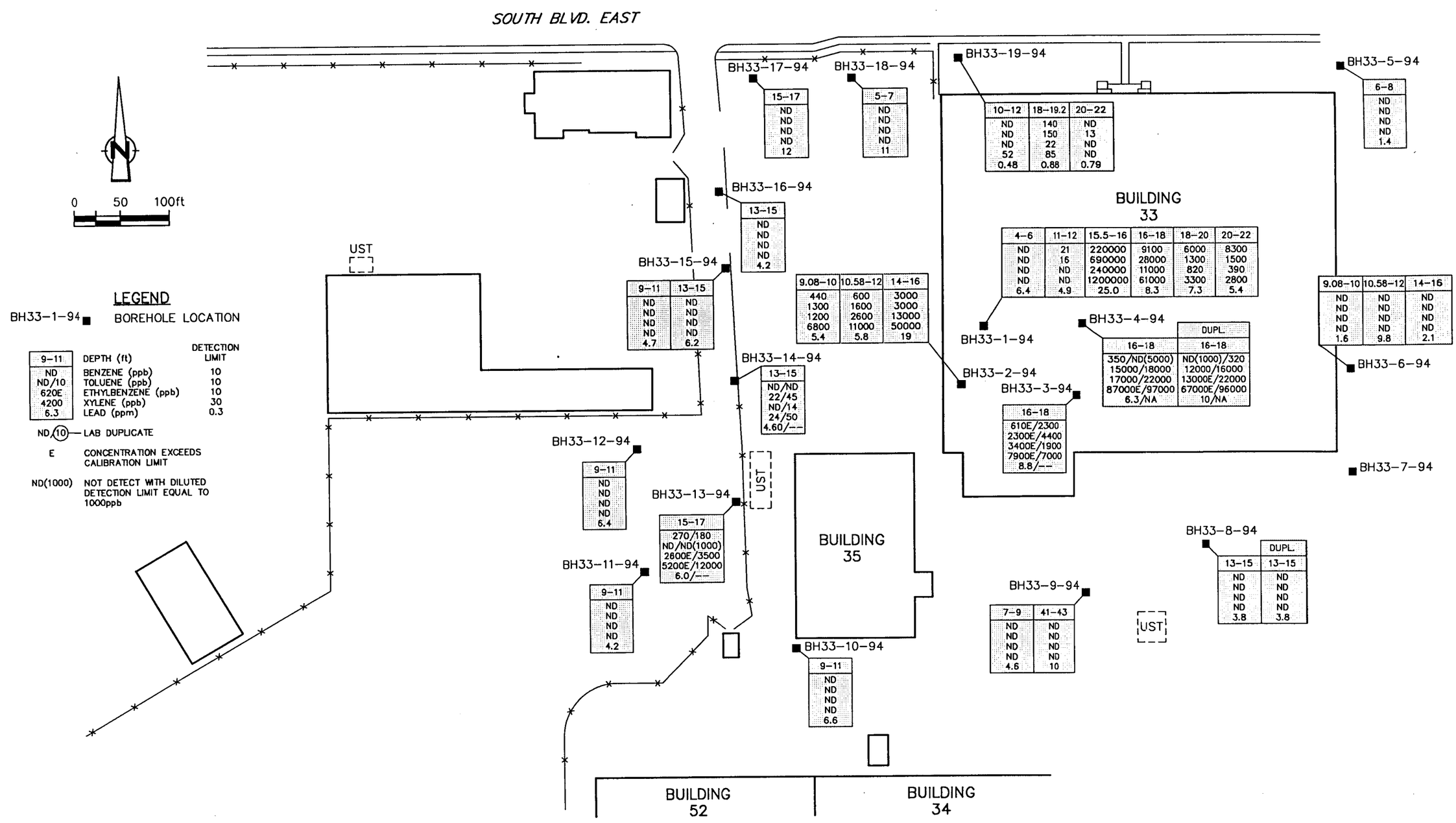


figure 4.4

SOIL ANALYTICAL RESULTS
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 05/94(W) REV.0 (P-33)

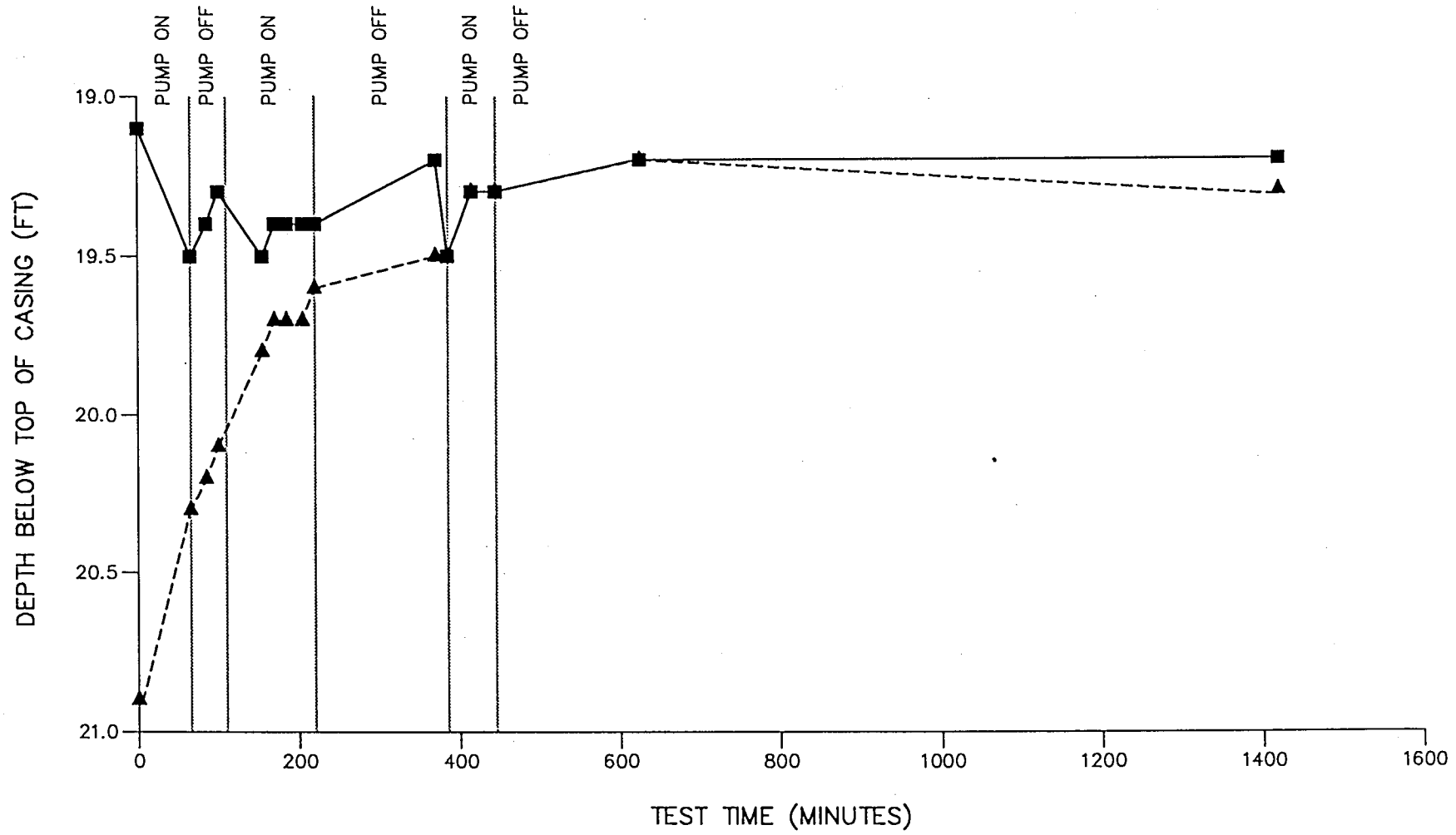


figure 4.5
PUMPING TEST RESULTS
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (G-01)

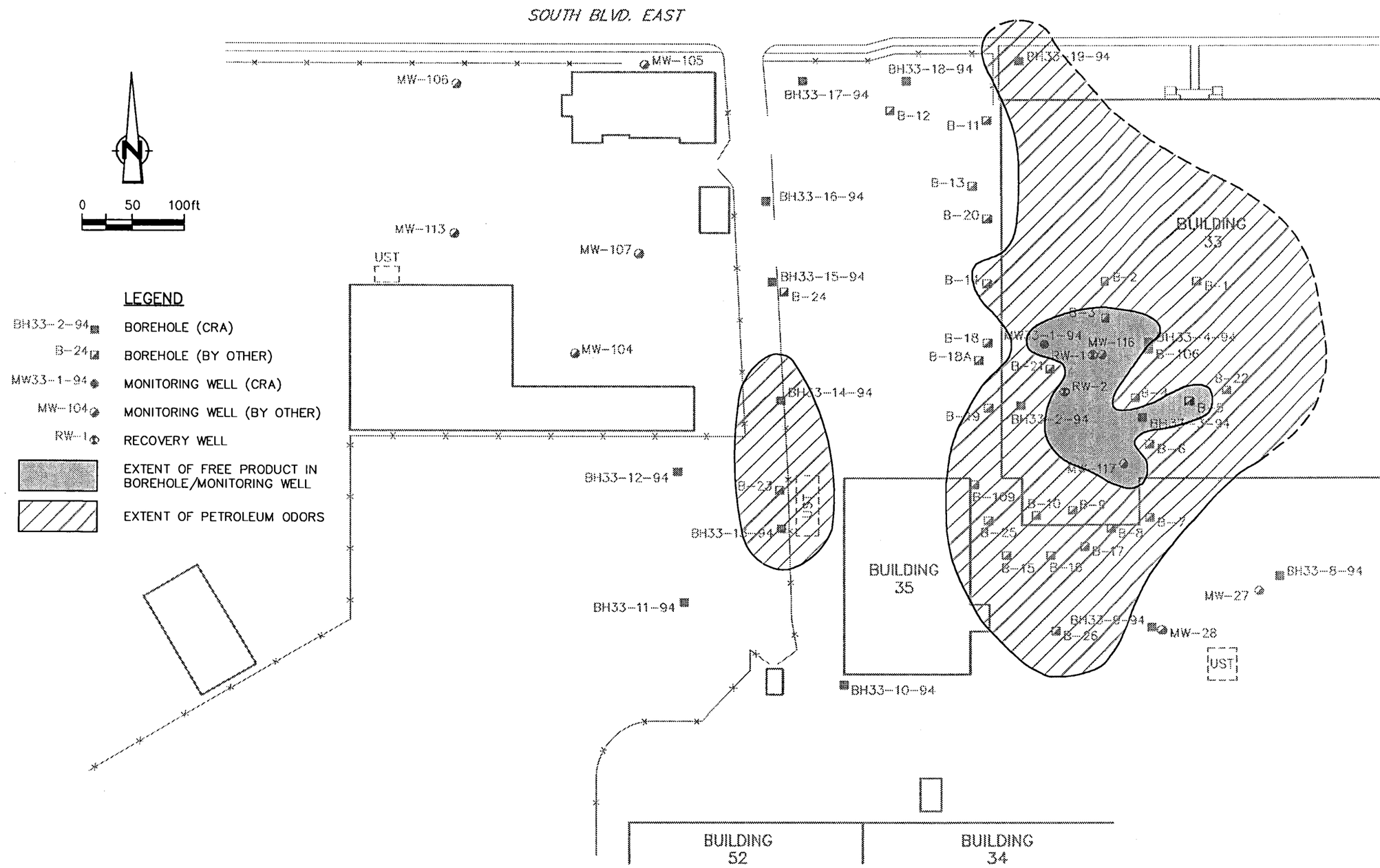
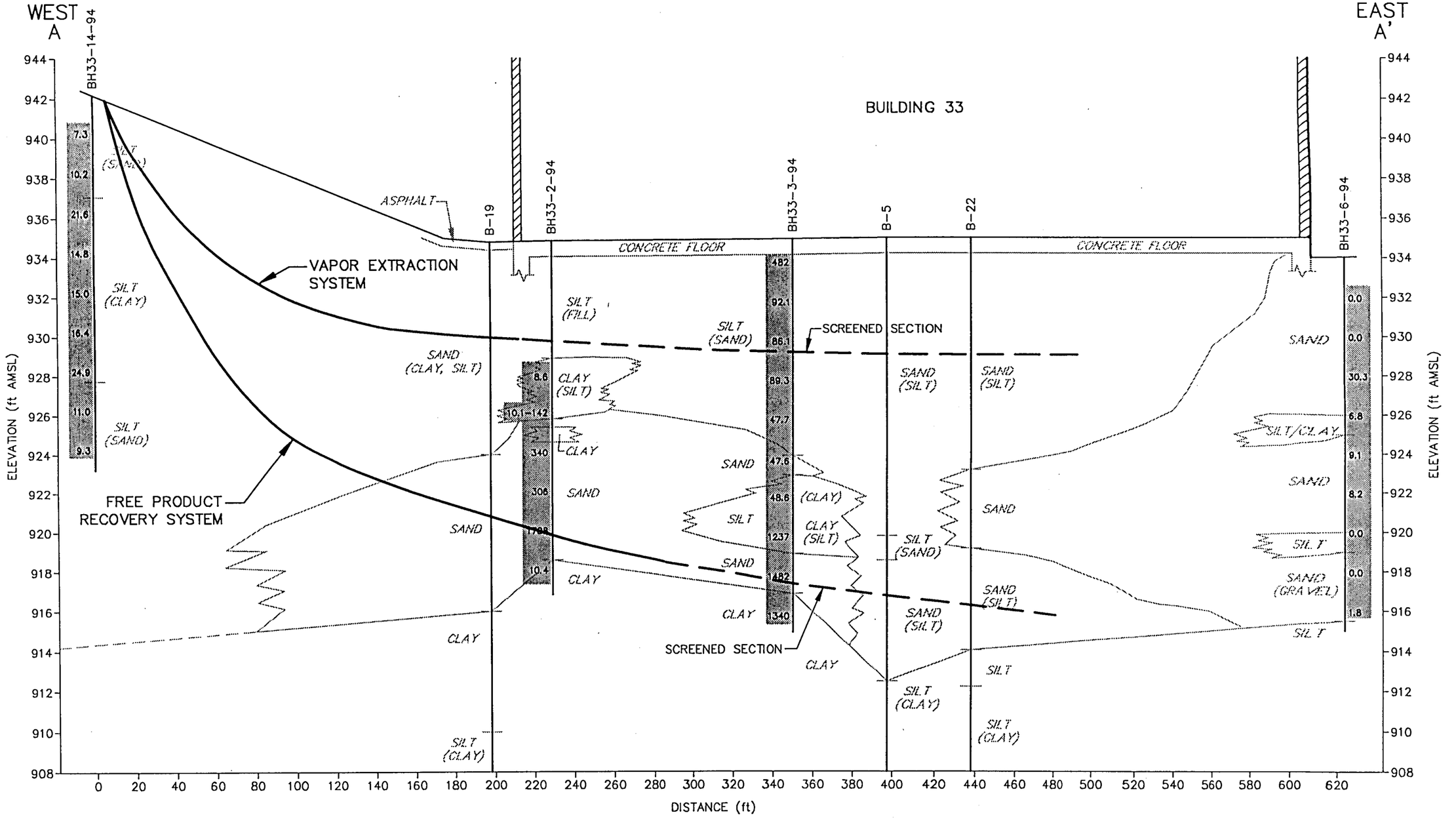


figure 5.1

EXTENT OF FREE PRODUCT
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) OCT 03/94(W) REV.0 (P-38)



LEGEND

10.4 PID READING (ppm)

figure 6.1

PROPOSED VAPOR EXTRACTION AND FREE PRODUCT RECOVERY SYSTEMS
BUILDING 33 – FREE PRODUCT GASOLINE PLUME
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (9) APR 17/95(W) REV.0 (X-13)

Page 12 of 14

TABLE 2.1

REVIEW OF RECOVERY WELL ACTIVITIES
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Date	*Activity Description*
8/26/89	Operation of RW-1 commences
9/13/89	Lowered RW-1 pump in well (intake at 22' BGS) Bottom intake plugged intentionally
10/10/89	Recommend installation of RW-2 due to low recovery
October 1989	RW-2 installed
11/6/89	8" of hose added to top of intake (intake 17' 10" BGS)
11/7/89	Lines feeze-up, operation ceased for winter
11/20/89	Equipment winterized
07/24-26/1990	ABB well testing results: RW-1 yields 5.3 gal of gasoline and 9.17 gal of water in about 2 hours, with recovery of 1.1 gal/hr RW-2 yields 4.2 gal of gasoline and 6.2 gal of water in about 3 hours, with recovery of 1.0 gal/hr MW-117 yields 2.7 L of gasoline and 0.1 L of water during 8 hours of testing Smaller pumps recommended for testing access
4/11/91	System restart recommended with smaller pumps and other minor retrofits

Source: Various Gilbert and Commonwealth progress reports and letters

Known Extraction Well Pumping Summary

	Gasoline Pumped (gal)	*Water Pumped (gal)*
1989	112	3,239
1990	8	104
TOTALS:	120	3,343

Initial total estimated quantity of gasoline 1,800 to 2,000 gallons

Source: GM memo from R. Milz to J. Tandoc dated March 21, 1991.

TABLE 4.1

ANALYTICAL RESULTS SUMMARY
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Location	*BH33-1-94*	*BH33-1-94*	*BH33-1-94*	*BH33-1-94*	*BH33-1-94*	*BH33-1-94*	*BH33-2-94*	*BH33-2-94*	*BH33-2-94*	*BH33-3-94*
	Depth	4 to 6	11 to 12	15.5 to 16	16 to 18	18 to 20	20 to 22	9.08 to 10	10.58 to 12	14 to 16	16 to 18
Parameter	*Units*										
Benzene	µg/kg	ND(10)	21	200,000	9,100	6,000	8,300	440	600	3,000	610 E
Toluene	µg/kg	ND(10)	16	690,000	28,000	1,300	1,500	1,300	1,600	3,000	2,300 E
Ethylbenzene	µg/kg	ND(10)	ND(10)	240,000	11,000	820	390	1,200	2,600	13,000	3,400 E
Xylene	µg/kg	ND(30)	ND(30)	1,200,000	61,000	3,300	2,800	6,800	11,000	50,000	7,900 E
Lead	mg/kg	6.4	4.9	25.0	8.3	7.3	5.4	5.4	5.8	19	8.8

			Field Duplicate							
	Location	*BH33-3-94 Lab. Dup.*	*BH33-4-94*	*BH33-4-94 Lab. Dup.*	*BH33-4-94*	*BH33-4-94 Lab. Dup.*	*BH33-5-94*	*BH33-6-94*	*BH33-6-94*	*BH33-6-94*
	Depth	*16 to 18*	*16 to 18*	*16 to 18*	*16 to 18*	*16 to 18*	*6 to 8*	*5 to 7*	*11 to 13*	*17 to 19*
Parameter	*Units*									
Benzene	µg/kg	2,300	350	ND(5,000)	ND(1,000)	320	ND(10)	ND(10)	ND(10)	ND(10)
Toluene	µg/kg	4,400	15,000	18,000	12,000	16,000	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	µg/kg	1,900	17,000	22,000	13,000 E	22,000	ND(10)	ND(10)	ND(10)	ND(10)
Xylene	µg/kg	7,000	87,000 E	97,000	67,000 E	96,000	ND(30)	ND(30)	ND(30)	ND(30)
Lead	mg/kg	NA	6.3	NA	10	NA	1.4	1.6	9.8	2.1

TABLE 4.1

ANALYTICAL RESULTS SUMMARY
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

			Field Duplicate								
	Location	*BH33-8-94*	*BH33-8-94*	*BH33-9-94*	*BH33-9-94*	*BH33-10-94*	*BH33-11-94*	*BH33-12-94*	*BH33-13-94*	*BH33-13-94 Lab. Dup.*	*BH33-14-94*
	Depth	*13 to 15*	*13 to 15*	*7 to 9*	*41 to 43*	*9 to 11*	*9 to 11*	*9 to 11*	*15 to 17*	*15 to 17*	*13 to 15*
Parameter	*Units*										
Benzene	µg/kg	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	270	180	ND(10)
Toluene	µg/kg	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(1,000)	22
Ethylbenzene	µg/kg	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	2,600 E	3,500	ND(10)
Xylene	µg/kg	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	5,200 E	12,000	24
Lead	mg/kg	3.8	3.8	4.6	10	6.6	4.2	6.4	6.0	NA	4.6

	Location	*BH33-14-94 Lab. Dup.*	*BH33-15-94*	*BH33-15-94*	*BH33-16-94*	*BH33-17-94*	*BH33-18-94*	*BH33-19-94*	*BH33-19-94*	*BH33-19-94*
	Depth	*13 to 15*	*9 to 11*	*13 to 15*	*13 to 15*	*15 to 17*	*5 to 7*	*10 to 12*	*18 to 19.2*	*20 to 22*
Parameter	*Units*									
Benzene	µg/kg	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	140	ND(10)
Toluene	µg/kg	45	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	150	13
Ethylbenzene	µg/kg	14	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	22	ND(10)
Xylene	µg/kg	50	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	52	85	ND(30)
Lead	mg/kg	NA	4.7	6.2	4.2	12	11	0.48	0.88	0.79

Notes:

NA = Lab duplicate done only on organic compounds
E = Concentration exceeded instument calibration range

TABLE 4.2

PUMPING TEST RESULTS
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Pump On (minutes)	*Pump Off (minutes)*	*Pumping Rate(1) (GPM)*	*Total Volume Pumped (2) (gallons)*	*Depth to Gasoline (feet)*	*Depth to Groundwater (feet)*	*Gasoline Thickness (feet)*
0	--	0.047	1.88	19.06	20.90	1.84
40	--	0.039	2.66	--	--	--
60	--	0.018	2.75	--	--	--
--	65	--	--	19.52	20.32	0.80
--	85	--	--	19.38	20.19	0.81
--	100	--	--	19.30	20.10	0.80
110	--	0.018	4.52	--	--	--
125	--	0.019	5.09	--	--	--
155	--	0.008	5.21	19.47	19.83	0.36
170	--	--	--	19.42	19.71	0.29
175	--	0.006	5.27	--	--	--
185	--	--	--	19.40	19.67	0.27
205	--	--	--	19.36	19.65	0.29
--	220	--	--	19.38	19.63	0.25
--	370	--	--	19.22	19.50	0.28
385	--	0.059	7.04	none	19.50	0.00
415	--	--	--	none	19.31	0.00
--	445	--	--	none	19.28	0.00
--	625	--	--	19.20	19.22	0.02
--	1420	--	--	19.20	19.32	0.12

Notes:

(1) Pumping rate averaged over time from pump on time to the next time interval.
(2) Volume pumped is from pump on time to the next time interval.

TABLE 4.3

GASOLINE LAYER MONITORING
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Location	*Date*	*Depth to Gasoline (ft)*	*Depth to Water (ft)*	*Measured Gasoline Thickness (ft)*	*Calculated Gasoline Layer Thickness in Sand Stratum (inches)*
CRA					
Recovery Well #1	5/25/94	19.7	20.05	0.35	1.1
Recovery Well #2	5/25/94	18.75	20.73	1.98	5.9
MW33-1-94	5/25/94	15.76	15.93	0.17	0.5
	5/26/94	15.71	15.88	0.17	0.5
	5/31/94	15.89	16.05	0.16	0.5
Historical					
MW-117 * (1)	-	-	-	1.4	4.2
MW-116 * (1)	-	-	-	1.9	5.7

Note:

(1) November 1989 Progress Report by Gilbert and Commonwealth.

TABLE 5.1

SOIL CLEANUP CRITERIA
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Units*	*Type B[1] 20X Drinking Water Criteria*	*Type B[1] Direct Contact Criteria*	*Type C[2] Direct Contact Criteria*
Benzene	µg/kg	24	13,000	85,000
Ethylbenzene	µg/kg	1,500	7.5×10^6	1.4×10^7
Toluene	µg/kg	16,000	1.7×10^7	3.3×10^7
Xylene	µg/kg	5,600	1.4×10^8	2.7×10^8
Lead	mg/kg	21[3]	400	400

Source:

(1) MDNR/MERA Operational Memoradum #8, Revision 3, February 4, 1994.
(2) MDNR/MERA Operational Memorandum #14, Revision 2, June 21, 1994.
(3) MDNR/MERA Operational Memorandum #15, September 30, 1993.

APPENDIX A

BOREHOLE AND MONITORING WELL LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-28)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: MW33-1-94

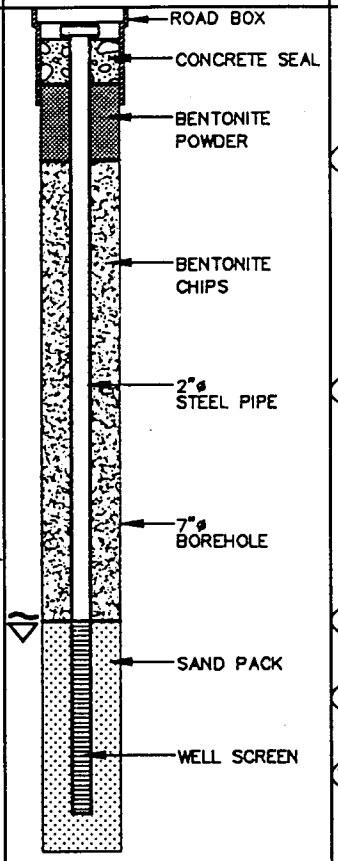
PROJECT NO.: 5770
DATE COMPLETED: MAY 25, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: F. RING

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	GROUND ELEVATION	934.87
	Concrete, wire	934.36
2.5	ML-SILT, trace fine sand, trace gravel, light brown, dry	
		930.87
5.0	SM-SAND, some silt, fine grained, light brown, dry	
7.5	- little silt	
		926.37
	CL-CLAY, some fine sand, some silt, soft, brown, moist	925.37
10.0	SM-SAND, some silt, fine grained, light brown, dry	923.87
12.5	CL-CLAY, some fine sand, some silt, trace gravel, brown, moist	922.87
	ML-SILT, some fine sand, trace gravel, gray, moist	
15.0		FREE PRODUCT AT 918.98
	SW-SAND, well graded, dark brown, wet, gasoline odor	919.37
		918.87
17.5	ML-SILT, trace fine sand, gray, wet, gasoline odor	918.82 WATER AT
20.0		
	CL-CLAY, some silt, trace gravel, gray, moist	913.87
22.5	END OF HOLE @ 22.0 FT. BGS	912.87
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS:
Screened Interval:
16.0 to 21.0' BGS
Length -5.0'
Diameter -2.0"
Slot # 10
Material -pvc
Sand pack interval:
16.0 to 22.0' BGS
Material -Sand

SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		8	30-80
2SS		11	35
3SS		20	10.2
4SS		12	15.8
5SS		16	2.5-5.5
6SS		12	61
7SS		22	61->1132
8SS		27	2059
9SS		30	1712
10SS			12.8-59

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-29)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-2-94

PROJECT NO.: 5770
DATE COMPLETED: MAY 11, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: J. DANIEL

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	934.86					
	Concrete	934.16	CONCRETE SEAL				
	ML-SILT, some sand, gray brown						
2.5							
5.0		928.86					
	CL-CLAY(FILL), some sand and silt, trace gravel, stiff, brown, dry to moist, slight gasoline odor		7"ø BOREHOLE	1SS		7	3.6
7.5							
		925.76		2SS		9	10.1-142
10.0	SP-SAND, some gravel, non cohesive, coarse grained, brown and black, dry, gasoline odor	934.56					
	CL-CLAY, trace sand, moderately stiff, brown, moist	934.26		3SS		11	340
12.5	SP-SAND, trace silt, poorly graded, light brown, dry to moist, gasoline odor - moist to wet, very strong gasoline odor		CEMENT/ BENTONITE GROUT	4SS		13	306
15.0				5SS		15	1788
		918.56					
	CL-CLAY, trace sand, stiff, gray, moist, slight petroleum odor			6SS		17	10.4
17.5		916.86					
	END OF HOLE @ 18.0 FT. BGS						
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-30)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-3-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	*934.93*					
	Concrete	*934.13*	CONCRETE SEAL				
	ML-SILT, some sand, gray brown			1SS	X	14	482
2.5				2SS	X	8	92.1
	- brown, slightly moist						
5.0			7"ø BOREHOLE	3SS	X	4	86.1
	- black staining (@ 7.0 ft BGS)			4SS	X	4	89.3
7.5	- fine grained, brown gray						
				5SS	X	4	47.7
10.0							
	SP-SAND, fine to medium grained, light brown, moist	*923.93*		6SS	X	8	47.6
12.5	ML-SILT, some clay, trace gravel, brown, slightly moist	*922.93*		7SS	X	5	48.6
	CL-CLAY, some silt, trace gravel, gray brown, moist	*921.43*	CEMENT/ BENTONITE GROUT				
15.0				8SS	X	11	1237
	SP-SAND, medium grained, gray black, moist to saturated, strong gasoline odor	*918.93*					
17.5	- fine grained, gray, saturated @16.3 BGS			9SS	X	12	1482
	CL-CLAY(NATIVE), gray, moist	*916.93*					
				10SS	X	4	1340
20.0	END OF HOLE @ 20.0 FT. BGS	*914.93*					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-31)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-4-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	934.82					
	Concrete	934.02	CONCRETE SEAL				
	ML-SILT, some sand, brown, mottled – slightly moist			1SS		19	14.0
2.5				2SS		9	7.9
	– trace gravel						
5.0			7"ø BOREHOLE	3SS		4	0.2
7.5				4SS		6	7.3
				5SS		5	2.2
10.0	CL-CLAY, some silt, trace gravel, brown, moist	925.32		6SS		5	6.5
	SP-SAND, trace gravel, fine to medium grained, tan, slightly moist	923.82					
12.5	CL-CLAY, trace gravel, brown, moist – slightly moist	922.82	CEMENT/ BENTONITE GROUT	7SS		10	11.9
15.0				8SS		22	
	ML-SILT, some fine sand, gray, moist to saturated, strong gasoline odor	918.82		(9SS)		22	1548
17.5							
	ML-SILT, some clay, gray, moist to saturated, strong gasoline odor	916.82		10SS		12	1300
20.0	SP-SAND, some gravel, coarse grained, saturated, strong gasoline odor	915.32 914.82					
	END OF HOLE @ 20.0 FT. BGS						
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (C) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-32)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-5-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 19, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	*932.51*					
	Concrete, gravel		CONCRETE SEAL				
		931.01					
2.5	SP-SAND, some gravel, fine grained, light brown, moist			1SS		7	0.0
		928.51					
5.0	CL-CLAY, and silt, trace gravel, dark green, moist			2SS		7	0.0
		927.01					
	SP-SAND, some clay, fine grained, light brown, moist	*926.51*	7"ø BOREHOLE				
7.5	ML-SILT, some clay, trace gravel, gray brown, moist			3SS		18	10.0
				4SS		14	2.4
10.0			CEMENT/ BENTONITE GROUT				
				5SS		10	3.0
12.5				6SS		14	3.3
15.0				7SS		14	4.2
		916.51					
	CL-CLAY, some silt, trace gravel, moist			8SS		6	0.0
17.5		*914.51*					
	END OF HOLE @ 18.0 FT. BGS						
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-33)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-6-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 15, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	934.02					
2.5	SP-SAND, fine grained, red brown, slightly moist		7" ø BOREHOLE	GS 1SS		7	0.0
				2SS		3	0.0
5.0	– moist to saturated			3SS		3	30.3
7.5		926.02		4SS		2	6.8
	ML-SILT, some clay, trace gravel, gray brown, mottled, moist	925.02					
10.0	SP-SAND, fine grained, red brown, saturated			5SS		16	9.1
	– coarse grained, gray			6SS		14	8.2
12.5			CEMENT/ BENTONITE GROUT				
	ML-SILT, some clay, trace grovel, gray, moist	920.02		7SS		11	0.0
15.0	SW-SAND, trace gravel, coarse grained, gray, saturated	919.02		8SS		10	0.0
17.5				GS 9SS		14	1.8
	ML-SILT, some clay, trace gravel, gray, slightly moist	915.52 915.02					
20.0	END OF HOLE @ 19.0 FT. BGS						
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-34)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-7-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 14, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	932.86					
	SP-SAND, fine grained, red brown, moist to saturated			GS			
				1SS		2	0.0
2.5	No recovery						
			7"ø BOREHOLE	2SS		2	
5.0	- saturated, some black staining						
				3SS		1	0.0
7.5							
	ML-SILT, some clay, trace gravel, gray brown, slightly moist, some staining	924.86		4SS		18	0.0
10.0	SP-SAND, fine grained, gray brown, saturated, red brown staining	922.86		5SS		10	0.0
		920.86		6SS		11	0.0
12.5	ML-SILT, some clay, trace gravel, brown, slightly moist	919.86					
	SP-SAND, fine grained, gray brown, saturated		CEMENT/ BENTONITE GROUT	7SS		4	0.2
		918.36					
15.0	CL-CLAY, some silt, trace gravel, brown, slightly moist	917.86		8SS		4	0.0
	SW-SAND, fine to coarse, gray brown, saturated	915.86					
17.5	SP-SAND, coarse grained, gray brown, saturated			9SS		6	0.0
				GS			
20.0		912.86		10SS		8	0.0
	ML-SILT, some clay, trace gravel, gray, moist	911.86					
	END OF HOLE @ 21.0 FT. BGS						
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-35)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-8-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 23, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	933.36					
2.5	ML-SILT, some clay, trace gravel, mottled grey brown, slightly moist			1SS		9	4.7
		929.36	7"ø BOREHOLE	2SS		3	0.0
5.0	SP-SAND, fine grained, gray, moist	928.36		3SS		2	0.0
	CL-CLAY, some silt, gray green, moist	926.36		4SS		6	2.6
7.5	ML-SILT, some clay, dark brown to black, slightly moist						
	- mottled green brown	924.86					
	SP-SAND, fine grained, gray, moist	924.36		5SS		12	25.7
10.0	ML-SILT, some clay, trace gravel, mottled grey green, slightly moist	922.36		6SS		7	5.3
12.5	ML-SILT, some sand, trace gravel, fine grained, gray, moist	920.36	CEMENT/ BENTONITE GROUT	7SS		8	65.3
	ML-SILT, some clay, trace gravel, light brown, gray, moist						
15.0				8SS		8	54.9
	- sand seam, fine grained, brown gray, moist (16.5 to 16.7 ft BGS)	916.66		9SS		13	40.0
17.5	ML-SILT, some clay, trace gravel, gray brown, slightly moist						
	- gray	914.36					
20.0	CL-CLAY(NATIVE)						
	END OF HOLE @ 19.0 FT. BGS						
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-36)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-9-94 (Page 1 of 2)
PROJECT NO.: 5770
DATE COMPLETED: APRIL 23, 1994
CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA
LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	SURFACE ELEVATION	934.07
	Pavement	
	ML-SILT, some clay, some sand, trace gravel, brown rust, slightly moist	933.07
2.5	– no sand, brown green	
	– black staining (4.5 to 4.7 ft BGS)	
5.0		
		927.07
7.5	ML-SILT, some clay, trace gravel, gray brown, slightly moist	
10.0		924.07
	SP-SAND, coarse grained, gray black, slightly moist	
	– trace gravel	
12.5		
		920.07
	ML-SILT, some clay, trace gravel, gray,	
15.0	slightly moist	
		917.57
	SP-SAND, coarse grained, grey black, saturated	917.07
17.5	ML/CL-SILT and CLAY, trace gravel, gray, slightly moist	
	– dark gray	
20.0		
		912.07
		911.77
22.5	CL-CLAY, some silt, trace gravel, gray, slightly moist	911.57
	SP-SAND, coarse grained, grey black, saturated	910.57
25.0	ML-SILT, some clay, trace gravel, gray, slightly moist	
	CL-CLAY, trace gravel, gray, slightly moist	
27.5		
30.0		
32.5		



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		3	4.5
2SS		3	0.0
3SS			
4SS		21	49.1
5SS		14	19.5
6SS		28	42.0
7SS		19	6.9
8SS		15	2.9
9SS		16	10.9
10SS		14	24.9
11SS		18	1.1
12SS		8	22.8
13SS		8	0.0
14SS		14	0.0
15SS		14	2.1
16SS		14	10.3

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-36)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 33

HOLE DESIGNATION: BH33-9-94 (Page 2 of 2)
DATE COMPLETED: APRIL 23, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0	SP-SAND, coarse grained, gray brown, moist	900.07	7"ø BOREHOLE	17SS	X	16	13.4
	CL-CLAY, trace gravel, gray, slightly moist	899.87		18SS	X	12	14.6
37.5				19SS	X	11	21.4
40.0	SP-SAND, gray brown, slightly moist	894.07	CEMENT/ BENTONITE GROUT	20SS	X	17	33.5
	CL-CLAY, trace gravel, gray, slightly moist	893.87		21SS	X	18	77.7
42.5	END OF HOLE @ 43.0 FT. BGS	891.07					
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-37)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-10-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 24, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	936.08					
	Pavement	935.08					
	SP-SAND, little gravel, brown, slightly moist						
2.5	- black staining - trace gravel, brown red			1SS		10	0.0
			7" ø BOREHOLE	2SS		4	0.0
5.0	- red brown			3SS		2	4.2
	- moist to saturated						
7.5	- moist			4SS		2	9.1
10.0		926.08		5SS		4	63.0
	CL-CLAY, some silt, trace gravel, gray, moist						
		924.08	CEMENT/ BENTONITE GROUT	6SS		4	0.0
12.5	ML-SILT, some sand, trace gravel, gray, saturated			7SS		4	53.2
15.0				8SS		5	37.1
17.5		918.08		9SS		8	39.2
	ML-SILT, some clay, trace gravel, gray	917.08					
	END OF HOLE @ 19.0 FT. BGS						
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (C) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-38)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-11-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 24, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	*943.05*					
	Pavement	*942.05*					
2.5	ML-SILT, trace gravel, brown gray, slightly moist - no gravel, brown with some staining			1SS		6	10.5
		939.05	7"ø BOREHOLE	2SS		16	0.0
5.0	ML-SILT, some clay, trace gravel, gray brown, slightly moist to moist			3SS		5	10.7
7.5	- dark gray, slightly moist			4SS		15	25.6
	- moist						
10.0				5SS		7	27.2
	- slightly moist						
12.5	- black gray staining - green			6SS		7	6.0
		929.05	CEMENT/ BENTONITE GROUT	7SS		12	21.1
15.0	ML-SILT, trace gravel, brown gray, slightly moist			8SS		22	9.0
17.5				9SS		18	25.5
		924.55					
	ML-SILT, some clay, trace gravel, gray, slightly moist	*924.05*					
20.0	END OF HOLE @ 19.0 FT. BGS						
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-39)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-12-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	944.45					
	Pavement	943.45					
2.5	ML-SILT, some sand, trace gravel, light brown	941.45		1SS		9	6.1
5.0	ML-SILT, some clay, trace gravel, light brown, slightly moist		7" ø BOREHOLE	2SS		6	9.6
7.5				3SS		8	11.1
10.0				4SS		12	13.3
12.5			CEMENT/ BENTONITE GROUT	5SS		16	21.9
15.0				6SS		22	7.3
17.5	SP-SAND, trace gravel, light brown, slightly moist	928.45		7SS		14	19.1
20.0	END OF HOLE @ 19.0 FT. BGS	925.45		8SS		14	9.8
22.5				9SS		13	11.1
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-40)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
PROJECT NO.: 5770
CLIENT: GM
LOCATION: BUILDING 33

HOLE DESIGNATION: BH33-13-94
DATE COMPLETED: APRIL 30, 1994
DRILLING METHOD: 3 1/4" ID HSA
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	941.79					
	Pavement	940.79					
2.5	ML-SILT, some sand, trace gravel, dark gray, slightly moist - black staining		7"ø BOREHOLE	1SS		24	11.1
		937.29		2SS		4	22.1
5.0	ML-SILT, some clay, trace gravel, light brown, slightly moist - moist			3SS		2	24.4
7.5	SP-SAND, trace gravel, light brown, slightly moist	934.79		4SS		14	25.0
10.0	SM-SAND, some silt, light gray, slightly moist	932.29		5SS		11	1475
	ML-SILT, some clay, trace gravel, light gray, slightly moist	930.79		6SS		15	108
12.5	- moist		CEMENT/ BENTONITE GROUT	7SS		11	1629
15.0				8SS		12	2130
17.5				9SS		10	2094
	ML-SILT, some sand, trace gravel, dark gray	923.29					
	END OF HOLE @ 19.0 FT. BGS	922.79					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (CA) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-41)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-14-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	942.20					
	Pavement	941.20					
2.5	ML-SILT, some sand, trace gravel, light brown, slightly moist			1SS		11	7.3
			7" ø BOREHOLE	2SS		6	10.2
5.0		937.20		3SS		9	21.6
7.5	ML-SILT, some clay, trace gravel, gray brown, slightly moist			4SS		13	14.8
10.0				5SS		18	15.0
12.5				6SS		12	16.4
			CEMENT/ BENTONITE GROUT	7SS		18	24.9
15.0	- sand seam (@ 14.5 FT. BGS)	927.70					
	ML-SILT, some sand, trace gravel, brown gray, slightly moist			8SS		17	11.0
17.5				9SS		27	9.3
	END OF HOLE @ 19.0 FT. BGS	923.20					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-42)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-15-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	941.60					
	Pavement	940.60					
2.5	CL-CLAY, some sand, trace gravel, dark gray, brown			1SS		6	10.7
	No recovery		7"ø BOREHOLE	2SS		7	
5.0				3SS		6	54.9
7.5				4SS		5	17.4
	SC-SAND, some clay, trace gravel, light brown	932.60		5SS		12	19.5
10.0							
	ML-SILT, some clay, trace gravel, tan brown, slightly moist	930.60		6SS		12	19.3
12.5							
			CEMENT/ BENTONITE GROUT	7SS		11	52.3
	SP-SAND, some gravel, coarse grained, gray brown, slightly moist	927.10 926.60					
15.0	ML-SILT, some clay, gray brown, slightly moist	926.10		8SS		12	17.7
17.5	SP-SAND, some gravel, coarse grained, gray, slightly moist			9SS		16	20.0
	END OF HOLE @ 19.0 FT. BGS	922.60					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS ◯ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-43)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-16-94

PROJECT NO.: 5770
DATE COMPLETED: MAY 1, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	*941.67*					
	Pavement	*940.67*					
2.5	ML-SILT, some clay, some gravel, dark gray, slightly moist			1SS		10	9.1
5.0	– black gray staining		7" ø BOREHOLE	2SS		15	10.6
				3SS		4	22.9
7.5	– trace gravel, strong petroleum odor – light gray			4SS		5	24.6
10.0	– light brown gray, mottled			5SS		7	30.4
12.5				6SS		14	11.4
15.0			CEMENT/ BENTONITE GROUT	7SS		9	38.9
		925.17		8SS		8	33.9
17.5	SP-SAND, trace gravel, coarse grained, light brown, slightly moist No recovery			9SS		54	
20.0				10SS		41	26.9
	END OF HOLE @ 21.0 FT. BGS	*920.67*					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-44)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-17-94

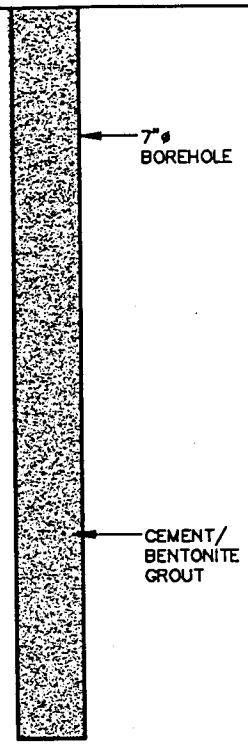
PROJECT NO.: 5770
DATE COMPLETED: MAY 1, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	SURFACE ELEVATION	940.99
	Pavement	939.99
2.5	ML-SILT, trace gravel, light brown, slightly moist	
5.0	- black staining	935.99
	ML-SILT, some clay, trace gravel, slightly moist	
7.5	- light brown	
10.0		
12.5		
		926.99
15.0	SP-SAND, trace gravel, light brown, slightly moist	925.99
	ML-SILT, some clay, trace gravel, light brown, slightly moist	924.99
17.5		923.99
	SP-SAND, trace gravel, light brown, slightly moist	922.99
	ML-SILT, some clay, trace gravel, light brown, slightly moist	921.99
20.0	SP-SAND, some gravel, coarse grained, dark gray, slightly moist	
	END OF HOLE @ 19.0 FT. BGS	
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SAMPLE

NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		8	7.7
2SS		7	11.1
3SS		5	14.2
4SS		7	6.9
5SS		7	12.6
6SS		11	13.[illegible]
7SS		7	27.2
8SS		9	27.5
9SS		15	12.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (C) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-45)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-18-94

PROJECT NO.: 5770
DATE COMPLETED: APRIL 30, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: B. SMITH

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	*938.18*					
	Pavement	*937.18*					
2.5	SM-SILT, some sand, some gravel, dark brown		7"ø BOREHOLE	1SS		5	3.4
				2SS		7	4.8
5.0	SC-SAND, some clay, some black staining	*933.18*		3SS		9	22.0
7.5	CL-CLAY, some sand, trace gravel, light brown and gray, slightly moist	*931.18*		4SS		7	12.6
10.0				5SS		10	21.1
12.5	SC-SAND, some clay, gray brown, slightly moist	*926.18*	CEMENT/ BENTONITE GROUT	6SS		13	15.2
15.0				7SS		11	3.7
				8SS		16	7.1
17.5				9SS		19	0.9
20.0	END OF HOLE @ 19.0 FT. BGS	*919.18*					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-46)

PROJECT NAME: PONTIAC CENTRAL MANUFACTURING FACILITY
HOLE DESIGNATION: BH33-19-94

PROJECT NO.: 5770
DATE COMPLETED: MAY 19, 1994

CLIENT: GM
DRILLING METHOD: 3 1/4" ID HSA

LOCATION: BUILDING 33
CRA SUPERVISOR: J. DANIEL

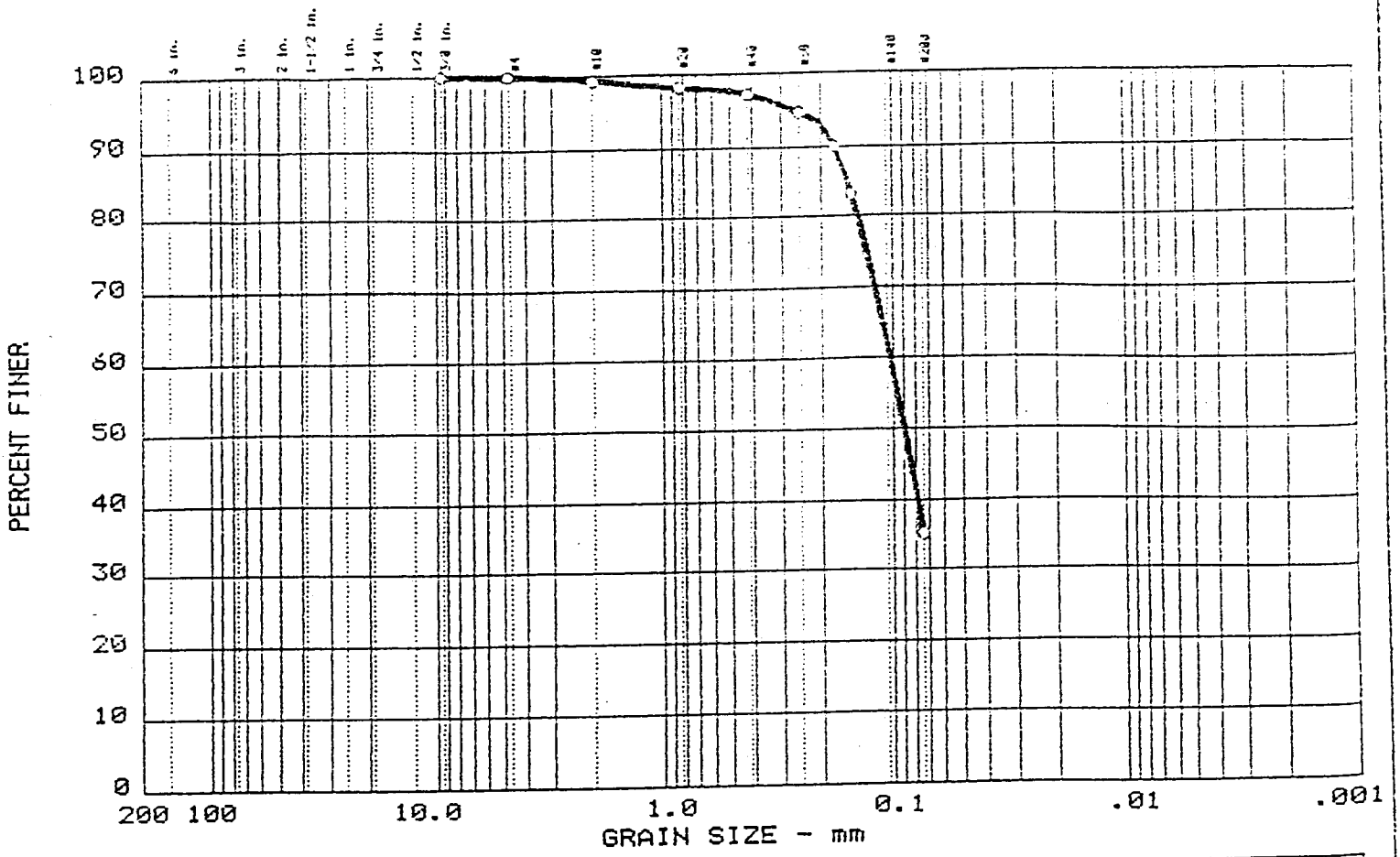
DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	SURFACE ELEVATION	934.16					
	Topsoil	933.66					
	SC-SAND, some clay, light brown, moist						
2.5				1SS		3	0
		930.46	7" ø BOREHOLE				
	CL-CLAY, trace sand, soft, brown, moist	929.66		2SS		6	0
5.0	SP-SAND, some clay seams, trace gravel, light brown, moist						
				3SS		6	0
	- coarse grained, non-cohesive, dry to moist						
7.5				4SS		9	1.2
		926.16					
	CL-CLAY, some sand, brown with some black staining, moist	925.16					
10.0	SP-SAND, non cohesive, light brown, dry to moist			5SS		15	0
	- 3" thick gray clay lens						
	- medium grained			6SS		16	5.0
12.5							
				7SS		16	0.3
		919.46					
15.0	CL-CLAY, some sand, moist	919.36					
	SP-SAND, fine grained, brown, moist to wet	918.66		8SS		12	1
	CL-CLAY, trace sand, stiff, gray, moist		CUTTINGS				
17.5	- some fine sand and silt, moist to wet			9SS		12	0
		916.16					
	SP-SAND, fine grained, gray, moist to wet	914.96					
20.0	CL-CLAY, trace silt and fine sand, stiff, gray, moist			10SS		9	0.1
		912.16		11SS		8	0.2
22.5	END OF HOLE @ 22.0 FT. BGS						
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
GRAIN SIZE ANALYSIS GS
CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

APPENDIX B

GRAIN SIZE ANALYSIS

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	0.1	64.7	35.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o			0.15	0.10	0.09					

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty sand	SM	

Project No.: V0139
Project: G.M.C. - Pontiac
o Location: B433-6-94, 1'-3'

Date: 4-29-94

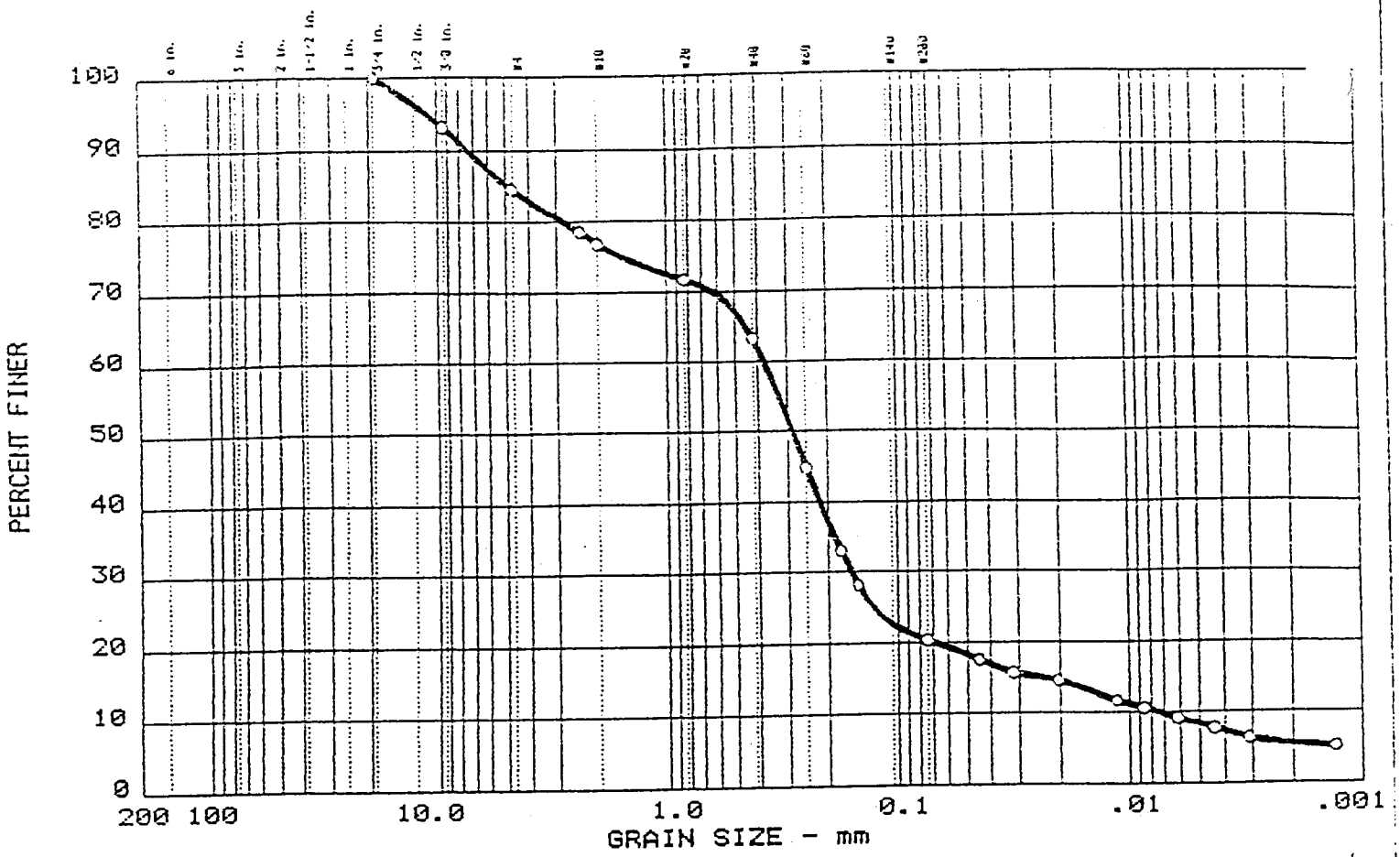
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	15.5	64.2	12.1	8.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			4.95	0.38	0.29	0.160	0.0226	0.0074	9.20	50.8

MATERIAL DESCRIPTION	USCS	AASHTO
○ Silty sand with gravel	SM	

Project No.: 90139
Projett: G.M.C. - Pontiac
○ Location: B433-6-94, 17'-19'

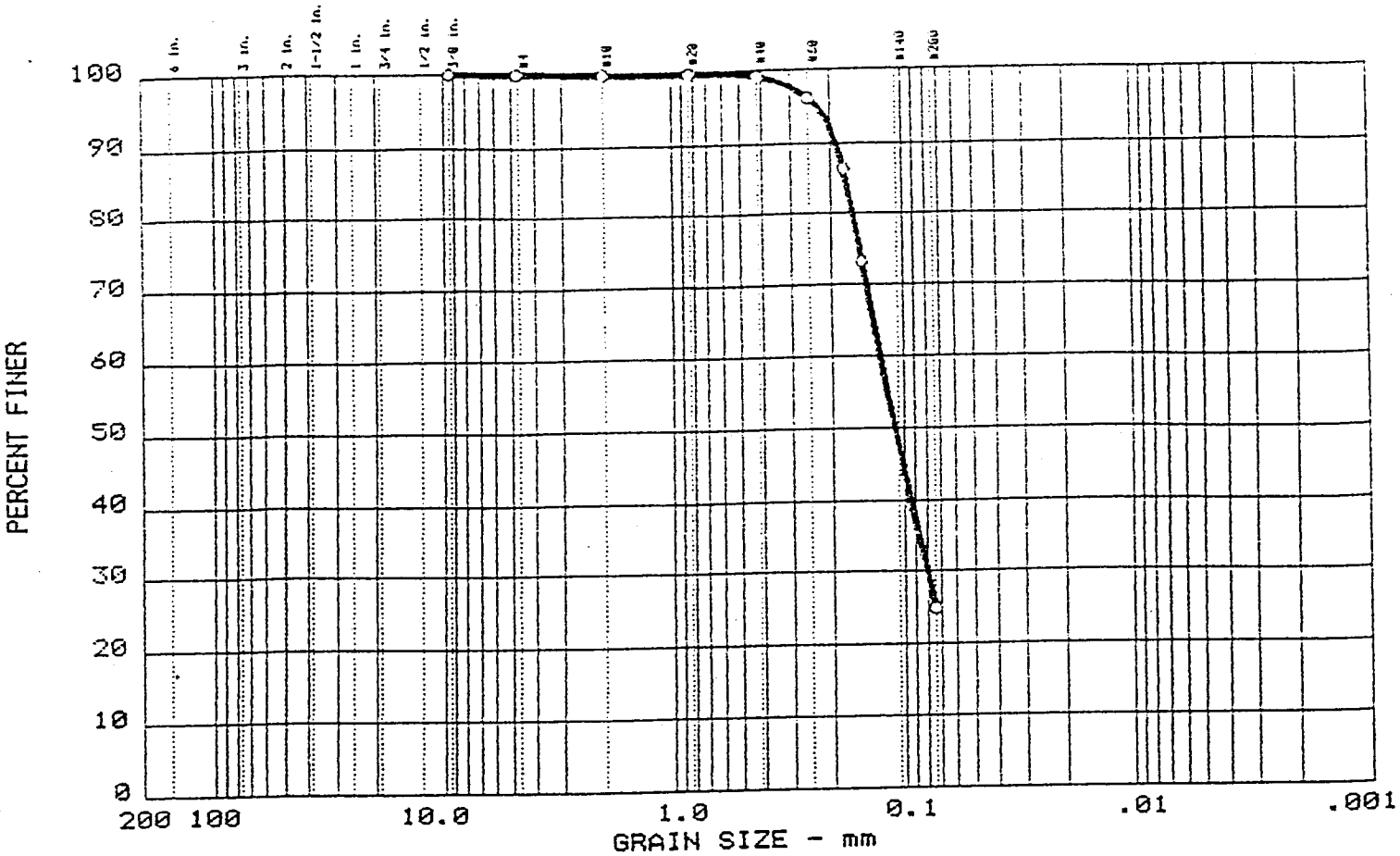
Date: 4-29-94

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT
MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	0.1	75.0	24.9	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o			0.17	0.13	0.11	0.080				

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty sand	SM	

Project No.: V0139
Projett: G.M.C. - Pontiac
o Location: B433-7-94, 1'-3'

Date: 4-29-94

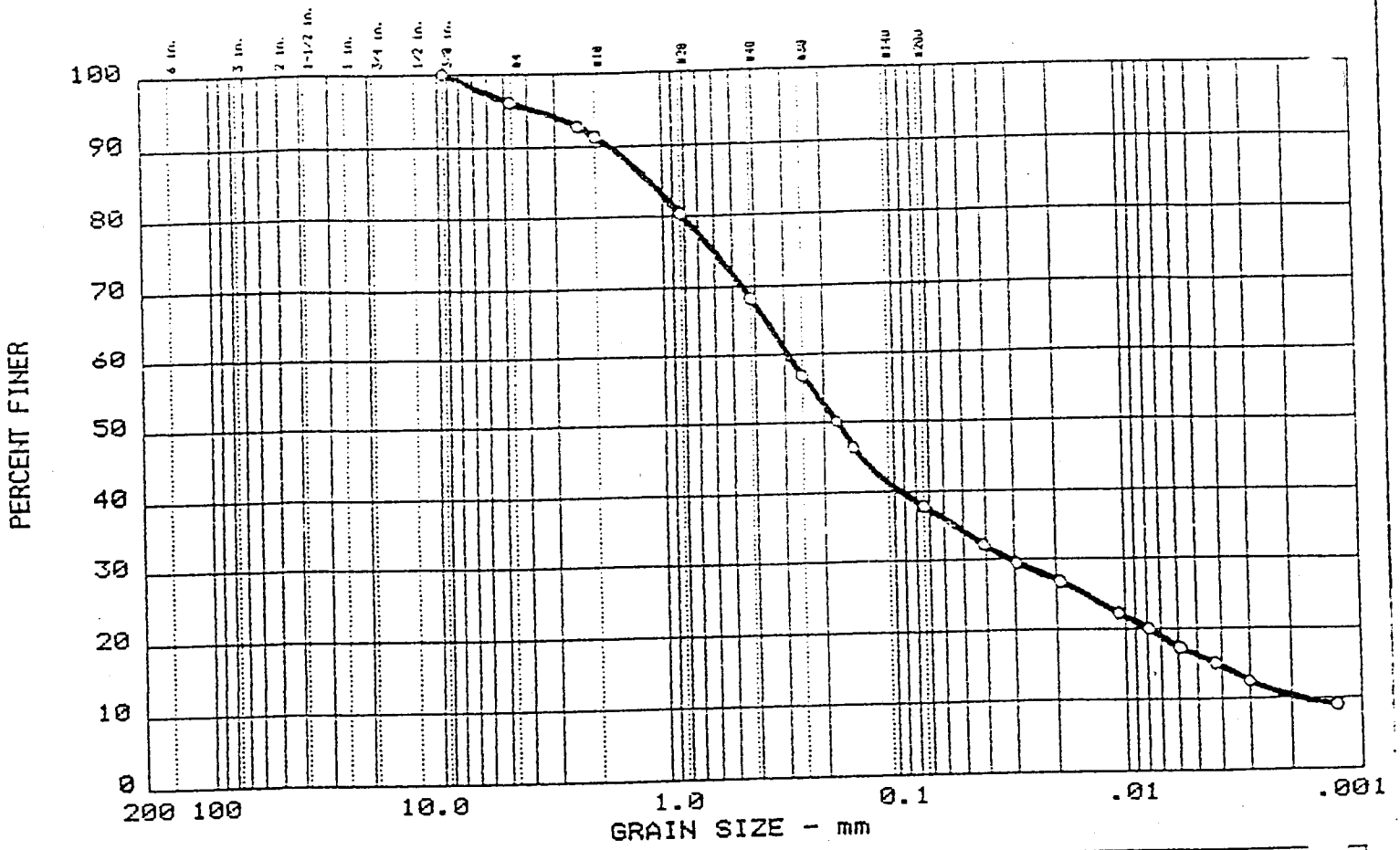
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
o	0.0	4.0	58.2	21.6	16.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
o			1.15	0.29	0.18	0.032	0.0042	0.0018	1.91	158.5

MATERIAL DESCRIPTION	USCS	AASHTO
o Silty sand	SM	

Project No.: V0139
Project: G.M.C. - Pontiac
o Location: B433-7-94, 19'-21'

Date: 4-29-94

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

APPENDIX C

ANALYTICAL DATA

SAMPLE KEY

GM - Building 33 - Free Product
Additional Investigation

Sample Identification	*Sample Location*	*Depth (ft)*	*Notes*
S-041594-BWS-001	BH33-6-94	5 to 7	
S-041594-BWS-002	BH33-6-94	11 to 13	
S-041594-BWS-003	BH33-6-94	17 to 19	
S-041994-BWS-004	BH33-5-94	6 to 8	
S-042394-BWS-005	BH33-8-94	13 to 15	
S-042394-BWS-006	BH33-8-94	13 to 15	Duplicate
S-042394-BWS-007	BH33-9-94	7 to 9	
S-042394-BWS-008	BH33-9-94	41 to 43	
S-042494BWS-009	BH33-10-94	9 to 11	
S-042494-BWS-10	BH33-11-94	9 to 11	
S-043094-BWS-011	BH33-3-94	16 to 18	
S-043094-BWS-012	BH33-4-94	16 to 18	
S-043094-BLM-013	BH33-12-94	9 to 11	
S-043094-BLM-014	BH33-13-94	15 to 17	
S-043094-BLM-015	BH33-14-94	13 to 15	
S-043094-HH-016	BH33-15-94	13 to 15	
S-043094-HH-017	BH33-18-94	5 to 7	
S-050194-BLM-018	BH33-16-94	13 to 15	
S-050194-BLM-019	BH33-17-94	15 to 17	
S-043094-BWS-020	BH33-4-94	16 to 18	Duplicate
S-043094-BLM-021	BH33-15-94	9 to 11	
5770-5/11/94-JD-021	BH33-2-94	9.08 to 10	
5770-5/11/94-JD-022	BH33-2-94	10.58 to 12	
5770-5/11/94-JD-023	BH33-2-94	14 to 16	
5770-5/19/94-JD-024	BH33-19-94	10 to 12	
5770-5/19/94-JD-025	BH33-19-94	18 to 19.2	
5770-5/19/94-JD-026	BH33-19-94	20 to 22	
S-052594-FR-027	BH33-1-94	4 to 6	
S-052594-FR-028	BH33-1-94	11 to 12	
S-052594-FR-029	BH33-1-94	15.5 to 16	
S-052594-FR-030	BH33-1-94	16 to 18	
S-052594-FR-031	BH33-1-94	18 to 20	
S-052594-FR-032	BH33-1-94	20 to 22	

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

April 28, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on April 18, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940595	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	GM-PONTIAC

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
BWS-001	940595001
BWS-002	940595002
BWS-003	940595003

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940595
MATRIX:SOIL
METHOD:8020

MICHIGAN - PURGEABLE AROMATICS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940595001	BWS-001					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	88	65-130	% Dry Weight	1
	DATE SAMPLED:	04/15/94	METHOD BLANK:	VV042594S		
	DATE ANALYZED:	04/25/94				
940595002	BWS-002					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	80	65-130	% Dry Weight	1
	DATE SAMPLED:	04/15/94	METHOD BLANK:	VV042394S		
	DATE ANALYZED:	04/23/94				
940595003	BWS-003					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	79	65-130	% Dry Weight	1
	DATE SAMPLED:	04/15/94	METHOD BLANK:	VV042594S		
	DATE ANALYZED:	04/25/94				
VV042394	METHOD BLANK					
		Benzene	U	1	ug/kg Dry Weight	1
		Toluene	U	2	ug/kg Dry Weight	1
		Ethylbenzene	U	2	ug/kg Dry Weight	1
		Xylene	U	2	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	97	65-130	% Dry Weight	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	04/23/94				

IEA
An Aquarion Company

CLIENT:-
CLIENT PROJECT#:-
CLIENT P.O.#:-
IEA PROJECT#:-
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
VV042594S	METHOD BLANK					
		Benzene	U	1	ug/kg Dry Weight	1
		Toluene	U	2	ug/kg Dry Weight	1
		Ethylbenzene	U	2	ug/kg Dry Weight	1
		Xylene	U	2	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	97	65-130	% Dry Weight	1

DATE SAMPLED: - METHOD BLANK: -
DATE ANALYZED: 04/25/94

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940595
MATRIX:SOIL
METHOD:6010

INORGANIC ANALYTE LIST

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940595001	BWS-001					
		Total Lead	1.6	0.15	mg/kg Dry Weight	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/22/94				
940595002	BWS-002					
		Total Lead	9.8	0.15	mg/kg Dry Weight	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/22/94				
940595003	BWS-003					
		Total Lead	2.1	0.15	mg/kg Dry Weight	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/22/94				

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940595
MATRIX:SOIL
METHOD:160.3

INORGANIC ANALYTE LIST

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940595001	BWS-001					
		Total Solids	85	-	%	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/20/94				
940595002	BWS-002					
		Total Solids	81	-	%	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/20/94				
940595003	BWS-003					
		Total Solids	88	-	%	-
		DATE SAMPLED: 04/15/94	METHOD BLANK:	-		
		DATE ANALYZED: 04/20/94				

IEA
An Aquarion Company

GC WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: 40606011, MS, MSD

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC
Benzene	30	250	281	103 %	75 – 125
Toluene	30	20	50	100 %	75 – 125

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD	REC
Benzene	30	281	103 %	0 %	20	75 – 125
Toluene	30	50	100 %	0 %	20	75 – 125

Corresponding Samples:

40595001
40595002
40595003

IEA
An Aquarion Company

IEA JOB#: CH940595
DATE: 4-20-94
ANALYST: T. V.
PREP BLANK: –

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
CH940602 – 001	86 %	86 %	0.0 %

GFAA Quality Control Data											
Date	Lead – 4/22						SAMPLES:	940596006, 8, 9, 10, 12			
Analyst	D.O.C.							940595001, 2, 3			
Sample	940596009										
Wt/Vol	2g/100										
Prp.Bat.	830										
Units	mg/kg (dry)										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.	Dup.	%RPD	Result
Lead	13.538	13.532	1.134	−0.529 *				13.538	15.668	14.6	
	Serial Dil Smp #			Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.003	0.01905	0.0200	95.3
mg/L											

* Sample exceeds 4 x spike concentration

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Brian Smith PRINTED NAME: BRIAN SMITH

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
1	4-15-94		S-041594-BWS-001	SOIL	2	✓	✓	* STANDARD TURN-
2	↓		S-041594-BWS-002	↓	2	✓	✓	AROUND TIME *
3	↓		S-041594-BWS-003	↓	2	✓	✓	
			TOTAL NUMBER OF CONTAINERS		6			

RELINQUISHED BY: 1. Brian W. Smith	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:
RELINQUISHED BY: 2.	DATE: / TIME:	RECEIVED BY: 2.	DATE: / TIME:
RELINQUISHED BY: 3.	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:

METHOD OF SHIPMENT: COOLER (FEDEX) AIR BILL No. 9395553790

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0653

SAMPLE TEAM: B. SMITH

RECEIVED FOR LABORATORY BY: Jim Dowse

DATE: 4/16/94 TIME: 10:46

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

May 04, 1994

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on April 21, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940622	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	GM - PONTIAC

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

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U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-041994-BWS-004	940622001

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940622
MATRIX:SOIL
METHOD:8020

MICHIGAN - PURGEABLE AROMATICS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940622001	S-041994-BWS-004					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	84	65-130	% Dry Weight	1
	DATE SAMPLED:	04/19/94	METHOD BLANK:	VV042594S		
	DATE ANALYZED:	04/25/94				
VV042594S	METHOD BLANK					
		Benzene	U	1	ug/kg Dry Weight	1
		Toluene	U	2	ug/kg Dry Weight	1
		Ethylbenzene	U	2	ug/kg Dry Weight	1
		Xylene	U	2	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	97	65-130	% Dry Weight	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	04/25/94				

IEA
An Aquarion Company

GC WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: 40606011, MS, MSD

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC
Benzene	30	250	281	103 %	75 – 125
Toluene	30	20	50	100 %	75 – 125

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD REC
Benzene	30	281	103 %	0 %	20 75 – 125
Toluene	30	50	100 %	0 %	20 75 – 125

Corresponding Samples:

622001

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940622
Project #: GM – PONTIAC

ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

	Client ID	S–041994 BWS–004						
	Lab ID	940622 001					Date Analyzed	PQL
Analyte	Method							
Lead	7421	1.4					4–29–94	0.15

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940622
Project #: GM – PONTIAC

ANALYTE LIST

Matrix: SOIL

	Client ID	S–041994 BWS–004						
	Lab ID	940622 001					Date Analyzed	PQL
Analyte	Method							
Total Solids	160.3	88					4–26–94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

IEA JOB#: CH940622
DATE: 4-26-94
ANALYST: T. V.

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
CH940618 – 006	95 %	95 %	0.0 %

GFAA Quality Control Data

Date	4-29-94						SAMPLES: 940622001				
Analyst	D O C										
Sample	940631004										
Wt/Vol	4g/100 mL										
Prp.Bat.	837										
Units	mg/kg (dry)										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.	Dup.	%RPD	Result
Lead	2636.5	1789.6	138.2	Sample >	4 x spike			2636.5	1702.1	43.1	
	Serial Dil Smp #			Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.003	4.817	5.00	96.3
mg/L											

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM-PONTIAC

SAMPLER'S SIGNATURE: Brian Smith PRINTED NAME: BRIAN SMITH

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
1	4-20-94		S-041994-BWS-004	SOIL	2	✓	✓	* STANDARD TURN-AROUND TIME *

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. Brian W. Smith	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:
RELINQUISHED BY: 2.	DATE: / TIME:	RECEIVED BY: 2.	DATE: / TIME:
RELINQUISHED BY: 3.	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:

METHOD OF SHIPMENT: COOLER (FEDEX) AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0654

SAMPLE TEAM: B. SMITH

RECEIVED FOR LABORATORY BY: Paul Mangotra

DATE: 4-21-94 TIME: 10:15

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

May 16, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on April 27, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940662	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	GM - PONTIAC

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Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

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IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-042394-BWS-005	940662001
S-042394-BWS-006	940662002
S-042394-BWS-007	940662003
S-042394-BWS-008	940662004
S-042494-BWS-009	940662005
S-042494-BWS-010	940662006

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940662
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940662001	S-042394-BWS-005					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	70	65-130	% Dry Weight	1
	DATE SAMPLED:	04/25/94 METHOD BLANK:	VR050794S			
	DATE ANALYZED:	05/07/94				
940662002	S-042394-BWS-006					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	81	65-130	% Dry Weight	1
	DATE SAMPLED:	04/25/94 METHOD BLANK:	VS050594S			
	DATE ANALYZED:	05/05/94				
940662003	S-042394-BWS-007					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	70	65-130	% Dry Weight	1
	DATE SAMPLED:	04/25/94 METHOD BLANK:	VR050794S			
	DATE ANALYZED:	05/07/94				
940662004	S-042394-BWS-008					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	67	65-130	% Dry Weight	1
	DATE SAMPLED:	04/25/94 METHOD BLANK:	VS050594S			
	DATE ANALYZED:	05/05/94				

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940662
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940662005	S-042494-BWS-009					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	91	65-130	% Dry Weight	1
	DATE SAMPLED: 04/25/94	METHOD BLANK: VS050594S				
	DATE ANALYZED: 05/06/94					
940662006	S-042494-BWS-010					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	69	65-130	% Dry Weight	1
	DATE SAMPLED: 04/25/94	METHOD BLANK: VS050594S				
	DATE ANALYZED: 05/06/94					
VR050794S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	99	65-130	%	1
	DATE SAMPLED: -	METHOD BLANK: -				
	DATE ANALYZED: 05/07/94					
VS050594S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	96	65-130	%	1
	DATE SAMPLED: -	METHOD BLANK: -				
	DATE ANALYZED: 05/05/94					

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GC SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE NO.: 40662001

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % REC	QC LIMITS REC
Benzene	30	< 1	32	107 %	70 – 130
Toluene	30	< 2	29	97 %	70 – 130

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MSD % REC	% RPD	QC LIMITS RPD	REC
Benzene	30	36	120 %	11 %	25	70 – 130
Toluene	30	34	113 %	15 %	25	70 – 130

Corresponding Samples:

940662001
940662002
940662003
940662004
940662005
940662006

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940662
Project #: GM – PONTIAC

ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

Client ID	S 042394 BWS–005	S 042394 BWS–006	S 042394 BWS–007	S 042394 BWS–008	S 042394 BWS–009		
Lab ID	940662 001	940662 002	940662 003	940662 004	940662 005	Date Analyzed	PQL
Analyte	Method						
Lead	7421	3.8	3.8	4.6	10	6.6	5–10–94	0.3

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940662
Project #: GM – PONTIAC

ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

	Client ID	S 042394 BWS–010						
	Lab ID	940662 006					Date Analyzed	PQL
Analyte	Method							
Lead	7421	4.2					5–10–94	0.3

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940662
Project #: GM – PONTIAC

ANALYTE LIST Matrix: SOIL

Analyte	Method	Client ID: S 042394 BWS–005	S 042394 BWS–006	S 042394 BWS–007	S 042394 BWS–008	S 042494 BWS–009	Date Analyzed	PQL
		Lab ID: 940662 001	940662 002	940662 003	940662 004	940662 005		
Total Solids	160.3	90	90	90	92	88	4–28–94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA – MI
IEA Job#: CH940662
Project #: GM – PONTIAC

ANALYTE LIST

Matrix: SOIL

	Client ID	S 042494 BWS–010						
	Lab ID	940662 006					Date Analyzed	PQL
Analyte	Method							
Total Solids	160.3	89					4–28–94	%

PQL = Practical Quantitation Limit

GFAA Quality Control Data											
Date	5-10-94				SAMPLES: 940653003, 940653004						
Analyst	D O C				940662001 -> 006						
Sample	940653003										
Wt/Vol	1 g / 100										
Prp.Bat.	853										
Units	mg/kg (dry)										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.	Dup.	%RPD	Result
Lead	13.101	13.013	2.532	0 *				13.101	11.423	13.7	
	Serial Dil Smp #			Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								< 0.003	0.01669	0.0200	83.4
mg/L											

* Sample exceeds 4 x spike concentration

IEA JOB#: CH940662
DATE: 4-28-94
ANALYST: R. M.

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
S – 042494	89 %	90 %	1.1 %
BWS – 010			

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Brian Smith PRINTED NAME: BRIAN W. SMITH

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
1	4-25-94		S-042394-BWS-005	SOIL	2	✓	✓	* STANDARD TURN-
2			S-042394-BWS-006	SOIL	2	✓	✓	AROUND TIME *
3			S-042394-BWS-007	SOIL	2	✓	✓	
4			S-042394-BWS-008	SOIL	2	✓	✓	
5			S-042494-BWS-009	SOIL	2	✓	✓	
6			S-042494-BWS-010	SOIL	2	✓	✓	
			TOTAL NUMBER OF CONTAINERS		12			

RELINQUISHED BY: 1. Brian W. Smith	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:
RELINQUISHED BY: 2.	DATE: / TIME:	RECEIVED BY: 2.	DATE: / TIME:
RELINQUISHED BY: 3.	DATE: / TIME:	RECEIVED BY: 1.	DATE: / TIME:

METHOD OF SHIPMENT: COOLER (FEDEX) AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0712

SAMPLE TEAM: B. SMITH, B. MARTEL

RECEIVED FOR LABORATORY BY: Paul Mangelos
DATE: 4-26-94 TIME: 3:15

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

June 16, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on May 03, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- definitions
- analytical methodology
- analytical results
- state certifications
- chain-of-custody (if applicable)

IEA Project#	CH940719	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

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SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-043094-BWS-011	940719001
S-043094-BWS-012	940719002
S-043094-BLM-013	940719003
S-043094-BLM-014	940719004
S-043094-BLM-015	940719005
S-043094-HH-016	940719006
S-043094-HH-017	940719007
S-050194-BLM-018	940719008
S-050194-BLM-019	940719009
S-043094-BWS-020	940719010
S-043094-BLM-021	940719011
S-043094-BLM-021MD	940719011MD
S-043094-BLM-021MS	940719011MS
R-050194-BLM-001	940719012

IEA
An Aquarion Company

CASE NARRATIVE: CH940719

Samples S-043094-BWS-011, S-043094-BWS-012, S-043094-BLM-014, and S-043094-BWS-020 needed reanalyses because dilutions were necessary to dilute target analytes into the calibration curve. The reanalyses were performed out of hold time.

Sample S-043094-BLM-015 needed a reanalysis because of low surrogate recovery due to matrix effect. The reanalysis was performed out of hold time.

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940719
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940719001	S-043094-BWS-011					
		Benzene	610 E	10	ug/kg Dry Weight	1
		Toluene	2300 E	10	ug/kg Dry Weight	1
		Ethylbenzene	3400 E	10	ug/kg Dry Weight	1
		Xylene	7900 E	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	97	65-130	% Dry Weight	1
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719001D1	S-043094-BWS-011					
		Benzene	2300	10	ug/kg Dry Weight	10
		Toluene	4400	10	ug/kg Dry Weight	10
		Ethylbenzene	1900	10	ug/kg Dry Weight	10
		Xylene	7000	30	ug/kg Dry Weight	10
		Bromofluorobenzene (surr)	100	65-130	% Dry Weight	10
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VV051694S		
		DATE ANALYZED: 05/16/94				
940719002	S-043094-BWS-012					
		Benzene	330	10	ug/kg Dry Weight	20
		Toluene	15000	10	ug/kg Dry Weight	20
		Ethylbenzene	17000	10	ug/kg Dry Weight	20
		Xylene	87000 E	30	ug/kg Dry Weight	20
		Bromofluorobenzene (surr)	74	65-130	% Dry Weight	20
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719002D1	S-043094-BWS-012					
		Benzene	UD	10	ug/kg Dry Weight	50
		Toluene	18000	10	ug/kg Dry Weight	50
		Ethylbenzene	22000	10	ug/kg Dry Weight	50
		Xylene	97000	30	ug/kg Dry Weight	50
		Bromofluorobenzene (surr)	84	65-130	% Dry Weight	50
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VV051694S		
		DATE ANALYZED: 05/16/94				

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940719
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940719003	S-043094-BLM-013					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	65	65-130	% Dry Weight	1
	DATE SAMPLED:	04/30/94	METHOD BLANK:	VR051494S		
	DATE ANALYZED:	05/14/94				
940719004	S-043094-BLM-014					
		Benzene	270	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	2600 E	10	ug/kg Dry Weight	1
		Xylene	5200 E	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	71	65-130	% Dry Weight	1
	DATE SAMPLED:	04/30/94	METHOD BLANK:	VR051494S		
	DATE ANALYZED:	05/14/94				
9407190040D1	S-043094-BLM-014					
		Benzene	180	10	ug/kg Dry Weight	10
		Toluene	UD	10	ug/kg Dry Weight	10
		Ethylbenzene	3500	10	ug/kg Dry Weight	10
		Xylene	12000	30	ug/kg Dry Weight	10
		Bromofluorobenzene (surr)	92	65-130	% Dry Weight	10
	DATE SAMPLED:	04/30/94	METHOD BLANK:	VV051694S		
	DATE ANALYZED:	05/16/94				
940719005	S-043094-BLM-015					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	22	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	24	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	46	65-130	% Dry Weight	1
	DATE SAMPLED:	04/30/94	METHOD BLANK:	VR051494S		
	DATE ANALYZED:	05/14/94				

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940719
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940719005R1	S-043094-BLM-015					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	45	10	ug/kg Dry Weight	1
		Ethylbenzene	14	10	ug/kg Dry Weight	1
		Xylene	50	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	70	65-130	% Dry Weight	1
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VS051794S		
		DATE ANALYZED: 05/18/94				
940719006	S-043094-HH-016					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	67	65-130	% Dry Weight	1
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719007	S-043094-HH-017					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	67	65-130	% Dry Weight	1
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719008	S-050194-BLM-018					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	66	65-130	% Dry Weight	1
		DATE SAMPLED: 05/01/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940719
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940719009	S-050194-BLM-019					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	67	65-130	% Dry Weight	1
		DATE SAMPLED: 05/01/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719010	S-043094-BWS-020					
		Benzene	UD	10	ug/kg Dry Weight	10
		Toluene	12000	10	ug/kg Dry Weight	10
		Ethylbenzene	13000 E	10	ug/kg Dry Weight	10
		Xylene	67000 E	30	ug/kg Dry Weight	10
		Bromofluorobenzene (surr)	75	65-130	% Dry Weight	10
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				
940719010D1	S-043094-BWS-020					
		Benzene	320	10	ug/kg Dry Weight	25
		Toluene	16000	10	ug/kg Dry Weight	25
		Ethylbenzene	22000	10	ug/kg Dry Weight	25
		Xylene	96000	30	ug/kg Dry Weight	25
		Bromofluorobenzene (surr)	95	65-130	% Dry Weight	25
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VV051694S		
		DATE ANALYZED: 05/16/94				
940719011	S-043094-BLM-021					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	65	65-130	% Dry Weight	1
		DATE SAMPLED: 04/30/94	METHOD BLANK:	VR051494S		
		DATE ANALYZED: 05/14/94				

IEA
An Aquarion Company

CLIENT:-
CLIENT PROJECT#:-
CLIENT P.O.#:-
IEA PROJECT#:-
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
VR051494S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	97	65-130	%	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	05/14/94				
VS051794S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	85	65-130	%	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	05/17/94				
VV051694S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	81	65-130	%	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	05/16/94				

IEA
An Aquarion Company

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE#:940719011

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % REC	QC LIMITS REC
Benzene	30	<1	22	73	70–130
Toluene	30	<2	21	70	70–130

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MSD % REC	% RPD	QC LIMITS RPD REC
Benzene	30	24	80	9	25 70–130
Toluene	30	22	73	4	25 70–130

Corresponding Samples:

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

	Client ID	S043094 BWS-11	S043094 BWS-12	S043094 BLM-13	S043094 BLM-14	S043094 BLM-15		
	Lab ID	940719 001	940719 002	940719 003	940719 004	940719 005	Date Analyzed	PQL
Analyte	Method							
LEAD	7421	8.8	6.3	6.4	6.0	4.6	05/13/94	0.15

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST
mg/kg dry weight

Matrix: SOIL

Client ID	S043094-HH-016	S043094-HH-017	S043094-BLM-018	S043094-BLM-019	S043094-BWS-20		
Lab ID	940719 006	940719 007	940719 008	940719 009	940719 010	Date Analyzed	PQL
Analyte	Method						
Lead	7421	4.7	11	4.2	12	10	5/13/94	0.15

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST
mg/kg (dry weight)

Matrix: SOIL

	Client ID	S043094 BLM-21					Date Analyzed	PQL
	Lab ID	940719 011						
Analyte	Method							
LEAD	7421	6.2					05/13/94	0.15

PQL = Practical Quantitation Limit

GFAA Quality Control Data

Date	5/9/94					SAMPLES:	940736007-010				
Analyst	DOC						940711002, 940711008				
Sample	940739004										
Wt/Vol	2g/100										
Prp.Bat.	859										
Units	mg/kg dry weight										
Element	Matrix Spike										TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC				Int.	Dup.	%RPD	Result
Lead	30.117	43.939	0.918	1505*				30.117	29.597	1.7	
	Serial Dil	Smp #		Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.003	0.02020	0.0200	101

* Sample exc[illegible] 4x spike concentration

GFAA Quality Control Data

Date	5/13/94
Analyst	DOC
Sample	940719011
Wt/Vol	2/100
Prp.Bat.	863
Units	mg/kg dry weight

SAMPLES: 940719001-011

Element	Matrix Spike										TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC				Int.	Dup.	%RPD	Result
Lead	6.245	5.726	1.069	0*				6.245	5.350	15.4	

	Serial Dil Smp #			Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Lead								<0.003	0.01844	0.02000	92.2

* Sample exceeds 4x spike concentration

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST

Matrix: SOIL

		S043094	S043094	S043094	S043094	S043094		
	Client ID	BWS-011	BWS-012	BLM-013	BLM-014	BLM-015		
		940719	940719	940719	940719	940719	Date	
	Lab ID	001	002	003	004	005	Analyzed	PQL
Analyte	Method							
TOTAL SOLIDS	160.3	88	87	91	90	94	05/06/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRI-MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST

Matrix: SOIL

		S043094	S043094	S043094	S043094	S043094		
	Client ID	HH-016	HH-017	BLM-018	BLM-019	BLS-020		
		940719	940719	940719	940719	940719	Date	
	Lab ID	006	007	008	009	010	Analyzed	PQL
Analyte	Method							
TOTAL SOLIDS	160.3	90	90	90	92	88	05/06/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA–MI
IEA Job#: CH940719
Project #: 5770

ANALYTE LIST

Matrix: SOIL

	Client ID	S043094 BLM–021						
	Lab ID	940719 011					Date Analyzed	PQL
Analyte	Method							
TOTAL SOLIDS	160.3	87					05/06/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

IEA JOB#: CH940719
DATE: 5/6/94
ANALYST: R.M.
PREP BLANK:

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
CH940721-003	94%	94%	0.0%

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Brian Smith PRINTED NAME: BRIAN W. SMITH

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
1	4-30-94		S-043094-BWS-011	SOIL	2	✓	✓	* STANDARD TURN-
2			S-043094-BWS-012		2	✓	✓	AROUND TIME *
3			S-043094-BLM-013		2	✓	✓	
4			S-043094-BLM-014		2	✓	✓	
5			S-043094-BLM-015		2	✓	✓	
6			S-043094-HH-016		2	✓	✓	
7	4-30-94		S-043094-HH-017		2	✓	✓	
8	5-1-94		S-050194-BLM-018		2	✓	✓	
9	5-1-94		S-050194-BLM-019		2	✓	✓	
10	4-30-94		S-043094-BWS-020		2	✓	✓	
11	4-30-94		S-043094-BLM-021	SOIL	6	✓	✓	MS/MSD
12	5-1-94		R-050194-BLM-001	WATER	1	✓	✓	RINSATE
TOTAL NUMBER OF CONTAINERS					27			

RELINQUISHED BY:	DATE: / TIME:	RECEIVED BY:	DATE: / TIME:
1. Brian W. Smith		1.	
RELINQUISHED BY:	DATE: / TIME:	RECEIVED BY:	DATE: / TIME:
2.		2.	
RELINQUISHED BY:	DATE: / TIME:	RECEIVED BY:	DATE: / TIME:
3.		1.	

METHOD OF SHIPMENT: COOLER (FEDEX) AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

No. 0657

SAMPLE TEAM: B. MARTEL, H. HOLMBERG, B. SMITH

RECEIVED FOR LABORATORY BY: Tom Mayo (IEA)

DATE: 5-3-94 TIME: 10:30

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

June 14, 1994

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on May 13, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940806	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

ies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
5770-5/11/94-JD-021	940806001
5770-5/11/94-JD-022	940806002
5770-5/11/94-JD-023	940806003

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940806
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940806001	5770-5/11/94-JD-021					
		Benzene	440	10	ug/kg Dry Weight	50
		Toluene	1300	10	ug/kg Dry Weight	50
		Ethylbenzene	1200	10	ug/kg Dry Weight	50
		Xylene	6800	30	ug/kg Dry Weight	50
		Bromofluorobenzene (surr)	89	65-130	% Dry Weight	50
		DATE SAMPLED: 05/11/94 METHOD BLANK:	VS052494S			
		DATE ANALYZED: 05/24/94				
940806002	5770-5/11/94-JD-022					
		Benzene	600	10	ug/kg Dry Weight	50
		Toluene	1600	10	ug/kg Dry Weight	50
		Ethylbenzene	2600	10	ug/kg Dry Weight	50
		Xylene	11000	30	ug/kg Dry Weight	50
		Bromofluorobenzene (surr)	85	65-130	% Dry Weight	50
		DATE SAMPLED: 05/11/94 METHOD BLANK:	VS052494S			
		DATE ANALYZED: 05/24/94				
940806003	5770-5/11/94-JD-023					
		Benzene	3000	10	ug/kg Dry Weight	250
		Toluene	3000	10	ug/kg Dry Weight	250
		Ethylbenzene	15000	10	ug/kg Dry Weight	250
		Xylene	50000	30	ug/kg Dry Weight	250
		Bromofluorobenzene (surr)	91	65-130	% Dry Weight	250
		DATE SAMPLED: 05/11/94 METHOD BLANK:	VS052494S			
		DATE ANALYZED: 05/24/94				
VS052494S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	93	65-130	%	1
		DATE SAMPLED: - METHOD BLANK:	-			
		DATE ANALYZED: 05/24/94				

IEA
An Aquarion Company

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE#:40806003

COMPOUND	SPIKE ADDED	SAMPLE CONCENTRATION	MS CONCENTRATION	MS % REC	QC LIMITS REC
Benzene	7500	2500	8000	73	70–130
Toluene	7500	2500	8000	73	70–130

COMPOUND	SPIKE ADDED	MSD CONCENTRATION	MSD % REC	% RPD	QC LIMITS RPD REC
Benzene	7500	7750	70	4	25 70–130
Toluene	7500	7750	70	4	25 70–130

Corresponding Samples:

IEA
An Aquarion Company

Client: CRA–MI
IEA Job#: CH940806
Project #: 5770

ANALYTE LIST
(mg/kg) dry

Matrix: SOIL

		05/11/94	05/11/94	05/11/94				
	Client ID	5770 JD–021	5770 JD–022	5770 JD–023				
	Lab ID	940806 001	940806 002	940806 003			Date Analyzed	PQL
Analyte	Method							
LEAD	7421	5.4	5.8	19			05/17/94	0.15

PQL = Practical Quantitation Limit

GFAA Quality Control Data

Date	05/17/94				SAMPLES:						
Analyst	DOC				940806001-3						
Sample	940806003										
Wt/Vol	26/100ML										
Prp.Bat.	874										
Units	mg/kg dry										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.	Dup.	%RPD	Result
Arsenic											
Selenium											
Lead	19.4220	21.107	1.147	147.1	Sample>4x spike			19.420	22.120	13.0	
Thallium											
Cadmium											
Silver											
Antimony											

Serial Dil Smp #				Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Arsenic											
Selenium											
Lead mg/L								<0.003	0.01727	0.020	86.4
Thallium											
Cadmium								<0.0004	0.005495	0.00500	109.9
Silver											
								<0.002	0.02054	0.020	102.7
Antimony											

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940806
Project #: 5770

ANALYTE LIST
(mg/kg) dry

Matrix: SOIL

		05/11/94	05/11/94	05/11/94				
	Client ID	5770 JD-021	5770 JD-022	5770 JD-023				
	Lab ID	940806 001	940806 002	940806 003			Date Analyzed	PQL
Analyte	Method							
TOTAL SOLIDS	160.3	95	94	83			05/20/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

IEA JOB#: CH940806
DATE: 05/20/94
ANALYST: T.V.
PREP BLANK:

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
CH940815-003	87%	87%	0.0%

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): TEA Schaumburg

REFERENCE NUMBER: 5770

PROJECT NAME: GM Powertrain Central

SAMPLER'S SIGNATURE: _____ PRINTED NAME: Jeff Daniel

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
	May 11/94		5770 - 05/11/94 - SD-021		2	X	X	
	"		" - " - " -022		2	X	X	
	"		" - " - " -023		2	X	X	
			TOTAL NUMBER OF CONTAINERS		6			

RELINQUISHED BY: 1. _____	DATE: May 11/94 TIME: 1:00 pm	RECEIVED BY: 1. _____	DATE: TIME:
RELINQUISHED BY: 2. _____	DATE: TIME:	RECEIVED BY: 2. _____	DATE: TIME:
RELINQUISHED BY: 3. _____	DATE: TIME:	RECEIVED BY: 1. _____	DATE: TIME:

METHOD OF SHIPMENT: AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

№ 0809

SAMPLE TEAM: J. Daniel

RECEIVED FOR LABORATORY BY: Pete Hoberecht

DATE: 5-13-94 TIME: 3:15 p.m.

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

June 13, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on May 20, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940892	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

Copies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

IEA
An Aquarion Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
JD-024	940892001
JD-025	940892002
JD-026	940892003

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940892
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940892001	JD-024					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	52	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	96	65-130	% Dry Weight	1
	DATE SAMPLED:	05/19/94	METHOD BLANK:	VS052894S		
	DATE ANALYZED:	05/28/94				
940892002	JD-025					
		Benzene	140	10	ug/kg Dry Weight	1
		Toluene	150	10	ug/kg Dry Weight	1
		Ethylbenzene	22	10	ug/kg Dry Weight	1
		Xylene	85	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	66	65-130	% Dry Weight	1
	DATE SAMPLED:	05/19/94	METHOD BLANK:	VS052894S		
	DATE ANALYZED:	05/28/94				
940892003	JD-026					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	13	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	71	65-130	% Dry Weight	1
	DATE SAMPLED:	05/19/94	METHOD BLANK:	VS052894S		
	DATE ANALYZED:	05/28/94				
VS052894S	METHOD BLANK					
		Benzene	U	1	ug/kg	1
		Toluene	U	2	ug/kg	1
		Ethylbenzene	U	2	ug/kg	1
		Xylene	U	2	ug/kg	1
		Bromofluorobenzene (surr)	98	65-130	%	1
	DATE SAMPLED:	-	METHOD BLANK:	-		
	DATE ANALYZED:	05/28/94				

IEA
An Aquarion Company

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE#:40874006

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	QC LIMITS REC
Benzene	30	6	27	70	70–130
Toluene	30	<2	23	77	70–130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	% RPD	QC LIMITS RPD REC
Benzene	30	27	70	0	25 70–130
Toluene	30	24	80	4	25 70–130

Corresponding Samples:

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940892
Project #: 5770

ANALYTE LIST

Matrix: Soil

	Client ID	JD-024	JD-025	JD-026				
	Lab ID	940892 001	940892 002	940892 003			Date Analyzed	Approximate PQL
Analyte	Method							
Lead	7421	0.48	0.88	0.79			05/27/94	0.075

PQL = Practical Quantitation Limit

GFAA Quality Control Data

Date	05/27/94						SAMPLES:	940596003			
Analyst	DOC							940892001-3			
Sample	940596003										
Wt/Vol	4G/100 ML										
Prp.Bat.	889										
Units	'mg/kg Dry										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.	Dup.	%RPD	Result
Arsenic											
Selenium											
Lead	1.143	106.143	133.547	78.6				1.143	0.961	17.3	
Thallium											
Cadmium											
Silver											
Antimony											

Serial Dil Smp #				Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
Arsenic											
Selenium											
Lead mg/L								<0.003	4.040	5.00	80.8
Thallium											
Cadmium											
Silver											
Antimony											

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): TEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM PONTIAC CENTRAL

SAMPLER'S SIGNATURE: _____ PRINTED NAME: JEFF DANIEL

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: DIESEL	PARAMETERS: LEAD	REMARKS
	05/19/94		5-5770-051994-JD-024	SOIL	2	X	X	STANDARD
	05/19/94		-025	SOIL	2	X	X	TAT
	05/19/94		-026	SOIL	2	X	X	

TOTAL NUMBER OF CONTAINERS: 6

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
1. _____	05/19/94	19:25	1. _____		
2. _____			2. _____		
3. _____			1. _____		

METHOD OF SHIPMENT: AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: JEFF DANIEL

RECEIVED FOR LABORATORY BY: _____

DATE: 5-20-94 TIME: 10:00

No. 0812

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

IEA
An Aquarion Company

126 West Center Court
Schaumburg, Illinois 60195

Phone 708·705·0740
Fax 708·705·1567

MR. JACK LINDSAY
CRA -MI
11100 METRO AIRPORT CENTER DR
SUITE 160
ROMULUS, MI 48174

June 23, 1994

Dear Mr. Lindsay

Please find enclosed the analytical results of the samples received at our laboratory on May 27, 1994. This report contains sections addressing the following information at a minimum:

- sample summary
- analytical methodology
- state certifications
- definitions
- analytical results
- chain-of-custody (if applicable)

IEA Project#	CH940951	Client Project#	5770
		Purchase Order#	-
IEA Quote#		Site Name	

ies of this analytical report and supporting data are maintained in our files for three years; samples are retained for two weeks unless special arrangements have been made. Unless specifically indicated, all analytical testing was performed at this laboratory location and no portion of the testing was subcontracted.

We appreciate your selection of our services and welcome any questions or suggestions you may have relative to this report. Please contact your customer service representative at 705-0740 for any additional information. Thank you for utilizing our services, we hope you will consider us for your future analytical needs.

I have reviewed and approved the enclosed data for final release.

Sincerely,

Larry D. Lewis
Director of Operations
IEA-Illinois Laboratory

IEA
An Aquanon Company

SAMPLE SUMMARY

CLIENT SAMPLE ID	IEA SAMPLE ID
S-52594-FR-027	940951001
S-52594-FR-028	940951002
S-52594-FR-029	940951003
S-52594-FR-030	940951004
S-52594-FR-031	940951005
S-52594-FR-032	940951006

IEA
An Aquarion Company

Definitions of Data Qualifiers and Terminology

There are a number of data qualifiers that are widely used within the environmental testing industry which may be utilized in our data reports. The following definitions of these qualifiers are included as a service to our clientele. The majority of the qualifiers have evolved from the EPA contract laboratory program (CLP) therefore, they may or may not be appropriate for the particular testing that you have requested. If your work did not involve CLP type analyses, only a few of these items may apply to your particular report.

A - This flag is utilized to indicate that a tentatively identified compound (TIC) is a suspected aldol-condensation product formed during sample processing and caution should be applied in interpreting these results.

B - This flag is used when the analyte is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to use caution when applying the results of this analyte.

BQL - Below quantitation limit indicates the compound was not detected in the sample above the practial quantitation limit.

C - Indicates that a pesticide identification has been confirmed utilizing GC/MS techniques.

D - Indicates the sample extract was diluted by the factor listed due to the sample matrix and/or concentration levels. All method detection limits or practical quantitation limits for the particular sample are therefore increased by this dilution factor.

E - Indicates that the concentration of the specific compound exceeded the calibration range of the instrument for that particular analysis.

J - Indicates an estimated value. It indicates that the compound was analyzed for and determined to be present in the sample. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the mass spectral data indicate the presence of a compound that meet the identification criteria but the result is less than the sample quantitation limit but greater than zero.

MDL - The method detection limit (MDL) is defined as the minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero.

ND - Indicates the compound or analyte was not detected in the sample above the method detection limit or the practical quantitation limit for the particular analysis.

PQL - The practical quantitation limit is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine operating conditions.

U - Indicates the compound was analyzed for but not detected in the sample above the applicable quantitation limit.

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CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940951
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940951001	S-52594-FR-027					
		Benzene	U	10	ug/kg Dry Weight	1
		Toluene	U	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	72	65-130	% Dry Weight	1
	DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060494S			
	DATE ANALYZED: 06/05/94					
940951002	S-52594-FR-028					
		Benzene	21	10	ug/kg Dry Weight	1
		Toluene	16	10	ug/kg Dry Weight	1
		Ethylbenzene	U	10	ug/kg Dry Weight	1
		Xylene	U	30	ug/kg Dry Weight	1
		Bromofluorobenzene (surr)	67	65-130	% Dry Weight	1
	DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060494S			
	DATE ANALYZED: 06/05/94					
940951003	S-52594-FR-029					
		Benzene	220000	10	ug/kg Dry Weight	500
		Toluene	690000	10	ug/kg Dry Weight	500
		Ethylbenzene	240000	10	ug/kg Dry Weight	500
		Xylene	1.2E6	30	ug/kg Dry Weight	500
		Bromofluorobenzene (surr)	77	65-130	% Dry Weight	500
	DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060694S			
	DATE ANALYZED: 06/07/94					
940951004	S-52594-FR-030					
		Benzene	9100	10	ug/kg Dry Weight	50
		Toluene	28000	10	ug/kg Dry Weight	50
		Ethylbenzene	11000	10	ug/kg Dry Weight	50
		Xylene	61000	30	ug/kg Dry Weight	50
		Bromofluorobenzene (surr)	73	65-130	% Dry Weight	50
	DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060694S			
	DATE ANALYZED: 06/07/94					

IEA
An Aquarion Company

CLIENT:CRA -MI
CLIENT PROJECT#:5770
CLIENT P.O.#:-
IEA PROJECT#:CH940951
MATRIX:SOIL
METHOD:8020

PURGEABLE AROMATICS - MICHIGAN LIMITS
BTEX - EPA 602/8020

LAB ID#	CLIENT ID	ANALYTE	RESULT	PQL	UNITS	DILUTION FACTOR
940951005	S-52594-FR-031					
		Benzene	6000	10	ug/kg Dry Weight	10
		Toluene	1300	10	ug/kg Dry Weight	10
		Ethylbenzene	820	10	ug/kg Dry Weight	10
		Xylene	3300	30	ug/kg Dry Weight	10
		Bromofluorobenzene (surr)	73	65-130	% Dry Weight	10
		DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060694S		
		DATE ANALYZED: 06/07/94				
940951006	S-52594-FR-032					
		Benzene	8300	10	ug/kg Dry Weight	10
		Toluene	1500	10	ug/kg Dry Weight	10
		Ethylbenzene	390	10	ug/kg Dry Weight	10
		Xylene	2800	30	ug/kg Dry Weight	10
		Bromofluorobenzene (surr)	84	65-130	% Dry Weight	10
		DATE SAMPLED: 05/25/94	METHOD BLANK:	VR060694S		
		DATE ANALYZED: 06/07/94				
VR060494S	METHOD BLANK					
		Benzene	U	10	ug/kg	1
		Toluene	U	10	ug/kg	1
		Ethylbenzene	U	10	ug/kg	1
		Xylene	U	30 3	ug/kg	1
		Bromofluorobenzene (surr)	95	65-130	%	1
		DATE SAMPLED: -	METHOD BLANK:	-		
		DATE ANALYZED: 06/04/94				
VR060694S	METHOD BLANK					
		Benzene	U	10	ug/kg	1
		Toluene	U	10	ug/kg	1
		Ethylbenzene	U	10	ug/kg	1
		Xylene	U	30	ug/kg	1
		Bromofluorobenzene (surr)	103	65-130	%	1
		DATE SAMPLED: -	METHOD BLANK:	-		
		DATE ANALYZED: 06/06/94				

IEA
An Aquarion Company

VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

IEA REFERENCE#:40943004

COMPOUND	SPIKE ADDED (ug/kg)	SAMPLE CONCENTRATION (ug/kg)	MS CONCENTRATION (ug/kg)	MS % REC	QC LIMITS REC
Benzene	30	<1	23	77	70–130
Toluene	30	<2	22	73	70–130

COMPOUND	SPIKE ADDED (ug/kg)	MSD CONCENTRATION (ug/kg)	MSD % REC	% RPD	QC LIMITS RPD REC
Benzene	30	22	73	5	25 70–130
Toluene	30	22	73	0	25 70–130

Corresponding Samples:

Client: CRA-MI
IEA Job#: CH940951
Project #: 5770

ANALYTE LIST
(mg/kg) dry weight

Matrix: SOIL

		S-5294	S-52594	S-52594	S-52594	S-52594	S-52594	
	Client ID	FR-027	FR-028	FR-029	FR-030	FR-031	FR-032	
		941042	941042	941042	941042	941042	941042	
	Lab ID	001	002	003	004	005	006	PQL
Analyte	Method							
Lead	7421	6.4	4.9	25.0	8.3	7.3	5.4	0.3
Date of Analysis	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	06/10/94	

PQL = Practical Quantitation Limit

GFAA Quality Control Data

Date	06/10/94					SAMPLES:	940950995				
Analyst	DOC										
Sample	CH941031002										
Wt/Vol	1g/100mg										
Prp.Bat.	907										
Units	mg/kg (dry)										
Element	Matrix Spike				Matrix Spike Duplicate						TCLP Blk
	Org.Smp	Spk.Smp	Amt.Spkd	%REC	Spk.Smp	Amt.Spkd	%REC	Int.Spk	Dup.Spk	%RPD	Result
Lead	72.832	791.270	580.450	124				72832	104002	35.3	

Serial Dil Smp #				Post SpK.		Sample #:		Prep Blk	LCS		
	Sample	Dilution	RPD	Org.Smp.	Amt.Spkd	Result	%REC		Org	Known	%REC
								<0.003	4.948	5.000	98.9

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940951
Project #: 5770

ANALYTE LIST

Matrix: Soil

	Client ID	S-52594 FR-027	S-52594 FR-028	S-52594 FR-029	S-52594 FR-030	S-52594 FR-031		
	Lab ID	940951 001	940951 002	940951 003	940951 004	940951 005	Date Analyzed	PQL
Analyte	Method							
Total Solids	160.3	94	92	92	84	86	06/07/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

Client: CRA-MI
IEA Job#: CH940951
Project #: 5770

ANALYTE LIST

Matrix: Soil

	Client ID	S-52594 FR-032						
	Lab ID	940951 006					Date Analyzed	PQL
Analyte	Method							
Total Solids	160.3	88					06/07/94	%

PQL = Practical Quantitation Limit

IEA
An Aquarion Company

IEA JOB#: CH940957
DATE: 06/07/94
ANALYST: JH
PREP BLANK:

QUALITY CONTROL

PARAMETER Total Solids

DUPLICATE

Sample #	Original Result	Duplicate Result	%RPD
CH940999-002	97%	97%	0.0%

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): IEA

REFERENCE NUMBER: 5770

PROJECT NAME: GM - PONTIAC

SAMPLER'S SIGNATURE: Frank W. Ring PRINTED NAME: Frank W. Ring

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: LEAD	REMARKS
1	5/25/94		S-52594-FR-027	SOIL	2	✓	✓	
2	↓		-028	↓	2	✓	✓	
3			-029		2	✓	✓	
4			-030		2	✓	✓	
5			-031		2	✓	✓	
6	↓		-032	↓	2	✓	✓	
TOTAL NUMBER OF CONTAINERS					12			

RELINQUISHED BY: 1. Frank W. Ring	DATE: 5/26/94 TIME: 1500	RECEIVED BY: 1. Pete Horbenko	DATE: 5/27/94 TIME: 9:00
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

No. 0754

SAMPLE TEAM: Frank W. Ring

RECEIVED FOR LABORATORY BY:

DATE: TIME:

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

MEMO

TO: Glenn Turchan

REFERENCE NO: 5770

FROM: Jack Lindsay

DATE: May 31, 1994

RE: Data Quality Assessment and Validation
for Six Soil Samples collected from the
General Motors Corporation Central Manufacturing Facility
Pontiac, Michigan (Report CH940662)

The following details an analytical data quality assessment and validation for data resulting from April 25, 1994 collection of six soil samples from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Surrogate Compound Percent Recoveries

Individual sample performance for the Benzene, Toluene, Ethylbenzene and Xylene (BTEX) analyses were monitored using the percent recoveries of surrogate compound spikes. The BTEX surrogate data were found to be within the control limits.

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988, and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", July 1988.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and the relative percent difference (RFD) were determined. All data were found to be within the control limits indicating that the data achieved acceptable levels of accuracy and precision based on the information provided.

Laboratory Check Spike Recovery (Organic)

Laboratory check spike recoveries were examined to assess the accuracy of the laboratory procedures for the analyses. The laboratory check spike samples were found to be within the control limits indicating that an acceptable level of accuracy had been achieved.

Matrix Spike (MS) Sample Analysis (Inorganics)

The MS sample analysis provides information about the effect of sample matrix on the preparation and analytical methods. A non-project sample was used to establish testing matrices for the analyses; therefore, MS data for these analyses were not used to determine interference within the investigative sample.

Laboratory Control Sample (LCS)

The LCS serves as a monitor of the overall accuracy of all steps in the analysis, including sample preparation. All LCS data were found to be within the control limits indicating that an acceptable level of accuracy was achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information, and may be used with qualifications.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	SW-846[1] 8020
Lead	SW-846 7421

[1] SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
BETX	- 14 days from sample collection to completion of analysis
Lead	- 6 months from sample collection to completion of analysis

MEMO

TO: Glenn Turchan REFERENCE NO: 5770

FROM: Jack Lindsay JL DATE: May 6, 1994

RE: Data Quality Assessment and Validation for Three Soil Samples collected from the General Motors Corporation Central Manufacturing Facility Pontiac, Michigan (Report CH940595)

The following details an analytical data quality assessment and validation for data resulting from April 15, 1994 collection of three soil samples from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Surrogate Compound Percent Recoveries

Individual sample performance for the Benzene, Toluene, Ethylbenzene and Xylene (BTEX) analyses were monitored using the percent recoveries of surrogate compound spikes. The BTEX surrogate data were found to be within the control limits.

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988, and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", July 1988.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and the relative percent difference (RFD) were determined. All data were found to be within the control limits indicating that the data achieved acceptable levels of accuracy and precision based on the information provided.

Laboratory Check Spike Recovery (Organic)

Laboratory check spike recoveries were examined to assess the accuracy of the laboratory procedures for the analyses. The laboratory check spike samples were found to be within the control limits indicating that an acceptable level of accuracy had been achieved.

Matrix Spike (MS) Sample Analysis (Inorganics)

The MS sample analysis provides information about the effect of sample matrix on the preparation and analytical methods. A non-project sample was used to establish testing matrices for the analyses; therefore, MS data for these analyses were not used to determine interference within the investigative sample.

Laboratory Control Sample (LCS)

The LCS serves as a monitor of the overall accuracy of all steps in the analysis, including sample preparation. All LCS data were found to be within the control limits indicating that an acceptable level of accuracy was achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information, and may be used without qualifications.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	SW-846[1] 8020
Lead	SW-846 6010

[1] SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
BETX	- 14 days from sample collection to completion of analysis
Lead	- 6 months from sample collection to completion of analysis

MEMO

TO: Glenn Turchan REFERENCE NO: 5770

FROM: Jack Lindsay JL DATE: May 9, 1994

RE: Data Quality Assessment and Validation
for One Soil Sample collected from the
General Motors Corporation Central Manufacturing Facility
Pontiac, Michigan (Report CH940622)

The following details an analytical data quality assessment and validation for data resulting from April 20, 1994 collection of one soil sample from General Motors Corporation Central Manufacturing Facility in Pontiac, Michigan. The samples were analyzed for the parameters presented in Table 1. The methods of analysis used by IEA, Schaumburg, Illinois, are presented in Table 1. The quality control criteria were established by these methods of analysis[1].

Holding Time Periods

The holding time periods for the analyses are listed in Table 2. On the basis of the sample collection dates on the chain-of-custody documents and on the analytical reports provided by IEA, the analyses were completed within the specified holding time periods, indicating that the data were acceptable based on this criteria.

Method Blank Samples

Contamination of the samples contributed by laboratory conditions or procedures were monitored by the concurrent preparation and analysis of method blank samples. The method blank samples were reported to be free from detectable concentrations of target analytes, indicating that no significant laboratory contamination had occurred.

Surrogate Compound Percent Recoveries

Individual sample performance for the Benzene, Toluene, Ethylbenzene and Xylene (BTEX) analyses were monitored using the percent recoveries of surrogate compound spikes. The BTEX surrogate data were found to be within the control limits.

---

[1] Application of quality control criteria was consistent with "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses", February 1, 1988, and "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses", July 1988.

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Percent Recoveries

To assess the long term accuracy and precision of the analytical methods on various matrices, MS/MSD percent recoveries and the relative percent difference (RFD) were determined. All data were found to be within the control limits indicating that the data achieved acceptable levels of accuracy and precision based on the information provided.

Laboratory Check Spike Recovery (Organic)

Laboratory check spike recoveries were examined to assess the accuracy of the laboratory procedures for the analyses. The laboratory check spike samples were found to be within the control limits indicating that an acceptable level of accuracy had been achieved.

Matrix Spike (MS) Sample Analysis (Inorganics)

The MS sample analysis provides information about the effect of sample matrix on the preparation and analytical methods. A non-project sample was used to establish testing matrices for the analyses; therefore, MS data for these analyses were not used to determine interference within the investigative sample.

Laboratory Control Sample (LCS)

The LCS serves as a monitor of the overall accuracy of all steps in the analysis, including sample preparation. All LCS data were found to be within the control limits indicating that an acceptable level of accuracy was achieved.

Overall Assessment

The data were found to exhibit acceptable levels of accuracy and precision bases on the provided information, and may be used with qualifications.

TABLE 1

SUMMARY OF ANALYTICAL METHODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Parameters	Method
Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	SW-846[1] 8020
Lead	SW-846 6010

[1] SW-846 - "Test Methods for Evaluating Solid Waste Physical/Chemical Methods", 3rd Edition, November, 1986

TABLE 2

HOLDING TIME PERIODS ASSOCIATED WITH THE SAMPLE COLLECTION FROM GENERAL MOTORS CORPORATION PONTIAC CENTRAL MANUFACTURING FACILITY

Analysis	Holding Time Period
BETX	- 14 days from sample collection to completion of analysis
Lead	- 6 months from sample collection to completion of analysis

APPENDIX K.2

INVESTIGATION OF GASOLINE IN SOILS BENEATH BUILDING 33

INVESTIGATION OF GASOLINE IN SOILS BENEATH BUILDING 33

FOR

GENERAL MOTORS CORPORATION
TRUCK AND BUS OPERATIONS
PONTIAC, MICHIGAN

R-2725

MAY 22, 1985

Gilbert/Commonwealth

Gilbert/Commonwealth Inc. of Michigan
engineers and consultants

INVESTIGATION OF GASOLINE

IN SOILS BENEATH BUILDING 33

GENERAL MOTORS CORPORATION
TRUCK AND BUS OPERATIONS
PONTIAC, MICHIGAN

Prepared by:
Annette Brewster, CPGS
at the offices of
Gilbert/Commonwealth Inc. of Michigan
209 East Washington Avenue
Jackson, Michigan 49201

May 22, 1985

Approved by:



W. W. Merrell, P.E.
Manager, Civil/Structure Engineering
Power & Industrial Systems Division

62/GMC-585/D1

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2. Cross Sections

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4. Typical Recovery Well

INTRODUCTION

During drilling for a foundations investigation, gasoline odors and liquid gasoline were observed in soils beneath a portion of the Engineering Building (Plant 2, Building 33) on the General Motors Truck and Bus site in Pontiac, Michigan. Gilbert/Commonwealth Inc. of Michigan (G/C-M) has performed additional investigations in the vicinity of Building 33 to determine the extent of gasoline in the subsurface. Specific objectives of these investigations were:

1. To determine the geometry of soil layers, i.e., homogeneous and predictable layering versus discontinuous layers and lenses;

2. To establish the role of ground water in controlling the movement and present occurrence of the gasoline;

3. To determine whether backfilled sewer trenches or other underground utilities affect or control the movement of ground water or gasoline;

4. To attempt to identify the probable source(s) of the gasoline; and

5. To provide recommendations regarding the necessity for, and methods of, gasoline recovery.

The investigations included review of existing data, drilling of nine additional test borings, installation of six observation wells, laboratory soils testing and analysis of the accumulated data. The following sections of this report contain a description of the methods and results of the investigations, a discussion of findings, and recommendations for the recovery of the gasoline.

SUMMARY

Near surface soils in the vicinity of Building 33 consist of sandy and clayey fill over a complex sequence of clean sand and gravel, silty or clayey sand, sandy or clayey

silt, and sandy or silty clay. Beginning between elevations 910 to 915 feet, these deposits are underlain by a thick layer of glacial till consisting of sandy, silty clay or clayey silt. Ground water was found perched above the till layer at most locations. Water level measurements in observation wells indicate the direction of ground water flow is northwest, away from Buildings 33 and 35.

Gasoline odors were observed above or near the top of the till layer, which acts as a barrier to downward migration of the gasoline. Pure gasoline was observed at only one location: boring B-3 inside Building 33. Considering the reported lead content and direction of ground water flow, the gasoline appears to have been in the ground several years. Based upon the direction of ground water flow, the probable source of the gasoline was the fuel distribution lines for the abandoned fuel island south of Building 33. Gasoline which leaked from the lines apparently became trapped in a thin sand layer wedged between two layers of till. Approximately 2,100 gallons of gasoline may be present at this location.

It is recommended that GM install a recovery system to remove the gasoline present in soils beneath Building 33. Only the recovery of accumulated liquid gasoline is recommended at this time; laboratory tests demonstrate that very little gasoline is likely to be recovered from unsaturated soils, even those having strong gasoline ordors. The recovery system should incorporate one recovery well in close proximity to boring B-3 and several injection wells located 50 to 75 feet from the recovery well. Water introduced at the injection wells would push the gasoline toward the recovery well, and thereby speed up the recovery process. Recommendations for the recovery well and operation of the recovery system are provided in this report.

Operation of the recovery system may alter soils foundation characteristics beneath Building 33. To minimize potential damage to the building, the soils and existing foundations should be monitored during gasoline recovery. Monitoring devices should include: pneumatic piezometers to measure soil pore water pressures; strain gages to detect foundation movement; and settlement plates to measure soil settlement beneath the existing floor slab. In addition, ground water

levels in observation wells close to Building 33 should be measure periodically to determine the ground water response to pumping or injection of water.

METHODS AND RESULTS OF INVESTIGATIONS

Review of Existing Data

At the beginning of the investigations, G/C-M requested all available subsurface data for the area around Building 33. GM provided the original foundation borings for Buildings 33, 34, and 52; borings taken for modifications to Building 33 and additions to Building 35; a ground water study prepared by Camp Dresser & McKee Inc. (October 1981); and numerous drawings showing foundation elevations, underground storm and sanitary sewers, fuel tanks, and distribution lines. At G/C-M's request, GM also prepared a historical narrative of onsite fuel usage in the vicinity of Building 33. This narrative is reproduced as Appendix A.

Borings located on Exhibit 1A are listed in Table 1. Some borings were renumbered by G/C-M to avoid duplication of boring numbers. The actual locations of the original foundation borings may differ from those shown on Exhibit 1A; some locations were determined from undimensioned sketches provided with the boring report.

Borings B-1 through B-19 were drilled by G/C-M as part of the geotechnical investigations for a proposed new loadcenter and shaker foundations at Building 33. Logs of these borings and the associated laboratory soils test results are provided in the G/C-M Report R-2719, dated May 2, 1985. Results of five field permeability tests performed in borings B-4, B-6, B-8, and B-9 are presented in Table 2.

Gasoline was first observed beneath Building 33 in borings B-1, B-2, and B-3. A liquid sample obtained from boring B-3 was analyzed by GM and was reported to contain very little water. The reported lead content for the sample indicates the gasoline is a leaded product.

GM drawings showing sanitary and storm sewer layouts and elevations, foundations for Buildings 33 and 35, and underground fuel tanks and distribution lines were examined to determine whether any of these facilities could have served as migration pathways for the gasoline. The deepest trench, for a 72-inch storm sewer, passes beneath Building 33 between column lines E and F; invert elevations for this sewer vary from 913.8 feet on the south to 912.0 feet on the north. An 18-inch sanitary sewer runs east to west between column rows 5 and 6 on its way to Building 39 (former lift station); invert elevations for this line range from 919.9 feet on the east edge of Building 33 to 918.9 feet on the west side to 917.9 feet at Building 39. Footings along column line 6, which parallels the 18-inch sanitary sewer, are deeper than most of the other footings except those along column line F, which parallels the 72-inch storm sewer. A new (circa 1977) 18-inch sanitary sewer originating at Building 18 passes between Buildings 33 and 35 on its way to Building 39. At the manhole closest to and south of Building 33, the invert elevation is 916.8 feet; at Building 39, the invert elevation is 916.1 feet. These sewer lines constitute the deepest excavations G/C-M has located in the vicinity of Building 33. Most of the other sewer trenches, or underground fuel tanks and distribution lines, occur above elevations 923 to 930 feet.

Additional Test Borings and Observation Wells

Nine additional test borings, B-20 through B-28, were drilled for this investigation in March and April 1985. The purpose of these borings was to further define soil layering and gasoline occurrence, to provide additional soil samples for laboratory testing, and to install additional observation wells to determine the direction of gasoline and/or ground water movement. The borings were drilled using 3 1/4-inch I.D. hollowstem augers. Outside the building, soil samples were generally taken at 5-foot intervals during drilling using the Standard Penetration Test (ASTM D1586). Two borings, B-21 and B-22, were located inside Building 33; soil samples were obtained from these borings by pushing a split-spoon sampler hydraulically for 18 inches or to refusal. At selected depths, undisturbed samples of clayey soils were also taken using a 3-inch diameter thin-wall Shelby tube sampler (ASTM D1587). Drilling and sampling were directed by a G/C-M geologist, who also

logged the test borings. Boring logs are presented in Appendix B. Soils were classified according to the Unified Soil Classification System.

Observation wells were installed in the following six test borings: B-20, B-23, B-24, B-26, B-27, and B-28. Well installation details are shown on the respective boring log. Wells were not installed in the two borings drilled inside Building 33. Saturated soils were not encountered in boring B-25, so no well was installed there either. Observation wells had previously been installed in borings B-9 and B-19; logs of these borings are also included in Appendix B. All B-series borings without observation wells were fully sealed to the ground surface with a sand-cement grout.

Each observation well was constructed using 2-inch I.D., threaded and coupled, galvanized steel casing and Johnson wire-wound, stainless steel well screen or well points. Screen lengths varied from 3.0 to 5.0 feet. The screen slot size was 0.010 inch. Clean silica sand was placed around and above the screen as a filter. Above the sand filter, the annular space between the casing and borehole was filled with sand-cement grout. The grout seal extends to the ground surface in all wells except B-20. The grout seal in boring B-20 extends 4.0 feet above the sand filter; the remaining annular space was backfilled with a mixture of grout and original borehole cuttings. A 5-foot long protective steel standpipe with lockable cap was set in cement at each well location. Each observation well was bailed briefly to assure the well would respond to changes in ground water levels.

Upon completion of well installation, G/C-M and GM measured the locations and surveyed the elevations of the borings and observation wells. Locations were referenced to the walls or columns of existing buildings. Elevations were referenced to the floor of Building 33 (935.0 feet). Elevations of the observation wells are presented in Table 3. The ground elevation at each boring location is listed on the respective boring log. Ground water levels measured in the observation wells are also reported in Table 3.

Laboratory Testing

Soil samples obtained from the test borings were taken to G/C-M soils laboratory in Jackson, Michigan for testing. Representative samples were tested to determine natural moisture content, Atterberg limits, and percent finer than the No. 200 sieve. These tests were performed in accordance with ASTM standard procedures. Gradation tests on granular soils were generally limited to sieve analyses. Test results such as moisture content, liquid limits, plasticity index, penetrometer readings (field measurements), and soil classifications are indicated directly on the boring logs contained in Appendix B. Laboratory test procedures and gradation curves are presented in Appendix C.

Laboratory falling head permeability tests were performed on two undisturbed samples of clayey soils. To closely simulate insitu conditions, the soil samples were tested using Brainard-Kilman triaxial consolidation apparatus. Prior to the actual test, each sample was saturated using a procedure called back-pressure saturation. Test results are summarized in Table 4.

Several unsaturated soil samples from the test borings were observed to have moderate to strong gasoline odors. Although the odors often persisted below the water table, the strongest odors usually occurred at or slightly above the depth where water was encountered. A special testing procedure was developed to determine whether the odors were caused by vapors trapped in the soil or whether liquid gasoline was held on the soil particles by adsorption or surface tension. The test procedure is described in Appendix C. Table 5 provides a qualitative description of the gasoline content of tested soil samples.

Permeability Estimates From Gradation Curves

Permeability values for granular soils across the site were determined from gradation curves prepared for individual soil samples. Three empirical methods

were used to calculate permeability: Hazen's approximation, Beyer's (1969) modification of the Hazen formula, and the USBSC formula (Bialas and Kleczkowski, 1970). These equations are presented here for comparison:

Hazen	Beyer	USBSC
$k = Ad_{10}^2$	$k = Cd_{10}^2$	$k = 0.36d_{20}^{2.3}$

where k is permeability in cm/sec, d_{10} and d_{20} are the respective particle sizes in mm at which 10 and 20 percent of the total sample are finer (by weight), and A and C are constants of proportionality. In the Hazen approximation, A equals 1.00. The constant, C, in Beyer's formula depends upon the soil uniformity coefficient, d_{60}/d_{10}; C is determined graphically and equals A when the uniformity coefficient is 2.4. The Hazen and Beyer equations are most applicable to soils which have very little silt or clay. When soils have an appreciable amount of silt or clay, a more reliable estimate of permeability is provided by the USBSC formula.

Estimated permeability values calculated using all three empirical methods are summarized in Table 6. For similar soil descriptions, permeability values from the field and laboratory tests are remarkably consistent. Values in Table 6 represent the saturated permeability of the soil. Permeability values for unsaturated soils will be lower than the calculated values.

DISCUSSION

Soil Sequence

The soil sequence in the vicinity of Building 33 is illustrated by four cross sections presented on Exhibit 2 (in pocket). Throughout the area, sandy or clayey fill materials overlie discontinuous lenses of clean sand and gravel (SP, SW, GW), silty or clayey sand (SM, SC), sandy or clayey (ML), and sandy or silty clay (ML, ML-CL). As shown by the cross-sections, the sand lenses are not laterally continuous. These deposits are underlain by a thick layer of glacial till which consists of stiff to very stiff sandy, silty clay or clayey silt with a trace to little gravel. The till layer,

which generally begins between elevations 910 and 915 feet, is approximately 20 to 30 feet thick.

West of Building 33 and in boring B-26, soils above the till layer are predominantly sand, sand and gravel, or sand-silt mixtures. Soils in these areas were observed to be saturated for a short distance above the till layer. In boring B-24, saturated silty sands were also encountered directly below the asphalt pavement to a depth of eight feet; this water is probably perched above a 2-foot layer of silty clay within the fill which begins at the 8-foot depth.

Soils encountered beneath Building 33 are a complex sequence of clean sand, silty sand, sandy silt, and clayey silt. Interbedded layers of sand, silt, and till, several inches to several feet thick, occurred near the top of the till in borings B-2, B-3, B-4, and B-21. The interlayering and discontinuous nature of the soil types above the till make it difficult to prepare cross sections in this area with any degree of certainty.

In contrast to the sandy soils on the west side of Building 33, soils above the till layer south of Building 33 include numerous lenses of silt, clayey silt and silty clay. No liquid gasoline or odors were observed east of borings B-26 and B-7 in the parking area between Building 33 and the fuel island north of Building 34.

Ground Water

Ground water was found perched above the till layer in most borings drilled for this study. Six observation wells were installed to permit measurement of ground water levels. Ground water elevations above the till layer, listed in Table 3, are plotted on Exhibit 3. On April 11, 1985, measured ground water levels ranged from elevation 923.7 feet in B-27 to 914.7 feet in B-24. Future measurements may indicate different water levels owing to the perched nature of the ground water and limited recharge due to extensive coverage by buildings and paved areas.

Ground water contours for the perched water table are shown on Exhibit 3 for the area west of Building 33. Based upon these contours, the ground water is moving in a northwesterly direction away from Buildings 33 and 35. Ground water levels in the parking area between Buildings 33 and 34 vary from elevation 923.7 feet to 918.6 feet. In general, these water levels confirm the general direction of ground water flow. The similarity of water levels in wells B-19, B-26, and B-28 suggests the influence of an 18-inch sanitary sewer which passes between Buildings 33 and 35; the invert elevation of this sewer near Buildings 33 and 35 is approximately 917 feet.

The actual direction of ground water flow may deviate from the general direction indicated on Exhibit 3. This is because water will move preferentially through the coarser (more permeable) sands and gravels. The coarsest materials were found at the locations of borings B-23, B-24, and B-26.

Deep borings drilled by G/C-M encountered several layers of sand within and below the till layer. Some of these lower sand layers were dry while others were partially to fully saturated. An observation well installed below the till, B-9, indicates that ground water may occur under confined conditions in some locations. The elevation of ground water in the deep observation well was 885.4 feet on April 11, 1985.

In 1981, Camp Dresser & McKee Inc. prepared a report for GM which addresses the ground water resources of the site. The report also contains a description of the soil sequence which indicates the clay till extends to depths of approximately 150 feet. Ground water for plant use is obtained from several onsite wells in the glacial drift. The shallowest wells used by the plant are screened in a sand layer between depths of 150 to 175 ft. A second sand layer which occurs between depths of approximately 230 to 270 feet is also used for water supply by GM. In addition to GM, the South Bloomfield Highlands Subdivision, located south of the plant site, is reported to have wells in both of these aquifers. Any gasoline components reaching the upper aquifer in the vicinity of Building 33 would be drawn toward

GM's well #6, located at the south end of Building 52 (Exhibit 1A), and would not enter the subdivision's water supply (Camp Dresser & McKee, 1981).

Extent of Gasoline

Gasoline odors have been observed only in shallow soils above the glacial till layer which begins above elevation 910 feet. The relatively impermeable till acts as a barrier which limits the vertical migration of ground water and also the gasoline. Liquid gasoline was observed in only one boring, B-3; no water was observed above the till layer at this location. Water with gasoline odors was encountered in the following boreholes: B-1, B-2, B-4, B-5, B-14, B-15, B-19, B-21, B-23, and B-26. Gasoline-water mixtures were also noted in the logs of borings D-1, D-2 and D-4. Gasoline odors were observed in unsaturated soils in borings B-7, B-8, B-9, B-10, B-11, B-16, B-17, B-22, and B-25. No evidence of gasoline, either as liquid or odors, was observed in borings B-6, B-12, B-13, B-18, B-18A, B-20, B-24, B-27, or B-28. Except for a slight odor in B-11, there appears to be no gasoline present north of a line between B-20 and B-24.

Gasoline odors were particularly strong around Building 35 and the southwest corner of Building 33. During drilling, a faint iridescent film was observed in the wash water or water which seeped from the accumulated cuttings from borings B-23 and B-26. These borings are located on the west and east sides of Building 35, respectively. No liquid gasoline was observed, however, floating on water samples bailed from the observation wells.

To determine whether gasoline odors resulted from the movement of gasoline vapors in unsaturated soils or represented areas through which liquid gasoline had once migrated, G/C-M developed a special laboratory procedure to estimate the gasoline content of the soils. Test results are reported in Table 5. Of the seven tests performed, only a sample from B-21 had a measureable residual gasoline content. Five tests indicated a trace of gasoline, as evidenced by a thin iridescent film at the end of the test. These results indicate that liquid gasoline had at one time moved through the area of these borings. The test was negative for the

sample from B-26, which was actually taken below the water table. These tests demonstrate that very little gasoline is likely to be recovered by flushing the unsaturated soils with clean water.

CONCLUSIONS

Gasoline occurring as free liquid appears to be restricted to the vicinity of boring B-3. GM personnel have indicated there were no underground fuel tanks or distribution lines inside Building 33, so the gasoline had to migrate from outside the building to this location. Because GM's analysis showed the gasoline to contain lead, the gasoline has probably been in the ground for several years.

In most of the borings drilled by G/C-M, ground water was found perched above the till layer. Therefore, it is likely that the gasoline migrated from its source by moving down through permeable soil layers, then spread laterally on the water table. The actual path of the gasoline, both vertically and horizontally, will be almost impossible to determine owing to the complex and unpredictable pattern of soil types and, thus, permeabilities. This is true even if the source of the gasoline is known. Like water, gasoline will move preferentially, and therefore farther, in the more permeable soils.

Based upon the present northwesterly direction of ground water flow, the source of gasoline was southeast of boring B-3. This suggests the probable source was the distribution lines for the abandoned fuel island south of Building 33 rather than the underground fuel tanks west of Building 35. The fuel island was abandoned in 1969 after a pressure test indicated a large leak in the underground premium fuel line (Appendix A). This conclusion is based upon the assumption that the direction of ground water flow at the time of the leak is the same as presently observed. Deep underground sewer lines appear to affect the direction of ground water flow south of Building 33; periodic rerouting and construction of sewer lines may have altered historical flow patterns.

The accumulation of gasoline in boring B-3 may now be explained as follows. As shown on Section B-B of Exhibit 2, the gasoline occurs in a sand layer (SP) confined between two till layers (ML-CL and ML). The sand layer apparently pinches out toward boring B-2. Gasoline floating on the water table and, therefore, migrating in the same direction as the ground water, became trapped in the sand layer. Ground water originally present was displaced toward boring B-4 (or another open area) by the floating gasoline. Note that the water level in boring B-4 is the same elevation as the base of the sand layer in boring B-3. This explains why virtually no water was found in the gasoline sample. Moreover, the thickness of the gasoline layer can be estimated as the difference between the gasoline level in boring B-3 and the water level in boring B-4, which is approximately 0.5 feet. The length of the gasoline wedge between borings B-2 and B-4 is approximately 60 feet. Assuming the gasoline accumulation is roughly circular in shape, and the effective porosity of the soil is 20 percent, the volume of gasoline at this location is estimated at 2100 gallons. The actual amount of gasoline present may be 50 percent higher or lower than this estimate.

The position of the Michigan Department of Natural Resources (MDNR) concerning gasoline in soils is briefly stated as follows. Known accumulations of free gasoline must be removed. Additional remedial action to recover residual gasoline adsorbed on soil particles and/or to recover and treat contaminated ground water may be required. The MDNR will evaluate the necessity for additional remedial action based upon the degree of hazard that would result from leaving the gasoline in the ground. The Department is particularly concerned about benzene, a component of gasoline, and its potential for entering ground water or surface water supplies. It is likely that GM will be required to install and operate a recovery system to remove all free gasoline that can be recovered by pumping. The MDNR may also request additional studies to determine the fate of the contamination plume resulting from the original gasoline spill.

RECOMMENDATIONS

Recovery System

Based upon the conclusions of this study, GM should install a recovery system to remove gasoline that has accumulated in soils beneath Building 33. A combination injection-withdrawal recovery system is recommended. Given the complex and often unpredictable pattern of soil types, it does not appear feasible to recover the gasoline from a point outside the building. Specific recommendations are given here.

1. One recovery well should be installed in close proximity to boring B-3. The well should be constructed of metallic casing and screen and should be a gravel-pack design. A double filter may be necessary to prevent the undermining of existing foundations by the pumping of fine sediment during operation. To assure that all gasoline is removed in the vicinity of the recovery well, the well should be overdrilled into the till and a separate water feed pipe should be installed through the filter to the bottom of the well hole. A sketch of the recommended recovery well is provided as Exhibit 4. The diameter of the recovery well is not specified since it will depend upon the pumping equipment used.

2. To facilitate gasoline recovery and reduce recovery time, water injection wells should be provided around the recovery well. Three or four injection wells will probably be required. These wells should be located between 50 and 75 feet from the recovery well. One injection well should be placed near the location of boring B-21.

3. Pumping rates for the recovery and injection wells must be closely regulated to assure that water is not injected faster than it is removed. Conversely, to avoid excessive withdrawals which might cause foundation settlements, the pumping rate from the recovery well should be maintained at a low level,

probably 5 gallons per minute or less. The actual recovery rate will depend upon the permeability characteristics at and between the well locations.

4. Tanks used for temporary storage or separation of recovered gasoline-water mixtures should be located outside building areas to minimize the danger from hazardous or explosive levels of gasoline vapors. Piping used between the recovery well and storage or separation tank should be gasoline-resistant and placed in low-traffic areas. The piping should be frequently inspected for leaks.

5. Water removed during the recovery process should be adequately treated prior to discharge.

Monitoring

The recovery process will alter the soils foundations characteristics. Therefore, monitoring of the soils and existing foundations will be required throughout the recovery process. Monitoring data should be reviewed by a qualified foundation engineer. Excessive structural movement may result in damage to existing foundations or equipment sensitive to foundation settlement and should be resolved immediately. Essential elements of the monitoring program are listed here.

1. Soil pore pressures should be monitored during the recovery operation. Pneumatic piezometers installed inside the building are recommended. The pneumatic piezometers should be placed in saturated soils above the till layer.

2. Strain gages should be installed for detection of foundation movement. The strain gages should be installed on the top of individual column footings or, preferably, beneath the footings. Alternately, the gages may be mounted directly on the column a few inches above the floor slab; gages mounted in this manner, however, may respond too slowly to prevent damaging structural

movement. Structural detail drawings must be examined to determined how the floor slab is tied to the columns.

3. Small (6-inch diameter) settlement plates should be installed below the floor slab to permit measurement of soil settlement during recovery operations.

4. The effect of injection and pumping on ground water levels should be measured in observation wells B-9, B-19, and B-20. All observation wells should be measured periodically to identify any seasonal fluctuation in perched ground water levels or the direction of ground water flow.

REFERENCES

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TABLES

TABLE 1
AVAILABLE BORING LOGS

Original Boring Numbers	Plant Location	Date Drilled	Purpose	Boring Number on Exhibit 1A[1]
#1 - #8	Building 33	1945	Original foundation borings	#1 - #8
#1A - #8B	Building 33	1945	Original foundation borings	#1A - #8B
#41	West of Bldg. 33	1945	Original foundation boring	#50
#28 - #31	Building 34	1945	Original foundation borings	#28 - #31
#35 - #38	Building 34	1945	Original foundation borings	#35 - #38
1 - 5	Building 33	Nov-Dec 1971	Building modifications (Argonaut Job 3209)	A-1 - A-5
1 - 5	Building 33	1971	Building modifications	C-1 - C-5
1 & 2	Building 33	March 1984	Building modifications	C-6 & C-7
#39 - #44	Building 52	Jul-Aug 1969	New building	#39 - #44
1 - 4	Building 35	May 1984	Building additions	D-1 - D-4
B-1 - B-19	Building 33	Feb-Mar 1985	Proposed loadcenter and shaker foundations	B-1 - B-19
B-20 - B-28	Building 33	Mar-Apr 1985	Gasoline study	B-20 - B-28

Notes:

1. Boring numbers were reassigned for this study to avoid confusion over repeated use of the same boring numbers at different locations.

2. Borings B-1 through B-19 and B-20 through B-28 were drilled under the supervision of Gilbert/Commonwealth Inc. of Michigan. Logs of all other borings were provided by General Motors Corporation.

TABLE 2

FIELD PERMEABILITY TESTS[1]

Test No.	Boring No.	Depth	Unified Soil Classification	Soil Type	% Passing #200 Sieve	Permeability
1	4	18.5'	SM	Silty fine to coarse sand	27	2.3×10^{-4} cm/sec
2	6	55'	SM	Silty fine to coarse sand, little fine gravel	-	4.0×10^{-4} cm/sec
3	8	17'	SM	Fine to medium sand, little silt	14	7.6×10^{-4} cm/sec
4	9	16.4'	SP-SM	Fine to medium sand, trace silt	8	1.1×10^{-3} cm/sec
5	9	65.5'	SP-SM	Fine to coarse sand, trace to little silt	-	1.0×10^{-3} cm/sec

Note:

1. Falling head permeability tests were performed in borings drilled for the proposed loadcenter and shaker foundations. These data were originally reported in Table 5 of the report "Geotechnical Investgations for New Loadcenter 33-28 and Shaker Foundations," R-2719, prepared by Gilbert/Commonwealth Inc. of Michigan, May 2, 1985.

TABLE 3

WATER LEVELS IN OBSERVATION WELLS[1]

Boring Number	Top of 2" Casing Elevation[2] ft	Top of Screen Elevation[3] ft	Measured Depth to Water ft	Water Level Elevation ft
B-9	936.8	877.3	51.4	885.4
B-19	937.36	922.6	18.77	918.6
B-20	937.42	916.2	20.38	917.0
B-23	941.76	916.8	25.73	916.0
B-24	941.51	916.1	26.84	914.7
B-26	936.53	916.5	17.85	918.7
B-27	936.06	917.0	12.39	923.7
B-28	936.81	915.2	18.26	918.6

Notes:

1. Construction details of the observation wells are shown on the boring logs. Locations of the wells are shown on Exhibit 1A.

2. Elevations are referenced to the floor of Building 33 (935.0 ft).

3. Water levels were measured on April 11, 1985, except B-9 which was measured on April 9, 1985. Water levels in wells B-19, B-20, B-23, and B-24 recovered slowly after bailing and were confirmed by measurements made by GM on April 26 and 30, 1985.

TABLE 4

TRIAXIAL PERMEABILITY TEST RESULTS

Boring No.	Sample Depth, ft	Unified Soil Classification	Soil Type	Average Permeability, cm/sec[1]
B-15	29	ML-CL	Clayey silt, little coarse sand and fine gravel	1.2×10^{-7}
B-26	31	ML	Clayey silt, trace to little fine to coarse sand and fine gravel	1.2×10^{-7}

Note:

1. Reported permeability values are the average of at least two trials on each sample.

TABLE 5

GASOLINE CONTENT OF SOILS

Boring No.	Sample Depth, ft	Unified Soil Classification	Soil Description	Gasoline Odor	Original Moisture Content,[1] %	Gasoline Content,[2] %
B-21	14.5	SM	Very fine sand and silt	Slight	15.5	15
B-22	14.5	SP-SM	Fine to medium sand, trace to little silt	Moderately strong	5.4	Trace
B-23	15.0	SM	Clayey silty sand	Slight	8.5	Trace
B-23	18.0	SW-SM	Fine to coarse sand, some gravel	Moderate	8.9	Trace-slight odor
B-23	20.5	SW-SM	Fine to coarse sand, some gravel	Moderate	4.2	Trace-slight odor
B-25	15.0	SM	Fine to coarse sand, little silt	Slight	18.0	Trace-slight odor
B-26	20.0	SP	Medium to coarse sand, some gravel	Slight	5.7	No odor

Note:

1. Original moisture content actually represents the total weight of water plus gasoline (if any) divided by the weight of soil solids.

2. The gasoline content is reported as percent by weight of the original moisture content. If only a thin film was observed on the sample, the gasoline content is reported as trace.

TABLE 6

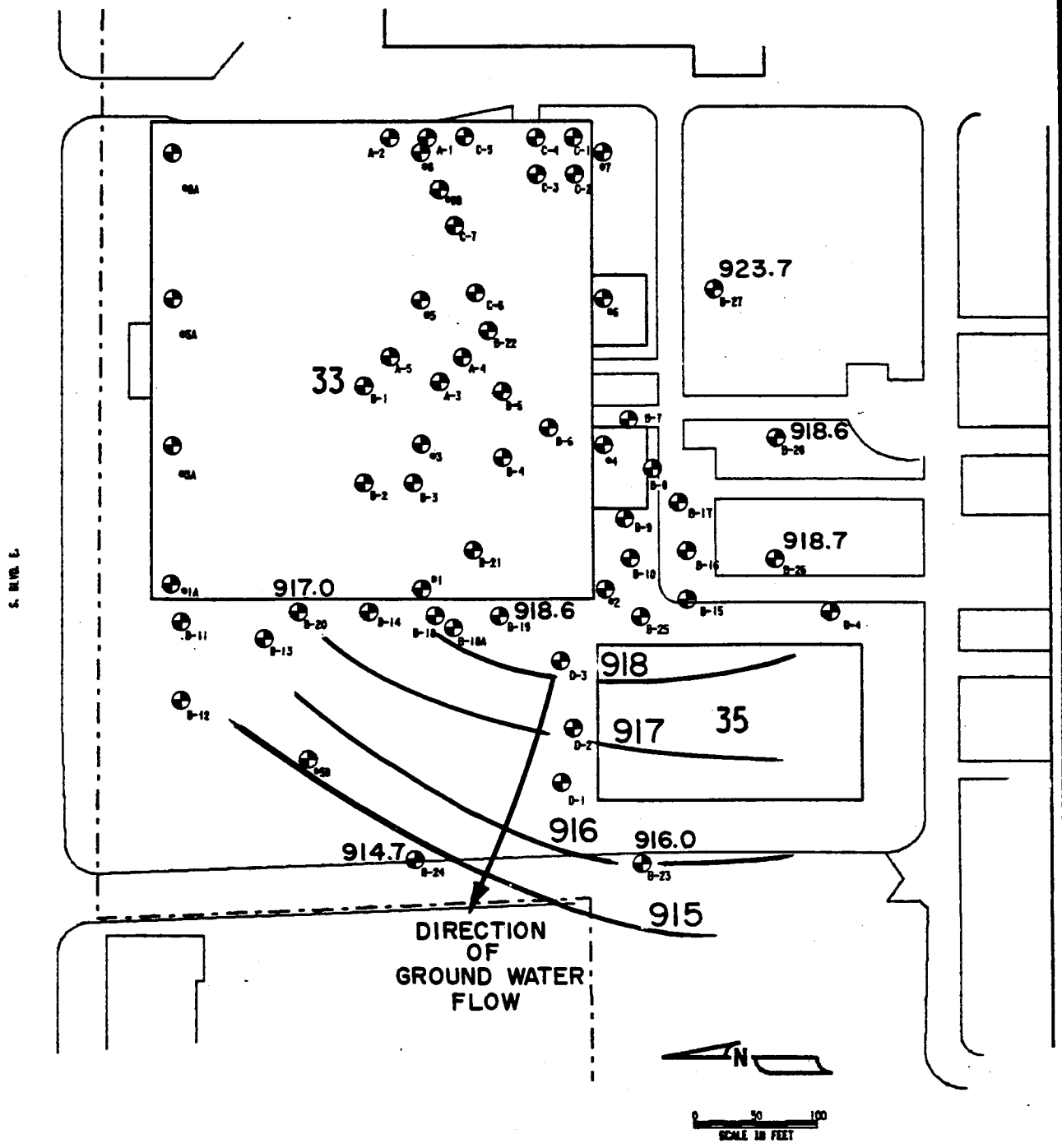
PERMEABILITY VALUES FROM GRADATION CURVES

Boring No.	Sample Depth, ft	Unified Soil Classification	Description	Calculated Permeability, cm/sec		
				Hazen	Beyer	USBSC
B-22	14.5	SP-SM	Fine to medium sand, trace to little silt	5.8×10^{-3}	5.2×10^{-3}	2.2×10^{-3}
B-22	18.0	SM-ML	Silty clayey sand	2.4×10^{-5}	-	2.0×10^{-5}
B-23	18.0	SW-SM	Fine to coarse sand, trace to little fine gravel	2.1×10^{-2}	1.6×10^{-2}	3.4×10^{-2}
B-23	24.5	SW	Medium to coarse sand, some fine gravel	9.0×10^{-2}	6.7×10^{-2}	1.6×10^{-1}
B-24	14.5	SW-SM	Fine to coarse sand and fine to coarse gravel	2.0×10^{-2}	1.3×10^{-2}	4.1×10^{-2}
B-26	9.5	SM	Fine to medium sand and silt	1.3×10^{-3}	-	5.4×10^{-4}
B-26	14.0	SM	Fine to coarse sand and silt	9.0×10^{-6}	-	3.2×10^{-4}
B-26	20.0	SP	Fine to coarse sand, some fine to coarse gravel	6.2×10^{-2}	4.7×10^{-2}	6.0×10^{-2}
B-28	10.0	SP-SM	Fine to medium sand, little silt	4.9×10^{-3}	4.4×10^{-3}	4.2×10^{-3}

Note:

1. Permeability values were calculated from gradation curves presented in Appendix C.

EXHIBITS



LEGEND

917.0 Perched ground water elevation

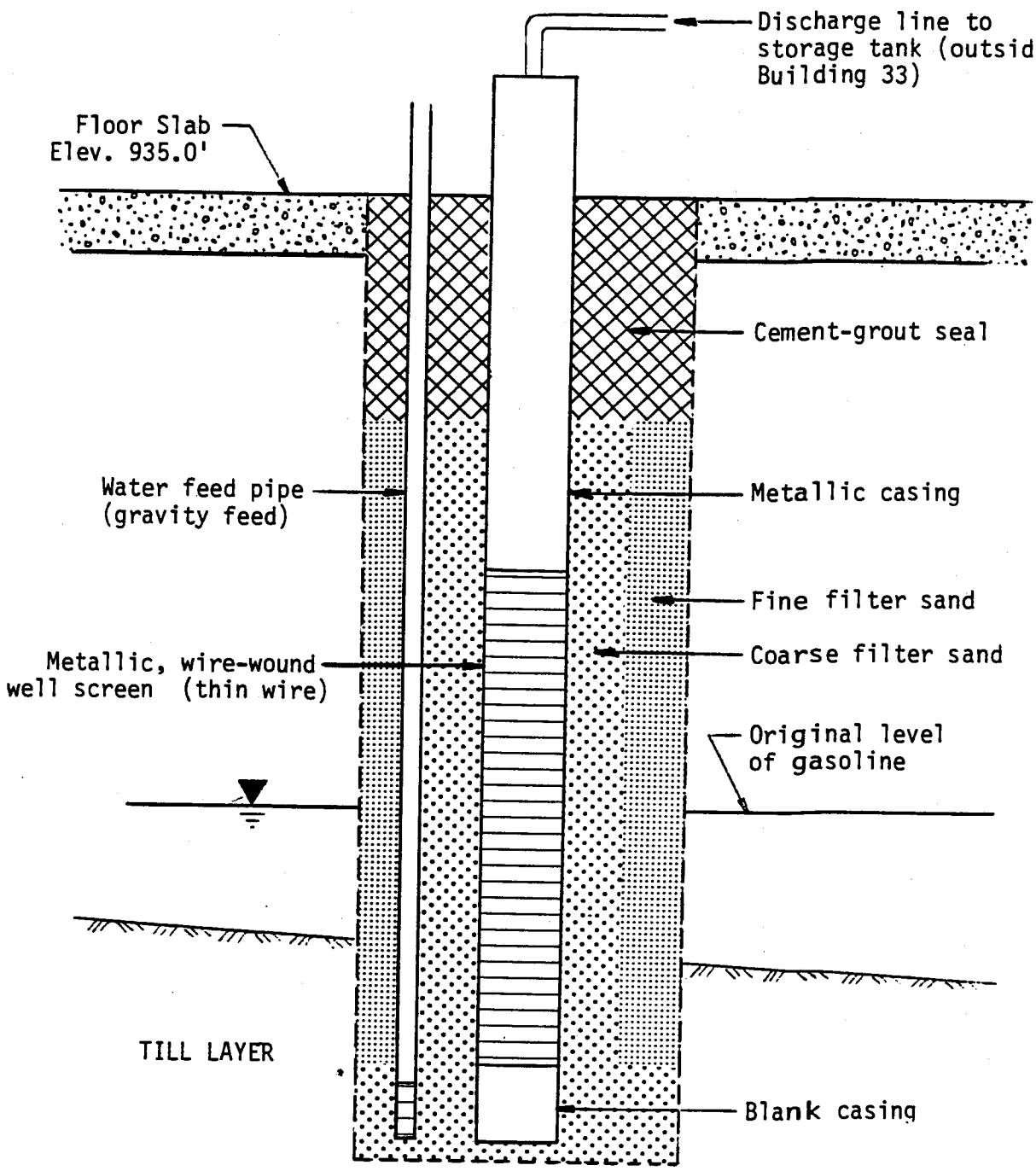
NOTES:

1. Water levels are to the floor of Bldg. #33 (935.0 ft.)
2. Ground water levels were measured on April 11, 1985.

GENERAL MOTORS
TRUCK & BUS OPERATIONS
PONTIAC, MICHIGAN

DIRECTION OF GROUND WATER FLOW

EXHIBIT 3



NOT TO SCALE

GENERAL MOTORS
TRUCK & BUS OPERATIONS
PONTIAC, MICHIGAN

TYPICAL RECOVERY WELL

EXHIBIT 4

APPENDIX A
HISTORY OF ONSITE FUEL USAGE

HISTORY OF ONSITE FUEL USAGE

Prior to 1946:

No fuel usage in the area.

1946:

Dynamometer and Engineering buildings constructed.

A tank farm was installed at the Dynamometer building which included six 2000 gallon tanks containing:*

Tank 1 - Diesel
Tank 2 - Diesel
Tank 3 - Regular/Premium
Tank 4 - Special fuels
Tank 5 - Diesel
Tank 6 - Mineral Spirits

* Tank/Fuel combinations from 1946 to present.

Fuel was pumped throughout the Dynamometer building and through the tunnel going to the Engineering building. The lines were routed overhead through the Engineering building to an indoor fueling station located at isle M, bay 8. These lines included one 2.5" diesel line, one 1.5" regular line, one 1.5" premium line, and one 1.5" naptha line.

1961:

A paint booth was to be put where the current indoor fueling station existed so an outdoor vehicle filling station was installed south of the Engineering building (outside at isle F). The four overhead fuel supply lines were removed from the Engineering building and five fuel lines were run from the east end of the building 33/35 tunnel, underground, to the new fueling station. These included a 2.5" & 1.5" diesel line, a 1.5" regular line, a 1.5" premium line, and a 2" naptha line.

1968/1969: (?)

The underground premium fuel supply line from the tunnel to the fueling station was found to have a leak. After frequent filling of the premium tank at the dynamometer tank farm, a check was

NOTE: Building 33 = Engineering; Building 35 = Dynamometer

made. The tank was filled and monitored. Apparently, the tank was down 1000 gallons, but only 300-400 was used at the pump. A pressure check was performed on the premium line from the tunnel t the fueling station. The line held no air pressure (the hole was very large). There is no information on the amount of fuel that that was lost nor is there information on the length of time the fuel discrepancy occurred.
At about this time, the water control on the dynamometer fuel tanks was replaced by individual tank pumps.

1969:
The fueling station was abandoned and removed. The underground lines were capped at both ends and were also abandoned. The supply lines in the tunnel were removed and the lines feeding these were capped. All vehicles were fueled at a local gas station that was under contract.

1970:
A new vehicle filling station was installed north of building 34. This new filling area was provided with fuel by three newly installed fuel tanks, located 25 feet north of the new fuel pumps. Each tank has a capacity of 10,000 gallons. At the time of installation, one tank contained diesel fuel, one contained premium, and the other contained regular gas.

1971:
Tank 7 was installed just south of the dynamometer tank farm. This tank contained diesel fuel, had a 10,000 gallon capacity, and was connected to tank 5. Tanks 1 through 5 were shot blasted inside and fiberglass lined.

Mid 1970's:
The premium tank at the current fueling island was filled with no-lead instead of premium.

Early 1980's:
The regular tank at the current fueling island was filled with no-lead instead of regular.

1984:

Tank 7 was removed from the dynamometer area and two 12,000 gallon tanks were installed in that same area. Both tanks are totally isolated from all other tanks. One contains diesel fuel while the other contains a special leaded gasoline.

Presently:

The fueling station installed in 1970 is in use having one diesel fuel tank and two no-lead tanks. No fuel lines exist in or around the Engineering building.

NOTE: The tanks at the Dynamometer building have never been leaked checked. The underground lines from these tanks to the building have never been changed or leak checked.

APPENDIX B
BORING LOGS

GENERAL NOTES
FOR LOG OF BORINGS

GRANULAR SOILS

COMPONENT	SIEVE SIZE RANGE
BOULDERS	>8 in.
COBBLES	8 in. - 3 in.
GRAVEL (COARSE)	3 in. - 3/4 in.
GRAVEL (FINE)	3/4 in. - #4 (4.75 mm)
SAND (COARSE)	#4 - #10 (2.00 mm)
SAND (MEDIUM)	#10 - #40 (0.425 mm)
SAND (FINE)	#40 - #200 (0.074 mm)
SILT	<#200

RQD INTERPRETATION

RQD = TOTAL LENGTH OF RECOVERED CORE PIECES MEASURING 4" OR MORE IN LENGTH, EXPRESSED AS A PERCENTAGE OF THE TOTAL LENGTH OF THE CORE RUN.

DESCRIPTIVE TERM	RQD. PERCENTAGE
VERY POOR	0-25
POOR	26-50
FAIR	51-75
GOOD	76-90
EXCELLENT	91-100

DEGREE OF COMPACTNESS OF GRANULAR SOILS

N-BLOWS/FT	DESCRIPTION
<4	VERY LOOSE
4-9	LOOSE
10-29	MEDIUM DENSE
30-49	DENSE
50-80	VERY DENSE
>80	EXTREMELY DENSE

CONSISTENCY OF COHESIVE SOILS

N-BLOWS/FT	UNCONFINED COMPRESSIVE STRENGTH, qu, TSF	CONSISTENCY
<2	qu <0.25	VERY SOFT
2-3	0.25 ≤qu <0.50	SOFT
4-7	0.50 ≤qu <1.00	MEDIUM STIFF
8-15	1.00 ≤qu <2.00	STIFF
16-32	2.00 ≤qu <4.00	VERY STIFF
>32	4.00 ≤qu	HARD

N = NUMBER OF BLOWS OF A 140 LB. HAMMER FALLING 30 IN. REQUIRED TO DRIVE A 2 IN. O.D. SPLIT-SPOON SAMPLER ONE FOOT.

LEGEND

- SS - SPLIT-SPOON SAMPLE
  UNDISTURBED SOIL SAMPLES
- ST - SHELBY TUBE SAMPLE
- OST - OSTERBERG SAMPLE
- D - DENISON SAMPLE
- BG - BAG SAMPLE
- RQD - ROCK QUALITY DESIGNATION (see above)
- CR - CORE RUN NO.
- 22 - N-VALUE, BLOWS PER FOOT
- P - HYDRAULICALLY PUSHED
- TV - TORVANE TEST
- UC - UNCONFINED COMPRESSION TEST
- Gs - SPECIFIC GRAVITY
- C - CONSOLIDATION TEST
- PN - PENETROMETER
- $\overline{CU}$ - CONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST
- UU - UNCONSOLIDATED - UNDRAINED TRIAXIAL COMPRESSION TEST
- LL - LIQUID LIMIT
- PI - PLASTICITY INDEX

CLASSIFICATION TERMINOLOGY

DESCRIPTIVE TERM	PERCENT BY WEIGHT
TRACE	0-9
LITTLE	10-19
SOME	20-34
AND	35-50

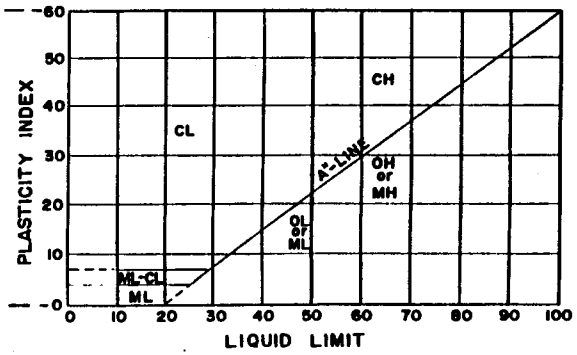
GENERAL MOTORS
TRUCK & BUS OPERATIONS
PONTIAC, MICHIGAN

KEY TO LOG OF BORINGS

MAJOR DIVISIONS			GRAPH SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE.	CLEAN GRAVEL (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE.	CLEAN SAND (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND CLAY MIXTURES.
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE.	SILTS AND CLAYS — LIQUID LIMIT LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY.
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS.
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY.
	SILTS AND CLAYS — LIQUID LIMIT GREATER THAN 50			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS.
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS.
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS.
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS.

GRAPH SYMBOL	LETTER SYMBOL	ROCK CLASSIFICATION
	SH	SHALE
	SI	SILTSTONE
	SS	SANDSTONE
	LS	LIMESTONE

PLASTICITY CHART



GENERAL MOTORS
TRUCK & BUS OPERATIONS
PONTIAC, MICHIGAN

CLASSIFICATION
C S

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
								9	SS-1		ASPHALT 6"	
									ST-1	SM		
5	1.67 1.7			38.5	88.2	26		18	SS-2	SM	Brown medium dense clayey silty SAND, fine to medium moist, nonplastic - slightly plastic	Grout / Seal
											7.5	
									ST-2			
10								31	SS-3	SW	Brown dense fine to coarse SAND, trace light to fine gravel, grades to fine to medium sand at tip, moist	
											12.2	
									ST-3			Filter Sand
15								28	SS-4	SP	Brown fine to medium SAND, slight gas odor	
											Brown, fine to medium SAND, saturated with water, strong gasoline odor	
											19.2	
20								13	SS-5	ML-CL	Gray stiff silty CLAY, little to some fine to coarse sand, trace fine gravel, plastic	Grout / Seal
25	1.2 - 1.75	16.1	3.4	11.6				18	SS-6	ML	Gray very stiff clayey SILT, some fine - medium SAND, trace coarse sand and fine gravel, coarse gravel noted	
30								25	SS-7	ML	Same as above	Backfilled With Sand
35		18.9	5.2	11.9				31	SS-8	ML-CL	Same as above	
40								25	SS-9	ML-CL	Same as above (Pushed stone with spoon)	
45								32	SS-10	SM	Gray dense fine SAND with silt layers, wet at tip Hole backfilled with sand to Elevation 26 2" diameter x 6' long well point type piezometer was installed at 19.2'. Top 7.5' hole grouted	
50											Boring terminated at 45.5'	

GASOLINE INVESTIGATION - BORING REPORT
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

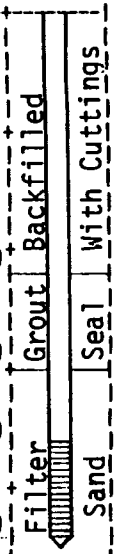
BORING NO.: B-19
LOCATION :See Exhibit 1A
ELEVATION : 934.8'

INSPECTOR: R. Wagner

COMPLETION DATE: 02/28/85

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION
									8" Asphalt
									FILL
5						9	SS-1	SM	Brown, loose, fine SAND, little to some silt and clay, trace coarse sand and fine gravel, moist
								End of Fill	Grades to reddish-brown
10						18	SS-2	SM	Gray-brown, medium dense, very fine SAND and silt, slightly moist.
									Coarse gravel at 13'
15					35.9	41	SS-3	ML	Gray, very stiff SILT, moist
								&	
20						15	SS-4	SM	Gray, very stiff SILT and very fine sand, saturated with water; 0.2' layer of gray silty clay, plastic
									Gray, medium dense, very fine SAND and silt
25		16.9	6.2	11.7		17	SS-5	ML-CL	TILL Gray, very stiff to hard, sandy silty CLAY, trace to little fine to coarse gravel, moist
									Coarse gravel or cobbles from 27.0' to 27.5'
30	1.0 TSF					38	SS-6		
35	1.25 TSF			11.5		44	SS-7		Boring terminated at 35.5'
									Water level data are reported in Table 3
40									
45									
50									

WELL RECORD



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan

BORING NO: B-20
LOCATION : See Exhibit 1A
ELEVATION: 934.2 Ft

INSPECTOR: A. BREWSTER
COMPLETION DATE: MARCH 30,1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									8.5" Concrete	None
								SM	FILL	
								End of Fill	Brown and yellow-brown fine to medium SAND, little silt or clay, trace fine gravel, moist	
5						*	S-1		Mottled gray and yellow-brown fine to coarse SAND, little fine to coarse gravel	
								SM	Buff fine to medium SAND, little silt, dry	
					11.9	*	S-2	SP-SM	Buff to light brown fine to coarse SAND, little fine	
10									to coarse gravel, dry	
					43.1	*	S-3	SM	Light brown very fine SAND, little silt, slightly moist with slight gasoline odor.	
15									Drilling cuttings moist with strong gasoline odor.	
						*	S-4	SP,SM	Layers of gray fine to coarse SAND, trace fine gravel,	
20						P	ST-1	&	saturated with strong gasoline odor; mottled gray -	
								ML-CL	brown silty CLAY, trace sand, slight gas odor; fine to medium SAND, little silt, trace fine gravel; fine SAND and silt, strong gas odor	
	0.5 TSF	17.3	4.7	12.0	56.8	*	S-6		TILL	
25								ML-CL	Gray sandy clayey SILT, trace fine to coarse gravel, moist, slightly plastic; no gasoline odor	
	0.25 to	15.7	3.8	11.3		*	S-7	ML	Grades to very moist, soft	
30	0.38 TSF								Boring terminated at 30.0', grouted to floor elevation upon completion	
35									* Samples obtained by pushing split-spoon and Shelby tube samplers; SPT test not performed due to inadequate vertical clearance inside building.	
40										
45										
50										

GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO: B-21
LOCATION : See Exhibit 1A
ELEVATION: 935.0 Ft.

INSPECTOR: A. BREWSTER
COMPLETION DATE: APRIL 5, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETROMETER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	WELL RECORD
									9" Concrete FILL	None
5	1.75 TSF (Sheared)					*	S-1	SM	Brown fine to medium SAND, little to some silt and clay, trace fine to coarse gravel, slightly moist	
10						*	S-2	End of Fill	Occasional cinders noted	
								SP-SM	Gray fine to medium SAND, trace to little silt, trace	
15					10.7	*	S-3		fine to coarse gravel, slightly moist with moderately strong gasoline odor	
	0.37 to 1.25 TSF	14.6	3.0	11.3	47.4	*	S-4	SM	TILL Gray-brown silty clayey SAND, trace fine to coarse gravel, moist; no gasoline odor	
20										
						*	S-5	ML	Yellow-brown, mottled gray SILT, very moist to wet, no gasoline odor TILL	
25										
	0.67 TSF	18.3	4.1	11.4		*	S-6	ML	Gray clayey SILT, trace to little sand, trace fine gravel, moist, slightly plastic, no gasoline odor; occasional seam of medium to coarse sand	
30	1.5 TSF			11.5		*	S-7		1/8" of gray silt at 29.7'	
									Boring terminated at 30.5', grouted to floor elevation upon completion.	
35										
									* Samples obtained by pushing split-spoon sampler; SPT test not performed due to inadequate vertical clearance inside building	
40										
45										
50										

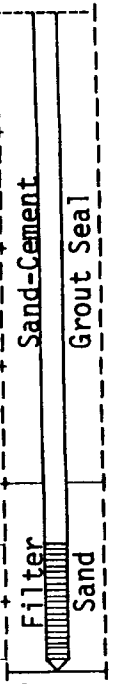
GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO.: B-22
LOCATION : See Exhibit 1A
ELEVATION: 935.0 Ft.

INSPECTOR: A. Brewster
COMPLETION DATE: April 5, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION
									5" Asphalt
									FILL
5						5	SS-1	SM	Yellow-brown, loose, fine to medium SAND, trace to little silt and clay, moist
									Grades to medium dense, some silt and clay, little coarse sand and fine gravel, including red brick fragments
10	)2.25 TSF					23	SS-2	End of Fill	
15	)2.25 TSF				46.1	23	SS-3	SM	Yellow-brown, medium dense, clayey silty SAND, trace fine gravel, moist with slight gasoline odor
					8.1	25	SS-4		
								SW.SM	Gray, medium dense, fine to coarse SAND, trace to little fine to coarse gravel, slightly moist with moderate gasoline odor
20						23	SS-5		
									Layered with fine to coarse gravel, some layers with no gravel; slightly moist with moderate gasoline odor
25				11.0	3.2	18	SS-6	SW	Gray, medium dense, medium to coarse SAND, some fine GRAVEL, saturated with water, strong gasoline odor
									TILL
30	0.67 TSF	16.6	5.0			17	SS-7	ML-CL	Gray, very stiff, silty CLAY, trace sand and fine gravel, moist, slightly plastic with no gasoline odor
35	1.0 to 1.25 TSF	16.0	0.85			26	SS-8	ML	Gray, very stiff, clayey SILT, trace sand and fine gravel, slightly moist
									Grades to hard
40	1.5 to)2.25 TSF					32	SS-9		
									Boring terminated at 40.5'
									Water encountered at 23.0' during drilling
45									Water level data are reported in Table 3
50									

WELL RECORD



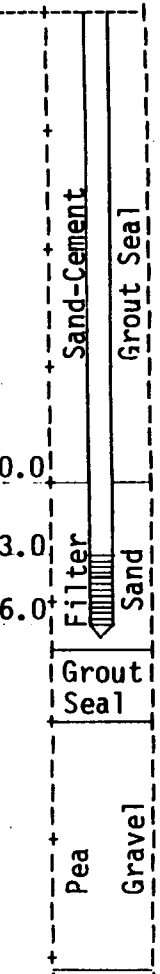
GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO: B-23
LOCATION : See Exhibit 1A
ELEVATION: 939.4 Ft.

INSPECTOR: A. Brewster
COMPLETION DATE: April 8, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION
									3" Asphalt FILL Brown SAND, wet
5				14.5		3	SS-1	SM	Reddish-brown, very loose, fine to medium SAND, little silt, trace clay and fine gravel, saturated with water
								CL	Light brown, very stiff, silty CLAY, trace sand and fine gravel, slightly moist, grades to sandy CLAY; 2" soft red brick fragment noted
10	2.25 TSF					9	SS-2	SM	Reddish-brown fine to medium SAND, some silt and clay, wet (water)
									End of Fill
15					9.0	19	SS-3	SW-SM	Varicolored, medium dense, fine to coarse SAND and fine to coarse gravel, dry Grades with less gravel, dry 19.8' to 20.2' - gray SILT, little to some very fine sand, occasional sand partings, saturated
20						20	SS-4	SP	Gray-brown fine to coarse SAND, trace fine gravel, dry
25					75.8	14	SS-5	ML	Gray, stiff SILT, some very fine sand, saturated (water)
									TILL
30	0.67 to 0.75 TSF	16.1	6.4			13	SS-6	ML-CL	Gray, medium stiff, silty CLAY, little to some sand and fine gravel, moist
35	1.25 TSF	17.7	6.0			21	SS-7		Coarse gravel noted
40	1.25 TSF					20	SS-8		Boring terminated at 40.5' Water encountered at 24.0' during drilling
45									Water level data are reported in Table 3
50									

WELL RECORD



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING No.: B-24
LOCATION : See Exhibit 1A
ELEVATION: 939.1 Ft.

INSPECTOR: A. Brewste.
COMPLETION DATE: April 8, 1985

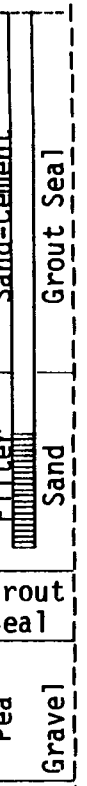
DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									7" Asphalt	None
								GM	FILL Loose mixture of waste concrete, asphalt, and gray sand	
5						6	SS-1	SC	Greenish-gray mottled gray and black, loose, clayey SAND, numerous wood fragments and splinters, slightly moist	
10					16.1	11	SS-2	SM	Light gray-brown, medium dense, fine to medium SAND, little silt, dry with slight gasoline odor	
									Grades to slightly moist, slight gasoline odor	
15						9	SS-3	ML	Gray, medium stiff, SILT, small carbonized roots, wet	
								SM	Gray, medium dense, fine to coarse SAND, little silt and clay, wet but not saturated, slight gasoline odor	
									TILL	
20		15.7	5.0			12	SS-4	ML-CL	Gray, stiff, clayey SILT, trace to little sand and gravel, no gasoline odor @ 19.5' - 1/4" seam of coarse sand and fine gravel	
25	0.87 TSF					17	SS-5		Grades to very stiff	
30	1.75 TSF	19.1	6.2			20	SS-6		Grades to silty CLAY	
35	1.5 to 1.75 TSF					21	SS-7		Boring terminated at 35.5' No water table encountered during drilling	
40										
45										
50										

GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO: B-25
LOCATION : See Exhibit 1A
ELEVATION: 934.6 Ft.

INSPECTOR: A. Brewster
COMPLETION DATE: April 9, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									6" Asphalt FILL	
				12.0		7	SS-1	SM	Gray mottled brown, loose, fine to coarse SAND, little to	
5								End of Fill	some silt and clay, trace fine to coarse gravel, wet but not saturated	
	0.5 TSF			17.7	40.0	8	SS-2	SM	Gray, loose, fine to medium SAND, little to some silt	
10	(Shears)								and clay, trace fine gravel, occasional small roots, moist	
		13.6	2.8		36.2	31	SS-3	SM	Gray, dense, fine to coarse SAND, little to some silt	
15									and clay, trace fine gravel, coarse gravel noted, moist, slightly plastic	15.0
										17.5
					3.4	20	SS-4	SP	Gray and varicolored, medium dense, medium to coarse SAND,	
20									little fine to coarse gravel, trace silt, saturated (water) with slight gasoline odor	22.5
		19.3	7.3			26	SS-5		TILL	
25								CL	Gray, stiff, silty CLAY, trace to little fine to coarse	
	0.75 TSF					15	SS-6		sand and fine gravel, moist, plastic	
30	1.63 TSF	15.9	3.5			P	ST-1	ML		
						26	SS-7			
	1.0 to 2.5 TSF (Depends								Boring terminated at 32.5'	
35	on gravel content)								Water level at 18.0' during drilling, moderate gasoline odor	
									Water level data are reported in Table 3	
40										
45										
50										



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO. B-26
LOCATION : See Exhibit 1A
ELEVATION: 934.0 Ft.

INSPECTOR: A. Brewste.
COMPLETION DATE: April 9, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									4" Asphalt	
									FILL	
		19.2	7.7		20.0	4	SS-1	SC	Mottled greenish-gray and yellow-brown, loose, clayey SAND, little silt, moist	
5										
								End of Fill		
10	1.75 TSF (Gravelly)					20	SS-2	ML-CL	Yellow-brown mottled gray, very stiff, silty CLAY, trace sand and fine gravel, slightly moist	
									Gray-brown, medium dense, clayey SAND, little silt, trace fine gravel, moist	14.0
	1.0 TSF					18	SS-3	SC		
15	1.75 TSF					P	ST-1	ML-CL	Gray-brown, very stiff, silty CLAY, trace to little sand, and fine to coarse gravel, moist	16.5
								ML	Gray, stiff, SILT, trace very fine sand and clay, moist	
20						15	SS-4	SM	Gray, medium dense, fine to coarse SAND, little to some silt, trace clay, wet to saturated (water) Layered with silty fine to medium sand	21.5
						17	SS-5		Grades to clayey sand	
25										
	1.25 to 1.37 TSF					17	SS-6	ML-CL	TILL Gray, stiff silty CLAY, trace sand and fine gravel, moist, slightly plastic	
						P	ST-2			
30									Grades to very stiff, trace to little sand and fine gravel	
	1.5 to 2.0 TSF					27	SS-7			
									Boring terminated at 32.0'	
35									Water level at 8.0' during drilling	
									Water level data are reported in Table 3	
40										
45										
50										

WELL RECORD: Sand-Cement, Grout Seal, Filter Sand, Sand-Cement, Grout Seal

GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO: B-27
LOCATION : See Exhibit 1A
ELEVATION: 933.5 Ft.

INSPECTOR: A. Brewster
COMPLETION DATE: April 10, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
									4" Asphalt
									FILL
						6	SS-1	ML & SM	Yellow-brown, stiff, silty CLAY and gray, loose, silty clayey fine to medium SAND, trace fine gravel, moist, occasional small roots
5									
								End of Fill	
	2.25 TSF								Yellow-brown mottled gray, stiff, silty CLAY
10					11.0	15	SS-2	SP-SM	Light gray, medium dense, fine to medium SAND, trace silt, slightly moist
								ML	Cobbles from 13.0' to 13.6'
						18	SS-3		Gray clayey SILT, almost dry
15								SM	Gray, medium dense fine SAND, little silt, moist
									Gray, medium stiff, sandy clayey SILT, trace fine gravel, moist
		15.4	4.1			24	SS-4	ML-CL	
20									Gray, medium dense, silty fine SAND, saturated (water)
						11	SS-5	SM	Grades with alternating layers, 2" to 8" thick, of clayey sand, silty clay till, and sandy silt
	0.5 to	17.5	5.8	12.1		15	SS-6	ML-CL	TILL
25	1.0 TSF								Gray, very stiff, silty CLAY, trace to little sand and fine gravel, very moist
						P	ST-1		
	2.0 to								
30	2.25 TSF					23	SS-7		
	1.0 to								1.5" layer of fine to coarse gravel at 34.8', saturated
35	1.75 TSF					19	SS-8		
									Boring terminated at 35.5'
									Water level data are reported in Table 3
40									
45									
50									

WELL RECORD: 16.0 Sand-Cement; 18.0 Grout Seal; Filter Sand; 23.0 Sand-Cement; Grout Seal; Pea Gravel

GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING N 3-28
LOCATION : See Exhibit 1A
ELEVATION: 933.2 Ft.

INSPECTOR: A. Brewst
COMPLETION DATE: April 10, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	WELL RECORD
											5" ASPHALT	
										SP	Yellow-brown fine to medium SAND	
								5	SS-1		-FILL-	
5	.75 TSF			21.6				9	SS-2	ML-CL	Brown medium to stiff sandy CLAY, little to some fine to coarse sand, little silt, trace fine gravel	
				10.2	106.5	21			ST-1	SM	Organics noted, moist	
								17	SS-3			
										SM	Gray medium dense fine to medium SAND, trace	
10										SP	silt was found at top of sample	
				9.5		8		24	SS-4	SP	Same as above, gasoline odor	
15											Falling Head Permeability Test No. 1	
									ST-2	ML-CL	Gray stiff clayey SILT, little to some fine to coarse sand and fine gravel, moist	
20	.75 TSF					56		15	SS-5	ML-CL	Same as above, moist	
25	1.0 TSF			12.6				17	SS-6	ML-CL	Same as above, moist	
				10.9			2.66		ST-3			
30	1.5 TSF							34	SS-7	ML-CL	Same as above, moist	
35				12.6				27	SS-8	ML-CL	Same as above, moist	
40								18	SS-9	ML-CL	Same as above, moist	
									ST-4			
45	1.38 TSF							51	SS-10	ML-CL	More sandy, moist	
50				18.1				18	SS-11		Little gravel, moist	

Cement-Bentonite Grout Seal

GASOLINE INVESTIGATION - BORING REPORT
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BORING NO.: B-9
LOCATION : See Exhibit 1A
ELEVATION : 934.3'

INSPECTOR: B. Bearinger
COMPLETION DATE: 02/13/85

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
										SM	Saturated gray medium dense silty SAND.	52.0
											Water level at 55'.	
55								30	SS-12	ML-CL	Gray stiff clayey SILT, little to some fine to coarse sand and gravel	
												57.0
										SP	Gray dense coarse to fine SAND, little silt, saturated	
60				10.4				87	SS-13	ML-CL	Gray very stiff to hard sandy CLAY, little gravel	
										SP	Gray very dense coarse to fine SAND	
												64.0
65								121		SP,SM	Gray very dense silty fine to coarse SAND, interbedded with 6" clay layer	
											Boring terminated at 65.5'	
70											Falling Head Permeability Test No. 2 At casing depth of 64'	
75											Water level data are reported in Table 3	
80												
85												
90												
95											PIEZOMETER installation: Bottom screen at 64' Screen - 7.0' #12 (galvanized steel) Sand Pack at 64' to 52' Bentonite and grout mix, 2" diameter well casing (galvanized steel) 2.5' above ground, capped.	
100												



GASOLINE INVESTIGATION - BORING REPORT
GM Truck & Bus, Plant 2, Pontiac, Michigan
Prepared by: Gilbert/Commonwealth Inc. of Michigan

BO[illegible] NO.: B-9 (CONTINUED)
LOCATION : See Exhibit 1A
ELEVATION : 934.3'

INSPECTOR: B. [illegible]ringer
COMPLETION DATE: 02/13/85

APPENDIX C
LABORATORY TESTING PROCEDURES AND RESULTS

APPENDIX C
LABORATORY TESTING
PROCEDURES AND RESULTS

A number of laboratory tests were performed on representative samples obtained from the borings to determine pertinent physical properties of the various soil types encountered. The testing program included determinations of natural moisture content, Atterberg limits, and analyses for particle size distribution and triaxial permeability. A special procedure was devised to determine qualitatively the gasoline content of soils in which gasoline odors were observed. Test results not included in this Appendix are shown on the boring logs (Appendix B).

C-1 Moisture Content

Moisture content determinations were performed in accordance with ASTM procedures contained in Standard D2216-80. The results of all moisture content tests are shown on the boring logs.

C-2 Atterberg Limits

Liquid and plastic limit tests were performed in accordance with ASTM procedures D423-66 and D424-59. These tests were performed for soil classification purposes and have been used to correlate soil strata and engineering properties from empirical relationships. Liquid limits and plasticity index values from these tests are shown on the boring logs.

C-5 Triaxial Permeability

Falling-head permeability tests were performed on saturated samples confined in a Brainard-Kilman triaxial cell. The confining pressure was 3 psi on each sample. Test procedures were in accordance with the Brainard-Kilman Instruction Book, which follows the procedures described in U.S.

Army Corps of Engineers Engineering Manual EM 1110-2-1906 Appendix VII: 4 and VII: 7 (May 1, 1980). The permeability of the sample was calculated based on the following formula:

$$K = 2.3 \frac{aL}{At} \left(\log \frac{ho}{hl}\right) R_T$$

in which:

a	=	cross section area of burette, cm^2
L	=	length of specimen, cm
t	=	total time for water flow, seconds
A	=	cross sectional area of specimen, cm^2
ho	=	head start minus tail start in burettes, cm
hl	=	head final minus tail final, cm
R	=	temperature correction factor for viscosity of water
K	=	coefficient of permeability, cm/sec.

Triaxial permeability test results are presented in Table 4.

C-4 Particle Size Distribution

Sieve analyses and hydrometer tests were carried out on a number of soil samples to determine their proper classifications. The tests were performed in accordance with ASTM procedures contained in Standard D422-72. Additionally, tests were performed on selected samples in accordance with ASTM D1140-54 to determine the percentage of materials smaller than the No. 200 sieve. The percentage of fines passing the No. 200 sieve is shown on the boring logs.

C-5 Gasoline Content

The approximate gasoline content of selected soil samples was determined in accordance with the following procedure:

1. The soil sample was placed in a hydrometer cylinder of known weight, capped with a rubber stopper and weighed to the nearest 0.1 gram. The total weight of the soil sample, W_t, was computed by subtracting the

weight of the empty hydrometer cylinder with stopper from the total cylinder plus sample weight.

2. A known quantity of water, approximately 3 times the volume of the soil samples, was added to the cylinder. The sample was shaken gently for one minute every hour for four hours by inverting the cylinder. A measured quantity of water was added to wash the sides of the cylinder after each shaking episode.

3. The soil-water mixture was allowed to stand at least 24 hours after which time the water surface was observed for evidence of gasoline, including odor. If a gasoline layer was observed, its thickness was measured and the volume of gasoline was computed. The weight of the gasoline, Wg, was calculated by assuming 1 milliliter equaled 1 cubic centimeter (cm^3) and a density of 0.69 gram/cm^3 for the gasoline.

4. After carefully removing all soil from the cylinder, the sample was drained and dried overnight at 105°C, and weighed to obtain the dry weight of the soil, Ws. The original moisture content of the soil was computed from the following formula:

$$w = \frac{W_t - Ws}{Ws} = \frac{Ww}{Ws}$$

5. The gasoline content of the soil was calculated by dividing Wg by Ww, and is expressed as percent by weight of the original moisture content.

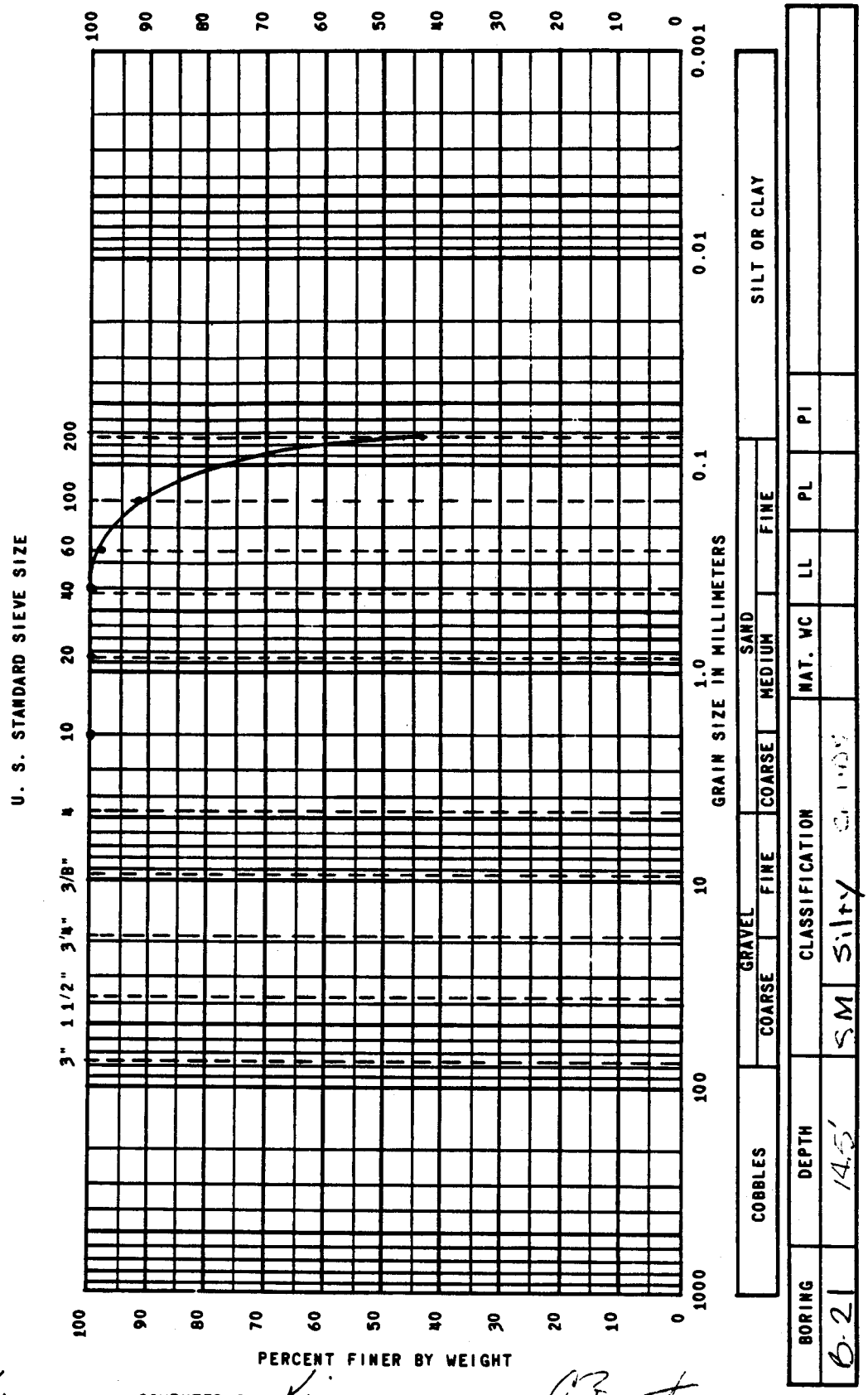
GRADATION CURVES

GRADATION CURVE

DATE 4-26-85

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-21 SAMPLE NUMBER S-3



TECHNICIAN King COMPUTED BY King CHECKED BY C. Bronstein

REMARKS

SOILS 5 (8-78)

Gilbert/Commonwealth

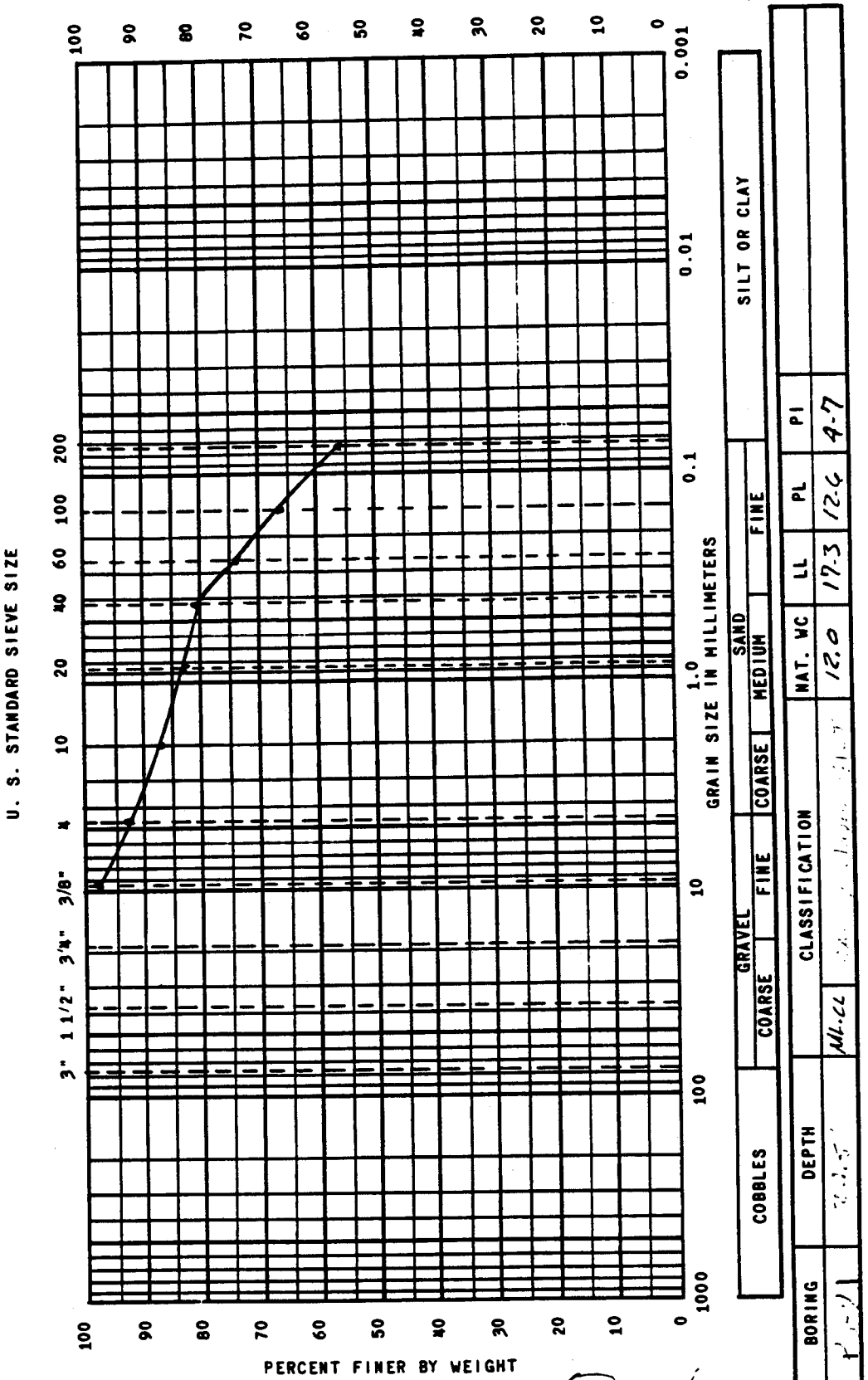
ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 4-25-95

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 62-2410-001 BORING NUMBER B-21 SAMPLE NUMBER SS-6



TECHNICIAN King COMPUTED BY King CHECKED BY A. Bowman

REMARKS

SOILS 5 (8-78)

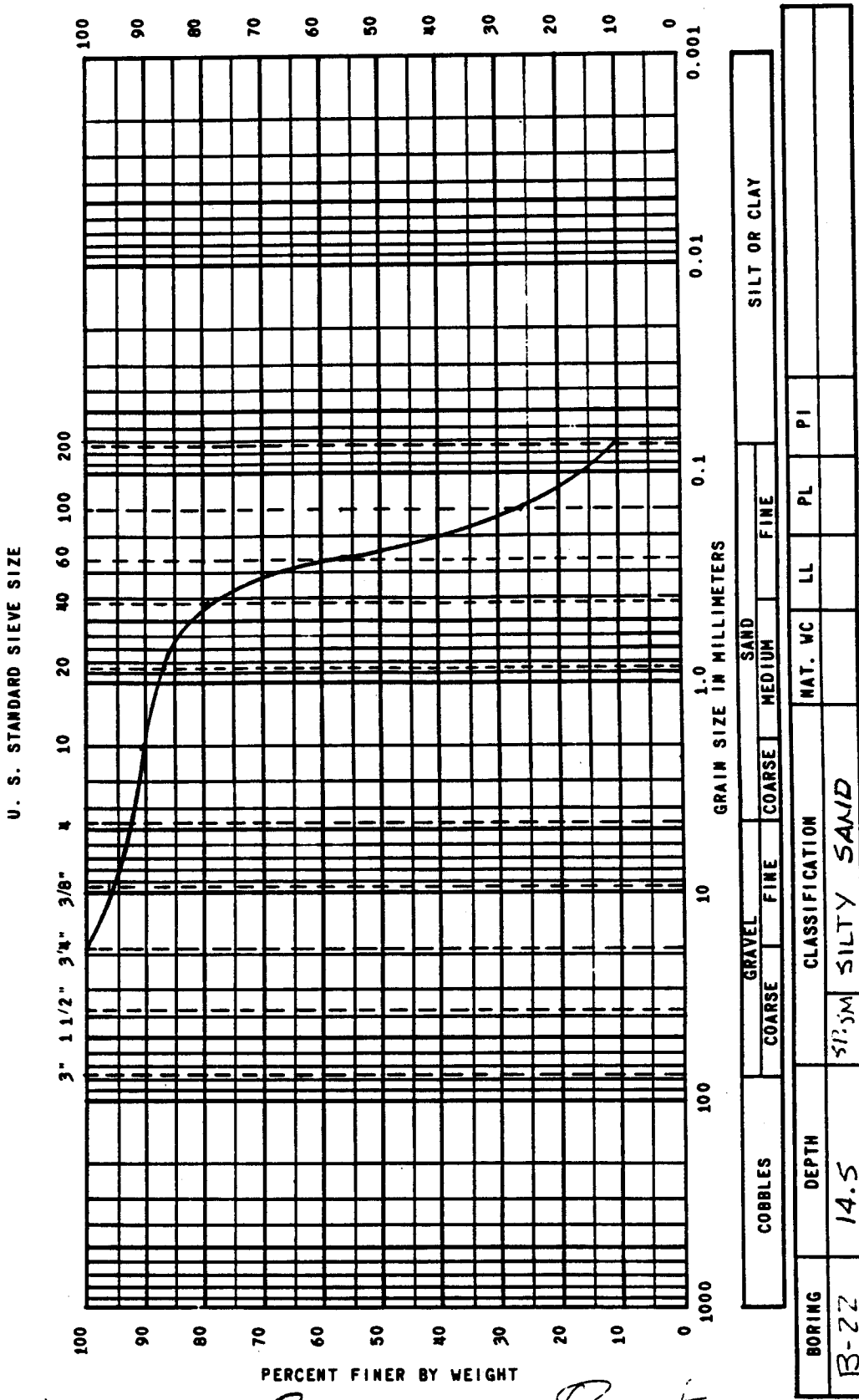
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GRADATION CURVE

DATE 4-25-85

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-22 SAMPLE NUMBER # 3



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REMARKS

SOILS 5 (8-78)

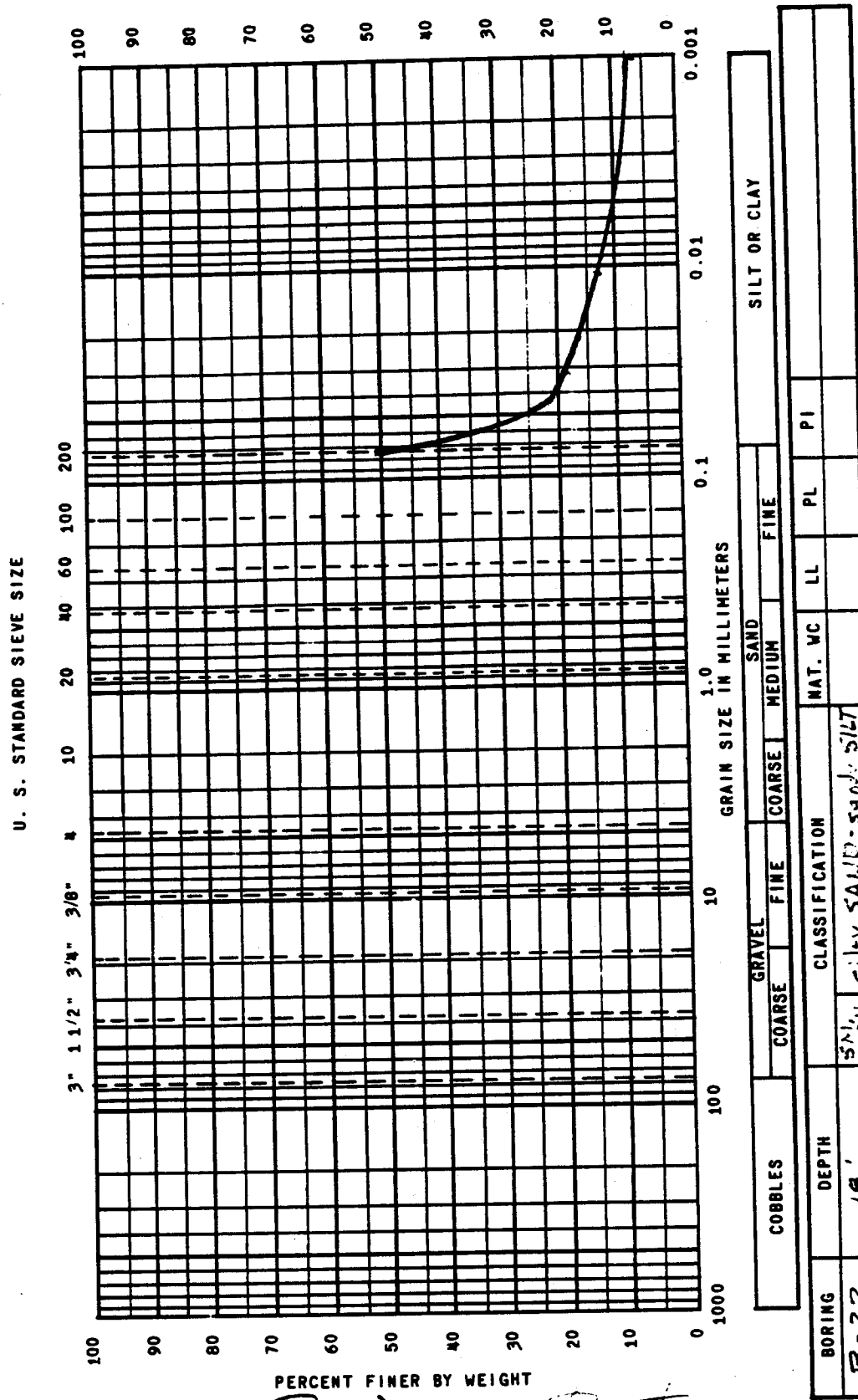
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 2-1-85

CLIENT GM PROJECT GRADATION STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-22 SAMPLE NUMBER SS-4



TECHNICIAN Beaujon COMPUTED BY Beaujon CHECKED BY [illegible]

REMARKS

SOILS 5 (8-78)

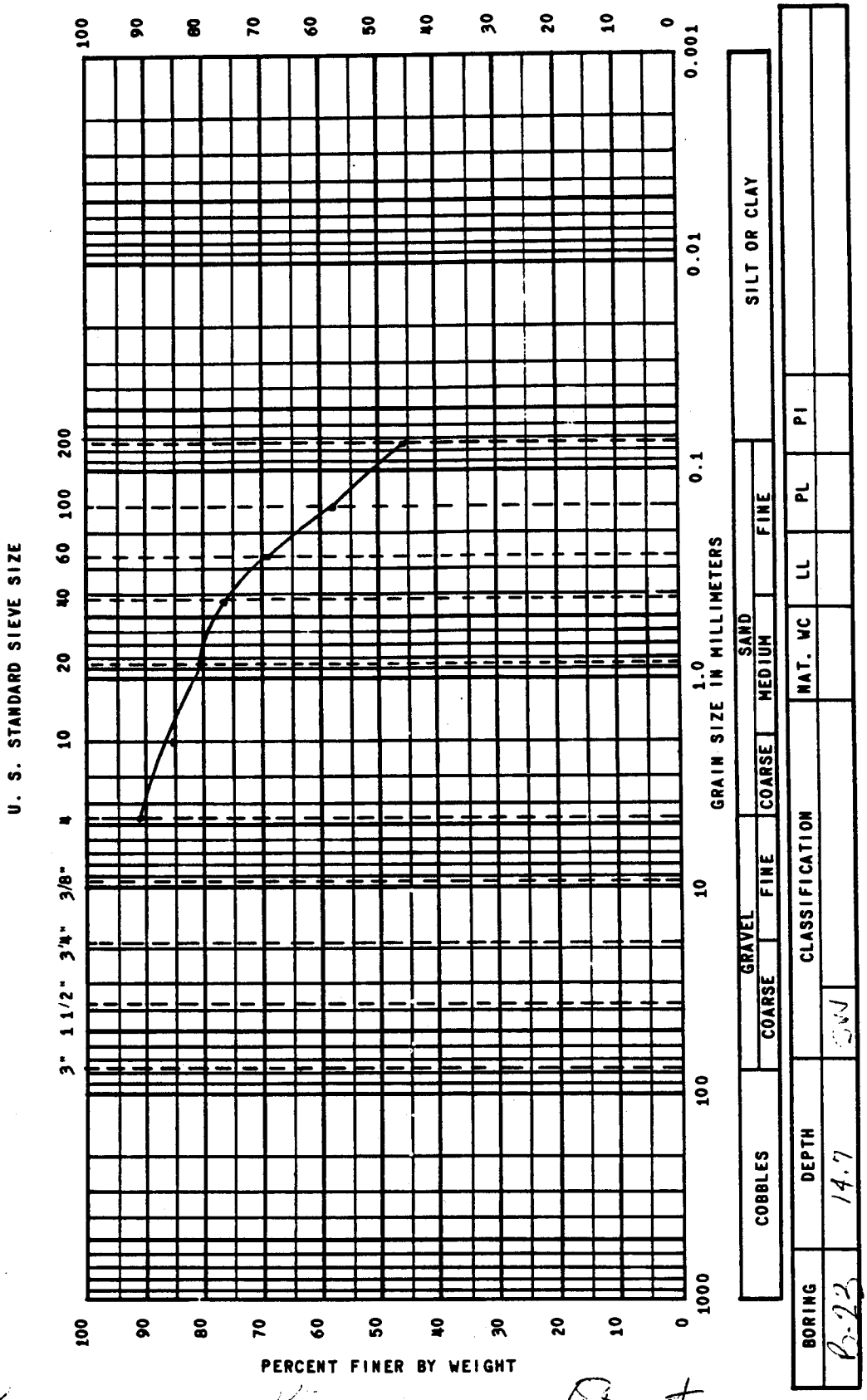
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ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 4-25-55

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-23 SAMPLE NUMBER SS-3



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REMARKS % fines

SOILS 5 (8-78)

Gilbert/Commonwealth

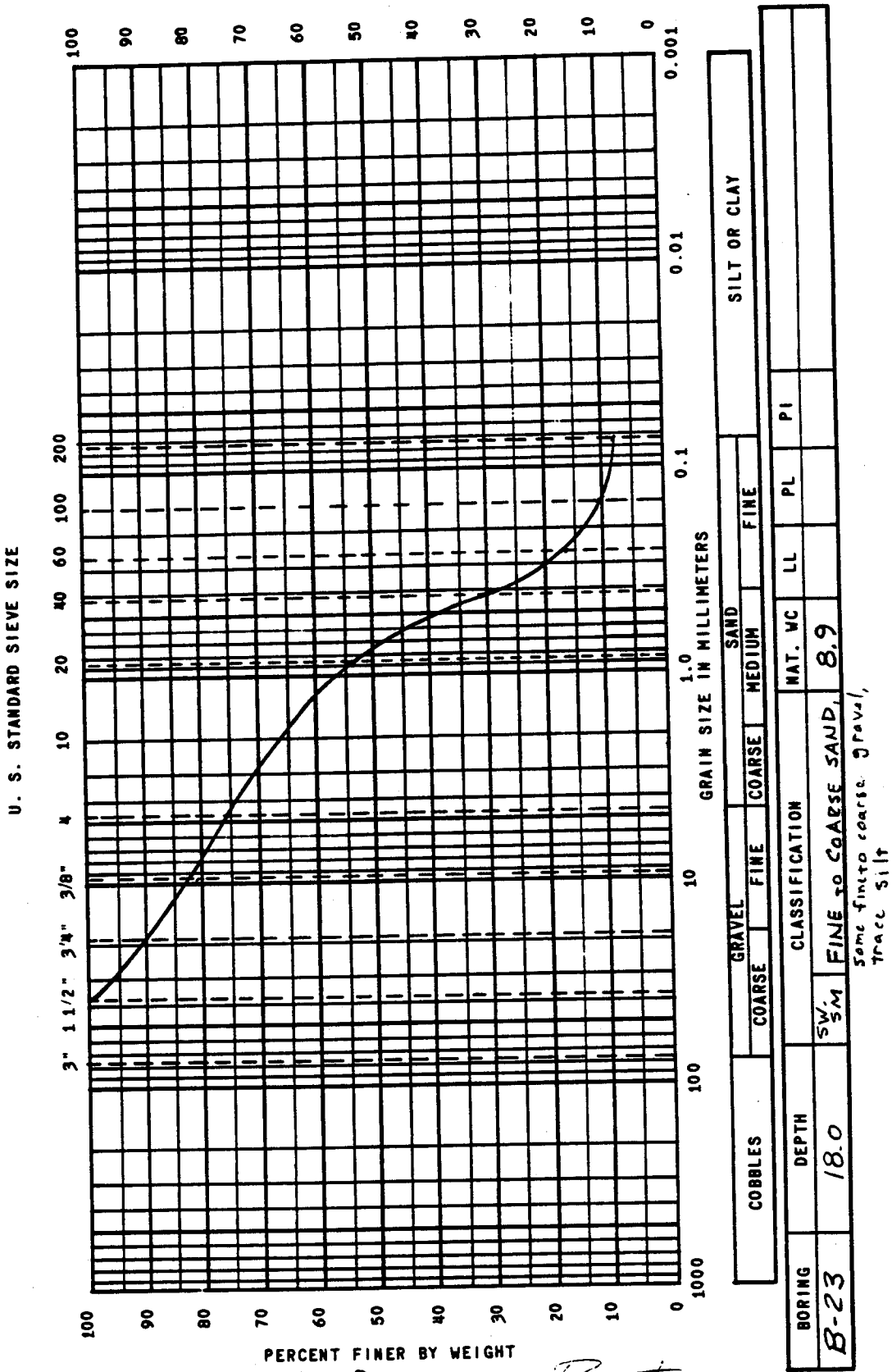
ENGINEERS/CONSULTANTS Reading PA/Jackson MS

GRADATION CURVE

DATE 5-1-85

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-23 SAMPLE NUMBER SS-4



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REMARKS

SOILS 5 (8-78)

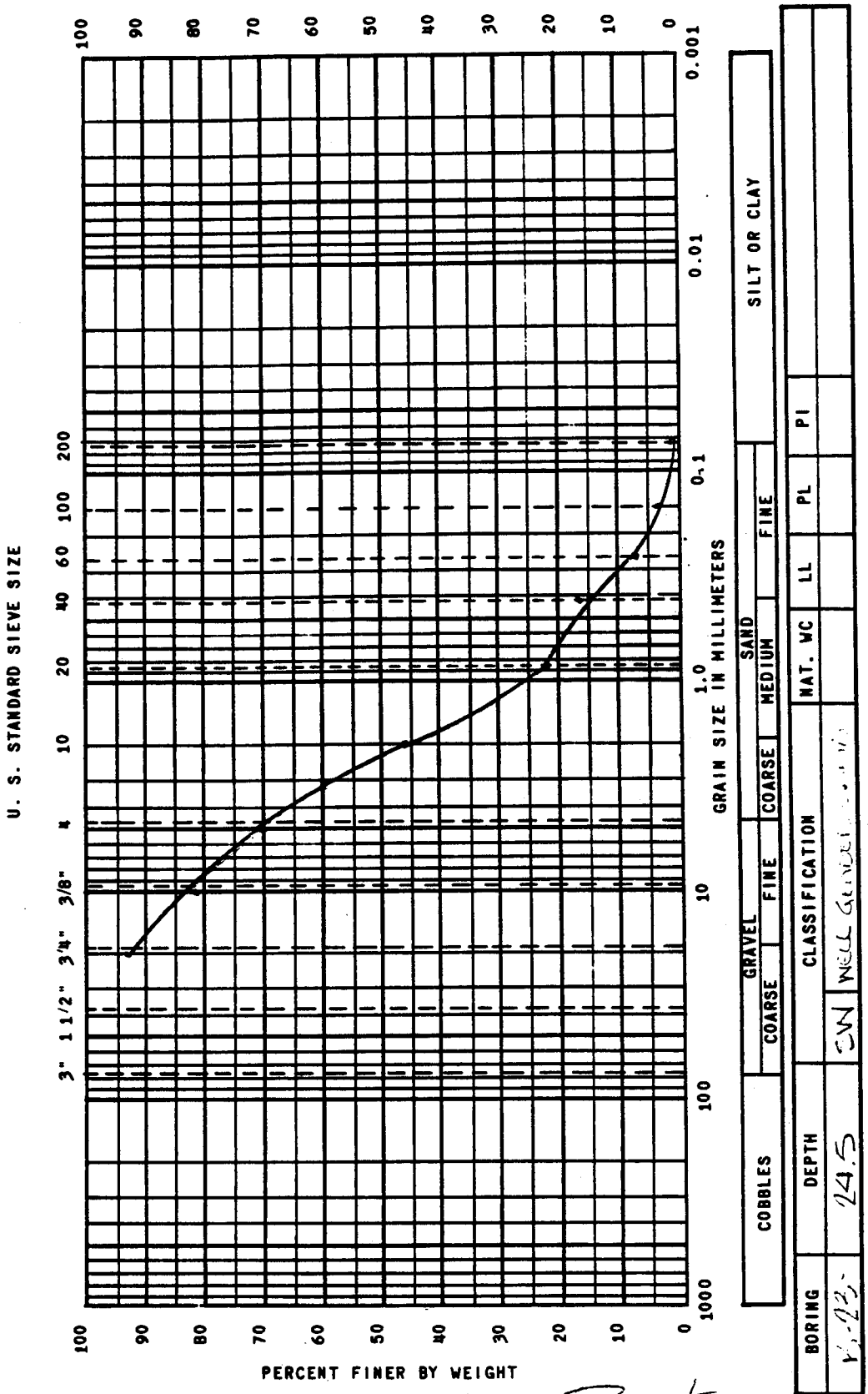
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ENGINEERS/CONSULTANTS Reading PA/Jackson MI

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DATE 4-2235

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-5410-001 BORING NUMBER B-23 SAMPLE NUMBER SS-6



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REMARKS

SOILS 5 (8-78)

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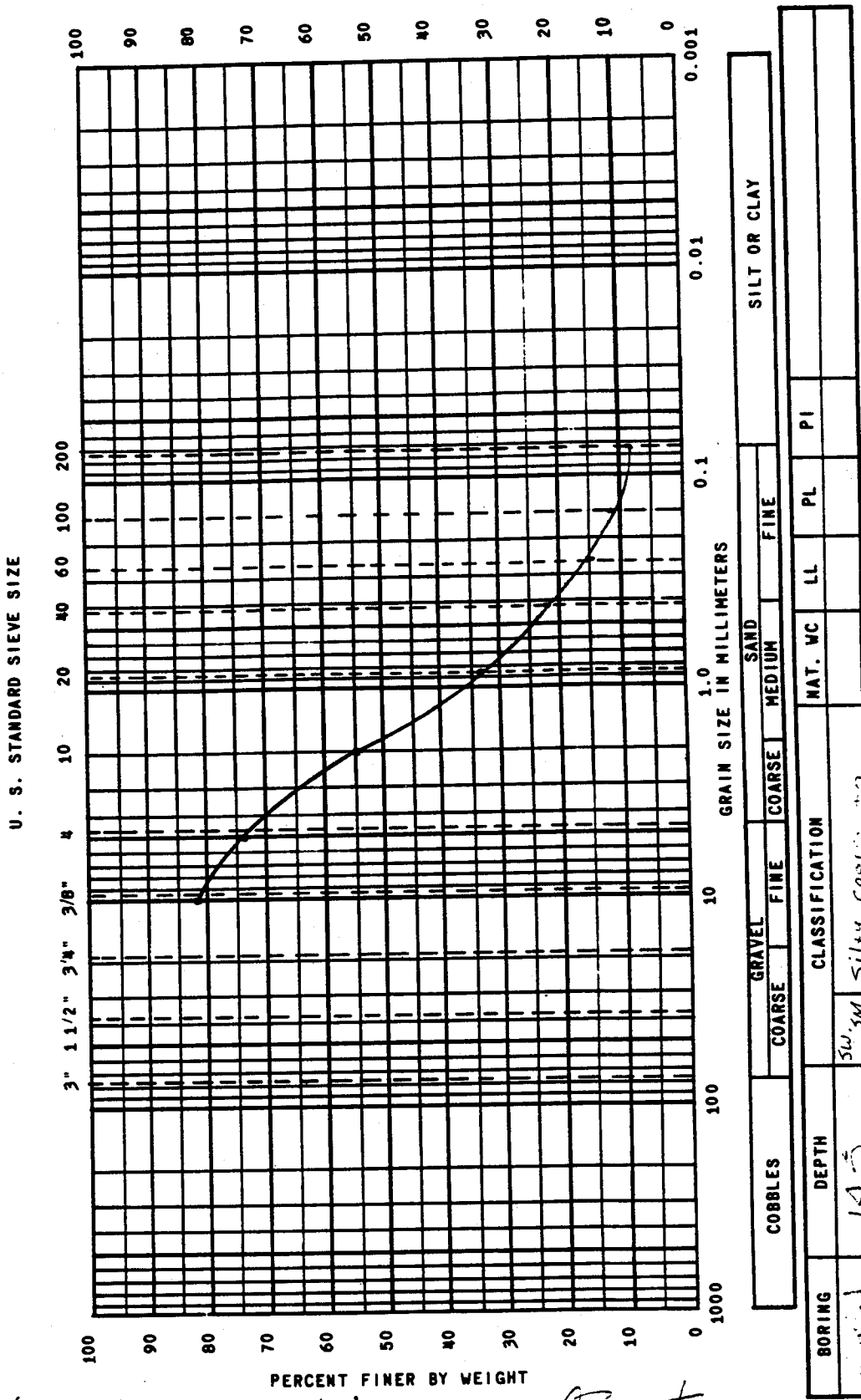
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GRADATION CURVE

DATE 1-14-85

CLIENT SM PROJECT [illegible]

JOB NUMBER 2-0410-201 BORING NUMBER B-14 SAMPLE NUMBER [illegible]



TECHNICIAN King COMPUTED BY King CHECKED BY [illegible]

REMARKS

SOILS 5 (8-78)

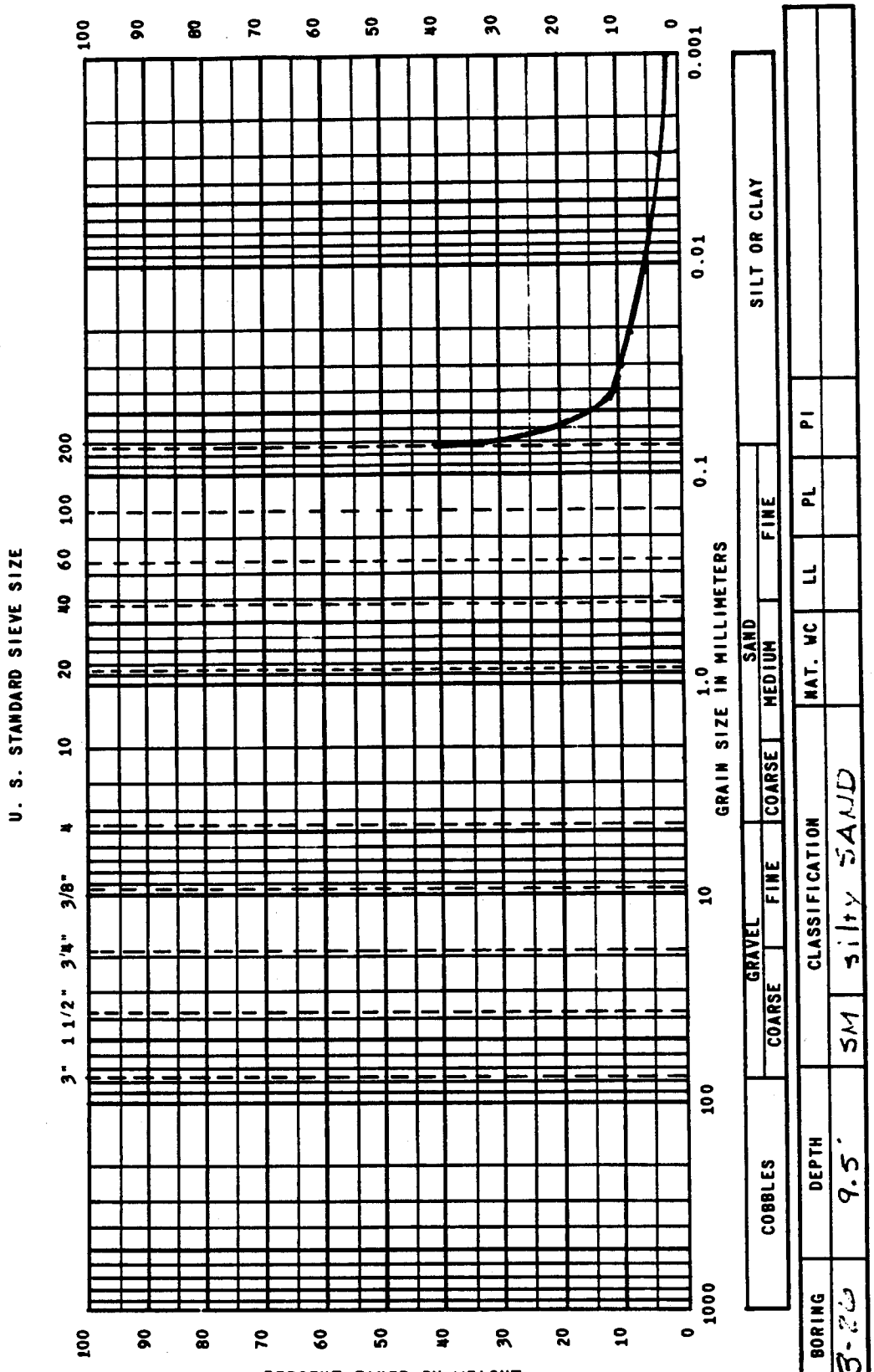
Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading PA/Jackson MS

GRADATION CURVE

DATE 7-1-88

CLIENT G.M. PROJECT GASOLINE STUDY

JOB NUMBER 63-040-001 BORING NUMBER B-26 SAMPLE NUMBER SS-2



TECHNICIAN [signature] COMPUTED BY [signature] CHECKED BY [signature]

REMARKS

SOILS 5 (8-78)

Gilbert/Commonwealth

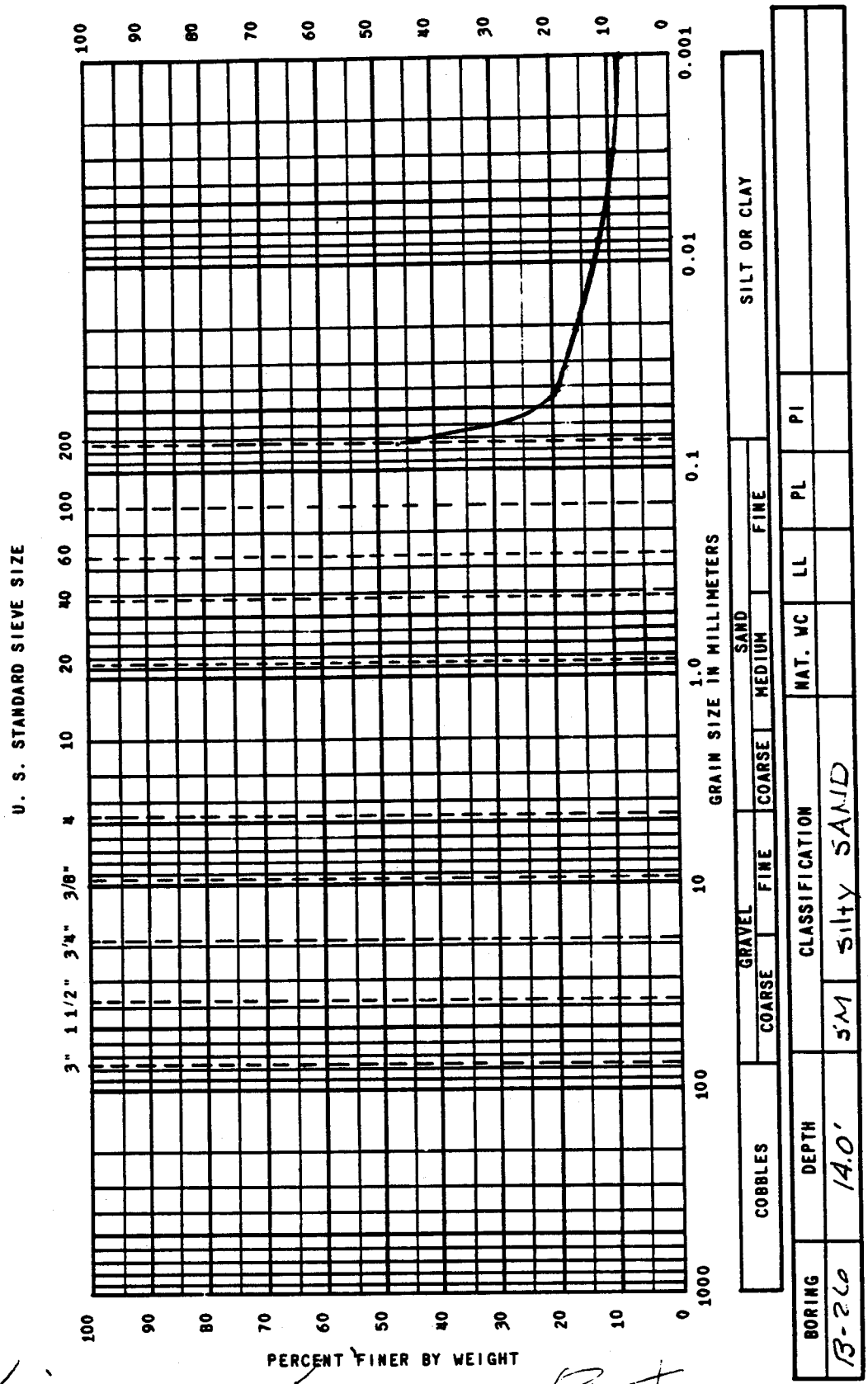
ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 5-1-85

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 62-0410-001 BORING NUMBER B-26 SAMPLE NUMBER SS-2



TECHNICIAN King COMPUTED BY King CHECKED BY Boynton

REMARKS

SOILS 5 (8-78)

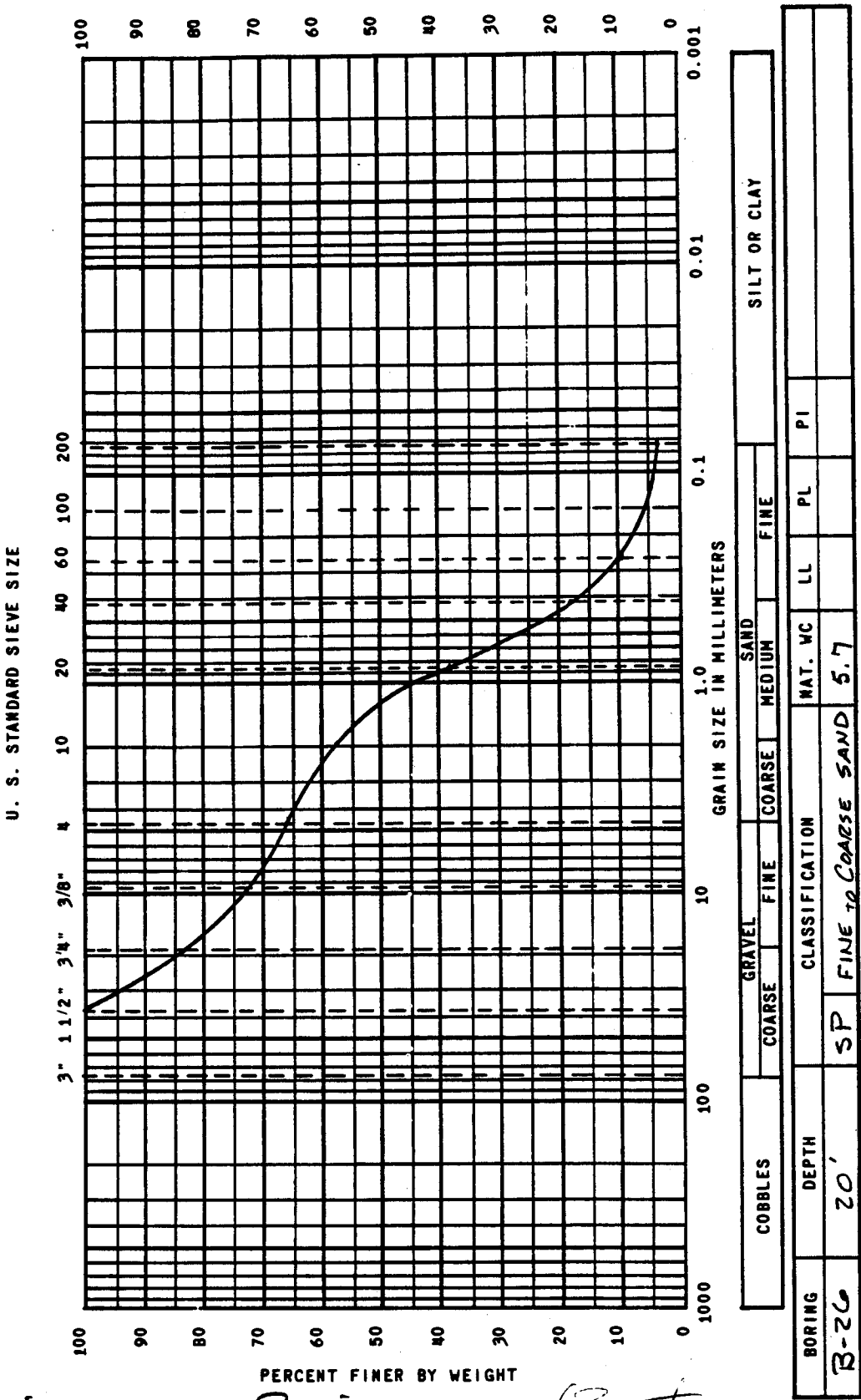
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GRADATION CURVE

DATE 5-1-85

CLIENT GM PROJECT GASOLINE STUDY

JOB NUMBER 63-0410-001 BORING NUMBER B-26 SAMPLE NUMBER SS-4



TECHNICIAN Beaingen COMPUTED BY Beaingen CHECKED BY C. Brewster

REMARKS

SOILS 5 (8-78)

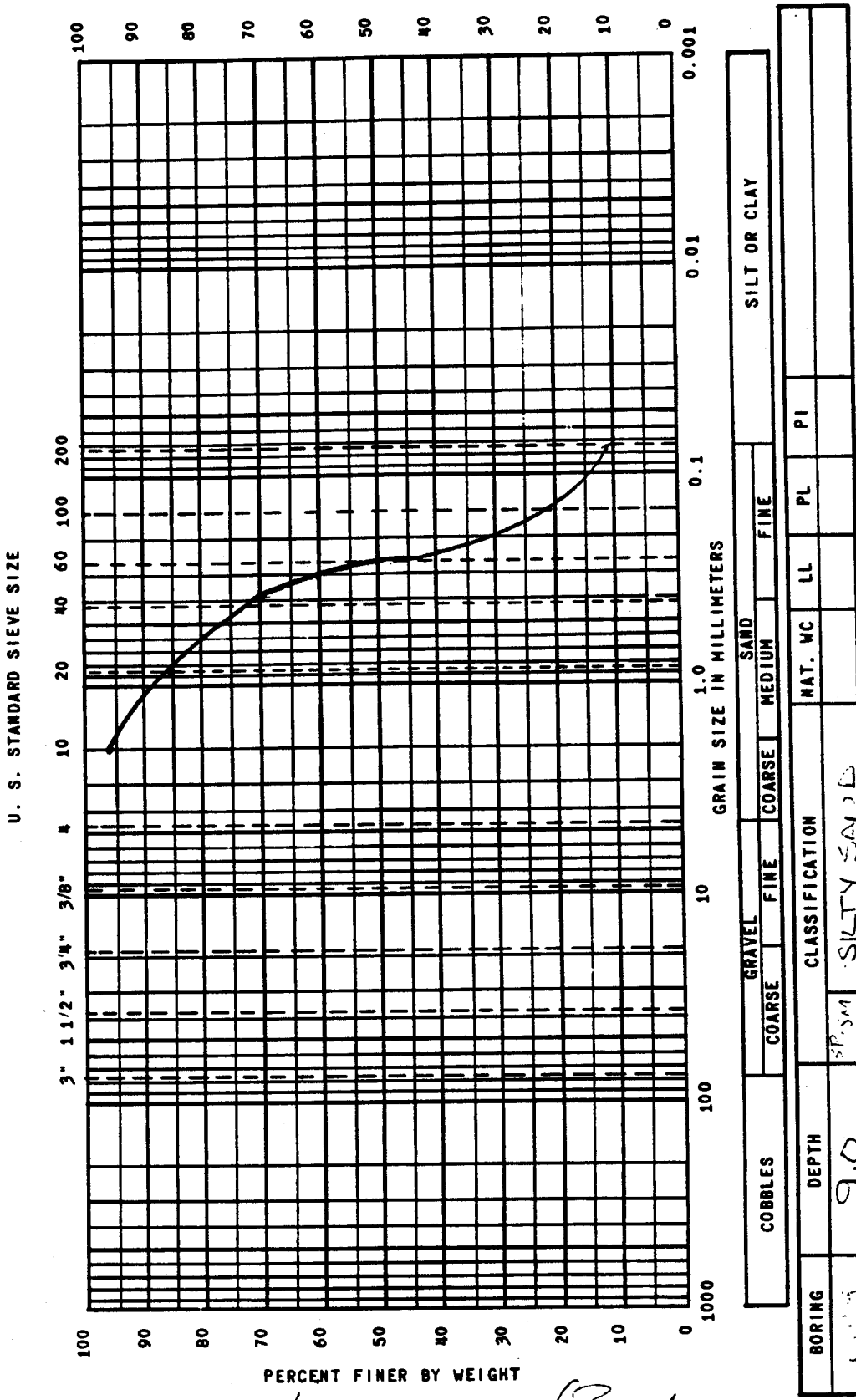
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ENGINEERS/CONSULTANTS Reading PA/Jackson MI

GRADATION CURVE

DATE 4-24-85

CLIENT GM PROJECT [illegible]

JOB NUMBER 85-0410-001 BORING NUMBER B-28 SAMPLE NUMBER [illegible]



TECHNICIAN [illegible] COMPUTED BY [illegible] CHECKED BY [illegible]

REMARKS

SOILS 5 (8-78)

Gilbert/Commonwealth
ENGINEERS/CONSULTANTS Reading PA/Jackson MI

APPENDIX K.3

BUILDING 33 FREE PRODUCT REPORT

BUILDING 33 - FREE PRODUCT STUDY AREA

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

JANUARY 1994
REF. NO. 5770 (5)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding the free product (gasoline) associated with Building 33 (Study Area) at the GM Facility.

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for the Building 33 - Free Product area is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the Building 33 - Free Product area with regards to the outstanding environmental issues identified by GM.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area are suspected to be the result of the operation of an underground storage tank (UST) system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g. final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA) [Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides

the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (draft October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g. sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29)

and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not expected to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This section presents a summary of available information from GM files regarding the free product gasoline located under Building 33.

3.1 HISTORY OF BUILDING 33 - FREE PRODUCT

In 1985, a gasoline release was discovered by GM during the foundation investigation for the planned expansion of Building 33. Twenty geotechnical soil borings were drilled. Free product (gasoline) was found in one borehole, gasoline constituents were found in soils from seven of the borings, gasoline odors were detected in seven borings and the remaining five borings showed no evidence of gasoline. The National Response Center and the Michigan Department of Natural Resources (MDNR) were notified of the gasoline leak. The source of the gasoline was considered to be a leaking fuel line supplying an abandoned fuel island south of Building 33. The fuel supply line (shown on Figure 3.1) was found to be leaking in 1968/69. A pressure check was performed on the line. The line held no air pressure, indicating a significant hole in the pipe. The fuel line and fuel station were abandoned in approximately 1969 following the discovery of the leaking pipe, and the fuel lines capped.

Approximately 2,000 gallons of gasoline are believed to have migrated from the fuel line to beneath Building 33. The free product from the release migrated to the northwest and apparently became trapped in a sand lens under Building 33. The depth to the free product is approximately 15 to 20 feet bgs. The free product thickness was estimated to be between 1 and 1.5 feet at the center of the free product and tapered to zero thickness at a radius of approximately 30 feet (December 2, 1991 letter from ABB Environmental Services, Inc. to Mr. Robert Milz). A summary of existing information is presented in Appendices A and B.

3.2 PAST INVESTIGATIVE AND REMEDIAL ACTIVITIES

Studies have been performed by Gilbert/Commonwealth Inc. of Michigan and E.C. Jordan Co. [now ABB-Environmental Services, Inc. (ABB-ES)] to determine the nature and extent of the free product, gasoline plume in perched groundwater, the extent of the gasoline vapor plume, and the stratigraphic variations near Building 33. Borings were drilled and monitoring wells were installed in the locations identified on Figure 3.1. Borehole logs and locations are provided in Appendix C.

The results of these studies indicated that leaded gasoline is trapped in a sand lens under Building 33. The gasoline trapped in the sand lens near borehole B-3 was estimated by E.C. Jordan Co. to be 60 feet in diameter. It was estimated by E.C. Jordan Co. that approximately 2,000 gallons of gasoline may exist in this sand lens, assuming a 20% porosity of the sand. Figure 3.1 shows the approximate extent of the gasoline free product plume.

The benzene, toluene and xylene (BTX) plume in the perched groundwater was mapped based on groundwater sampling which occurred early in 1987. The sampling included both on-Site wells and wells located on the property of William J. Winter (MW-104, -105, -106, -107, -113 and -114). Two distinctly different plume maps were created based on this data. The limits of these plumes (identified using the total BTX contour for 100 µg/L) are reproduced on Figure 3.2 from the original E.C. Jordan figures presented in Appendix B.

Soil and groundwater contamination was identified on the William J. Winter property at levels exceeding Type B criteria, however, it was concluded by E.C. Jordan and GM that the contamination on the William J. Winter property was not a result of GM activities. It is not clear, from the records which CRA received from GM, what the basis was for the differences in the limits of the BTX on the two figures.

The E.C. Jordan figure which identified the BTX contamination on the William J. Winter property also identifies a sanitary sewer line which pass through the center of the BTX plume between

Buildings 33 and 35. This sewer is an 18-inch gravity sewer which has an invert elevation of 916.8 feet AMSL (based on a floor elevation of 935.00 feet for Building 33). Perched groundwater was found at elevations ranging from 914.7 to 923.7 feet AMSL. Based on these elevations, the sewer bedding material may be providing a preferential pathway for groundwater migration in the area of the BTX plume which could accelerate the movement of BTX in groundwater toward the north property limit.

Following these studies, a design was prepared and implemented (in August 1989 by E.C. Jordon Co.) for a free product recovery system. The system consisted of a single extraction well containing an air-driven pump. A second extraction well was added shortly after the system was activated. The system was not designed to operate during the winter months. The treatment system collected approximately 133 gallons of the estimated 2,000 gallons of free product up to the time it was deactivated, in late 1991. The permeability of the soil containing the gasoline is highly variable (1×10^{-2} cm/sec to 1×10^{-5} cm/sec). As a result, the average rate of product inflow into the recovery well was very low (as low as 0.1 gallons per day).

Three alternatives regarding the free product recovery system were evaluated by ABB-ES. These alternatives included:

- investigation of the root cause of the poor performance of the recovery system;

- evaluation of other technologies for free product recovery/treatment; and

- inform the MDNR that the recovery program was attempted in good faith but was unsuccessful. As the free product currently poses no risk, monitoring and periodic operation of the recovery system would be adequate until such time as the building undergoes major decommissioning and demolition.

ABB-ES concluded that alternative recovery technologies to remove free product would be subject to the same hydrogeologic

constraints as the recovery well system. As a result, these systems were not considered by ABB-ES to be effective in recovering the free product. ABB-ES suggested that the gasoline plume be monitored and contained within the Facility boundaries.

ABB-ES also recommended that alternative clean-up methods be used when Building 33 undergoes major renovations or demolition.

3.3 GEOLOGY

The geology in the area of Building 33 has been defined by E.C. Jordan, Inc. and from soil borings drilled by other companies. Figure 3.3 presents a cross-section of the surficial soils in the area of Building 33 based on E.C. Jordan borehole logs.

The building floor is underlain by approximately 5 to 15 feet of brown silty sand. Below the silty sand there is 5 to 10 feet of silt or clayey silt. Between 17 and 25 feet bgs there is a sand lens which contains the gasoline residuals. A stiff clayey silt till extends 100 feet below the sand lens. The clay till, in turn, is underlain by alternating aquifer and aquitard overburden stratigraphic units. The contours of the top of the sand lens through which groundwater containing BTX is migrating are presented on Figure 3.4.

3.4 HYDROGEOLOGY

Flow in the surficial, perched groundwater is in the northwesterly direction. E.C. Jordan, Inc. concluded that movement of the free product gasoline has not occurred due to confining layers of clay till forming a trap in the sand lens. The estimated permeability ranges from 1×10^{-2} cm/sec to 1×10^{-5} cm/sec in the soils below Building 33, based on permeability testing performed by Gilbert/Commonwealth.

It has not yet been established whether or not the trenches for sanitary sewers which pass between Building 33 and 35 provide a preferential pathway for groundwater movement in a northerly direction towards South Boulevard.

4.0 ADDITIONAL INVESTIGATIVE ACTIVITIES

Based on a review of available information from GM files, CRA proposes a four-phase approach to the evaluation of the Study Area. Phase I would include obtaining and reviewing all available borehole logs and analytical data, as well as, a Site inspection to assess the condition of monitoring wells installed during previous investigations. Phase II work would involve the installation of soil borings and monitoring wells as necessary to fill information gaps. Phase III would involve a feasibility analysis of potentially applicable remedial technologies for the recovery of free product and gasoline residuals in soil and groundwater. Phase IV would involve implementation of remedial measures, as appropriate.

The tasks involved in both phases of the Study Area assessment are outlined below.

Phase I - Obtain and Review Existing Information

Phase I tasks will include:

- obtaining all available pertinent information regarding boreholes and monitoring wells in the Study Area. The information which CRA currently possesses is summarized in Table 4.1;
- a review and evaluation of all geologic, hydrogeologic and analytical data which exists;
- identification of data gaps;
- location and assessment of the condition of all existing monitoring wells; and
- identification of additional boreholes and monitoring wells which are required to fully define the extent of the free product and groundwater plumes, residual gasoline constituents in soils, area geology and area hydrogeology.

Phase II - Perform Additional Investigative Activities

Tasks to be performed under Phase II of the investigation cannot be fully defined prior to completing Phase I. Phase II tasks may include:

- completion of 4 soil borings to further define the extent of free product under Building 33;

- installation, development and sampling of monitoring wells to replace lost or damaged wells, or fill gaps in the monitoring well field. Soil samples will be collected and analyzed during the installation of monitoring wells;

- installation of soil borings to define the geology and extent of residual gasoline constituents in soils; and

- installation of monitoring wells at selected borehole locations to further define the hydrogeology and extent of BTEX constituents in groundwater.

All collected samples will be analyzed for benzene, toluene, ethylbenzene and xylene (BTEX) and lead.

Figures 4.1 and 4.2 identify the locations of additional soil borings and monitoring wells which will be required to fully define the extent of soil and groundwater contamination and free product limits. It has been assumed by CRA that all monitoring wells which have been lost or damaged will be replaced during these additional investigations.

Phase III - Feasibility Analysis of Potential Remedial Actions

Tasks to be performed as part of Phase III of the investigation include:

- evaluation of Phase I and II analytical and geologic information;

- re-defining the extent of soil and groundwater contamination and limits of free product;

- identification of potentially applicable remedial technologies for each contaminated medium;

- evaluation of the performance, implementability, and cost of each technology; and

- recommendation of the preferred technology(ies) for remediation of the Study Area, if any.

Phase IV - Remedial

Phase IV will involve the implementation of a remedial phase, as appropriate.

5.0 EVALUATION OF RESULTS

An evaluation of analytical data and borehole geology will be performed following the completion of additional soil borings and monitoring wells (if required).

6.0 CONCLUSIONS AND RECOMMENDATIONS

CRA recommends that further geologic and hydrogeologic information be obtained regarding boreholes and monitoring wells installed during previous investigations, as well as, any additional analytical results.

7.0 REFERENCES

1. Investigation of Gasoline in Soils Beneath Building 33, Gilbert/ Commonwealth Inc., May 22, 1985

2. Investigation of Gasoline in Soils Beneath Building 33, E. C. Jordan Company, January 30, 1986

3. Investigation of Gasoline in the Sub-surface of Building 33 and Adjacent Parking Area, J. R. Shock (GM) Memo, May 27, 1987

4. Conceptual Design of a Free Product Recovery System, E. C . Jordan Co., April 1988

5. Letter to William J. Winter from M. D. Zielke (GM) re: borehole logs for E. C . Jordan Co., July 14, 1988

6. Enrolled Senate Bill No. 645, State of Michigan, October 1993

7. Enrolled Senate Bill No. 644, State of Michigan, October 1993

8. Enrolled House Bill No. 4783, State of Michigan, October 1993

9. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

10. MERA Operational Memorandum #8, Revision 2 - Type B Criteria, July 16, 1993

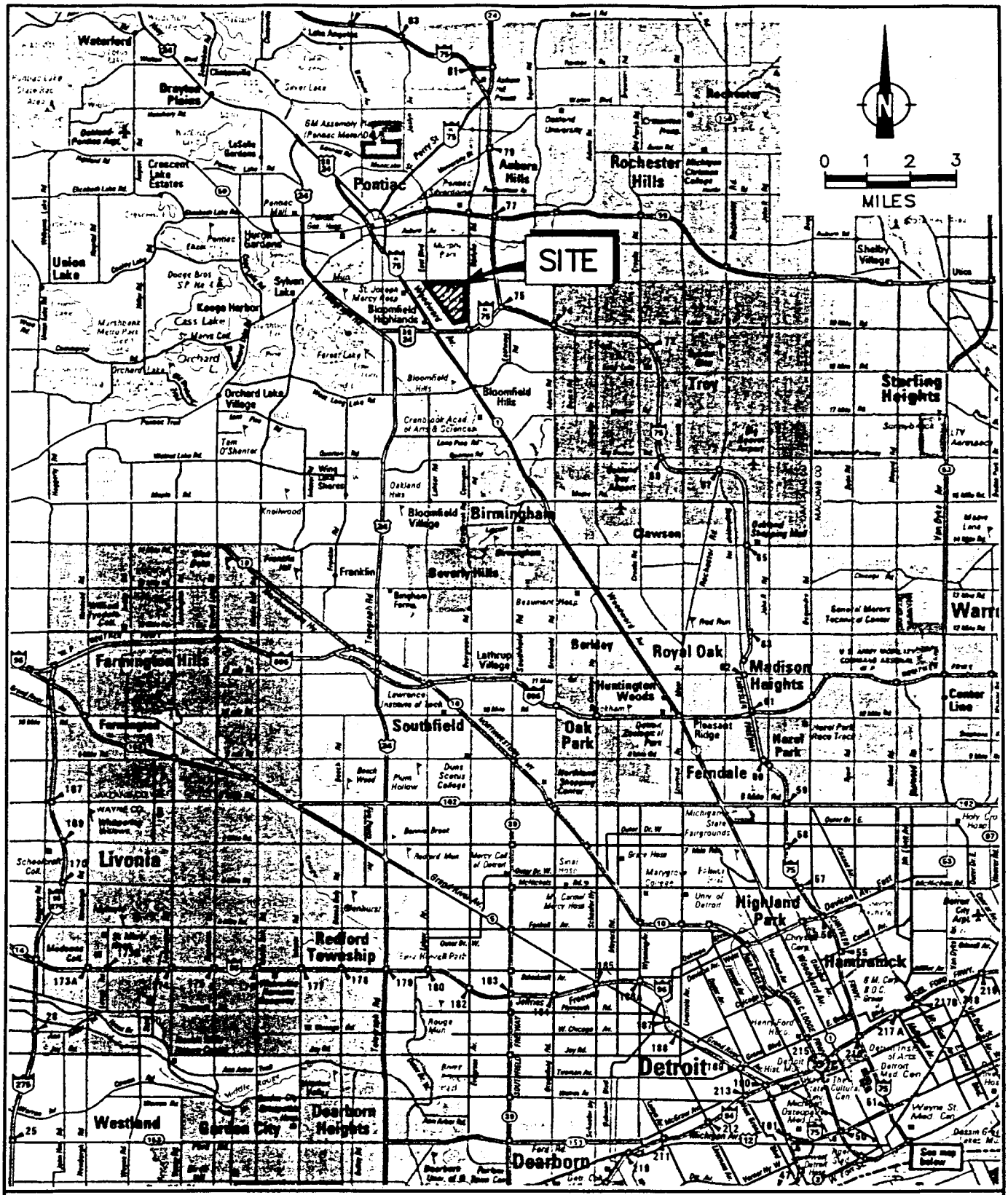
11. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

12. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

13. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

14. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

15. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



CRA

5770 (5) DEC 17/93 (W) REV.0

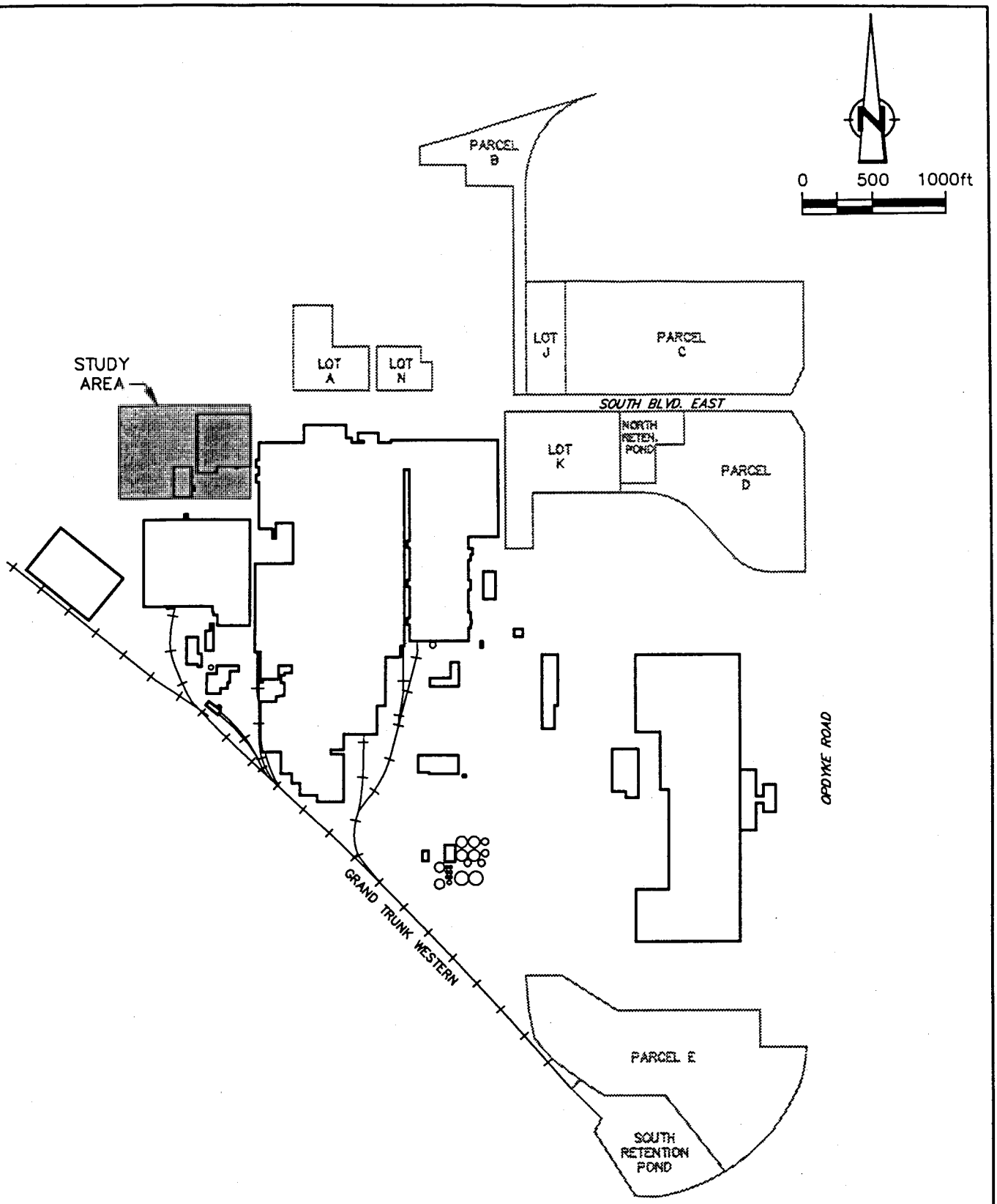


figure 1.2

SITE PLAN
BUILDING 33 – FREE PRODUCT – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 26/94(W) REV.0 (P–12)

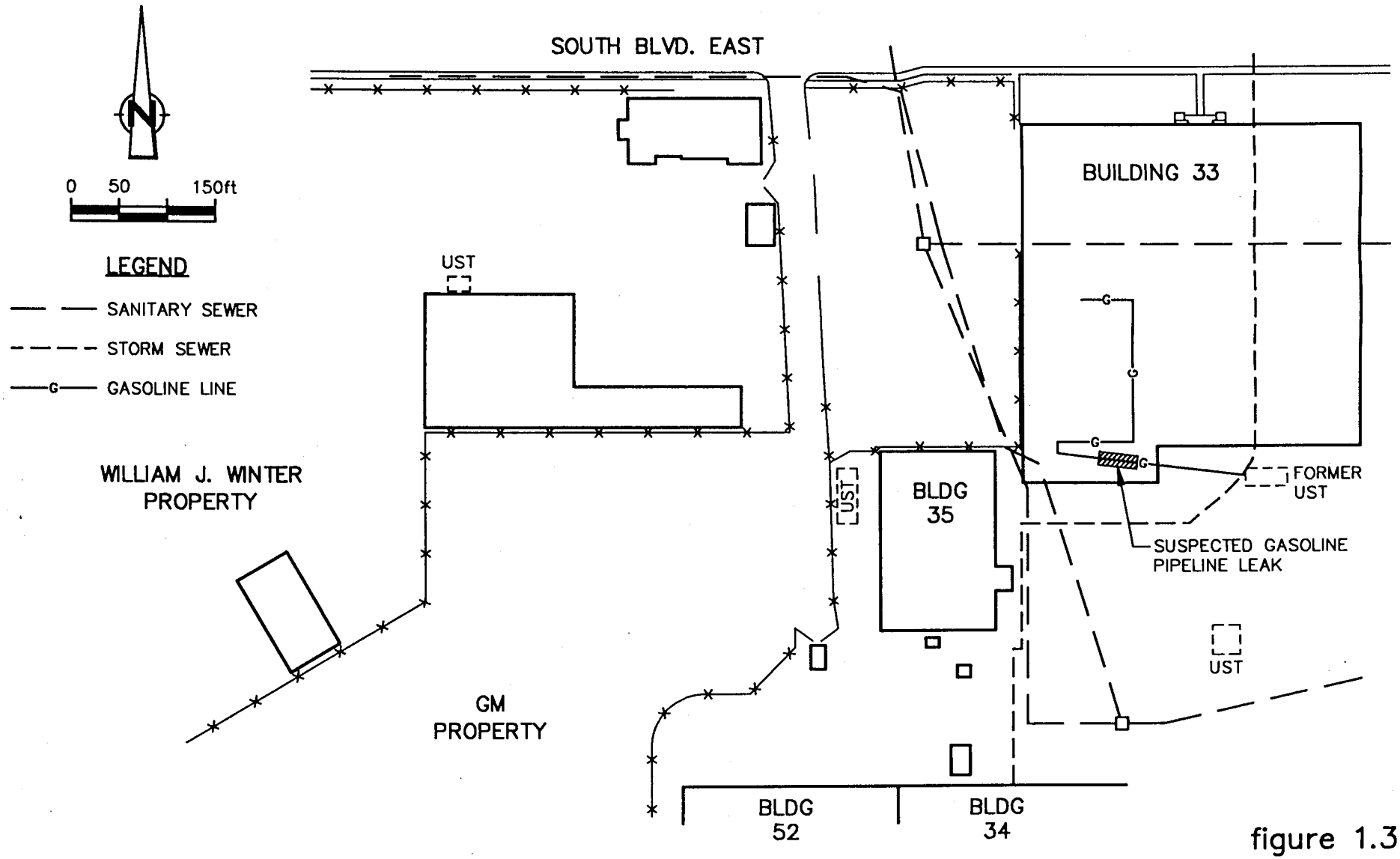


figure 1.3

SITE PLAN

GM NORTH AMERICAN TRUCK PLATFORMS

Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W) REV.0 (P-19)

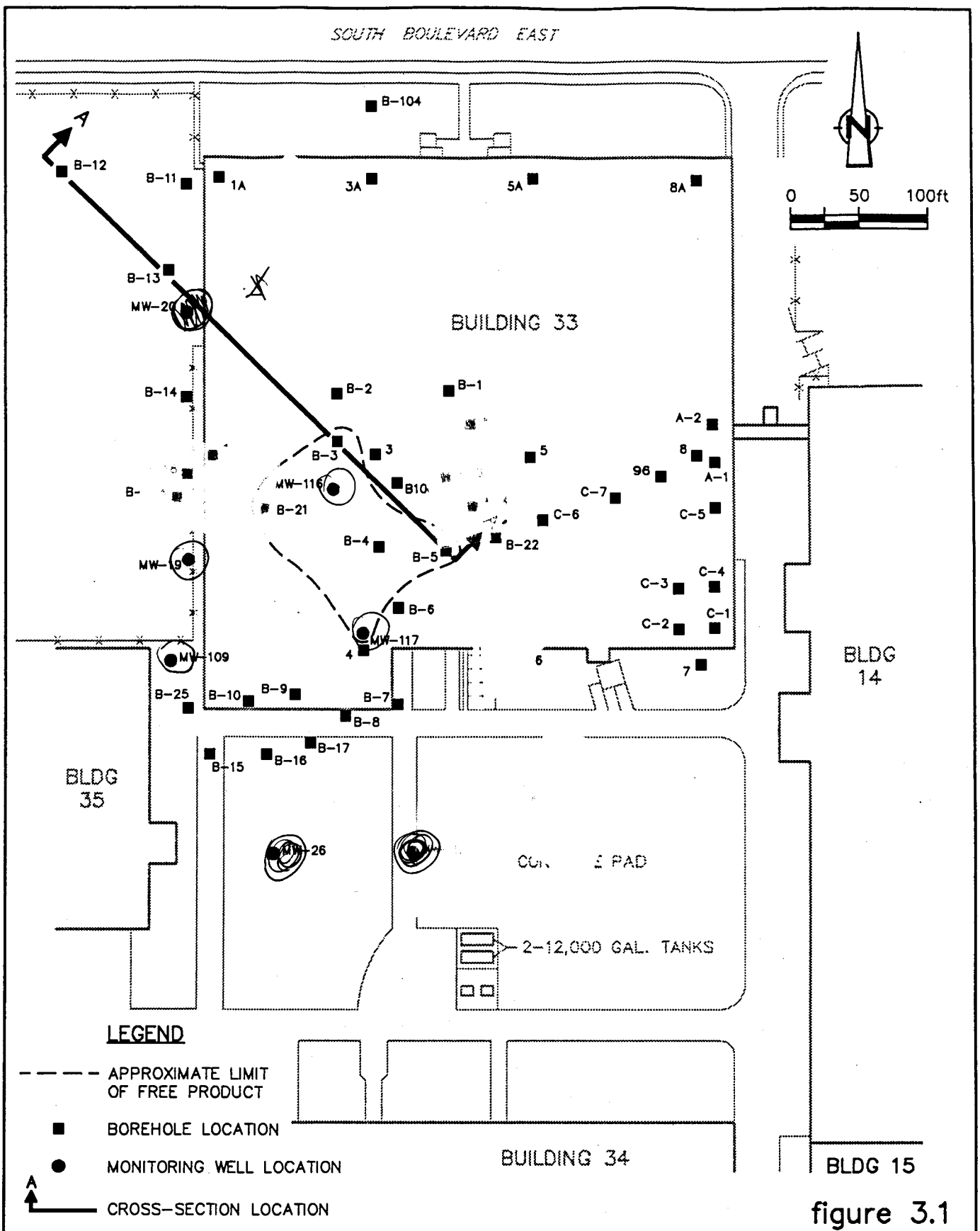


figure 3.1

BUILDING 33 – FREE PRODUCT – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W) REV.0 (P-07)

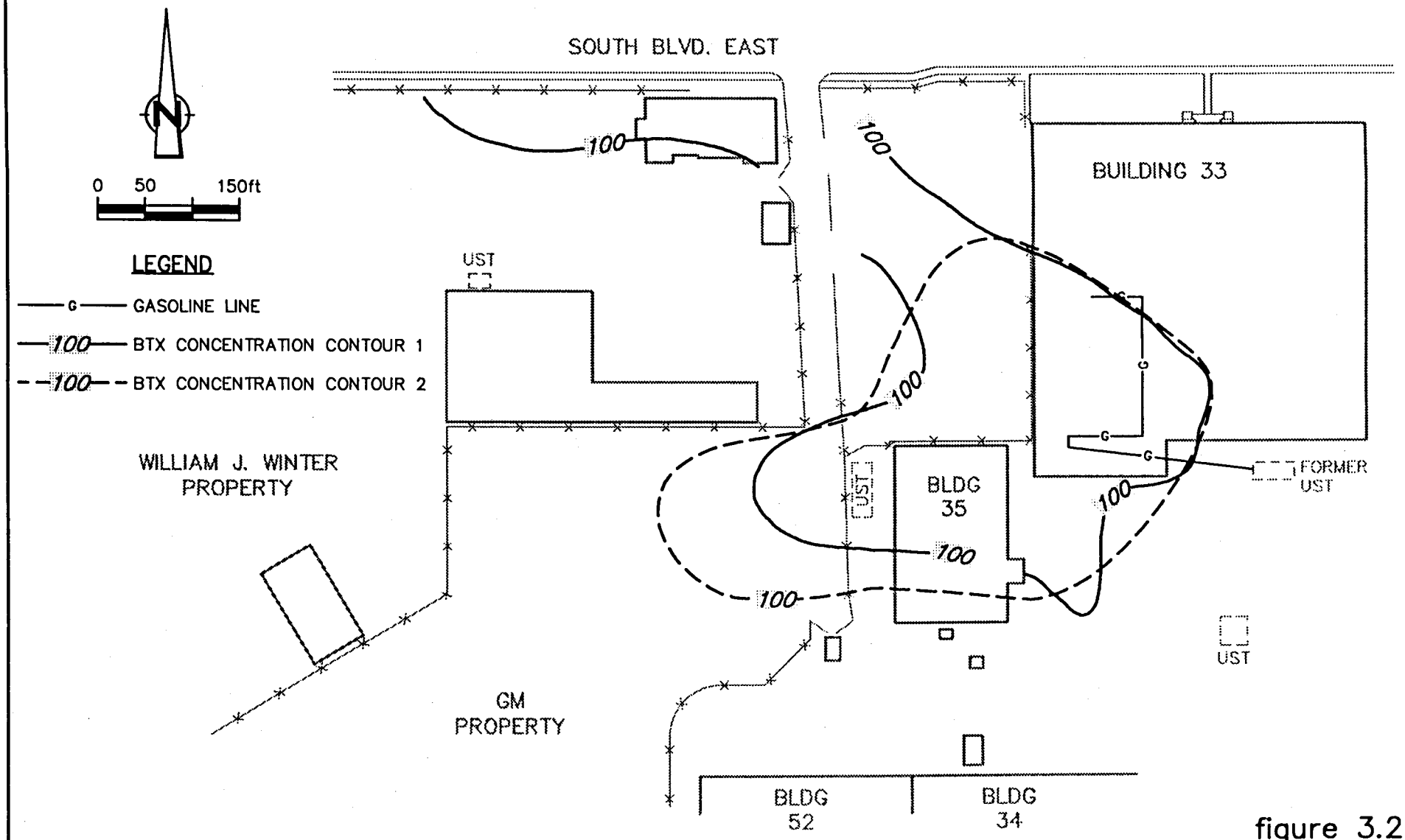


figure 3.2

EXTENT OF GROUNDWATER CONTAMINATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W). REV.0 (P-20)

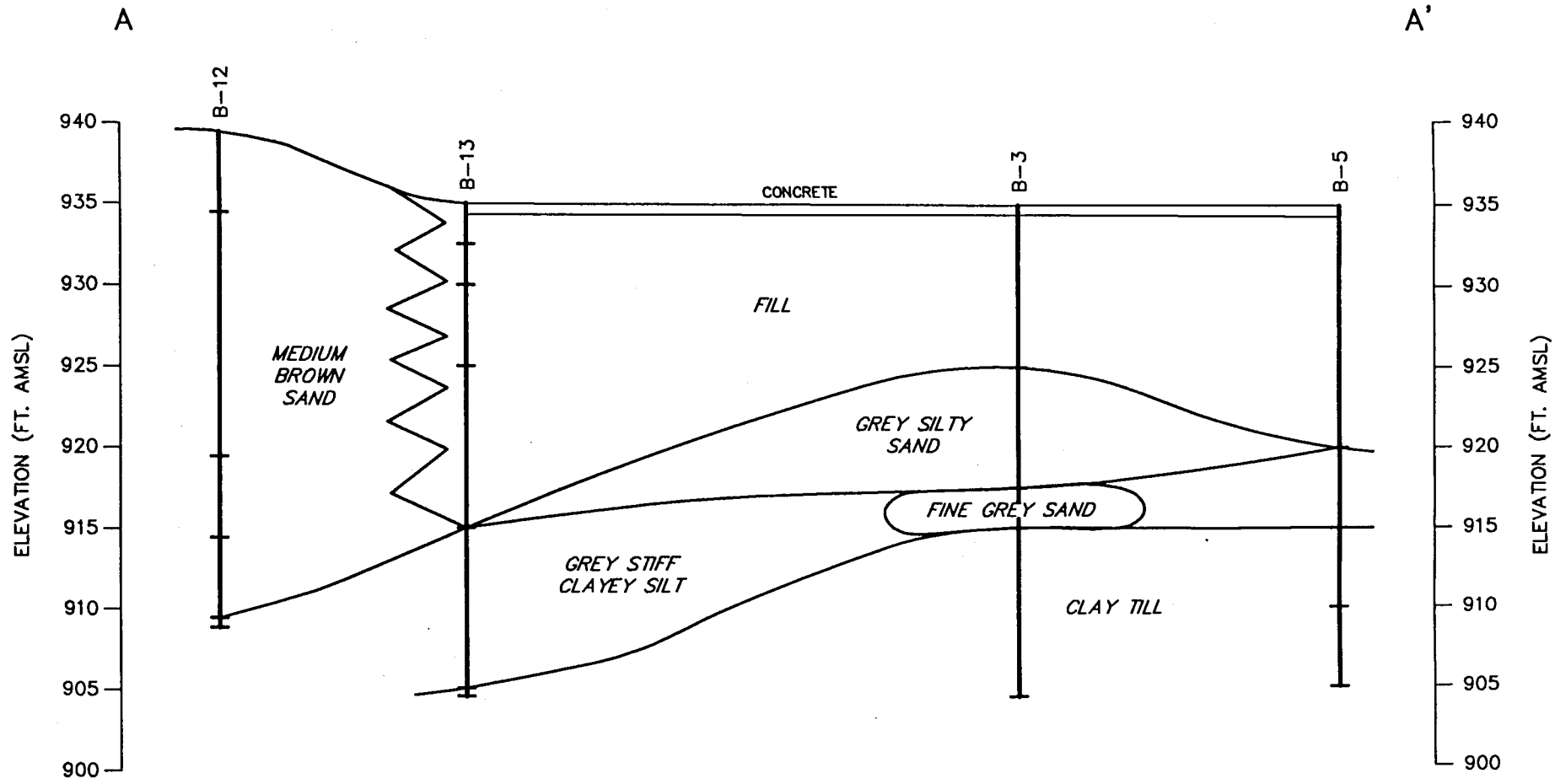


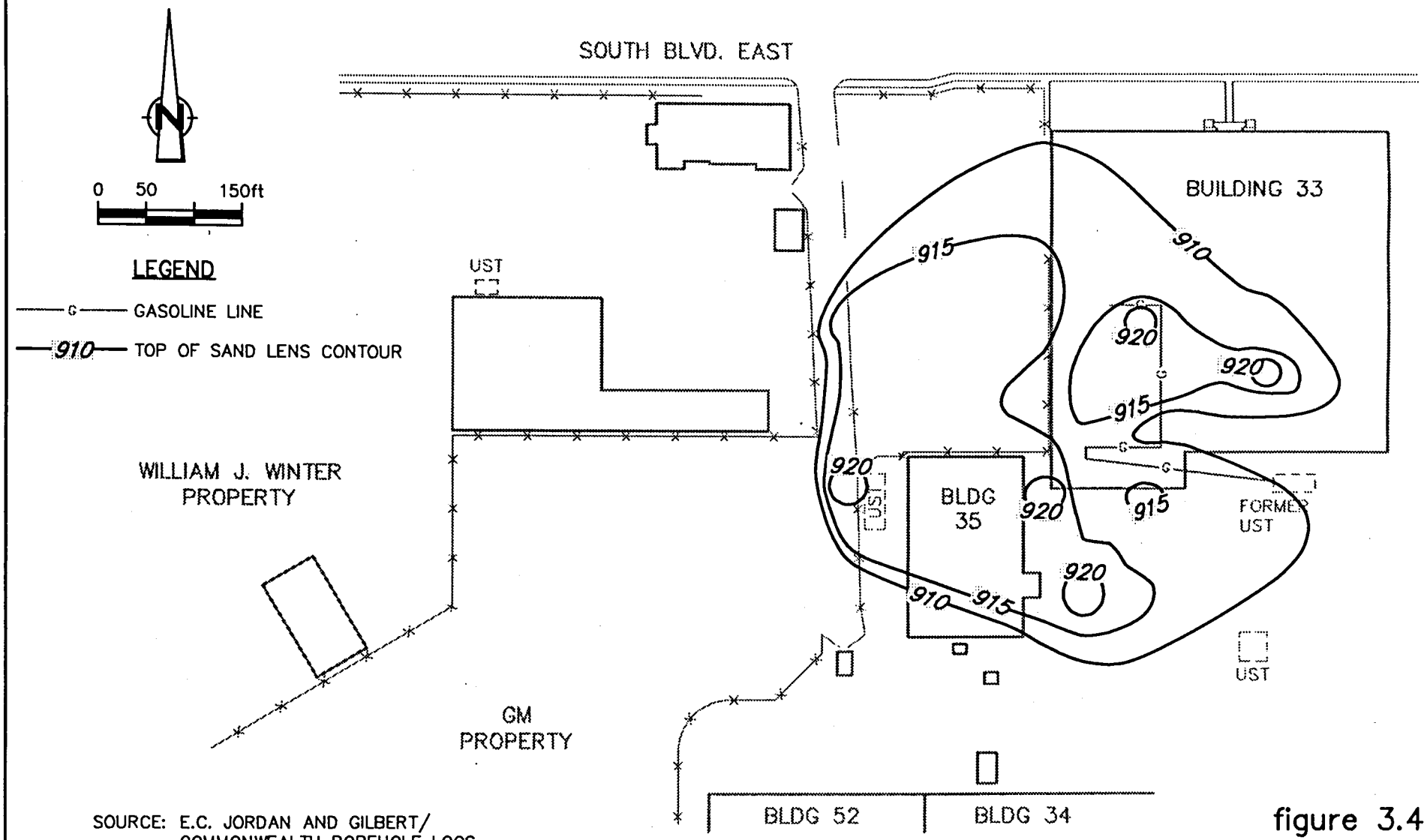
figure 3.3

SCALE:
VER. 1"=10'
HOR. 1"=50'

CROSS-SECTION OF SOILS UNDER BUILDING 33
BUILDING 33 – FREE PRODUCT – STUDY AREA
GENERAL MOTORS NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W) REV.0 (X-01)



SOURCE: E.C. JORDAN AND GILBERT/ COMMONWEALTH BOREHOLE LOGS

figure 3.4

CONTOUR PLOT
TOP OF WATER-BEARING SAND LENS
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W) REV.0 (P-22)

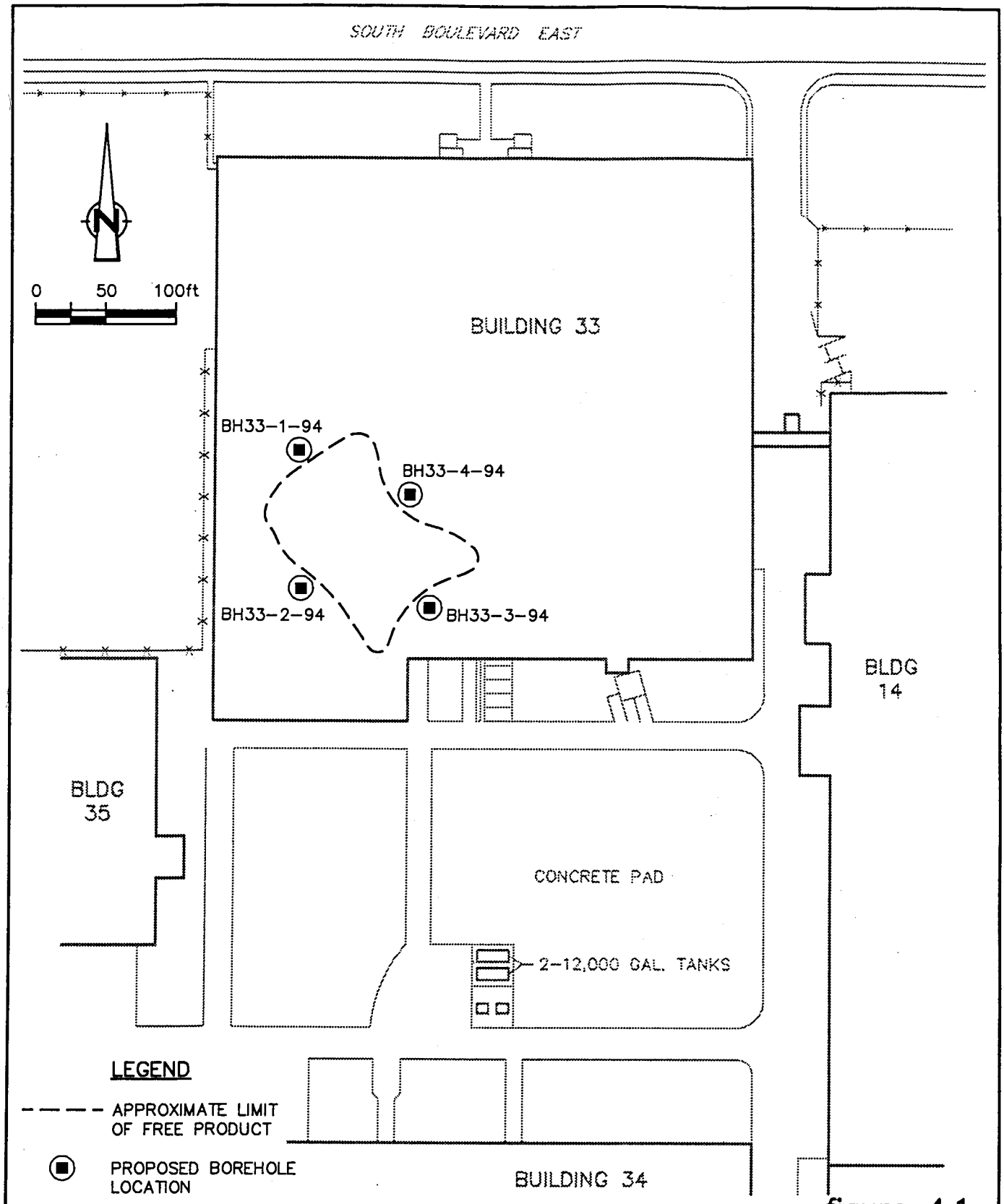


figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES – FREE PRODUCT
BUILDING 33 – FREE PRODUCT – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 26/94(W) REV.0 (P-18)

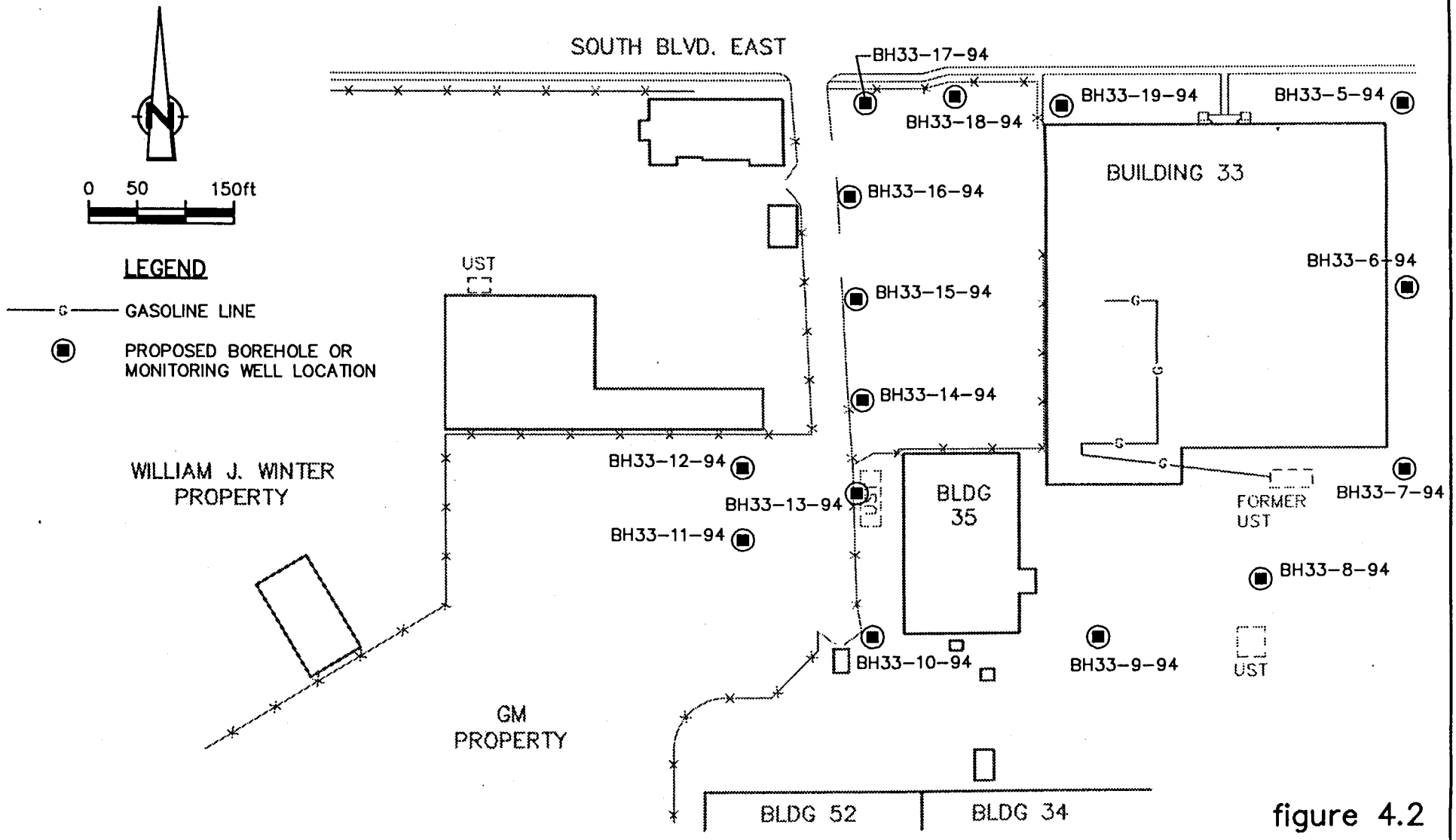


figure 4.2

ADDITIONAL INVESTIGATIVE ACTIVITIES
SOIL AND GROUNDWATER CONTAMINATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (5) JAN 27/94(W) REV.0 (P-21)

TABLE 4.1

SUMMARY OF EXISTING BOREHOLE AND MONITORING WELL INFORMATION
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

				Groundwater Analytical Data			*Soil Analytical Data*		
Borehole Number	*Monitoring Well Number*	*Stratigraphic Log Exists*	*Location Known*	*Benzene (ug/l)*	*Toluene (ug/l)*	*Xylene (ug/l)*	*Benzene (ug/kg)*	*Toluene (ug/kg)*	*Xylene (ug/kg)*
1			Y						
1A			Y						
2			Y						
3			Y						
3A			Y						
4			Y						
5			Y						
5A			Y						
6			Y						
7			Y						
8			Y						
8A			Y						
50			Y						
96			Y						
A-1			Y						
A-2			Y						
A-3			Y						
A-4			Y						
A-5			Y						
B-1		Y	Y						
B-2		Y	Y						
B-2A		Y	Y						
B-3		Y	Y						
B-4		Y	Y						
B-5		Y	Y						
B-6		Y	Y						
B-7		Y	Y						
B-8		Y	Y						
B-9		Y	Y						
B-10		Y	Y						
B-11		Y	Y						
B-12		Y	Y						
B-13		Y	Y						
B-14		Y	Y						
B-15		Y	Y						
B-16		Y	Y						
B-17		Y	Y						
B-18		Y	Y						
B-18A		Y	Y						
B-19		Y	Y	8,850-9,750	6,750-6,900	<3,900-6,800			
B-20		Y	Y	15	2	<1			
B-21		Y	Y						
B-22		Y	Y						
B-23		Y	Y	9,000	425	<12,300			
B-24		Y	Y	5	8	4			
B-25		Y	Y						

TABLE 4.1

SUMMARY OF EXISTING BOREHOLE AND MONITORING WELL INFORMATION
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

				Groundwater Analytical Data			*Soil Analytical Data*		
Borehole Number	*Monitoring Well Number*	*Stratigraphic Log Exists*	*Location Known*	*Benzene (ug/l)*	*Toluene (ug/l)*	*Xylene (ug/l)*	*Benzene (ug/kg)*	*Toluene (ug/kg)*	*Xylene (ug/kg)*
B-26		Y	Y	6,000	1,025	<3,700********			
B-27		Y	Y	<1	<1	<1			
B-28		Y	Y	<1	<1	<1			
B-102			Y				ND	ND	ND
B-103			Y				ND	ND	ND
B-104			Y						
B-105			Y						
B-106			Y						
B191			N	8,800	6,600	3,900			
B192			N	9,700	6,500	6,600			
B201			N	ND	ND	ND			
B231			N	9,000	300	12,200			
B241			N	ND	ND	ND			
B261			N	6,000	1,000	3,700			
B271			N	ND	ND	ND			
B281			N	ND	ND	ND			
C-1			Y						
C-2			Y						
C-3			Y						
C-4			Y						
C-5			Y						
C-6			Y						
C-7			Y						
D-1			Y						
D-2			Y						
D-3			Y						
	MW-19		Y	3,500	15,000	5,200			
	MW-20		Y	11	ND	1.1			
	MW-23		Y						
	MW-24		Y	11	2	0.2			
	MW-26		Y	410	20	58			
	MW-27		Y	6.4	ND	ND			
	MW-28		Y	5.8	ND	ND			
	MW-101		Y	ND	ND	ND	ND	ND	ND
	MW-102		Y	ND	ND	ND	ND	ND	ND
	MW-103		Y	ND	ND	ND	ND	ND	ND
	MW-104	Y	Y	ND	ND	ND	CHECK #'S FOR THESE SAMPLES		
	MW-105	Y	Y	610	ND	15	CHECK #'S FOR THESE SAMPLES		
	MW-106	Y	Y	1,200	310	410	CHECK #'S FOR THESE SAMPLES		
	MW-107	Y	Y	ND	ND	ND	CHECK #'S FOR THESE SAMPLES		
	MW-108		Y	5	ND	1.8	ND	ND	ND
	MW-109		Y						
	MW-110		Y						
	MW-111		Y						
	MW-112		Y						
	MW-113	Y	Y						

TABLE 4.1

SUMMARY OF EXISTING BOREHOLE AND MONITORING WELL INFORMATION
BUILDING 33 - FREE PRODUCT STUDY AREA
PONTIAC CENTAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

				Groundwater Analytical Data			*Soil Analytical Data*		
Borehole Number	*Monitoring Well Number*	*Stratigraphic Log Exists*	*Location Known*	*Benzene (ug/l)*	*Toluene (ug/l)*	*Xylene (ug/l)*	*Benzene (ug/kg)*	*Toluene (ug/kg)*	*Xylene (ug/kg)*
	MW-114	Y	Y						
	MW-115		Y						
	MW-116		Y						
	MW-117		Y						
	MW-118		Y						

APPENDIX A

HISTORICAL INFORMATION

- FREE PRODUCT INVESTIGATIONS 1985 AND 1986

ABB
ASEA BROWN BOVERI

5009-34

December 2, 1991

Mr. Robert Milz
Truck and Bus Group
General Motors Corp.
Mail Code 1206-08
31 Judson Street
Pontiac, MI 48053

Subject: 1991 Summary Report
Gasoline Recovery System - Plant 2, Building 33

Dear Bob:

This letter summarizes the status of the gasoline recovery system at the subject location. The history of the project is summarized briefly in the first section of the report. The results of our system evaluation conducted over the past five months are also summarized, followed by a discussion of three alternatives for future action.

PROJECT HISTORY

In 1985, a report prepared by a geotechnical engineering consultant to GM indicated that leaking underground storage tanks (LUSTs) had released gasoline into the ground near the southern end of Building 33 at Truck and Bus Plant 2 (Pontiac, Michigan). In 1986, GM requested that ABB Environmental Services, Inc. (then called E.C. Jordan Co.) conduct an investigation into the nature and extent of the contamination problem. The investigation did not include conducting any borings or installing monitoring wells inside the building itself, and some sampling locations were constrained by limited physical access and by the continuing engineering/testing operations at the site. Based on the data collected, ABB-ES concluded that gasoline-related compounds (benzene, toluene, ethylbenzene, and xylenes) were present in shallow groundwater near the former tank location, but no free product was found outside the building's footprint.

A supplemental investigation completed in January 1988 concluded that 2,000 gallons of gasoline released from a LUST had flowed northward and collected beneath Building 33. Free product thicknesses in monitoring wells averaged 1.0 to 1.5 feet. The shallow soils containing the gasoline were highly variable in composition and were reported to range in permeability from 1x10-5 centimeters per second (cm/sec) to 1x10-2 cm/sec. Again, delineation of the extent of gasoline was difficult due to active operations and physical constraints in the building.

At GM's request, ABB-ES evaluated available systems for free-product recovery at the site. ABB-ES' April 1988 report indicated that physical constraints at the site would eliminate some otherwise preferable options. For example, a recovery trench could not be constructed without severely disrupting operations and exposing workers to high concentrations of gasoline fumes. Product skimming pumps would require large-diameter recovery wells which could not be installed inside the building due to the limited access for a drilling rig. In light of the physical constraints and the desire to contain gasoline vapors, ABB-ES concluded that air-powered submersible pumps installed in small-diameter recovery wells represented the best available system for removing the product from beneath the building's floor. Although it was not clear at the time of the report

exactly how many recovery wells ultimately would be required, one recovery well was specified with the understanding that operation of the initial recovery well would provide information for determining the total number of recovery wells that would be needed to recover the gasoline plume. Due to the sparse number of monitoring wells inside the building, an additional observation well was included in the plan with the option of converting it to a recovery well, if needed. Only one other monitoring well was in place near the proposed recovery well making evaluation of the recovery system's effectiveness more difficult.

GM authorized the installation of the recovery system, and it was installed and started up in August 1989. The system was not designed for year-round operation. It was operated for three months and then shut down for the winter. During this time, 112 gallons of gasoline were recovered, but little information on the long-term performance of the system was obtained. However, despite activating the nearby observation well as a second recovery well, it was clear that rate of gasoline recovery was relatively low.

In December 1989, ABB-ES met with GM to assess possible causes for the slow rate of product recovery observed during first three months of operation. ABB-ES suspected that the low rate of product flow to the wells was related to the heterogeneous nature of the shallow soils, particularly variations in the characteristics of the gasoline-bearing sand layer and undulations in the underlying clay till layer. The ability to monitor fluid levels within the recovery wells was insufficient, and plans were developed to retrofit the wells with smaller-diameter pumps and modified well caps. In addition, short-term bail tests were conducted to aid in the evaluation of system performance.

These actions were authorized by GM and implemented in July 1990. The results of the bail tests, reported in August 1990, showed that the rate of product inflow to the wells was extremely slow after the first "slug" of product was removed from "storage" in and near the well. During the bail tests, an unidentified rubbery substance was present in samples of gasoline from the wells; the impact of this substance on the rate of product flow into the recovery wells remains unclear. At the conclusion of the bail tests, ABB-ES recommended that operation of the two-well recovery system continue to further evaluate its potential effectiveness. In late September 1990, the wells were retrofitted with smaller-diameter pumps and modified well caps (as planned), and the system was re-started. It was operated for five weeks and then shut down for winter. During this time, only 8 gallons of product were recovered.

In April 1991, the two-well recovery system was re-started and operated for approximately five months. During this time, the system's controls were adjusted, and the effect on the gasoline recovery rate was evaluated. Because both wells discharge to a common waste storage system, only one well was operated at a time to allow changes in the operating parameters to be correlated to changes in the volume of product removed. The system was shut down in early November 1991 prior to the arrival of sub-freezing temperatures. During this time, the volume of product recovered was only 13 gallons.

EVALUATION OF RECOVERY SYSTEM OPERATION IN 1991

Following five consecutive months of system evaluation, senior technical staff at ABB-ES met to discuss the progress made to date in removing gasoline using the two recovery wells at Building 33. The consensus of the group is as follows. Any free-product recovery system involving recovery wells can remove product only as fast as the product will enter the wells. The information collected to date at Building 33 clearly indicates that (on average) the rate of product inflow to the recovery wells is extremely slow (0.1 gallons per day, in one instance). Changes in pump operating schedules did not have an appreciable effect on the rate of product

accumulation in the recovery wells. The low rate of gasoline flow into the wells may be due to: (1) clogging of the soil and/or well screen with bacterial growth or a chemical precipitate; (2) the relatively low transmissivity of the gasoline-bearing formation; and/or (3) variations in the stratigraphy (e.g., clay layers) that affect the migration of gasoline through the subsurface. With the possible exception of biofouling of the well screen, these factors are beyond our ability to change or control. Even if the low inflow rate was the result of well-screen fouling, experience at other sites suggests that controlling clogging within the well screen is extremely difficult, requiring frequent scrubbing operations with a very limited outlook for long-term improvement. Based on our experience with the recovery system at Building 33, it is apparent that wells are not a cost-effective means for removing the product beneath the building.

ALTERNATIVES FOR FUTURE ACTION

During the meeting, ABB-ES identified the following three options: (1) we can investigate the root cause for the low rate of gasoline inflow (e.g., determine if it is biofouling inside the well screen, biofouling or clogging within the formation, or the heterogeneous stratigraphy at the site and low transmissivity of the gasoline-bearing formation); (2) we can evaluate other technologies for product recovery (e.g., vapor extraction); or (3) we can attempt to persuade the MDNR that: (a) product recovery has been attempted in good faith and found to be infeasible using standard methods; (b) the risk to human health and the environment is very low; and (c) GM will remediate the product plume if and when major construction or demolition occurs.

Unfortunately, existing technologies for recovering the gasoline that are based on controlling the movement of fluids (i.e., liquids or vapors; free-product or nutrient solutions) through the subsurface beneath Building 33 would be subject to the same constraints and likely would experience the same problems as the current system. That is, vapor extraction, biodegradation, soil flushing, or horizontal wells/drains (installed from the outside of the building) would likely be ineffective because these methods also require sufficient control over the fluid migration pathways in the subsurface. Spatial variations in the hydraulic characteristics of the geologic formations beneath the building, and the low transmissivity of the gasoline-bearing layer, make such control impractical in a cost-effective system.

Although our opinion may change after we have had the opportunity to discuss your short- and long-range concerns and policies at this site, ABB-ES currently recommends implementation of the third option. To present a convincing case, it would be necessary to demonstrate that the current and future risk of impacts in off-site areas would be negligible. This may require: (1) field verification that the product plume has not migrated beyond the facility boundary since the previous investigation was conducted; (2) long-term measurements in downgradient observation wells to monitor the extent of product migration; and (3) intermittent (e.g., monthly) operation of the existing two-well recovery system to remove product that has accumulated in and near the wells. In the event that these actions are deemed insufficient to prevent off-site impacts, installation of a downgradient barrier trench (outside the building) could be evaluated.

SUMMARY

The recovery system at Building 33 has been operated intermittently between 1989 and 1991, and the performance of the system has been evaluated. The results consistently show that the flow of gasoline into the recovery wells is being impeded. This situation is probably caused by variations in the hydrogeologic characteristics of the shallow soils, although other factors cannot be ruled out. The physical constraints imposed by ongoing engineering operations and by the structure itself contribute to the difficulty of removing

the gasoline from beneath the floor of Building 33.

Given past unsuccessful attempts to remove gasoline using recovery wells, the installation of additional recovery wells is not advisable. Unfortunately, other technologies for removing the free product are subject to the same hydrogeologic constraints as the recovery-well system, because they also rely on the accurate control of fluid movement through the saturated zone beneath the plant. Consideration should be given to simply containing the gasoline plume, monitoring its position with respect to the facility boundaries, and addressing the problem directly when construction or demolition at the plant allows. Occasional operation of the existing two-well recovery system could continue to remove small volumes of gasoline in conjunction with the "containment" approach.

I would like to meet with you to discuss your concerns and to explore the available options at your earliest convenience. In the meantime, if you have any questions, please do not hesitate to contact me.

Very truly yours,

ABB ENVIRONMENTAL SERVICES, INC.

Michael O'Hearn, P.E.
Program Manager

cc: B.F. Rogers (GM Truck and Bus)

GENERAL MOTORS - TRUCK & BUS GROUP
GASOLINE RECOVERY SYSTEM - BUILDING 33
FOR THE PERIOD JULY 30, 1991 THROUGH SEPTEMBER 18, 1991

July 30, 1991: Product thickness of 0.45 feet observed in RW-2, continue pumping activity in RW-2. Waste storage tank contains 34 gallons of product since pumping by Inland Waters on July 16, 1991. It is unclear if this represents additional recovery from RW-2 since July 16, 1991, or if Inland Waters was unable to pump the tank dry. Inland Waters does not record volumes removed from the storage tanks.

August 12, 1991: System shut-down by high level shut-down switch in wastewater storage tank. Request pumping of wastewater tank by Inland Waters. Positive pressure continues to be observed in RW-1.

August 22, 1991: Change fill time from 2 minutes to 5 minutes. Continue to pump at RW-2 in attempt to maintain depressed water table. No product observed in RW-2. RW-1 remains pressurized.

September 5, 1991: System shut-down by high level shut-down switch in wastewater storage tank. Request pumping of wastewater tank by Inland Waters. Changed fill time from 5 minutes to 15 minutes. Positive pressure observed in RW-1.

September 18, 1991: Positive pressure observed in RW-1.

In addition to tasks previously listed, storage tank levels were recorded during each visit. A summary of tank volumes recorded during each site visit is listed below.

Date	Product Tank (gal.)	Waste Water Tank (gal.)
July 30, 1991	34	870
August 12, 1991	34	870
August 22, 1991	34	361
September 5, 1991	34	870
September 18, 1991	34	303

TABLE 3

WATER LEVELS IN OBSERVATION WELLS[1]

Boring Number	Top of 2" Casing Elevation[2] ft	Top of Screen Elevation[3] ft	Measured Depth to Water ft	Water Level Elevation ft
B-9	936.8	877.3	51.4	885.4
B-19	937.36	922.6	18.77	918.6
B-20	937.42	916.2	20.38	917.0
B-23	941.76	916.8	25.73	916.0
B-24	941.51	916.1	26.84	914.7
B-26	936.53	916.5	17.85	918.7
B-27	936.06	917.0	12.39	923.7
B-28	936.81	915.2	18.26	918.6

Notes:

1. Construction details of the observation wells are shown on the boring logs. Locations of the wells are shown on Exhibit 1A.

2. Elevations are referenced to the floor of Building 33 (935.0 ft).

3. Water levels were measured on April 11, 1985, except B-9 which was measured on April 9, 1985. Water levels in wells B-19, B-20, B-23, and B-24 recovered slowly after bailing and were confirmed by measurements made by GM on April 26 and 30, 1985.

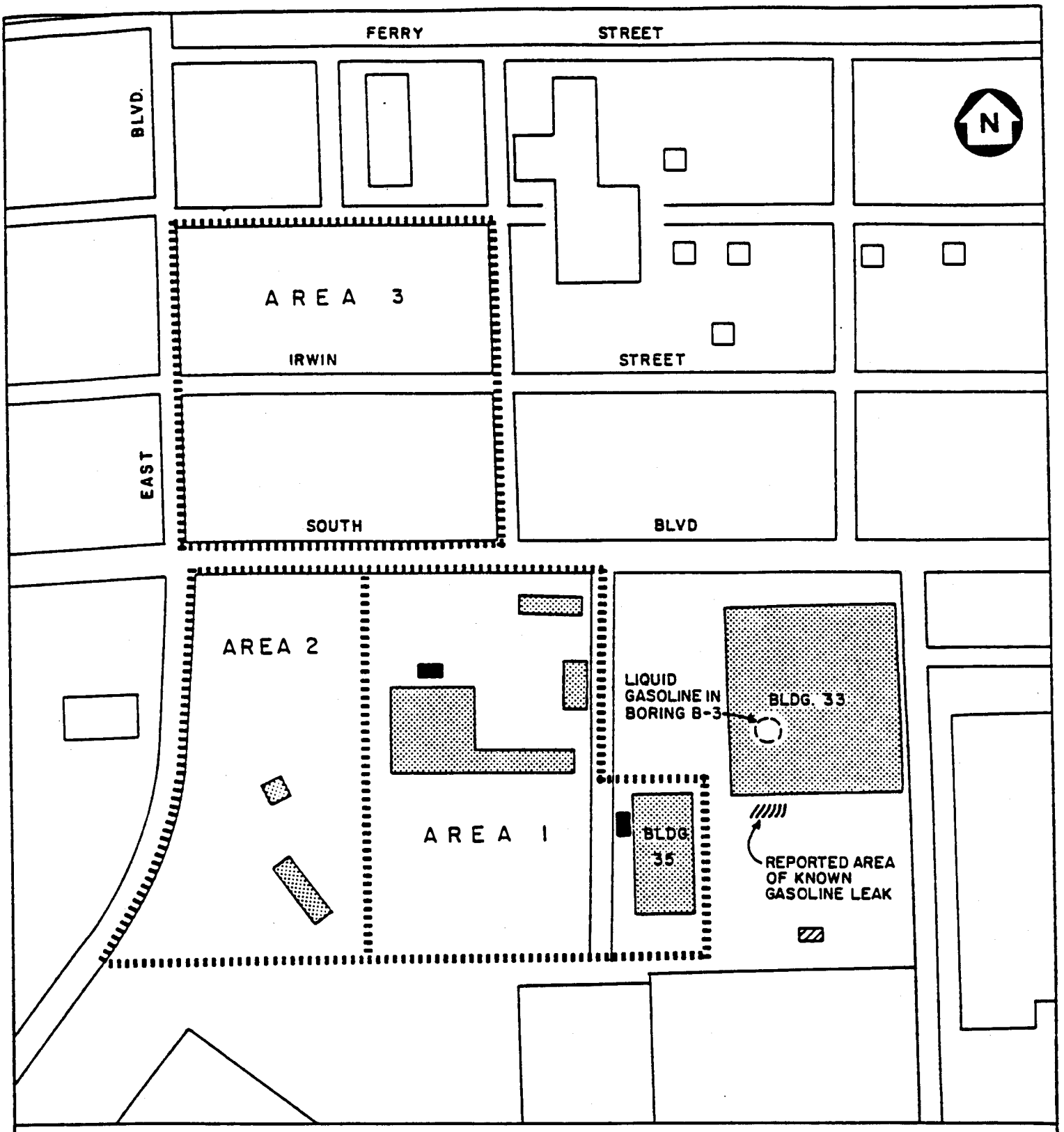
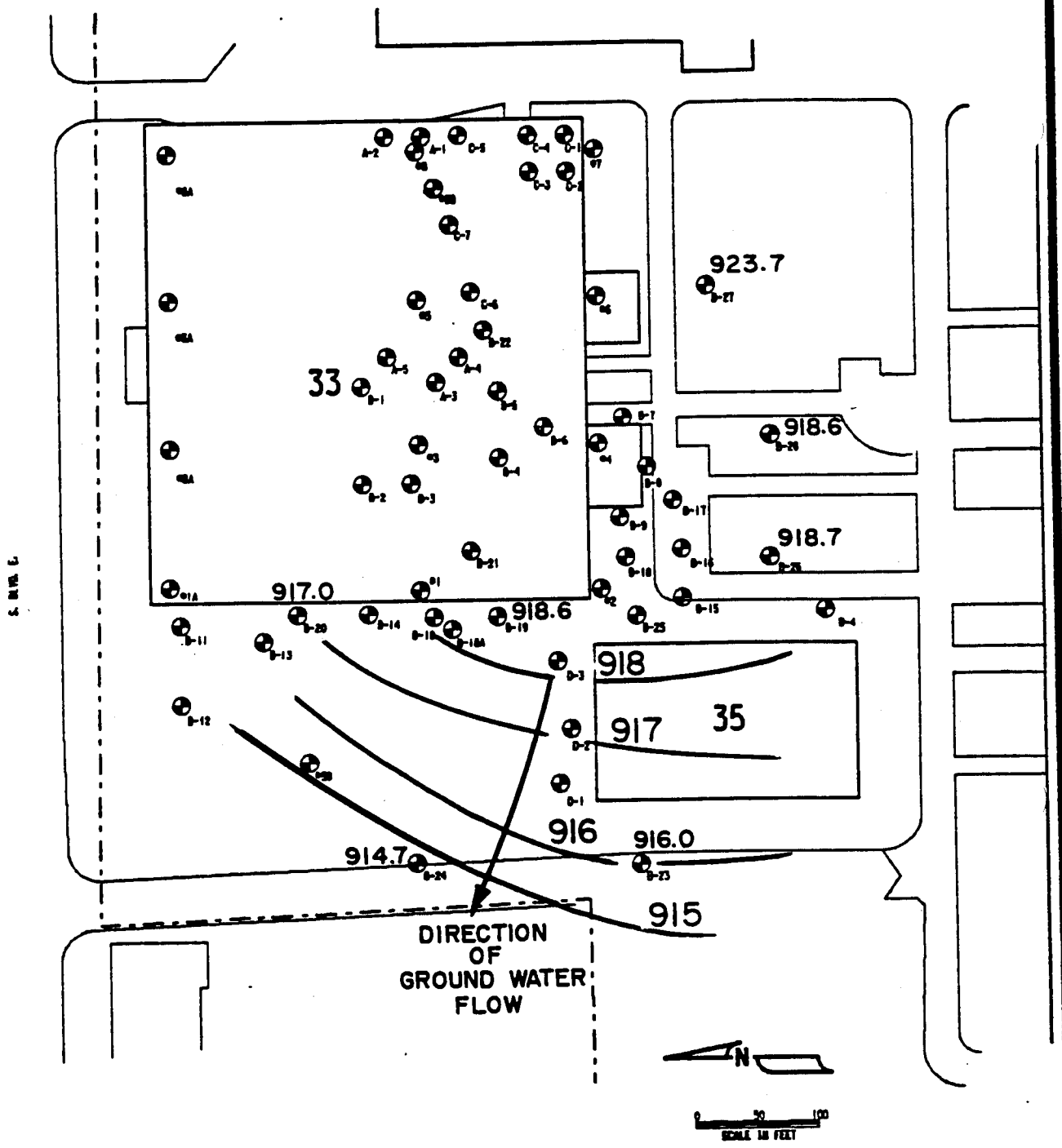


FIGURE 2-1
SITE LOCATION MAP
E.C. JORDAN CO.



LEGEND

917.0 Perched ground water elevation

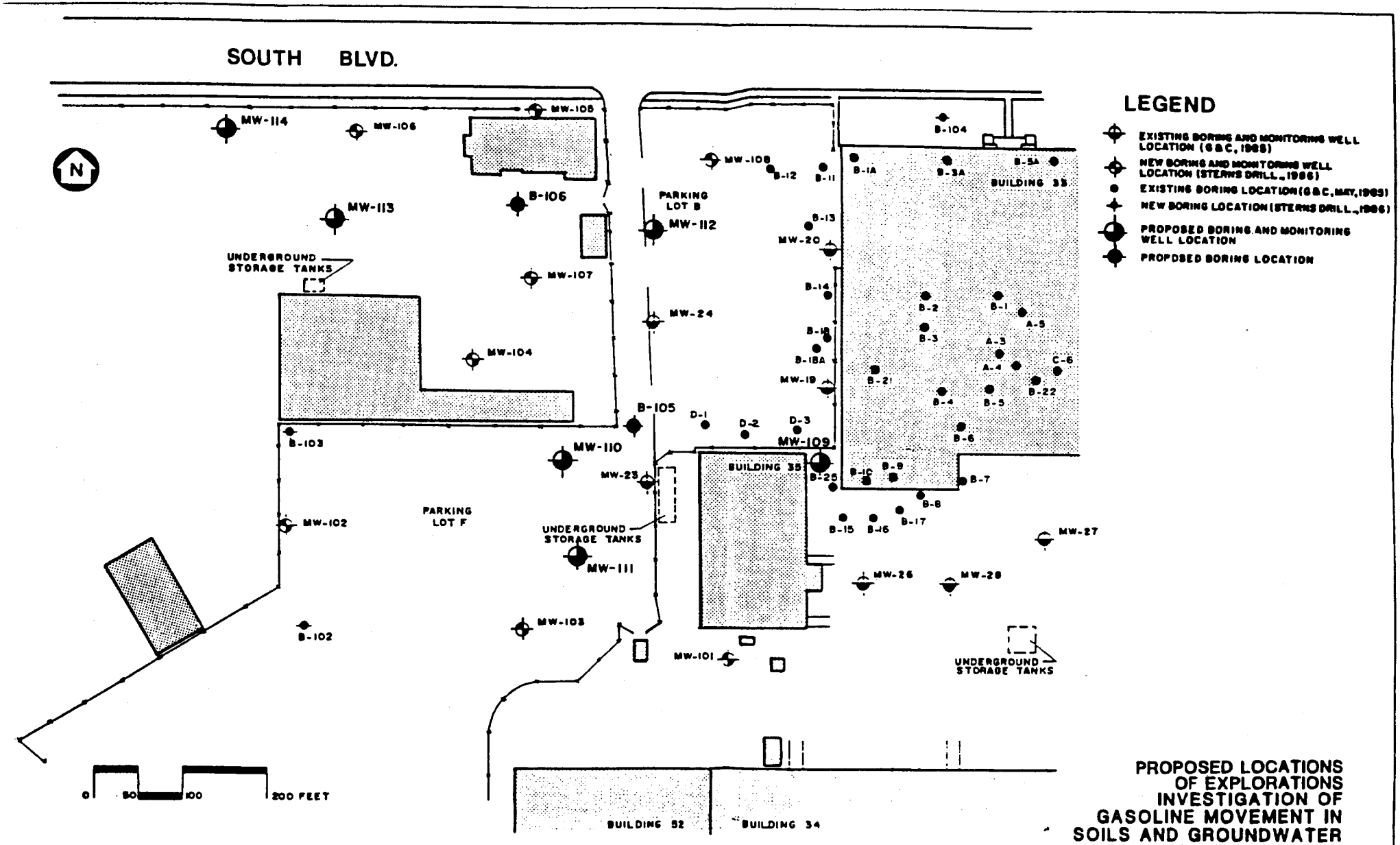
NOTES:

1. Water levels are to the floor of Bldg. #33 (935.0 ft.)
2. Ground water levels were measured on April 11, 1985.

GENERAL MOTORS
TRUCK & BUS OPERATIONS
PONTIAC, MICHIGAN

DIRECTION OF GROUND WATER FLOW

EXHIBIT 3



PROPOSED LOCATIONS OF EXPLORATIONS INVESTIGATION OF GASOLINE MOVEMENT IN SOILS AND GROUNDWATER GM TRUCK AND BUS PONTIAC, MICHIGAN

ECJORDANCO

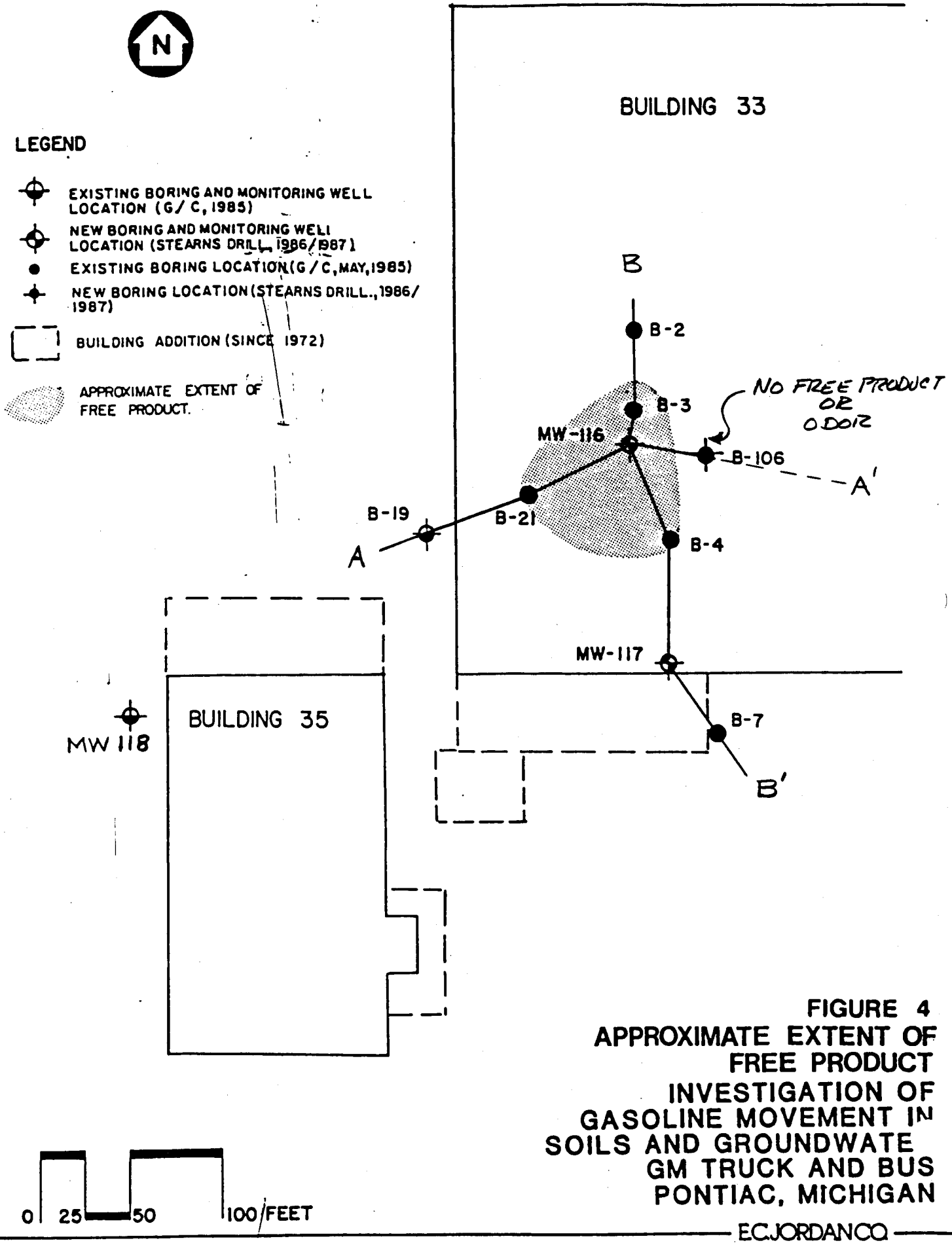


FIGURE 4
APPROXIMATE EXTENT OF FREE PRODUCT
INVESTIGATION OF GASOLINE MOVEMENT IN SOILS AND GROUNDWATE
GM TRUCK AND BUS
PONTIAC, MICHIGAN

EC JORDAN CO

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										39	SS-1	SM-ML	7" concrete slab. Brown dense, silty SAND or sandy SILT, trace medium to coarse sand
													At 1.2' - Brown clayey SILT, damp
													At 2.3' - cobble noted
5						7.7		32		22	SS-2	SM	Brown medium dense silty SAND, some clayey silt, trace coarse sand; damp, fine gravel noted in auger cutting
				21	4.9	20.3	111.2				ST-1	ML-CL	Gray stiff to very stiff clayey SILT, moist
10	PN TV PN	1.12 TSF .3 TSF 2.0 TSF								18	SS-3	ML-CL	Gray stiff to very stiff clayey SILT, moist
15	PN	1.0 TSF		16.5	4.5	10.8				23	SS-4	ML-CL	Gray very stiff clayey SILT, trace to little fine gravel and coarse sand, moist
20	PN	)2.5 TSF				8.6				24	SS-5	ML-CL	Coarse gravel noted
													Water at 22.6'
												SM-SC	Gray silty to clayey SAND, saturated
25	PN	1.0 TSF								21	SS-6	ML-CL	Gray very stiff clayey SILT, trace coarse sand and fine to coarse gravel; strong gasoline odor
											ST		Lost sample
30	PN	)2.5 TSF		17	5.1	10.0				38	SS-7	ML-CL	Gasoline odor, not as strong as above Boring terminated at 30.6', grouted to floor elevation
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation
Prepared by: Gilbert/Commonwealth Inc.

BORING NO.: B-1
LOCATION : Inside Building 33
ELEVATION : 935.0'

INSPECTOR: B. Bearinger

DATE: 02/04/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										37	SS-1	SM	7" concrete slab. Brown dense silty SAND and sandy SILT, trace fine gravel, dry
5						4.9		17.5		41	SS-2	SM	Brown dense fine to medium SAND, little silt, trace coarse sand, dry
10	PN	1.5 TSF		13.6	1.4					18	SS-3 ST-1	ML	Gray very stiff clayey SILT, little fine to coarse sand, moist ST sample disturbed, coarse gravel in tip. Pushed 8", recovered 6"
												ML	Brown sandy SILT, little coarse sand, trace fine gravel
15								65		18	SS-4		Gray clayey SILT, trace to little fine to coarse sand, organics noted
												ML-CL	Gray clayey SILT with layers of medium to coarse sand, gasoline odor
20						18.9				33	SS-5		
	PN	2.0 TSF				20.2				36 24	SS-6 SS-7	SM & ML	Gray dense silty SAND, interbedded with clayey SILT, saturated with water, gasoline odor Water at 21.1'
	PN	1.12 TSF											
	PN	1.5 TSF											
25						13.8				21	SS-8	ML-CL	Gray very stiff clayey SILT, trace fine to medium sand, trace gravel
													Same as above
30	PN	2.0 TSF		17.5	7.3					33	SS-9	ML-CL	
													Boring terminated at 30.6', grouted to floor elevation
35													
40													
45													
50													

GE. ANICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation
Prepared by: Gilbert/Commonwealth Inc.

BORING NO.: B-2
LOCATION : Inside Building 33
ELEVATION : 935.0'

INSPECTOR: B. ! nger

DATE: 02/04/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													7" concrete slab
5													5.1 Top of concrete footing Boring terminated and grouted to floor elevation
10													
15													
20													
25													
30													
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-2A
LOCATION : Inside Building 33

INSPECTOR: B. Bearinger

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										16	SS-1	SM	7" Concrete slab Brown medium dense silty SAND, broken cobble in tip
5						8.0		22		8	SS-2	SM	Brown loose fine to coarse SAND, some silt, little fine gravel
	TV	.85 TSF											
10	PN	.75 TSF								17	SS-3	SM	Brown medium dense silty SAND, little fine gravel, trace clay
	TV	.95 TSF		14	1.8	9.9		44			ST-1		Change to gray
	PN	1.5 TSF											
													Gray medium dense silty SAND with fine to coarse sand seam, trace fine gravel
15	PN	.75 TSF								27	SS-4	SM	
												SP	Gray fine SAND, saturated with gasoline
	UC	2.14 TSF				10.6	128.2				ST-2		
20	PN	(1.12 TSF)		16.2	3.6					16	SS-5	ML	Gray very stiff clayey SILT, little fine to coarse sand and fine to coarse gravel, no gasoline odor
													Lost sample
25										13	SS-6		
	PN	.85 to 1.12 TSF				11.4				19	SS-7	ML-CL	Gray very stiff clayey SILT, little fine gravel, trace coarse sand
										24	SS-8	ML-CL	Same as above
30				17.6	5.2	10.7							Boring terminated at 30.6', grouted to floor elevation
35													
40													
45													
		(Remolded)											

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-3
LOCATION : Inside Building 33

INSPECTOR: B. Bessinger

DATE: 02/05/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										41	SS-1	ML	7" Concrete slab Brown-gray hard sandy SILT, little fine to coarse sand, trace fine gravel, damp
5										9	SS-2	SM	Brown loose silty SAND, trace fine gravel, damp
10	PN	2.25 TSF				10.7				13	SS-3	ML-CL	Gray-brown stiff clayey SILT, little fine to coarse sand, trace fine gravel
15	PN	.63 TSF						53		10	SS-4	ML	Gray-brown clayey SILT and sand, trace fine to coarse gravel Gasoline odor at bottom of Shelby tube
											ST-1		
20								27		20	SS-5	SM	Gray medium dense silty SAND, saturated with water, strong gasoline odor
25										19	SS-6 ST-2	ML-CL	Gray very stiff clayey SILT, little to some fine to coarse gravel, trace fine to coarse sand
	PN	2.25 TSF				10.9				23	SS-7	ML-CL	
30													
35	PN	2.25 TSF		18.5	3.3					22	SS-8	ML	Same as above
40	PN	.625 TSF				15.0				16	SS-9	ML-CL	Grades to little fine gravel
45	PN	2.25 TSF				10.5				39	SS-10	ML-CL	
												SP	Gray dense fine to medium SAND, damp
50													Boring terminated at 46.1', grouted to floor elevation

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-4
LOCATION : Inside Building 33
ELEVATION : 935.0'

INSPECTOR: B. Bearinger

DATE: 02/19/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										12	SS-1	SM	8" Concrete slab Brown silty SAND, little fine to coarse gravel
												SP	Black medium to coarse SAND, little gravel
5										13	SS-2	SM	Brown medium dense silty fine to medium SAND, fine gravel noted.
10	PN	1.75 TSF		14.1	3.0	9.2		46		11	SS-3	SM	Brown medium dense silty SAND, little fine gravel
15								74	2.65	12	SS-4	ML	Gray medium dense sandy SILT, saturated with gasoline and water Very strong gasoline odor in auger cuttings No measurable water table
20								48		18	SS-5	SM	Gray medium dense silty fine SAND, little fine gravel, moist, slight gasoline odor
25	PN	1.63 TSF								21	SS-6	ML-CL	Gray stiff clayey SILT, little fine gravel, trace to little fine to coarse sand, slight gasoline odor Attempted Shelby tube, lost sample
												SM	Gray silty fine SAND, wet
30	PN	2.25 TSF				10.7				22	SS-7	ML-CL	Gray stiff clayey SILT, little to some fine gravel, trace fine to coarse sand. No measurable water level, moist
35	PN	2.25 TSF								24	SS-8	ML-CL	Same as above
40	PN	1.13 TSF		19.9	3.9	13.9				17	SS-9	ML-CL	Grades to more clay, little fine to coarse gravel
45										25	SS-10	ML-CL	Same as above
50						22.3				35	SS-11	ML-CL	Same as above

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-5
LOCATION : Inside Building 33

INSPECTOR: B. Bessinger

DATE: 02/19/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
												ML	Gray clayey SILT, little fine sand and trace coarse sand, wet
55								5		38	SS-12	SP	Gray dense fine SAND, saturated
60						8.3				76	SS-13	SM	Gray, very dense fine to coarse SAND, little fine gravel, little silt Boring terminated at 61.2', due to sand blowing up augers, grouted to floor elevation Water table at 51.1'
65													
70													
75													
80													
85													
90													
95													
100													

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-5 (CONTINUED)
LOCATION : Inside Building 33
ELEVATION: 975.0'

INSPECTOR: B. Bearinger

DATE: 02/20/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										29	SS-1	SM	6" Concrete slab Brown dense silty SAND, little fine gravel, damp (FILL)
5						11.5		33		5	SS-2	SM	Grades to loose, cinders noted
10						10.1		13		17	SS-3	SM	Brown medium dense silty SAND, moist
15	PN	.63 TSF		13.9	2.3	10.1				12	SS-4	ML	Gray-brown stiff clayey SILT, little fine to coarse sand, trace fine to coarse gravel, moist
20	PN	.75 TSF				16.2				14	SS-5	ML-CL	Gray-brown stiff clayey SILT, little to some fine to medium sand, very moist, at plastic limit
25	PN	1.25 TSF				10.2	106.5			18	ST-1 SS-6	ML-CL	Moist, water content near plastic limit
30	PN	2.0 TSF								28	SS-7	ML-CL	Damp
35	PN	1.75 TSF				11.2				21	SS-8	ML-CL	Grades to little fine to coarse sand and fine gravel, damp
40	PN	1.0 TSF								18	SS-9	ML-CL	Coarse gravel noted, damp to moist
45	PN	1.5 TSF				10.0				25	SS-10	ML-CL	
									97	38	SS-11	ML	Gray hard SILT, wet

BORING NO.: B-6

INSPECTOR: B. Bearinger

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													Water table during drilling at 51.7'
55										31	SS-12	SM	Brown dense silty SAND, little fine gravel Boring terminated at 56.0', grouted to floor elevation Falling Head Permeability Test; casing at 55.5' depth
60													
65													
70													
75													
80													
85													
90													
95													
100													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-6 (CONTINUED)
LOCATION : Inside Building 33

INSPECTOR: B. Bearinger

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										8	SS-1	ML-CL	5" Asphalt Gray-brown sandy clayey SILT, little fine gravel
5						14.8				10	SS-2	ML-CL	Same as above with 0.15' fine to medium sand at 5', slight gasoline odor
											ST-1		
												ML-CL	Same as above
10										17	SS-3	SM	Brown medium dense fine to medium SAND, damp slight gasoline odor
15						20.4		73		17	SS-4	ML-CL	Gray clayey SILT, little fine gravel
20				16.9	5.3					15	SS-5	ML-CL	Same as above, moist Water Table at 21.6'
											ST-2	ML-CL	
										21	SS-6	ML-CL	Same as above, very moist
25	PN	.75 TSF											
30	PN	1.25 TSF		17.9	4.5	11.9				31	SS-7	ML-CL	Same as above, coarse gravel in sampler tip Boring terminated at 30', grouted to ground surface
35													
40													
45													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-7
LOCATION : SW Corner of Building 33

INSPECTOR: B. Bearinger

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													8" Asphalt
										1	SS-1	SM	Gray very loose clayey SAND, 3' to 4' hollow with pea gravel
5	PN	.5 TSF		33.6	12.5	32.5				10	SS-2	ML-CL	Brown-gray stiff clayey SILT, little fine gravel and fine to coarse sand
										23	SS-3	ML-CL	Grades to very stiff
10													
										20	SS-4	SM	Gray medium dense fine to medium SAND, little silt, gasoline odor
15	P							14					Water level at 15.2'
													Falling Head Permeability Test
										21	SS-5	ML-CL	Gray very stiff clayey SILT, little to some fine gravel, trace coarse to medium sand
20				16.2	3.9	10.6							
										31	SS-6	ML-CL	Same as above, coarse gravel and gray clay in tip. No sample was recovered.
25													
										31	SS-7	ML-CL	Same as above.
30	PN	2.5 TSF		19.1	5.4	10.9							Boring terminated at 30.5', grouted to ground surface
													Falling Head Permeability Test Start at 15.5'
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-8
LOCATION : SW Corner of Building 33

INSPECTOR: B. Bearinger

DATE: 02/17/05

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
												SP	5" ASPHALT Yellow-brown fine to medium SAND
										5	SS-1		-FILL-
5	PN	.75 TSF				21.6				9	SS-2	ML-CL	Brown medium to stiff sandy CLAY, little to some fine to coarse sand, little silt, trace fine gravel
						18.2	106.5	21			ST-1	SM	Organics noted, moist
										17	SS-3	SM SP	Gray medium dense fine to medium SAND, trace silt was found at top of sample
10													
						9.5		8		24	SS-4	SP	Same as above, gasoline odor Falling Head Permeability Test No. 1
15	P										ST-2	ML-CL	Gray stiff clayey SILT, little to some fine to coarse sand and fine gravel, moist
20	PN	.75 TSF						56		15	SS-5	ML-CL	Same as above, moist
25	PN	1.0 TSF				12.6				17	SS-6	ML-CL	Same as above, moist
						10.9			2.66		ST-3		
30	PN	1.5 TSF								34	SS-7	ML-CL	Same as above, moist
35	PN	1.5 TSF				12.6				27	SS-8	ML-CL	Same as above, moist
40	PN	0.75 TSF								18	SS-9	ML-CL	Same as above, moist
											ST-4		
45	PN	1.38 TSF								51	SS-10	ML-CL	More sandy, moist
						18.1				18	SS-11		Little gravel, moist

SOILS CLASSIFICATION INVESTIGATION - BORING REPORT

BORING NO.: B-9

LOCATION: SW Corner of Building 33

INSPECTOR: B. Bearinger

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
												SM	Saturated gray medium dense silty SAND.
													Water level at 55'.
												ML-CL	Gray stiff clayey SILT, little to some fine to coarse sand and gravel
55	PN	1.35 TSF								30	SS-12		
												SP	Gray dense coarse to fine SAND, little silt, saturated
										87	SS-13	ML-CL	Gray very stiff to hard sandy CLAY, little gravel
60						18.4						SP	Gray very dense coarse to fine SAND
65	P									121		SP,SM	Gray very dense silty fine to coarse SAND, interbedded with 6" clay layer
													Boring terminated at 65.5', piezometer installed
70													Falling Head Permeability Test No. 2 At casing depth of 64'
75													
80													
85													
90													
95													PIEZOMETER installation: Bottom screen at 64' Screen - 7.0' Ø12 (galvanized steel) Sand Pack at 64' to 52' Bentonite and grout mix, 2" diameter well casing (galvanized steel) 2.5' above ground, capped.
100													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-9 (CONTINUED)
LOCATION : SW Corner of Building 33

INSPECTOR: B. Bearinger

DATE: 02/13/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										41	SS-1	ML	8" ASPHALT Brown sandy and gravelly SILT. High blow count due to frozen ground
5						13.4		43		14	SS-2	SM	Brown medium dense silty SAND, little fine gravel
10										16	SS-3	SM	Same as above, very slight gasoline odor, damp
15						10.4		23		12	SS-4	SM	Grades to gray, damp, strong gasoline odor
												ML	Gray stiff clayey SILT, some sand, little gravel, wet.
20				13.5	1.6	8.8				11	SS-5	SM	Silty SAND Water and gas mix level at 20.4', very slow seep rate
25	PN	.75 TSF								24	SS-6	ML-CL	Gray very stiff clayey SILT, little fine gravel and little fine to coarse sand
30						10.5				22	SS-7	ML-CL	Same as above Boring terminated at 30.5', grouted to ground surface
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-10
LOCATION : SW Corner of Building 33
ELEVATION : 971.41

INSPECTOR: B. B. Unger
DATE: 02/15/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													8" ASPHALT
										16	SS-1	ML-CL	Gray-brown very stiff to stiff clayey SILT, trace to little fine to coarse sand
5										9	SS-2	ML-CL	Same as above
10										30	SS-3	SP	Brown dense fine to coarse SAND, trace fine gravel, damp
15										20	SS-4	SP	Brown medium dense, fine to medium SAND
20										23	SS-5	SP	Grades to gray, wet, very slight gasoline odor
										8	SS-6	ML-CL	Gray, stiff to very stiff clayey SILT, little fine gravel, trace fine to coarse sand
25													24.3' - 25.0' - Gray fine to coarse SAND, wet
											ST-1	ML-CL	
30	PN	1.67 TSF								20	SS-7	ML-CL	Same as above
35	PN	1.5 TSF								20	SS-8	ML-CL	Same as above
											ST-2		
40	PN	1.0 TSF								18	SS-9	ML-CL	Same as above
45	PN	1.0 TSF								20	SS-10	ML-CL	Same as above
50	PN	1.0 TSF								50	SS-11	SW-SP	Gray-brown very dense fine to coarse SAND, trace fine gravel and silt, wet

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-11
LOCATION : NW OUTSIDE BLDG. 833

INSPECTOR: B. Bearinger

DATE 03/21/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
												SW-SP	
55										30	SS-12	SM	Gray dense silty SAND, wet
										88	SS-13	SM	Grades to very dense, trace medium to coarse sand
60												ML-CL	Gray very stiff gravelly clayey SILT in tip
65													Boring terminated at 60.5', grouted to ground surface Water table at 58.6'
70													
75													
80													
85													
90													
95													

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													ASPHALT FROZEN GROUND
5										28	SS-1	SM	Brown-gray medium dense silty SAND, little fine gravel, moist
10										6	SS-2	SM	Grades to loose
15										7	SS-3	SP-SM	Brown loose fine to medium SAND, trace silt
20										15	SS-4	SP	Brown medium dense fine to coarse SAND, little to some fine gravel, damp
25										17	SS-5	SP	Brown medium dense fine to medium SAND, trace coarse sand, wet
30										18	SS-6	SM	Gray medium dense silty SAND, little fine gravel, moist Boring terminated at 30.6', grouted to ground surface
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT
CM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-12
LOCATION : West of Building #33

INSPECTOR: B. Bearinger

DATE: 02/21/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										27	SS-1	ML-CL	8" Concrete slab Frozen to 2.5'
5										7	SS-2	ML-CL	Gray medium stiff clayey SILT, little fine to coarse sand, trace fine gravel. Organics and wood fragments noted.
10										14	SS-3	SM	Brown medium dense silty SAND, moist
										38	SS-4	SM	Grades to dense, trace coarse sand, damp
15										26	SS-5	SM	Grades to medium dense
20	PN	1.75 TSF								12	SS-6	ML-CL	Gray stiff clayey SILT, little fine gravel and fine to coarse sand, moist
25	PN	1.5 TSF								16	SS-7	ML-CL	Occasional fine to coarse sand lens, wet
30	PN	2.25 TSF								31	SS-8	ML-CL	Grades to very stiff, no sand lenses Boring terminated at 30.5', grouted to ground surface
35													Hole dry.
40													
45													

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-13
LOCATION : NW Corner of Building 33

INSPECTOR: B. Bearinger

DATE: 02/20/05

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										20	SS-1	SM	10" Asphalt FILL, Frozen sand to 3' Brown, medium dense fine to coarse SAND, trace silt and fine gravel, damp
5													
10				13.1	2.6	9.8				14	SS-2	ML	Gray stiff clayey SILT, little fine to coarse sand, trace to little fine to coarse gravel, moist
15								7		25	SS-3	SP-SM	Gray medium dense fine to coarse SAND, trace silt, slight gasoline odor
20								2		12	SS-4	GW	Gray medium dense silty GRAVEL, saturated with water, strong gasoline odor Water level at 19.4'
25										22	SS-5	ML-CL	Gray very stiff clayey SILT, little fine to coarse sand and fine to coarse gravel, moist
30										14	SS-6	ML-CL	Same as above Boring terminated at 30.5', grouted to ground surface
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-14
LOCATION : West Side of Building 033
ELEVATION : 934.4'

INSPECTOR: B. Bearinger

DATE: 02/15/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													7" ASPHALT
										16	SS-1	SW/SP	Brown medium dense fine to coarse SAND, trace fine gravel
5						3.6				7	SS-2	SW/SP	Same as above
10						11.1				7	SS-3	SM/ML	Brown-gray loose sandy SILT, silty fine to coarse SAND, trace fine to coarse gravel, slight petroleum odor, moist
15										5	SS-4	SM	Gray loose silty fine to medium SAND, trace coarse sand and fine gravel; stronger gasoline odor, very moist
20						20.2				8	SS-5	SM	Same as above, saturated with water, gasoline odor
25	PN	0.87 TSF				9.9				22	SS-6	ML-CL	Gray very stiff clayey SILT, little fine to coarse sand and fine gravel, moist
				17.2	4.9	11.1	128.8	58			ST-1	ML-CL	
30	PN	1.12 TSF								18	SS-7	ML-CL	Same as above
35	PN	1.37 TSF								20	SS-8	ML-CL	Same as above
40	PN	1.0 TSF		23.4	5.5	19.1				29	SS-9 ST-2	ML-CL	Grades with no gravel, thin seam of fine sand Fine to coarse gravel in end of tube
						9.9						ML-CL	Gray very stiff clayey SILT, little fine to coarse gravel, moist
45	PN	1.67 TSF								42	SS-10	SP-SW	Brown dense fine to medium SAND, trace coarse sand and fine gravel, moist
												SM	Brown medium dense silty fine to medium SAND, saturated
						20.7		38		27	SS-11		

BORING NO.: B-15
LOCATION : SW CORNER BLDG. 833

INSPECTOR: B. Bearinger

DATE: 02/25/85

GEOTECHNICAL INVESTIGATION - BORING REPORT

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
	PN	1.87 TSF										ML-CL	Gray very stiff clayey SILT, some sand, moist
55	PN	1.67 TSF								)100	SS-12	ML-CL	Gray hard clayey SILT, little coarse to fine gravel with 2" coarse-medium sand seam at 54.7', wet
												SW	Gray fine to coarse SAND, little fine gravel, wet
60						8.5				)100	SS-13	ML-CL	Gray gravelly clayey SILT
												SC	Gray clayey gravelly SAND
65						14.3				)100	SS-14	SM	Gray extremely dense silty fine to medium SAND, wet
													Boring terminated at 65.5', grouted to ground surface
													Water at 53.6'
70													
75													
80													
85													
90													
95													
100													

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
	PN	2.25 TSF								38	SS-1	SM	3-1/2" ASPHALT FILL Brown to dark gray very dense silty SAND, dry
5	PN	0.37 TSF								7	SS-2	ML-SM	Black medium stiff clayey SILT, some fine sand, organics noted
10								17.5		15	SS-3	SM	Brown, medium dense fine to medium SAND, little coarse sand in layers, little silt
15										20	SS-4	SP	Brown medium dense fine to medium SAND, damp, not saturated, strong gasoline odor
20											SS-5	SM	Light brown-gray, fine to coarse SAND, trace silt and fine gravel, no gasoline odor
25	PN	2.0 TSF				9.9				19	SS-6	ML-CL	Gray very stiff clayey SILT, little fine to coarse sand trace fine gravel, plastic
30	PN	2.2 TSF		18.9	5.1	11.1				29	SS-7	ML-CL	Same as above
35	PN	1.12 TSF								21	SS-8	ML-CL	Same as above, softer
40	PN	0.9 to 1.2 TSF				14.6		21		25	SS-9	SM	Gray, medium dense clayey silty SAND, fine to medium sand seams and sandy till layers
45										97	SS-10	SM	Light gray-brown, extremely dense fine to medium SAND, little silt, dry Boring terminated at 45', grouted to ground surface

GEOTECHNICAL INVESTIGATION - BORING REPORT
[illegible] Pontiac, Michigan Substation

BORING NO.: B-16
LOCATION : SW Corner of Building #33

INSPECTOR: R. [illegible]agner

DATE: 02/26/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										62	SS-1	ML	ASPHALT Brown-gray silty CLAY, little fine to coarse sand and fine gravel, frozen
5						14.3		28		8	SS-2	SM	Gray-brown loose silty fine to medium SAND, trace fine gravel, slight gasoline odor, moist
10										16	SS-3	SP	Brown medium dense fine to medium SAND, trace silt, slight gasoline odor
15	PN	1.87 TSF		19.6	5.0	13.6	112.0			15	SS-4 ST-1	ML-CL ML-CL	Gray stiff clayey SILT, little fine gravel, trace coarse to fine sand - moist
20	PN	0.67 TSF						38		13	SS-5	SM	Gray medium dense silty coarse to fine SAND, trace fine gravel, coarse gravel noted, moist
25	PN	1.12 TSF				11.3				20	SS-6	ML-CL	Gray very stiff clayey SILT, trace to little fine to coarse sand and fine gravel, moist
30	PN	1.0 TSF				13.3				20	SS-7	ML-CL	Grades to little coarse sand and fine gravel, trace fine to medium sand
35	PN	1.0 TSF								17	SS-8	ML-CL	Same as above
40	PN	0.6 TSF								15	SS-9	ML-CL	Gray, stiff clayey SILT, little light fine to medium sand, trace fine gravel
45										149	SS-10	SM	Light gray-brown, fine SAND, dry, hit cobble.
50										13	SS-11	SM	Gray-brown medium dense fine SAND, layers of gray till, layers of silt, saturated

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-17
LOCATION : SW Corner of Building #33

INSPECTOR: B. Bearinger

DATE: 02/25/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR RQD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
55										24	SS-12	SM	Gray, medium dense fine to coarse SAND, some fine gravel, trace coarse gravel, saturated, till seam in tip
60										143/11"	SS-13	SM	Gray very dense fine to coarse SAND and gray silty clay layers
65										129	SS-14	ML	Gray hard sandy SILT, little fine to coarse sand, trace fine gravel, dry
													Boring terminated at 65.0', grouted to ground surface
70													Water table at 59.9'
75													
80													
85													
90													
95													
100													

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-17 (CONTINUED)
LOCATION : SW Corner of Building #33
ELEVATION : 933.6'

INSPECTOR: B. L[illegible]nger
DATE: 02/25/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													5" ASPHALT
													FILL
5	PN	1.75 to 2.25 TSF								26	SS-1	SM/ ML-CL	Brown medium dense clayey silty fine to coarse SAND, moist, slightly plastic
10						7.4			9	19	SS-2	SP-SM	Light gray-brown medium dense fine SAND, trace silt and medium sand, dry, bedded
15						11.8				31	SS-3	SP / ML	Light gray-brown dense fine to coarse SAND, and fine gravel, dry, till at 15.3' Light brown-gray, clayey SILT and fine sand, nonplastic, moist
20	PN	1.2 to 1.87 TSF		19.1	6.2	13.3				16	SS-4	ML-CL	Gray very stiff clayey SILT, little fine to medium sand, trace coarse sand and fine gravel
25	PN	1.25 to 1.87 TSF								19	SS-5	ML-CL	Same as above, higher moisture content
													Boring terminated at 25.5', grouted to ground surface
30													
35													
40													
45													
50													

GEOTECHNICAL INVESTIGATION - BORING REPORT
CM Tower & Bus Pontiac Michigan Substation

BORING NO.: B-18A
LOCATION : WEST OUTSIDE BLDG. #33

INSPECTOR: B. Bearinger

DATE: 03/25/85

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
													SEE BORING NO. B-18A FOR 0 - 20'
5													
10													
15													
20													
25	PN	0.9 TSF								19	SS-1	ML-CL	Gray very stiff clayey SILT, some fine to medium sand, trace coarse sand and fine gravel, moist, plastic
30	PN	1.5 to 1.7 TSF								20	SS-2	ML-CL	Same as above
35	PN	1.3 to 1.7 TSF								22	SS-3	ML-CL	Same as above
40	PN	1.87 to 1.72 TSF								17	SS-4	ML-CL	Same as above
45										23	SS-5	ML/SM	Gray very stiff sandy SILT, trace fine gravel and coarse sand, very moist (till), fine to medium sand lenses, wet
50										58	SS-6	SW-SM	Gray very dense fine to coarse SAND, trace silt and fine gravel, moist; silt and fine sand seams below 50.0', tip near saturation

GEOTECHNICAL INVESTIGATION - BORING REPORT

BORING NO.: B-18

LOCATION: WEST OUTSIDE BLDG. #33

INSPECTOR: R. Wagner

DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
55										35	SS-7	SW-SM	Grades to dense, saturated
												SW-SM	Grades to very dense, some fine gravel
60										170/9	SS-8	SM	Gray, hard sandy SILT (till), some fine to coarse sand, trace fine gravel
													Boring terminated at 59.8', grouted to ground surface
65													Water table at 56.0'
70													
75													
80													
85													
90													
95													
100													

DEPTH (FT)	SHEAR STRENGTH (PENETROMETER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	WELL RECORD
									0.5" Concrete	None
								SM	FILL	
								End of Fill	Brown and yellow-brown fine to medium SAND, little silt or clay, trace fine gravel, moist	
5						*	S-1		Mottled gray and yellow-brown fine to coarse SAND, little fine to coarse gravel	
								SM	Buff fine to medium SAND, little silt, dry	
					11.9	*	S-2	SP-SM	Buff to light brown fine to coarse SAND, little fine to coarse gravel, dry	
10										
					43.1	*	S-3	SM	Light brown very fine SAND, little silt, slightly moist with slight gasoline odor. Drilling cuttings moist with strong gasoline odor.	
15										
						*	S-4	SP, SM & ML-CL	Layers of gray fine to coarse SAND, trace fine gravel, saturated with strong gasoline odor; mottled gray - brown silty CLAY, trace sand, slight gas odor; fine to medium SAND, little silt, trace fine gravel; fine SAND and silt, strong gas odor	
20						P	ST-1			
	0.5 TSF	17.3	4.7	12.0	56.8	*	S-6		TILL	
25								ML-CL	Gray sandy clayey SILT, trace fine to coarse gravel, moist, slightly plastic; no gasoline odor	
	0.25 to 0.38 TSF	15.7	3.8	11.3		*	S-7	ML	Grades to very moist, soft	
30									Boring terminated at 30.0', grouted to floor elevation upon completion	
35										
									* Samples obtained by pushing split-spoon and Shelby tube samplers; SPT test not performed due to inadequate vertical clearance inside building.	
40										
45										

GASOLINE INVESTIGATION - BORING LOG

BORING NO: B-21

INSPECTOR: A. BREWSTER
COMPLETION DATE: APRIL 5, 1985

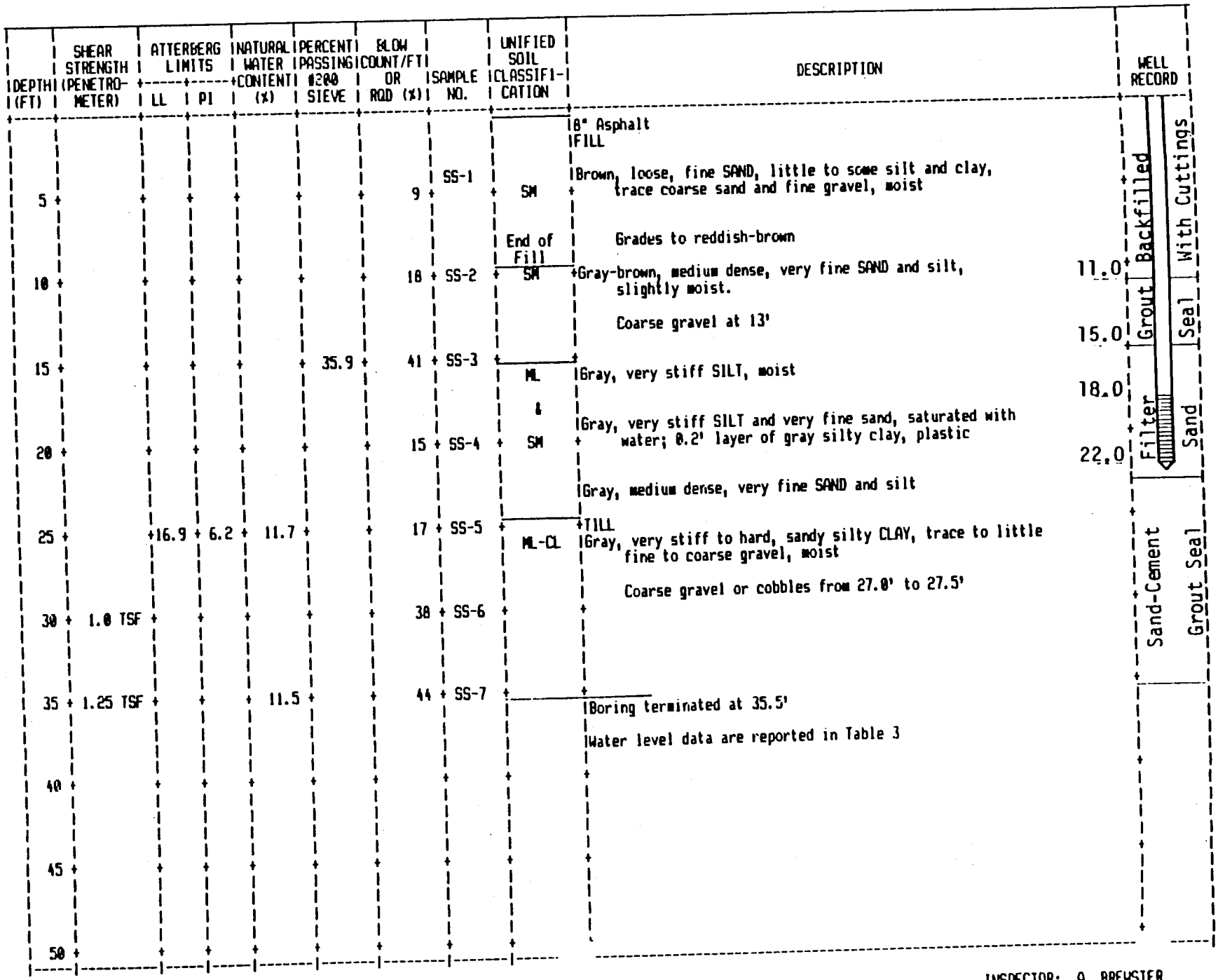
DEPTH (FT)	TEST TYPE	SHEAR STRENGTH	PH VALUE	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	DRY DENSITY (PCF)	PERCENT PASSING #200 SIEVE	SPECIFIC GRAVITY GS	BLOW COUNT/FT OR ROD	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
										9	SS-1		ASPHALT 6"
											ST-1	SM	
5	PN	1.67 TSF 1.7 TSF				38.5	88.2	26		18	SS-2	SM	Brown medium dense clayey silty fine to medium SAND, moist, nonplastic to slightly plastic
											ST-2		
10										31	SS-3		
												SW	Brown dense fine to coarse SAND, trace light to little fine gravel, grades to fine to medium sand at tip, moist
											ST-3		
15										28	SS-4	SP	Brown medium dense fine to medium SAND, slight gasoline odor Brown fine to medium SAND, saturated with water, strong gasoline odor
20										13	SS-5	ML-CL	Gray stiff silty CLAY, little to some fine to coarse sand, trace fine gravel, plastic
25	PN	1.2 to 1.75 TSF		16.1	3.4	11.6				18	SS-6	ML	Gray very stiff clayey SILT, some fine to medium SAND, trace coarse sand and fine gravel, coarse gravel noted
30										25	SS-7	ML	Same as above
35				18.9	5.2	11.9				31	SS-8	ML-CL	Same as above
40										25	SS-9	ML-CL	Same as above (Pushed stone with spoon)
45										32	SS-10	SM	Gray dense fine SAND with silt layers, wet at tip Hole backfilled with sand to 26' depth, 2" diameter x 6' long well point type piezometer was installed at 19.2'. Top 7.5' hole grouted
50													Boring terminated at 45.5'

GEOTECHNICAL INVESTIGATION - BORING REPORT
GM Truck & Bus, Pontiac, Michigan, Substation

BORING NO.: B-19
LOCATION : WEST OUTSIDE BLDG. #33
ELEVATION : 971.0'

INSPECTOR: R. Wagner

DATE: 02/28/85



GASOLINE INVESTIGATION - BORING LOG

BORING NO: B-20
LOCATION: See Exhibit 10

INSPECTOR: A. BREWSTER
COMPLETION DATE: MARCH 30, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETROMETER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION	WELL RECORD
									9" Concrete	None
									FILL	
5	1.75 TSF (Sheared)					*	S-1	SM	Brown fine to medium SAND, little to some silt and clay, trace fine to coarse gravel, slightly moist	
10						*	S-2	End of Fill	Occasional cinders noted	
								SP-SM	Gray fine to medium SAND, trace to little silt, trace fine to coarse gravel, slightly moist with moderately strong gasoline odor	
15					10.7	*	S-3			
	0.37 to 1.25 TSF	14.6	3.0	11.3	47.4	*	S-4	SM	TILL Gray-brown silty clayey SAND, trace fine to coarse gravel, moist; no gasoline odor	
20						*	S-5	ML	Yellow-brown, mottled gray SILT, very moist to wet, no gasoline odor	
									TILL	
25	0.67 TSF	18.3	4.1	11.4		*	S-6	ML	Gray clayey SILT, trace to little sand, trace fine gravel, moist, slightly plastic, no gasoline odor; occasional seam of medium to coarse sand	
30	1.5 TSF			11.5		*	S-7		1/8" of gray silt at 29.7'	
									Boring terminated at 30.5', grouted to floor elevation upon completion.	
35									* Samples obtained by pushing split-spoon sampler; SPT test not performed due to inadequate vertical clearance inside building	
40										
45										
50										

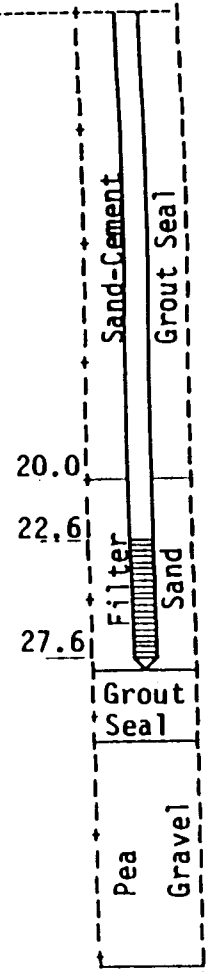
GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus, Plant 2, Pontiac, Michigan

BORING NO: B-22
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 5, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETROMETER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFICATION	DESCRIPTION
									5" Asphalt
									FILL
5						5	SS-1	SM	Yellow-brown, loose, fine to medium SAND, trace to little silt and clay, moist
									Grades to medium dense, some silt and clay, little coarse sand and fine gravel, including red brick fragments
10	2.25 TSF					23	SS-2	End of Fill	
15	2.25 TSF				46.1	23	SS-3	SM	Yellow-brown, medium dense, clayey silty SAND, trace fine gravel, moist with slight gasoline odor
					8.1	25	SS-4	SW.SM	Gray, medium dense, fine to coarse SAND, trace to little fine to coarse gravel, slightly moist with moderate gasoline odor
20						23	SS-5		Layered with fine to coarse gravel, some layers with no gravel; slightly moist with moderate gasoline odor
25				11.0	3.2	18	SS-6	SW	Gray, medium dense, medium to coarse SAND, some fine GRAVEL, saturated with water, strong gasoline odor
									TILL
30	0.67 TSF	16.6	5.0			17	SS-7	ML-CL	Gray, very stiff, silty CLAY, trace sand and fine gravel, moist, slightly plastic with no gasoline odor
35	1.0 to 1.25 TSF	16.0	0.85			26	SS-8	ML	Gray, very stiff, clayey SILT, trace sand and fine gravel, slightly moist
									Grades to hard
40	1.5 to 2.25 TSF					32	SS-9		Boring terminated at 40.5'
									Water encountered at 23.0' during drilling
45									Water level data are reported in Table 3
50									

WELL RECORD



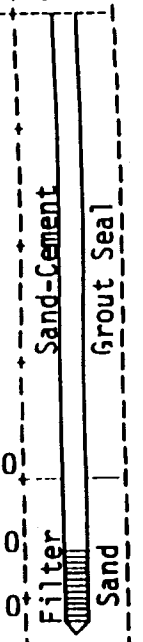
GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus Plant 2, Pontiac, Michigan

BORING NO: B-23
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 8, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR ROD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION
									3" Asphalt FILL Brown SAND, wet
5				14.5		3	SS-1	SM	Reddish-brown, very loose, fine to medium SAND, little silt, trace clay and fine gravel, saturated with water
								CL	Light brown, very stiff, silty CLAY, trace sand and fine gravel, slightly moist, grades to sandy CLAY; 2" soft red brick fragment noted
10	2.25 TSF					9	SS-2	SM	Reddish-brown fine to medium SAND, some silt and clay, wet (water)
									End of Fill
15					9.0	19	SS-3	SW-SM	Varicolored, medium dense, fine to coarse SAND and fine to coarse gravel, dry
									Grades with less gravel, dry 19.8' to 20.2' - gray SILT, little to some very fine sand, occasional sand partings, saturated
20						20	SS-4	SP	Gray-brown fine to coarse SAND, trace fine gravel, dry
25					75.8	14	SS-5	ML	Gray, stiff SILT, some very fine sand, saturated (water)
									TILL
30	0.67 to 0.75 TSF	16.1	6.4			13	SS-6	ML-CL	Gray, medium stiff, silty CLAY, little to some sand and fine gravel, moist
35	1.25 TSF	17.7	6.0			21	SS-7		Coarse gravel noted
40	1.25 TSF					20	SS-8		Boring terminated at 40.5'
									Water encountered at 24.0' during drilling
45									Water level data are reported in Table 3
50									

WELL RECORD



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus Plant 2 Pontiac Michigan

BORING NO: B-24
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 8, 1985

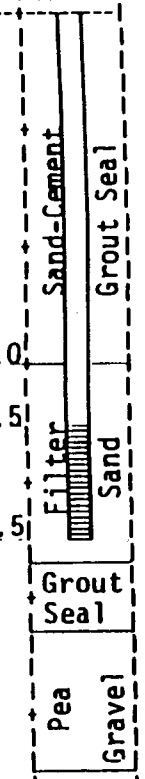
DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR ROD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									7" Asphalt	None
								GM	FILL Loose mixture of waste concrete, asphalt, and gray sand	
5						6	SS-1	SC	Greenish-gray mottled gray and black, loose, clayey SAND, numerous wood fragments and splinters, slightly moist	
10					16.1	11	SS-2	SM	Light gray-brown, medium dense, fine to medium SAND, little silt, dry with slight gasoline odor	
									Grades to slightly moist, slight gasoline odor	
15						9	SS-3	ML	Gray, medium stiff, SILT, small carbonized roots, wet	
								SM	Gray, medium dense, fine to coarse SAND, little silt and clay, wet but not saturated, slight gasoline odor	
20		15.7	5.0			12	SS-4	ML-CL	TILL Gray, stiff, clayey SILT, trace to little sand and gravel, no gasoline odor @ 19.5' - 1/4" seam of coarse sand and fine gravel	
25	0.87 TSF					17	SS-5		Grades to very stiff	
30	1.75 TSF	19.1	6.2			20	SS-6		Grades to silty CLAY	
35	1.5 to 1.75 TSF					21	SS-7		Boring terminated at 35.5' No water table encountered during drilling	
40										
45										
50										

GASOLINE INVESTIGATION - BORING LOG

BORING NO: B-25
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 9, 1985

DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									6" Asphalt	
									FILL	
				12.0		7	SS-1	SM	Gray mottled brown, loose, fine to coarse SAND, little to	
5								End of fill	some silt and clay, trace fine to coarse gravel, wet but not saturated	
	0.5 TSF			17.7	40.0	8	SS-2	SM	Gray, loose, fine to medium SAND, little to some silt	
10	(Shears)								and clay, trace fine gravel, occasional small roots, moist	
		13.6	2.8		36.2	31	SS-3	SM	Gray, dense, fine to coarse SAND, little to some silt	15.0
15									and clay, trace fine gravel, coarse gravel noted, moist, slightly plastic	17.5
					3.4	20	SS-4	SP	Gray and varicolored, medium dense, medium to coarse SAND,	
20									little fine to coarse gravel, trace silt, saturated (water) with slight gasoline odor	22.5
		19.3	7.3			26	SS-5		TILL	
25								CL	Gray, stiff, silty CLAY, trace to little fine to coarse	
	0.75 TSF					15	SS-6		sand and fine gravel, moist, plastic	
30	1.63 TSF	15.9	3.5			P	ST-1	ML		
						26	SS-7			
	1.0 to 2.5 TSF (Depends on gravel content)								Boring terminated at 32.5'	
35									Water level at 18.0' during drilling, moderate gasoline odor	
									Water level data are reported in Table 3	
40										
45										
50										

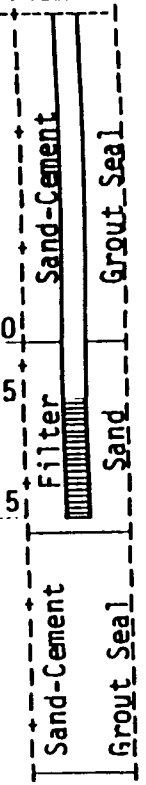


GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus Plant 2 Pontiac, Michigan

BORING NO: B-26
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 9, 1985

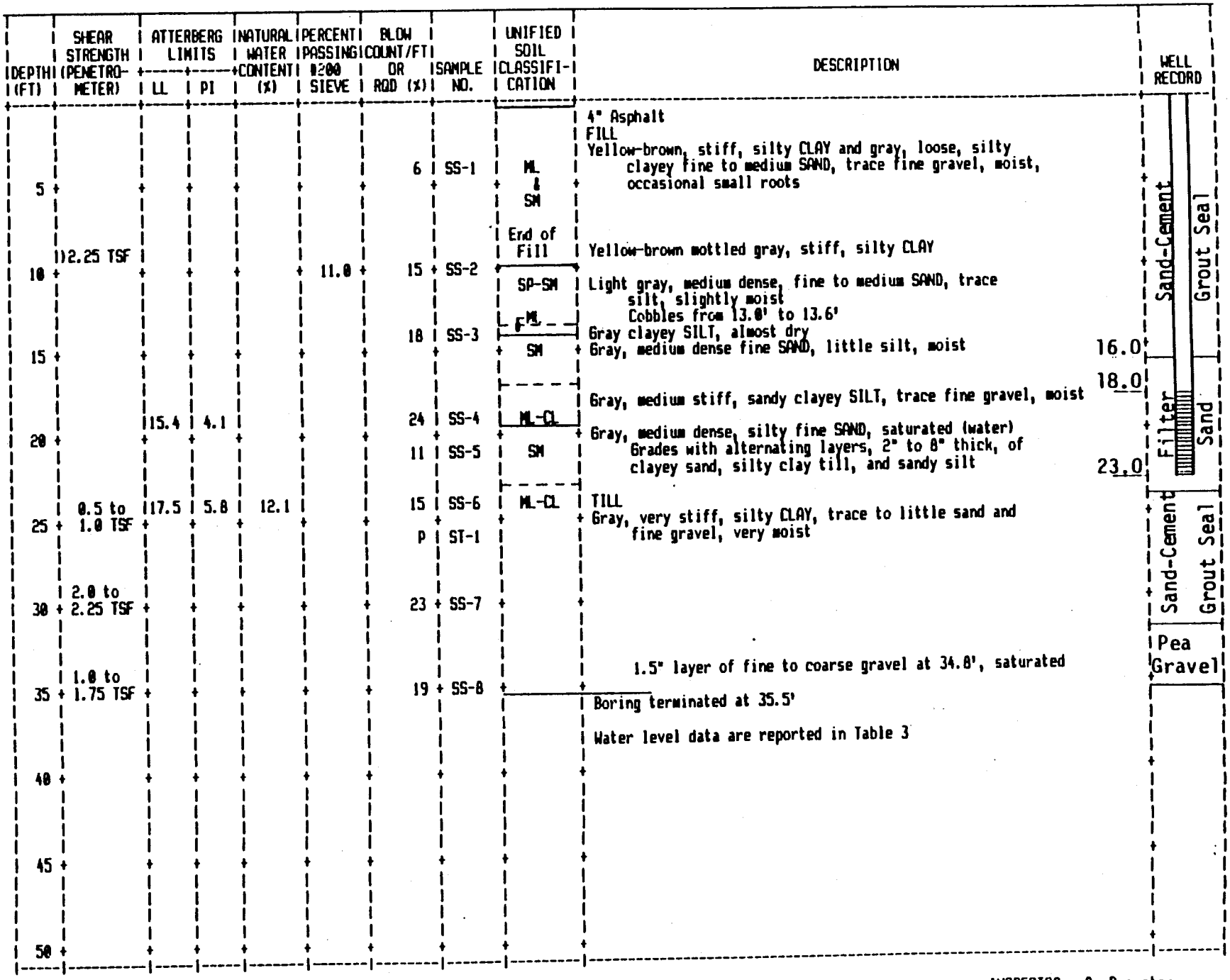
DEPTH (FT)	SHEAR STRENGTH (PENETRO-METER)	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	NATURAL WATER CONTENT (%)	PERCENT PASSING #200 SIEVE	BLOW COUNT/FT OR RQD (%)	SAMPLE NO.	UNIFIED SOIL CLASSIFI-CATION	DESCRIPTION	WELL RECORD
									4" Asphalt	
									FILL	
		19.2	7.7		20.0	4	SS-1	SC	Mottled greenish-gray and yellow-brown, loose, clayey SAND, little silt, moist	
5										
								End of Fill		
10	1.75 TSF (Gravelly)					20	SS-2	ML-CL	Yellow-brown mottled gray, very stiff, silty CLAY, trace sand and fine gravel, slightly moist	
									Gray-brown, medium dense, clayey SAND, little silt, trace fine gravel, moist	14.0
	1.0 TSF					18	SS-3	SC		
15	1.75 TSF					P	ST-1	ML-CL	Gray-brown, very stiff, silty CLAY, trace to little sand, and fine to coarse gravel, moist	16.5
								ML	Gray, stiff, SILT, trace very fine sand and clay, moist	
20						15	SS-4	SM	Gray, medium dense, fine to coarse SAND, little to some silt, trace clay, wet to saturated (water) Layered with silty fine to medium sand	21.5
						17	SS-5		Grades to clayey sand	
25						17	SS-6	ML-CL	TILL Gray, stiff silty CLAY, trace sand and fine gravel, moist, slightly plastic	
	1.25 to 1.37 TSF					P	ST-2		Grades to very stiff, trace to little sand and fine gravel	
30						27	SS-7			
	1.5 to 2.0 TSF								Boring terminated at 32.0'	
35									Water level at 8.0' during drilling	
									Water level data are reported in Table 3	
40										
45										
50										



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus Plant 2, Pontiac, Michigan

BORING NO: B-27
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 10, 1985



GASOLINE INVESTIGATION - BORING LOG
GM Truck & Bus Plant 2, Pontiac, Michigan

BORING NO: B-28
LOCATION : See Exhibit 1A

INSPECTOR: A. Brewster
COMPLETION DATE: April 10, 1985

APPENDIX B

HISTORICAL INFORMATION
- SOIL AND GROUNDWATER CONTAMINATION

& Bus Group

Truck & Bus Group
General Motors Corporation
31 Judson Street
Pontiac, Michigan 48058

July 14, 1988

Mr. William J. Winter
1359 Davis
Birmingham, MI 48009

Gentlemen:

Per your request, General Motors is submitting the boring logs that were conducted by our consultant E.C. Jordan under our license agreement dated February 26, 1987. A general layout of the boring and/or monitoring well locations is also attached.

As you are aware, the license agreement was to allow General Motors to conduct environmental testing and monitoring related only to petroleum products in the soils and/or groundwater as an extension to testing being conducted on our plant property.

The following concentrations of benzene, toluene and xylene were detected in your soil at the various depths tested. All data is in parts per billion.

Monitoring Well	Benzene	Toluene	Xylene
MW 105	6200-7800	1300-1400	ND
MW 106	ND - 2200	810-2700	ND
MW 114	ND	ND	ND
MW 113	ND	ND	2600
MW 107	ND	900-960	ND
MW 104	ND	1100	ND

The following concentrations of benzene, toluene and xylene were detected in the shallow perched ground water in the monitoring wells on your property. The concentrations are in parts per billion.

Monitoring Well	Benzene	Toluene	Xylene
MW 105	580-610	ND-5.1	15-100
MW 106	980-1200	30-220	410-1700
MW 114	ND	ND	ND
MW 113	120	ND	76
MW 107	ND	ND-1.1	ND-5.6
MW 104	ND	ND	ND-29

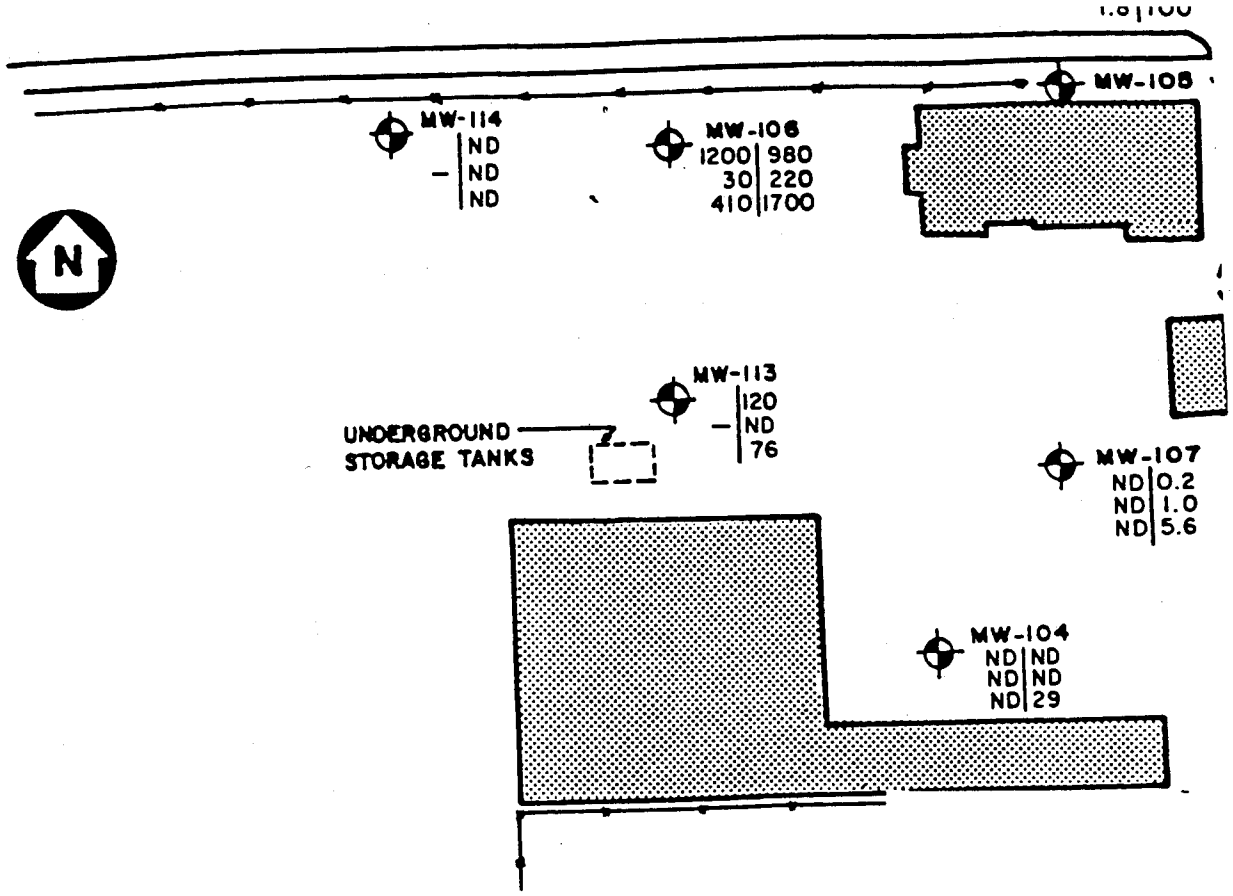
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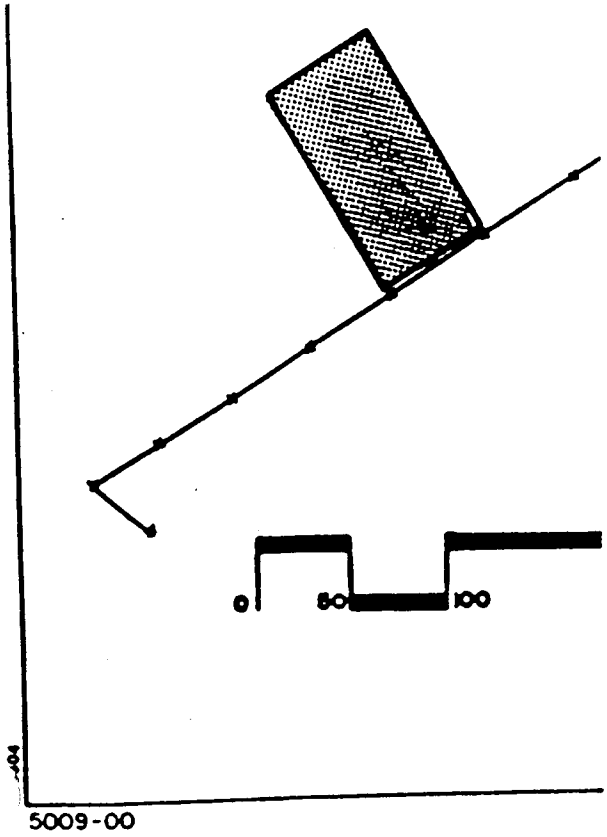
Should you have any questions about the foregoing information, please contact the writer.

M. D. Zielke
C.O. Environmental

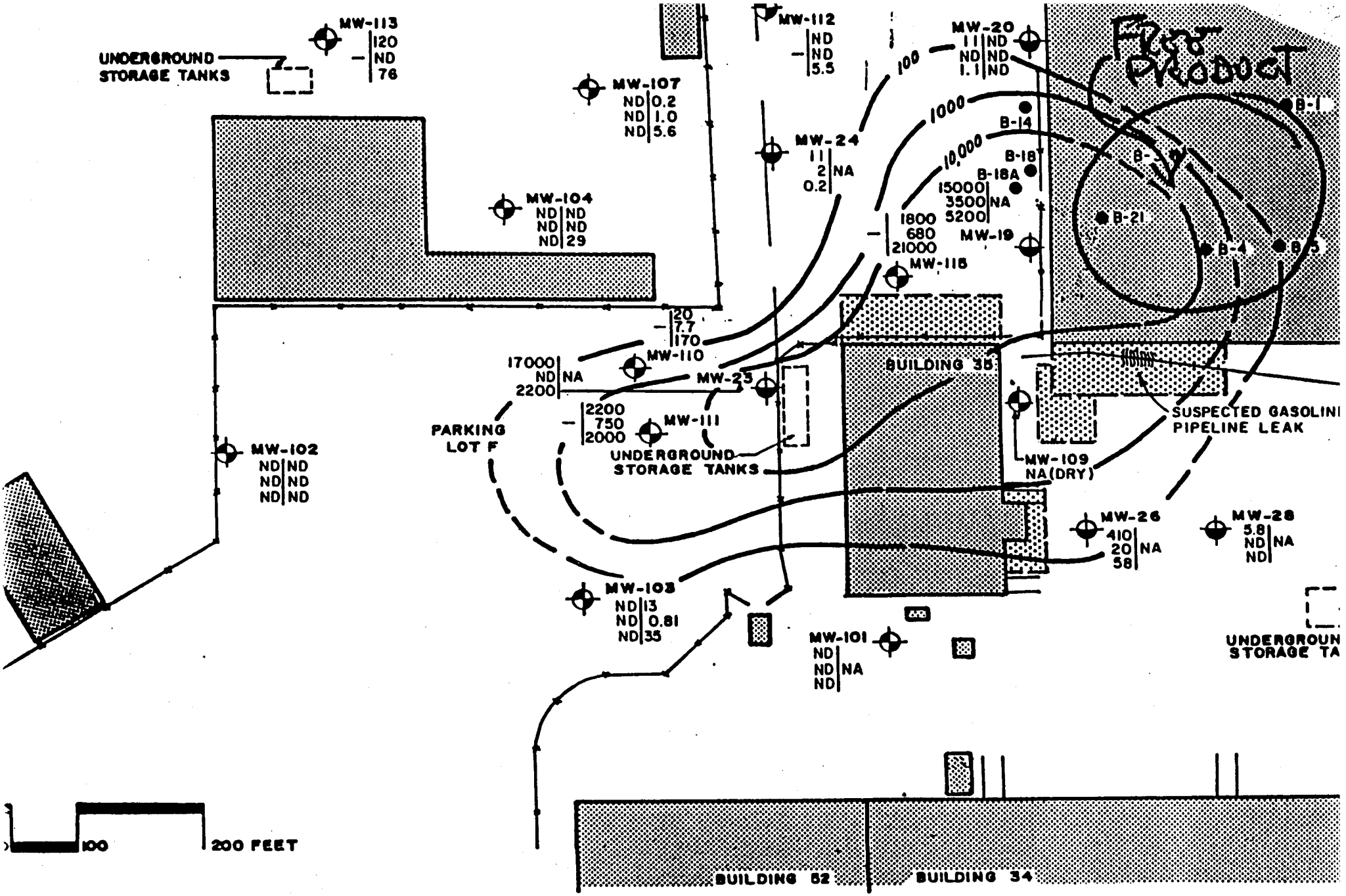
MDZ/sl
Attachment

bcc: L. L. Ritzman
B. F. Rogers
J. B. Nachtman


MW-108
MW-114
ND
—
ND
ND
MW-106
1200 980
30 220
410 1700
N
MW-113
120
—
ND
76
UNDERGROUND
STORAGE TANKS
MW-107
ND 0.2
ND 1.0
ND 5.6
MW-104
ND ND
ND ND
ND 29


0
50
100

5009-00


MW-113
120
ND
76
UNDERGROUND STORAGE TANKS
MW-112
ND
ND
5.5
MW-107
ND 0.2
ND 1.0
ND 5.6
MW-20
11 ND
ND ND
1.1 ND
FREE PRODUCT
100
1000
10,000
B-14
B-18
B-18A
B-21
B-4
B-5
MW-24
11
2 NA
0.2
15000
3500 NA
5200
1800
680
21000
MW-19
MW-118
MW-104
ND ND
ND ND
ND 29
20
7.7
170
MW-110
17000
ND NA
2200
MW-23
BUILDING 38
SUSPECTED GASOLINE PIPELINE LEAK
2200
750
2000
MW-111
PARKING LOT F
UNDERGROUND STORAGE TANKS
MW-102
ND ND
ND ND
ND ND
MW-109
NA(DRY)
MW-26
410
20 NA
58
MW-28
5.8
ND NA
ND
MW-103
ND 13
ND 0.81
ND 35
MW-101
ND
ND NA
ND
UNDERGROUN
STORAGE TA
100
200 FEET
BUILDING 52
BUILDING 34

FIELD LOG SOIL

BORING NO. MW105

JOB NO. 5009.00	PROJECT NAME GM Truck & Bus		PAGE 1 OF 1
CONTRACTOR Stearns	DRILLER R.Christianson	DATE STARTED 12/19/96	COMPLETED 12/19/96
METHOD 4¼ HSA	CASING SIZE 4"	MMO 11.7/10.8 BG=1.0	PROTECTION LEVEL D
GROUND EL 943.0	SOIL DRILLED 34	▽ BELOW GROUND 26'	TOTAL DEPTH 34
LOGGED BY N Gardner	CHECKED BY	DATE	

DEPTH (FT)	BLOW COUNTS	GRAIN SIZE LAB	OVA	OTHER	HEADSPACE (PPM)	SOIL DESCRIPTION	BOR CLASS	WELL DATA	ELEV (FT)
						Concrete 6", Fill 2	N/A	Cement	943.0
5						Silt; Mottled Gray & Brown, Clayey 10% Sand and/or Gravel, Dense Moist, Sl. Plastic, Very Stiff	ML	Bentonite & Cuttings	938.0
10									933.0
15	7/8 13/9		X		BG	Sand w/Gravel; Loose, Sl. Moist to Saturated @ 26', Poor Sorting 10-20% Fines, Med-Course. Diesel Fuel? Odor Noticed. 14.5	SW		928.0
20	13/16 17/18		X		4				923.0
25	9/14 6/19		X		18			▽	918.0
	14/10 10/9		X		13				
30						32			913.0
	4/7 13/8		X		BG	Sand; Uniform, Fine, Grey, Saturated Medium Dense 34	SP	Coarse Sand	
35	6/7 10/5				BG	Till; Clayey Silt, Gray, Stiff Tr. Gravel, Dry 36	ML		908.0
						EOB 36'			
40									903.0

E.C.JORDAN CO.

FIELD LOG SOIL

BORING NO. MW

PROJECT NO. 5009.00	PROJECT NAME GM Truck & Bus		PAGE 1 OF 1
CONTRACTOR Stearns	DRILLER R.Christianson	DATE STARTED 12/22/86	COMPLETED 12/22/86
METHOD 4¼" HSA	CASING SIZE 4½"	HNU 11.7/10.8 BG=1.0	PROTECTION LEVEL D
GROUND EL 946.0	SOIL DRILLED 43'	▽ BELOW GROUND 28'	TOTAL DEPTH 43
LOGGED BY N Gardner	CHECKED BY	DATE	

DEPTH (FT)	BLOW COUNTS	GRAIN SIZE LAB	OVA	OTHER	HNU HEADSPACE (PPM)	SOIL DESCRIPTION	SOIL CLASS	WELL DATA	ELEV (FT)
						Asphalt (4") & Fill/Topsoil, Olive Gray Dry, Silt or Cldy w/10-20% Grav 4	N/A	Concrete	
5						Silt; Brown Mottled w/Gray, Dry to Moist, 10% Fine Gravel Very Stiff, Sl. Plastic, 10% F-C Sand 17	ML		941
10	5/11 13/13				BG				936
15	5/8 11/13				BG				93
20	8/11 15/12				BG	Sand; Medium to Coarse, Loose Fair Sorting, Brown to Gray 10-20% Gravel, 10% Fines Very Definite Diesel Fuel Odor 26	SW	Bent. Cuttings & Bentonite	92
25	9/11 13/13				1				91
	9/10 12/5				12				
	5/7 8/11				26	Sand; Fine, Medium Dense, Uniform 20-30% Fines, Saturated Oily Film on Coarser Sand Lens @ 28.5". Definite Diesel Fuel Odor 34	SP		
35	6/6 11/21				BG	Silty Sand; Interbedded Sandy Silt and Silty Sands, Gray, Wet, Dense Grading to Till @ 39. Very Stiff Sl. Plastic	ML	Coarse Sand Pack	
40	8/8 12/10				BG	EOB @ 43'			90

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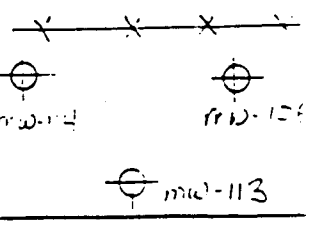
PROJECT NO.	PROJECT	BORING NO.
5009-01	GM Truck & Bus	MW-114

DRILLING CONTRACTOR:	DRILLER:	RIG TYPE / METHOD:
Stearns	R. Christianson	CME 45/4¼" HSA

DATE STARTED:	COMPLETED:	WEATHER:	LOGGED BY:
5-21-87	5-21-87	Cloudy, 60°	N. Gardner

TOTAL DEPTH:	GW ENC.	PI METER BG:	GROUND ELEVATION:
45'	30.9	1.0	948.3

BORING LOCATION:



DEPTH	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	RECOVERY	BLOW COUNTS	PI METER	OVA SAMPLE	LAB SAMPLE	COMMENTS
0	FILL; 2" asphalt, dk gray to brown, sandy silt, sl. moist								
25	SAND & GRAVEL; loose, fine to coarse grained dry to saturated @ 31'	114-24	SPT	1.4/2.0	9/23 16/15		40		SL. MOTOR FUEL ODOR IN SAMPLES
30		114-29	SPT	1.0/2.0	16/8 12/15		60		

PROJECT NO.	PROJECT	BORING NO.
5009-01	GM Truck & Bus	MW-114 (cont.)

DRILLING CONTRACTOR:	DRILLER: R.	RIG TYPE / METHOD:	BORING LOCATION:
Stearns	Christianson	CME 45/4¼" HSA	

DATE STARTED:	COMPLETED:	WEATHER:	LOGGED BY:
5-21-87	5-21-87	Cloudy, 60°	N. Gardner

TOTAL DEPTH:	GW ENC.	PI METER BG:	GROUND ELEVATION:
45'	30.9	1.0	948.3

DEPTH	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	RECOVERY	BLOW COUNTS	PI METER	OVA SAMPLE	LAB SAMPLE	COMMENTS	WE DA
	SAND & GRAVEL; as above									
	TILL; gray sandy silt, stiff dry	114-43	SPT	2.0/2.0	8/12 22/17	BG				
45										

E. C. JORDAN

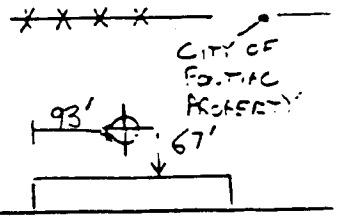
PROJECT NO.	PROJECT	BORING NO.
5009-01	GM Truck & Bus	MW-113

DRILLING CONTRACTOR:	DRILLER:	RIG TYPE / METHOD:
Stearns	R. Christianson	CME 45/4¼" HSA

DATE STARTED:	COMPLETED:	WEATHER:	LOGGED BY:
5-20-87	5-20-87	Sunny, 70°	N. Gardner

TOTAL DEPTH:	GW ENC.	PI METER BG:	GROUND ELEVATION:
45'	28.5	1.0	945.9

BORING LOCATION:



DEPTH	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	RECOVERY	BLOW COUNTS	PI METER	OVA SAMPLE	LAB SAMPLE	COMMENTS
5	FILL; sandy clayey silt; stiff, dry brown to gray mottled. Occasional sandy seam, moist								
10		113-9	SPT	2.0/2.0	7/14 15/20	BG			
15		113-14	SPT	2.0/2.0	7/9 11/13	BG			
20		113-19	SPT	1.8/2.0	6/8 13/10	BG		X	
25	SAND & GRAVEL; loose, fine to coarse grained, dry, very poor sorting	113-24	SPT	0.7/2.0	11/9 13/9	40			
30		113-28	SPT	0.7/2.0	13/13 17/11	120		X	OILY FILM ON SAMPLE
35		113-34	SPT	0.7/2.0	17/11 12/18	30			

E. C. JORDAN

PROJECT NO.	PROJECT	BORING NO.
5009-01	GM Truck & Bus	MW-113 (cor)

DRILLING CONTRACTOR:	DRILLER: R.	RIG TYPE / METHOD:	BORING LOCATION:
Stearns	Christianson	CME 45/4¼" HSA	

DATE STARTED:	COMPLETED:	WEATHER:	LOGGED BY:
5-20-87	5-20-87	Sunny, 70°	N. Gardner

TOTAL DEPTH:	GW ENC.	PI METER BG:	GROUND ELEVATION:
45'	28.5	1.0	945.9

DEPTH	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	RECOVERY	BLOW COUNTS	PI METER	OVA SAMPLE	LAB SAMPLE	COMMENTS
	SAND; as above								
	TILL; gray sandy silt, dry stiff	113-43	SPT	2.0/2.0	13/16 19/28	BG			
45	EOB @ 45'								

FIELD LOG SOIL

BORING NO. MW107

PAGE 1 OF 1

PROJECT NO. 5009.00	PROJECT NAME GM Truck & Bus		
ORIGINATOR Stearns	DRILLER R. Christianson	DATE STARTED 12/23/86	COMPLETED 12/23/86
METHOD 4¼" HSA	CASING SIZE 4¼"	HNU 10.7/10.8 BG=1.0	PROTECTION LEVEL D
GROUND EL 944.5	SOIL DRILLED 36	WATER LEVEL BELOW GROUND 28'	TOTAL DEPTH 36
LOGGED BY N Gardner	CHECKED BY	DATE	

DEPTH (FT)	BLOW COUNTS	GRAIN SIZE LAB	OVA	OTHER	HEADSPACE (PPM)	SOIL DESCRIPTION	SOIL CLASS	WELL DATA	ELEVATION
						Ashpalt (4") and Fill/Topsoil, Dark Brown, Sandy 2.5	N/A	Cement	
5						Silt; Brown Mottled w/Grey, Sandy Veins, Sl. Moist, Sl. Plastic, Very Stiff to Hard	ML		939.5
10	7/7 19/21				BG			Cuttings & Backfill	934.5
15	5/7 10/10				BG	Sand; Meduim to Coarse, Dry to Moist. Fair Sorting, Loose to Medium Dense. Fine Sandy Gray Silt Lense @ 20.9' - 21.0' 21	SW-SP		929.5
20	7/9 9/7				BG				924.5
	5/6 3/2				BG	Sand and Gravel; Very Poorly Sorted Medium to Coarse Sand, Fine to Coarse Gravel, 10% Fines, Moist to Wet, Loose 28	GW	Bent	
25	2/2 3/8				BG				919.5
	6/10 8/10				BG				
30	6/8 8/7				BG	Sand; Fine to Medium, Uniform, Brown to Gray 20-30% Fines, Saturated, Medium Dense 33.5	SP		914.5
35	5/6 3/9				BG	Till; Sandy Silt, Gray, Tr. Gravel Sl. Plastic, Stiff	ML	Coarse Sand Pack	909.5
						EOB 36'			
40									904.5

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FIELD LOG SOIL

BORING NO. MW'

PROJECT NO. 5009.00	PROJECT NAME GM Truck & Bus		PAGE 1 OF 1
CONTRACTOR Stearns	DRILLER R. Christianson	DATE STARTED 12/13/86	COMPLETED 12/19/36
METHOD 4½" HSA	CASING SIZE 4½	HNU 11.9/10.8	PROTECTION LEVEL D
GROUND EL 945	SOIL DRILLED 36'	▽ BELOW GROUND 27	TOTAL DEPTH 36'
LOGGED BY N. Gardner	CHECKED BY	DATE	

DEPTH (FT)	BLOW COUNTS	GRAIN SIZE LAB	OVA	OTHER	HEADSPACE (PPM)	SOIL DESCRIPTION	BOR CLASS	WELL DATA	ELEV(FT)
						Asphalt, Fill; Black, Gravelly Poorly Sorted			
						5			
5						Sandy Silt; Moderate Plasticity Stiff, Sl. Moist, Brown, Trace Gravel, Little Clay	SM	Cement	940'
10						14			935'
15	6/3 13/8				BG	Sand and Gravel; Poorly Sorted Loose, Subrounded, Damp, 10-20% Fines Alluvial, Fine to Coarse Sands		Cuttings w/Bentonite	930'
20	6/6 3/7				BG		SW-GW		925'
	9/13 1/11				BG			Bent	
25	9/9 11/8				BG				920'
	9/12 16/23				BG	27			
	11/13 19/15				BG	Sand; Uniform, Fine, Medium Dense Light Gray, Rounded, Saturated	SP	Sand Pack	915'
30	6/3 8/10				BG	30 Silt; Uniform, Stiff, Gray, Slightly Plastic, Moist	ML		
						33			
35	11/13 16/23					Till; Silt, Little Gravel, Very Stiff, Grey , Damp to Dry Dense, Sl. Plastic	ML		910
						EOB @ 36'			
40									905

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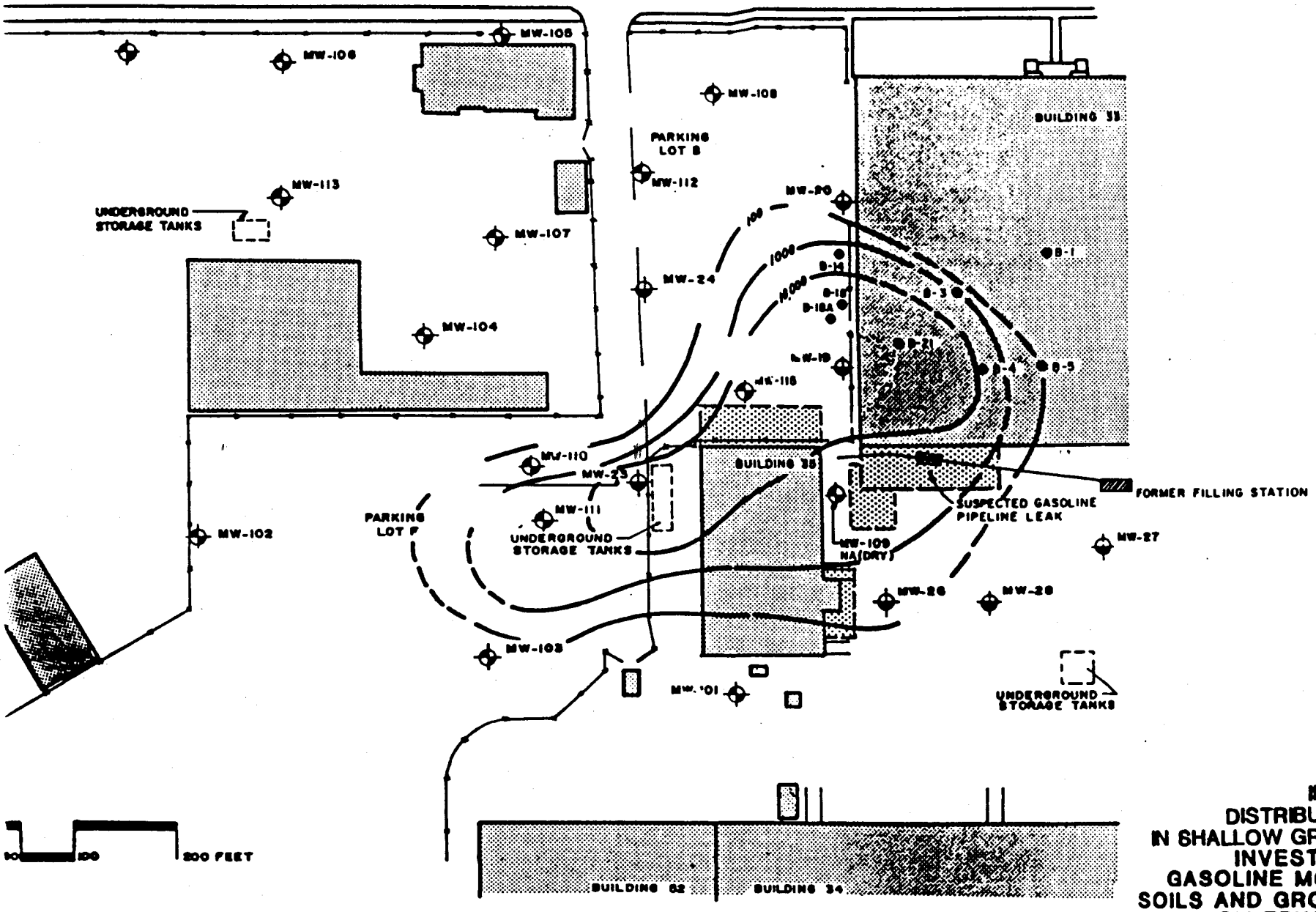
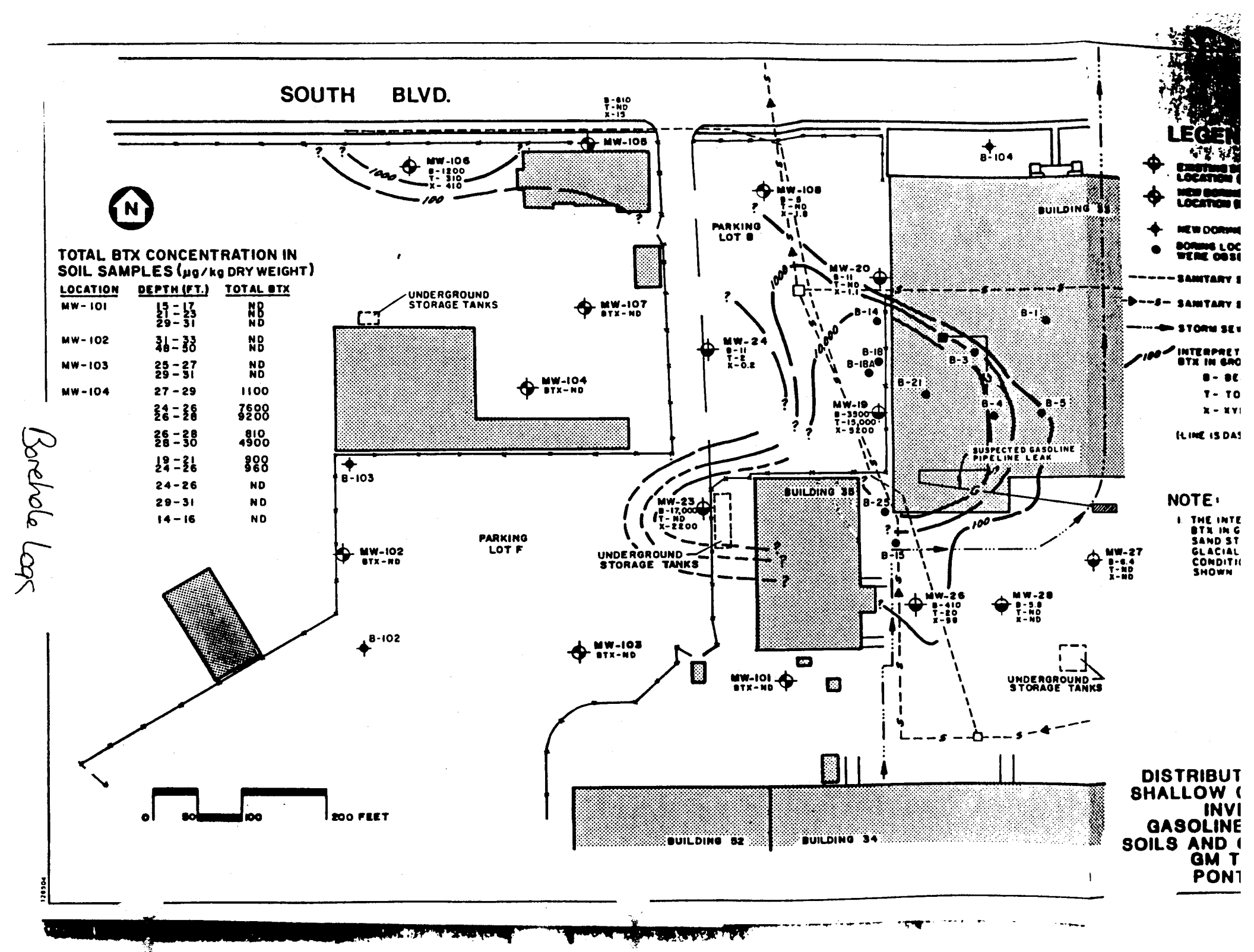


FIGURE 3-8
INTERPRETIVE DISTRIBUTION OF BTX IN SHALLOW GROUNDWATER
INVESTIGATION OF GASOLINE MOVEMENT IN SOILS AND GROUNDWATER
GM TRUCK AND BUS
PONTIAC, MICHIGAN

EC JORDAN CO


SOUTH BLVD.
B-610
T-ND
X-15
MW-105
MW-106
B-1200
T- 310
X- 410
1000
100
B-104
MW-108
B-8
T-ND
X-1.8
PARKING LOT B
BUILDING 35
MW-20
B-11
T-ND
X-1.1
1000
UNDERGROUND STORAGE TANKS
MW-107
BTX-ND
B-14
MW-24
B-11
T-2
X-0.2
1000
B-1
B-18
B-18A
B-3
B-21
B-4
B-5
MW-19
B-3300
T-15,000
X-9200
MW-104
BTX-ND
SUSPECTED GASOLINE PIPELINE LEAK
B-103
BUILDING 38
MW-23
B-17,000
T-ND
X-2200
B-25
PARKING LOT F
UNDERGROUND STORAGE TANKS
B-15
MW-27
B-6.4
T-ND
X-ND
MW-102
BTX-ND
MW-26
B-410
T-20
X-58
MW-28
B-5.8
T-ND
X-ND
B-102
MW-103
BTX-ND
MW-101
BTX-ND
UNDERGROUND STORAGE TANKS
BUILDING 52
BUILDING 34
0
50
100
200 FEET
N
TOTAL BTX CONCENTRATION IN SOIL SAMPLES (µg/kg DRY WEIGHT)
LOCATION
DEPTH (FT.)
TOTAL BTX
MW-101
15 - 17
21 - 23
29 - 31
ND
ND
ND
MW-102
31 - 33
48 - 50
ND
ND
MW-103
25 - 27
29 - 31
ND
ND
MW-104
27 - 29
24 - 26
26 - 28
26 - 28
28 - 30
19 - 21
24 - 26
24 - 26
29 - 31
14 - 16
1100
7600
9200
810
4900
900
960
ND
ND
ND
LEGEN
SANITARY
STORM SE
INTERPRET
BTX IN GRO
NOTE:
DISTRIBUT
SHALLOW
INVI
GASOLINE
SOILS AND
GM T
PONT
Borehole logs

REVIEW OF EXISTING CONDITIONS REPORT

GM TRUCK GROUP
PONTIAC EAST ASSEMBLY/FORMER PONTIAC CENTRAL MANUFACTURING AND ASSEMBLY PLANTS

MID 005356902

A "Brownfield" Redevelopment Project

Pontiac, Michigan

VOLUME IV OF IV - APPENDICES L TO M

OCTOBER 1995
REF. NO. 7097 (1)
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CONESTOGA-ROVERS & ASSOCIATES

APPENDIX L

BUILDING 33 FUEL ISLAND REPORT

BUILDING 33 - FUEL ISLAND STUDY AREA

General Motors Corporation
Pontiac Central Manufacturing Facility
Pontiac, Michigan

JANUARY 1994
REF. NO. 5770 (4)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM) - Pontiac Central Manufacturing Facility (Facility) to address outstanding environmental issues regarding the soils associated with the underground storage tanks (USTs) at the Building 33 - Fuel Island (Study Area).

The Facility is located in Pontiac, Michigan. The Site location is presented on Figure 1.1. Figure 1.2 presents a Site plan of the Facility.

The Study Area for the Building 33 - Fuel Island is identified on Figure 1.2. A plan of the Study Area is provided on Figure 1.3.

The purpose of this report is to present and evaluate the current status of the Building 33 - Fuel Island UST Study Area with regards to the outstanding environmental issues identified by the Michigan Department of Natural Resources (MDNR) in their letter to GM dated November 19, 1993.

1.1 REGULATORY REQUIREMENTS

As the environmental issues within the Study Area were the result of the operation of an underground storage tank (UST) system, the requirements of the Leaking Underground Storage Tank (LUST) Act (P.A. 478, 1988 as amended by Act 645 of 1993) must be addressed to resolve the outstanding environmental issues within this Study Area.

LUST provides an outline of the reporting, field investigative and remedial activities required by the Michigan Department of Natural Resources (MDNR) for closure (e.g. final remediation) of a LUST site to be granted by the MDNR.

The primary regulation which governs remedial actions within Michigan is the Michigan Environmental Response Act (MERA)

[Michigan Public Act 307 (P.A. 307, 1982 as amended)]. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment. Generic Type C Industrial Cleanup Standards have been prepared by the MDNR which are considered to be acceptable and based on conservative exposure assumptions.

This report has been prepared in accordance with the requirements of Act 307 and LUST, as well as draft MDNR requirements for the verification of soil remediation (October, 1990).

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the GM Facility as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Facility is located in an industrial area which is bordered to the south by residential areas. The Grand Trunk Western Railroad Line is located along the southern edge of the property. The Facility is bordered to the east and west by industrial areas, and to the north by South Boulevard.

The Facility was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

Following the Facility closure, USTs which were no longer in service were removed from the Facility. Waste Oil Product was noted in the soils in the area of the UST at Building 33 - Fuel Island. This oil product was reported to the Michigan State Police - Fire Marshall Division (MSP - FMD) office, and remedial actions were initiated, in accordance with LUST requirements.

Sections of the Facility are currently undergoing decommissioning, demolition and re-development activities.

2.2 FACILITY GEOLOGY

The Facility is located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the plant are predominantly composed of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

Through years of development and industrial use, the shallow native soils in many areas of the Facility have been overlain by earth fill (e.g. sand and gravel), asphalt, concrete or structures.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150 and 210 feet below ground surface (bgs) and are approximately 7, 25 and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized on Site for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the plant, generally at depths of 10 feet to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not expected to be hydraulically connected with the lower aquifers.

In many areas of the Facility, the clay till exists at the ground surface, and no perched groundwater layer is present.

3.0 DESCRIPTION OF STUDY AREA

This section presents a summary of available information from GM files regarding the Building 33 - Fuel Island.

3.1 HISTORY OF BUILDING 33 - FUEL ISLAND UST

The fuel island is located south of Building 33 in an asphalt parking area. There is a concrete pad surrounding the fuel island and covering two 12,000-gallon fuel tanks. In the past, a 10,000-gallon tank which contained diesel fuel was removed from the present location of the fuel island and the fuel island reconstructed (including installation of the two tanks now present). A release was documented in 1991 and MDNR records indicate that contaminated materials (from a diesel release) may still exist within the Study Area.

MDNR records also indicated that 20-Day and 45-Day reports were submitted by GM.

3.2 PAST REMEDIAL ACTIVITIES

CRA has not received any information regarding past remedial activities in the Study Area.

3.3 GEOLOGY

CRA has not received any information regarding the geology in the Study Area.

3.4 HYDROGEOLOGY

CRA has not received any information regarding the hydrogeology in the Study Area.

3.5 MDNR CONCERNS

Outstanding concerns were raised by the Michigan Department of Natural Resources (MDNR) in their letter dated November 19, 1993. This letter is reproduced in Appendix A of this report. These concerns included the requirements:

- to define the vertical and horizontal extent of contamination; and
- to determine whether or not the groundwater has been impacted.

Due to the nature of the suspected release, the MDNR requested that all samples be analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX), polynuclear aromatic hydrocarbons (PNAs) and lead.

The MDNR has not set a schedule for the completion of a report containing sufficient information to address MDNR concerns.

4.0 ADDITIONAL INVESTIGATIVE ACTIVITIES

CRA proposes to first assess any information which GM can provide regarding the fuel island. Following this assessment an appropriate scope will be developed for this Study Area. Based on the information CRA presently possesses, the following scope was prepared.

Based on our current knowledge of the project, CRA proposes installing four boreholes surrounding the fuel island and USTs in order to assess the vertical and horizontal extent of contamination, geology and the potential for groundwater to be impacted. In the absence of further information (which may be provided by GM), it is assumed that the boreholes would be completed to a depth of 20 to 30 feet bgs. The proposed borehole locations are presented on Figure 4.1. All samples collected from the boreholes would be analyzed for BTEX, PNAs and lead.

It is recommended that prior to implementing the proposed scope, CRA review any existing information in order to minimize instrusive investigations. The installation of boreholes in this location may be difficult due to the presence of concrete and underground storage tanks, lines and other utilities. In any event, CRA will require GM to complete an underground utility locate around this facility to ensure the safety of the field staff, as well as to avoid any interruptions to operations at the GM facilities.

5.0 EVALUATION OF RESULTS

An evaluation of analytical data and borehole geology will be performed following the completion of additional soil borings (if required). Pertinent Michigan Type B soil and groundwater cleanup standards, for purposes of comparison, are presented in Table 5.1.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Recommendations regarding the need for additional investigation or remediation in the Building 33 - Fuel Island Study Area will be made following a review of existing information.

7.0 REFERENCES

1. Letter to Keith West (GM) from MDNR re: Product Engineering, November 19, 1993

2. Enrolled Senate Bill No. 645, State of Michigan, October 1993

3. Enrolled Senate Bill No. 644, State of Michigan, October 1993

4. Enrolled House Bill No. 4783, State of Michigan, October 1993

5. MERA Operational Memorandum #15: Default Type A Cleanup Criteria, September 30, 1993

6. MERA Operational Memorandum #8, Revision 2 - Type B Criteria, July 16, 1993

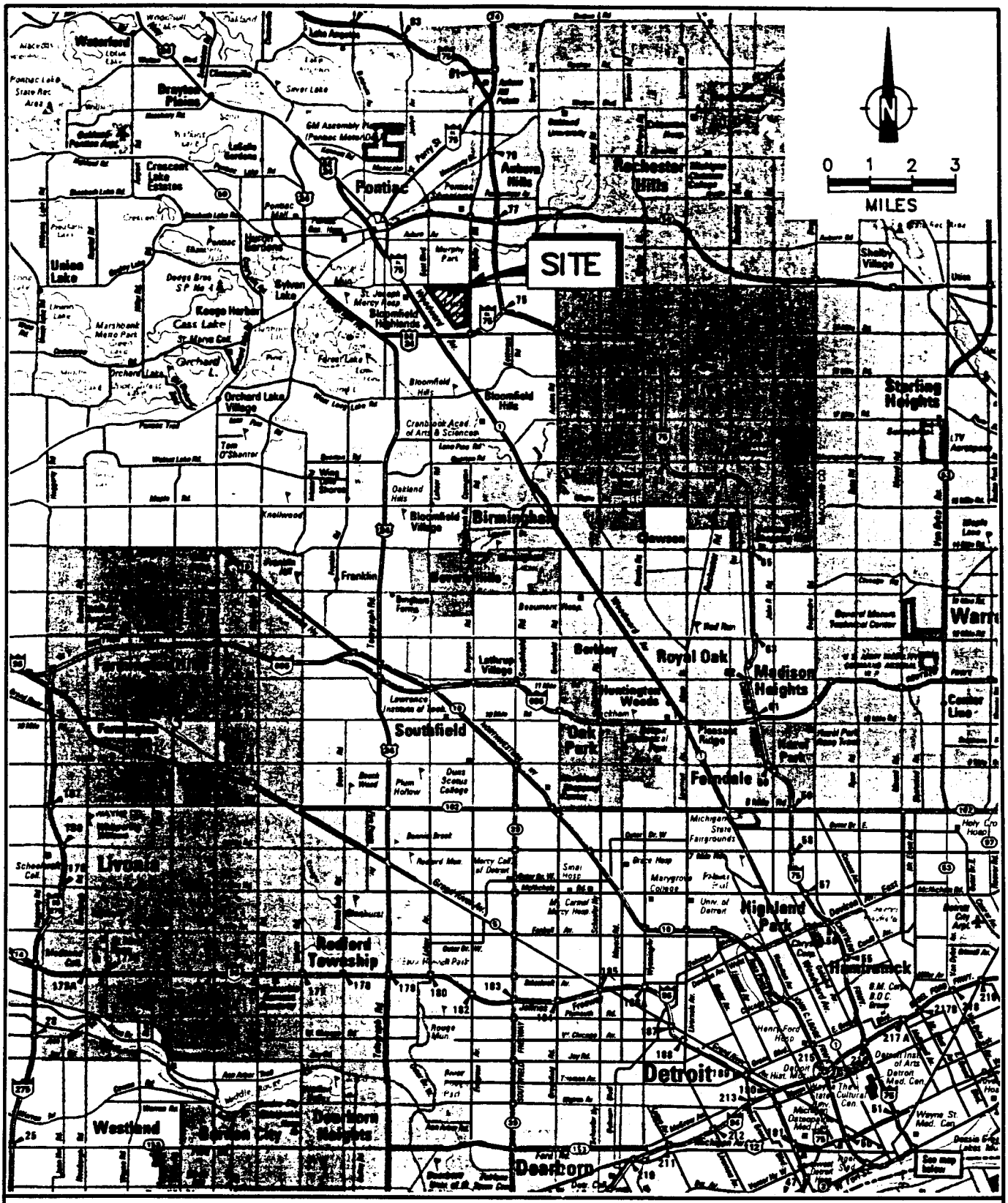
7. Recommended Parameters, Analytical Methods and Detection Levels at LUST Sites, MDNR, October 10, 1991

8. Michigan Background Soil Survey, MDNR - Waste Management Division, April 1991

9. Soil and Groundwater Clean-up Standards as Approached by the Michigan Department of Natural Resources, The Dragun Corporation, 1990

10. Verification of Soil Remediation, MDNR - Environmental Response Division, October 25, 1990

11. Leaking Underground Storage Tank Act, Michigan State Act No. 478, 1988 (as amended)



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

SITE LOCATION
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan



CRA

MICHIGAN

5770 (4) DEC 17/93 (W) REV.0

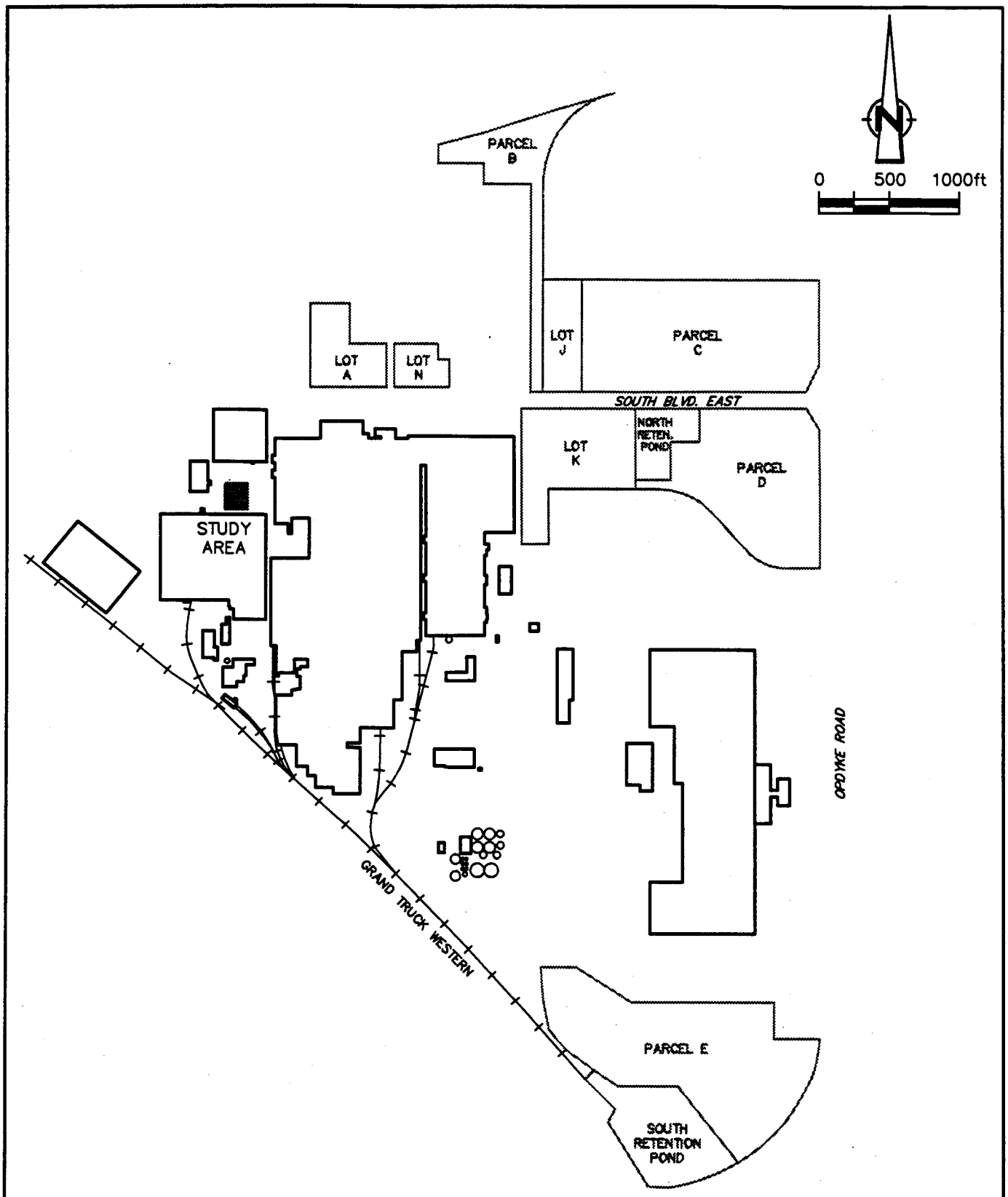


figure 1.2

SITE PLAN
BUILDING 33 – FUEL ISLAND – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (4) JAN 07/94(W) REV.0 (P-11)

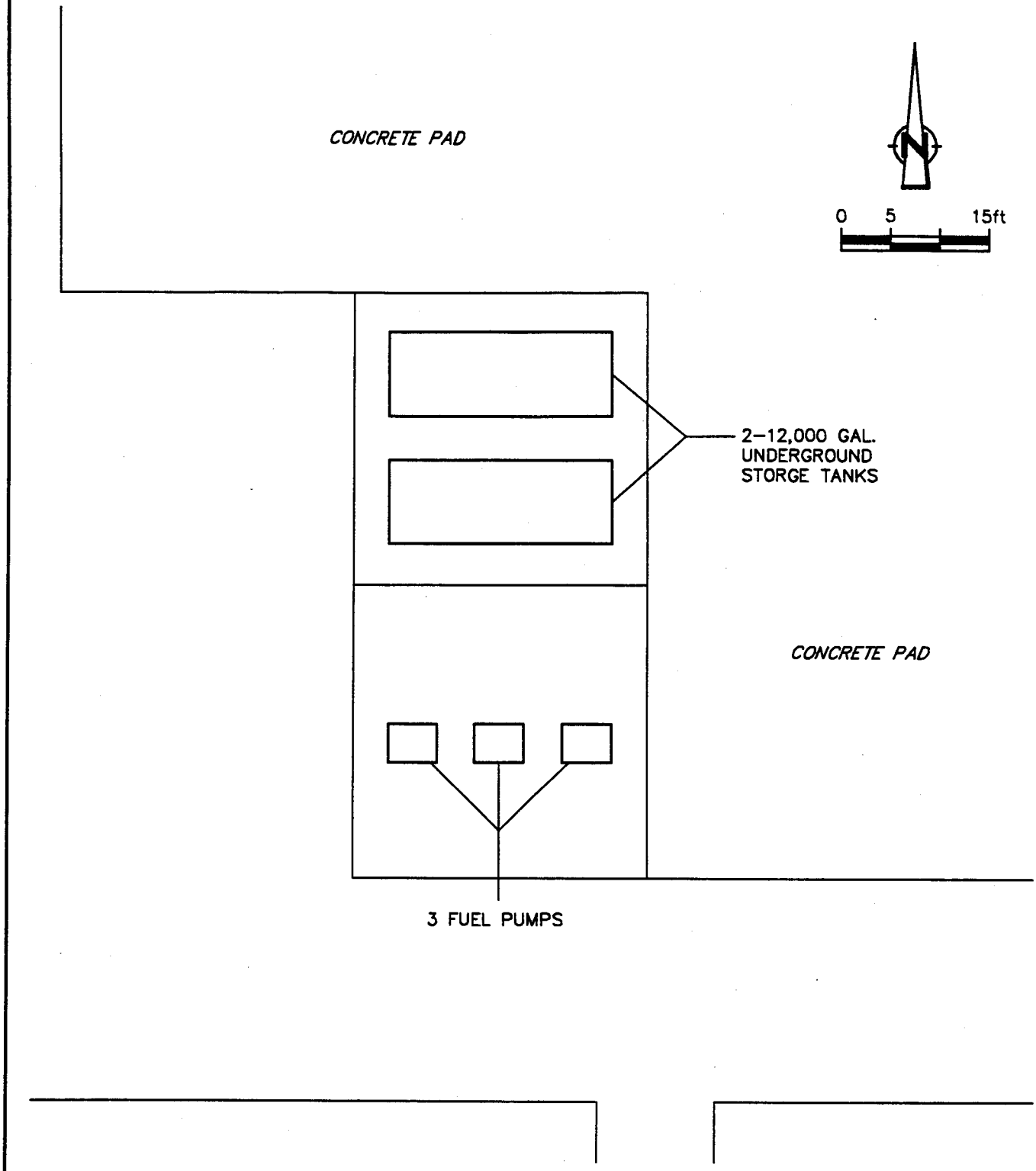
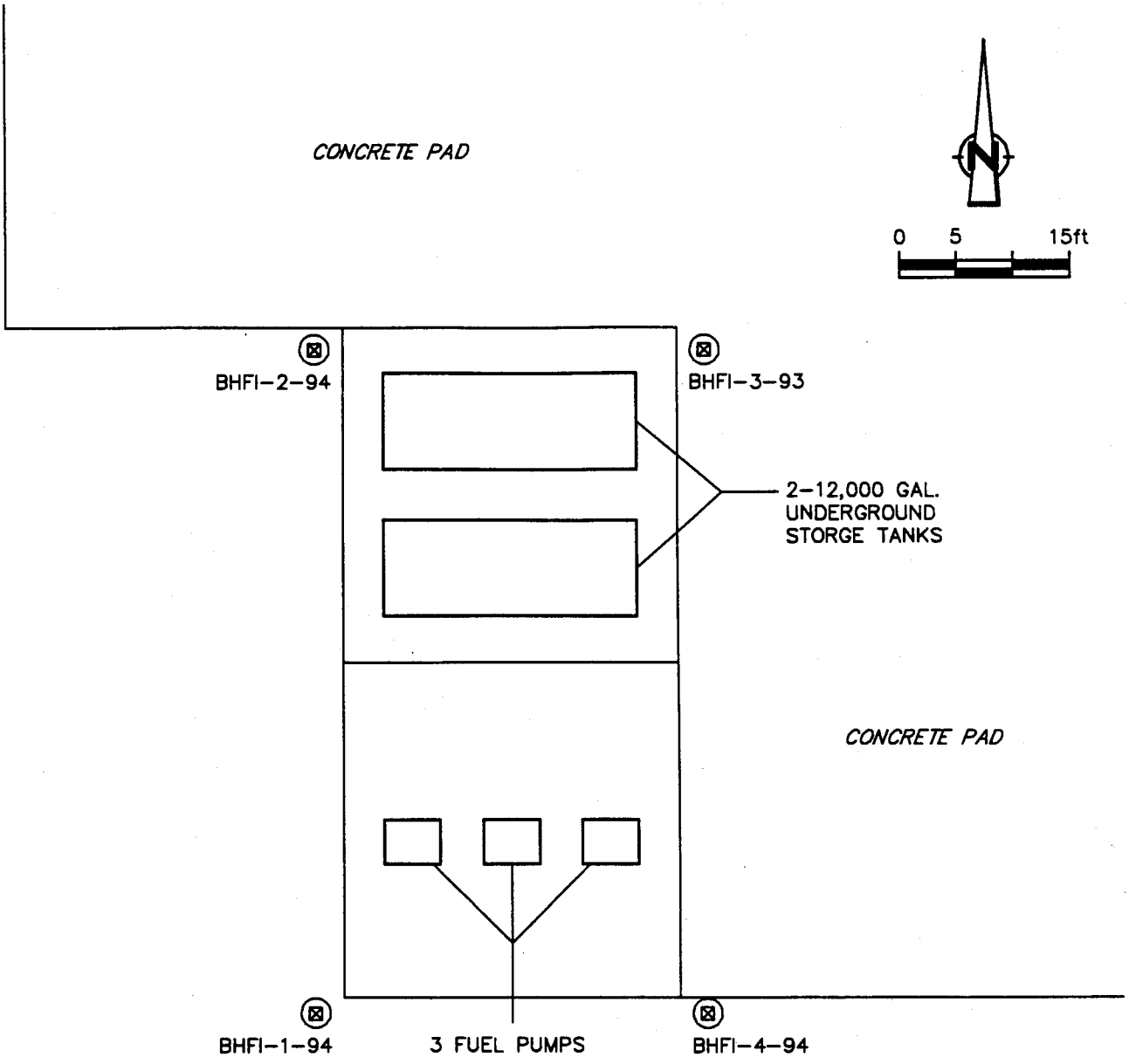


figure 1.3

BUILDING 33 – FUEL ISLAND – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (4) JAN 27/94(W) REV.0 (P–08)



LEGEND

⊠ PROPOSED BOREHOLE LOCATION

figure 4.1

ADDITIONAL INVESTIGATIVE ACTIVITIES
BUILDING 33 – FUEL ISLAND – STUDY AREA
GM NORTH AMERICAN TRUCK PLATFORMS
Pontiac, Michigan

CRA

5770 (4) JAN 07/94(W) REV.0 (P-15)

TABLE 5.1

ACT 307 - TYPE A AND TYPE B CRITERIA
BUILDING 33 - FUEL ISLAND STUDY AREA
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Type A Criteria Soil (ppb)*	*Type B Criteria*					
		Soil (ppb)			*GW (µg/l)*		
		20X Drinking Water	*20X GSI Value*	*Direct Contact*	*Health Based*	*Aesthetic*	*GSI Value*
BTEX		24	1,200	13,000	1.2	NA	60
Benzene		16,000	2,200	1.7E+07	1,500	790	110
Toluene		1,500	620	7.5E+06	680	74	31
Ethylbenzene		46,000	1,600	8.6E+07	2,300	5,000	81
Xylene							
PNAs							
Acenaphthene		24,000	--	4.50E+07	1,200	NA	--
Acenaphtylene		500	--	9.30E+05	25	NA	--
Anthracene		1.40E+05	2.20E+06	2.60E+05	7,000	NA	1.10E+05
Benzo(a)anthracene		N/A	N/A	180	0.0049	NA	0.31
Benzo(a)pyrene		N/A	N/A	180	0.0049	NA	0.31
Benzo(b)fluoranthene		N/A	N/A	180	0.0049	NA	0.31
Benzo(g,h,i)perylene		N/A	N/A	9.30E+05	25	NA	--
Benzo(k)fluoranthene		N/A	N/A	180	0.0049	NA	0.31
Chrysene		N/A	N/A	180	0.0049	NA	0.31
Dibenzo(a,h)anthracene		N/A	N/A	180	0.0049	NA	0.31
Fluoranthene		17,000	7,400	3.10E+04	840	NA	370
Flourene		17,000	2.80E+05	3.10E+07	840	NA	14,000
Indeno(1,2,3-cd)pyrene		N/A	N/A	180	0.0049	NA	0.31
Naphthalene		5,000	580	9.30E+06	250	NA	29
Phenanthrene		500	--	9.30E+05	25	NA	--
Pyrene		10,000	2.20E+05	1.90E+07	520	NA	11,000
Metals							
Lead	21,000	-- (1)	-- (1)	4.00E+05	4 (1)	NA	8

Notes:

NA = not available.
N/A = not applicable (i.e. direct contact value is considered to be protective).
-- = chemical has not yet been evaluated.
(1) = background concentration may be substituted if it is higher than the Type B criteria.

APPENDIX A

MDNR LETTER DATED NOVEMBER 19, 1993

NATURAL RESOURCES COMMISSION
JERRY C. BARTNIK
LARRY DEVUYST
PAUL EISELE
JAMES P. HILL
DAVID HOLL
JOEY M. SPANO
JORDAN B. TATTER

COPY

BLDG 33

JOHN ENGLER, Governor

DEPARTMENT OF NATURAL RESOURCES

ROLAND HARMES, Director

SOUTHEAST MICHIGAN DISTRICT OFFICE
ENVIRONMENTAL RESPONSE DIVISION
38980 West Seven Mile Road
Livonia, Michigan 48152

PRODUCT ENG'G

November 19, 1993

Hole filled in
what is plan, Shallow test sample

- Outside of NWCS project area
NWCS Report - Area 30
CAN'T TELL IF DNR WAS NOTIFIED ?

Mr. Keith West
General Motors Corporation
Remediation Group
2860 Clark Street
Detroit, MI 48232

Re: Underground Storage Tank Release at GM Truck & Bus Group - Product Engineering, 660 South Boulevard, Pontiac, MI, Facility ID #8812, Incident # C-1245-91.

Dear Mr. West,

The Michigan Department of Natural Resources (MDNR) staff have completed the review of the file for the above referenced facility. The most recent document in the file is the July 30, 1991 45-Day Report, which proposes an investigation to determine the extent of contamination with regard to this incident.

According to this file, it is evident that soil, and possible groundwater contamination, remain in the subsurface near the two 12,000 gallon USTs. You are hereby requested to initiate the investigation at this location according to the Leaking Underground Storage Tank (LUST) Act, P.A. 478 as amended by Act 213, October 26, 1993.

The investigation should be conducted according to the following criteria:

1. The vertical and horizontal extent of soil contamination needs to be defined at this site.

2. Determine whether or not groundwater has been impacted, then proceed with the necessary hydrogeological investigations as appropriate. NWCS- bedrock water has been impacted

3. The initial abatement report indicated that diesel fuel was present during the tank repair, and that a 10,000 gallon diesel UST was present prior to the two 12,000 gallon USTs. Therefore, all samples should be analyzed for PNA's in addition to BTEX and Lead.

MDNR staff are no longer required to review investigation plans, corrective action plans, or closure reports associated with LUST sites. The responsibility for developing, submitting and implementing a plan or report is now incumbent upon the Consultant as defined in the amended LUST/MUSTFAA legislation.

Please notify this office, in writing, seven days prior to initiating any work, to provide staff with the opportunity to monitor all site activities.

This should not be construed as a sign-off on all investigations or corrective actions that may be necessary at this site.

If you have any questions regarding this matter, please contact Paul Owens at (313) 953-1534.

Sincerely,

Oladipo Oyinsan
Southeast MI District Supervisor

cc: Tom Kohl, CTH, MDNR-BRD
Paul Owens, MDNR-ERD

APPENDIX M

J-LOT STUDY AREA

APPENDIX M.1

J-LOT WORK PLAN

CRA
Consulting Engineers

CONESTOGA-ROVERS & ASSOCIATES LIMITED
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510 Colby Office Fax: (519) 884-0525
(519) 725-3313 Bathurst Office (519) 725-1394

November 2, 1994 Reference No. 5770

Mr. G. Keith West
General Motors Corporation
Arogonaut "A" - 1004H
485 West Milwaukee Avenue
Detroit, Michigan
U.S.A. 48202-3220

Dear Mr. West:

Re: Final EOC/EECA Work Plan
J-Lot, Pontiac Central Manufacturing Facility
Pontiac, Michigan

We have enclosed two copies of the Final EOC/EECA Work Plan for the J-Lot Site at the Pontiac Central Manufacturing facility in Pontiac, Michigan, for your files.

Please feel free to contact our office should any questions or comments arise.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Renato Pasqualoni, P.Eng.

RP/bjr/26
Encl.
c.c. Glenn Turchan (CRA)
Frank Ring (CRA)

WORK PLAN FOR EXTENT OF CONTAMINATION STUDY/ENGINEERING EVALUATION AND COST ANALYSIS (EOC/EECA)

J-Lot Site (Site)
Pontiac Central Manufacturing Facility
Pontiac, Michigan

NOVEMBER 1994

REF. NO. 5770 (11)

This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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APPENDIX A	ERM REPORT

1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) has been retained by General Motors Corporation (GM) on behalf of the Pontiac Central Manufacturing Facility (Facility) to prepare a Work Plan (Work Plan) for an Extent of Contamination Study/Engineering Evaluation and Cost Analysis (EOC/EECA) for the area known as the J-Lot Site (Site). The Site is located at the Central Manufacturing Facility in Pontiac, Michigan. The Facility location is presented on Figure 1.1. A plan of the Facility is presented on Figure 1.2, indicating the location of the Site. Figure 1.3 presents a Site plan of the Site.

The Site is a former parking lot area used to temporarily store newly manufactured vehicles prior to transportation to sales facilities.

1.1 EXTENT OF CONTAMINATION (EOC) STUDY OBJECTIVES

The following objectives are identified for the EOC:

1. investigate the nature and extent of contamination (including TCL/TAL chemical analysis) across the entire area of the Site;
2. investigate the groundwater conditions at the Site; and
3. investigate the nature and extent of the underlying clay.

Information obtained during the EOC study may indicate that additional field investigations must be completed to define end points with sufficient detail to complete the EECA. This determination may be made either during planned EOC field activities or during the evaluation of collected data, as approved by GM.

1.2 ENGINEERING EVALUATION AND COST ANALYSIS (EECA) OBJECTIVES

The objectives of the EECA are to:

1. assess the Site conditions, defined during the EOC, to the extent sufficient to complete an evaluation of possible response alternatives, and
2. complete an evaluation of possible response alternatives.

1.3 WORK PLAN ORGANIZATION

This Work Plan is organized into the following sections:

Section 2.0 - Background Information
- presents Site historical and geologic information;

Section 3.0 - Site Environmental Conditions
- presents the known environmental conditions of the Site including the results of a recent preliminary investigation conducted by CRA;

Section 4.0 - Extent of Contamination Study/Engineering Evaluation and Cost Analysis (EOC/EECA)
- outlines the EOC/EECA investigative work plan tasks; and

Section 5.0 - Schedule
- presents the project schedule.

Additionally, a ***"Health and Safety Plan"*** (HASP) and ***"Quality Assurance Project Plan"*** (QAPP) have been prepared to support the EOC activities identified in this Work Plan. The HASP and QAPP are presented under separate cover.

It should be noted that the protocols and procedures identified within this Work Plan, and associated HASP and QAPP, have been

prepared in a manner consistent with U.S. EPA and MDNR guidance. This will ensure that an appropriate standard of practise is adhered to through the completion of the EOC/EECA.

2.0 BACKGROUND INFORMATION

The purpose of this section is to provide a general overview of the Site, as well as the geologic and hydrogeologic setting.

2.1 LOCATION AND HISTORY

The Site is located in an industrial area which is bordered to the south by South Boulevard, to the north by a Government Warehouse, and to the east and west by vacant properties.

The Site is part of the GM Central Manufacturing Facility which was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

The Site is located on the north side of South Boulevard, north of the Facility and west of Opdyke Road. It was reported by GM personnel that the Site was formerly a low lying area which was filled to its present grades to support the Site's use as a parking lot.

2.2 FACILITY GEOLOGY

The Facility and Site are located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock, which is reported to be Early Mississippian-age Coldwater Shale.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and Rouge River drainage basins. Construction activities at the Facility have moved the divide, and the Facility now drains to the Clinton River via the Murphy Drain.

Shallow native soil materials underlying the Site are predominantly comprised of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials.

2.3 FACILITY HYDROGEOLOGY

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the GM Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150, and 210 feet below ground surface (bgs) and are approximately 7, 25, and 50 feet thick, respectively.

The "120-foot aquifer" was identified in the well log record of supply well number 7 (Building 43) as a sand aquifer. This aquifer is not utilized by the Facility for water supply.

The "150-foot aquifer" was used for industrial water supply by the Facility, by means of two wells [Well Number 3 (Building 29) and Well Number 6 (Building 66)] which were screened in this aquifer. The material in this aquifer unit was identified to consist of medium to fine grained sand.

The "210-foot aquifer" was also utilized by the Facility for industrial water supply (Well Number 7). This aquifer is also a known local source for municipal water supply.

Shallow groundwater has been encountered in several areas of the GM Facility, generally at depths of 10 to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower aquifers.

3.0 SITE ENVIRONMENTAL CONDITIONS

The Site has been the focus of two preliminary soil investigations. These investigations have collectively identified the existence of extensive soil fill with construction debris at the Site.

3.1 ERM INVESTIGATION

An initial subsurface investigation of the Site was conducted by Environmental Resources Management, Inc. (ERM) in May 1994. A report entitled "Limited Phase II Environmental Assessment, 5, North Parcels", dated August 1994, was prepared by ERM, and is provided in Appendix A.

The ERM investigation identified the extent of "Potential Petroleum Contamination" at the Site by means of a series of boreholes placed throughout the areal extent of Site. However, the report indicates that the extent of contamination was not suitably defined, and that additional investigation was warranted.

3.2 CRA INVESTIGATION

CRA was retained by GM to carry out additional investigation of the Site.

An initial investigation was carried out by CRA to further define the extent of affected soils identified by ERM. The investigation was conducted on August 22 and 23, 1994, and consisted of 24 test pit excavations completed using a hydraulic backhoe. The test excavations were located as presented on Figure 3.1.

A log of the subsurface conditions at each excavation was prepared by CRA. Samples for chemical analysis were collected at the

discretion of CRA's field engineer. The samples were submitted for the chemical analysis of various analytes.

A summary of the test excavations is presented on Table 3.1. Table 3.2 presents a summary of the results of chemical analysis.

In general, the excavations identified mixed rubble fill and soil to a depth ranging from 1 to 13 feet bgs. Figure 3.2 identifies the areas of suspect fill. Such materials included ash, drum carcasses, foundry sand, diesel odors, paint, filter cloth, tar and tar paper, and wood products suspected to contain creosote.

Table 3.2 indicates that several of the samples contained constituents which were reported to exceed Type B criteria. Since the samples were collected from the fill materials, the analytical results indicate that the fill is a possible source of contaminants. Additional investigation is warranted to define the extent of fill, and to determine the effect on native soils and groundwater.

3.3 DATA GAPS

The investigations conducted to date have identified contaminant sources at the Site. The purpose of additional investigation will be primarily to identify possible migration pathways. As a result, the following media will be investigated:

i) the clay stratum directly below the contaminated fill;
ii) perched water quality and flow direction; and
iii) clay stratum at depth.

The Scope of Work for the investigation is presented in Section 4.0.

4.0 EXTENT OF CONTAMINATION STUDY/ENGINEERING EVALUATION AND COST ANALYSIS SCOPE OF WORK (SOW)

The following sections outline the Scope of Work (SOW) for conducting the Extent of Contamination Study/Engineering Evaluation and Cost Analysis (EOC/EECA) at the Site. The EOC/EECA study has been divided into the following Task Groups:

Task Group A. Pre-Investigation Tasks
Task Group B. Investigation Tasks
Task Group C. Reporting

The individual Tasks include:

A. Pre-Investigation Tasks

Task A.1 - Work Plan Preparation
Task A.2 - Subcontractor Procurement
Task A.3 - Utility Clearances
Task A.4 - Site Survey and Base Plan Preparation

B. Investigation Reports

Task B.1 - Boreholes/Soil Sampling
Task B.2 - Monitoring Wells/Groundwater Sampling
Task B.3 - Data Validation
Task B.4 - Data Evaluation

C. Reporting

Task C.1 - EOC Report
Task C.2 - EECA Preparation and Report

4.1 PRE-INVESTIGATION TASKS

4.1.1 Task A-1 - Work Plan Preparation

A Work Plan to conduct the EOC/EECA at the Site has been prepared and is presented in this document.

A Quality Assurance Project Plan (QAPP) has been prepared and included as an integral part of the Work Plan. The QAPP identifies the protocols for on-Site data acquisition activities, and includes sampling, preservation, chain-of-custody, field testing, project documentation, analytical procedures and quality control. The QAPP complies with the requirements of the U.S. EPA Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (EPA QAMS-005/8) and the Region V Model QAPP (1991).

A Site-specific Health and Safety Plan (HASP) has been prepared and included as an integral part of the Work Plan. The HASP has been prepared based on the specific requirements defined in 29CFR1910.120. All project personnel, subcontractors and Site visitors must comply with the Site HASP. In addition, CRA requires all subcontractors to prepare and enforce their own Health and Safety Plans that are, at a minimum, as protective as the Site HASP.

4.1.2 Task A.2 - Subcontractor Procurement

Prior to the initiation of field activities, CRA will procure the following subcontractors which are necessary to implement the investigative SOW contained herein:

Subcontractor	*Activities*
• Surveyor	Survey Site and Prepare Base Plan
• Driller	Boreholes/Monitoring Wells
• Analytical Laboratory	Chemical Analyses of Soils and Groundwater
• Geotechnical Laboratory	Grain Size, Hydraulic Conductivity Testing on Soils

4.1.3 Task A-3 - Utility Clearances

Utility clearances are necessary prior to commencing drilling at the Site, and will include:

- Underground and above ground electric power cables;
- Gas lines;
- Telephone cables;
- Municipal water and sewer piping/connections; and
- Television cables.

4.1.4 Task A.4 - Site Survey and Base Plan Preparation

The existing Site plan (Figure 1.3) was prepared from a 1990 aerial photograph of the Site and provides a general outline of the Site features. To provide a more accurate description of the Site, a topographic base plan will be prepared using current aerial photographic means, and a scale of 1 inch = 100 feet. The contour intervals will refer to the geodetic datum. The Site plan will be based on aerial mapping techniques which will be verified utilizing traditional land surveying methods. The Site plan will be developed electronically utilizing an Autocad system. All sampling locations will be plotted on this topographic Site plan as the EOC proceeds.

4.2 INVESTIGATION TASKS

4.2.1 Task B.1 - Boreholes/Soil Sampling

In order to characterize the surface and subsurface conditions within and below the fill materials, seventeen boreholes will be drilled at the locations shown on Figure 4.1. Eleven of the boreholes will be advanced to a depth of approximately 5 to 10 feet into the native clay soils which underlie the surficial fill material. Six of the boreholes will be advanced approximately 30 feet into the clay to provide confirmation that it is an aquiclude of low hydraulic conductivity. The exact location and number of boreholes will be based upon the actual field conditions encountered.

The boreholes would be advanced utilizing dry drilling methods, such as Hollow-Stem Augers (HSA). On completion, the boreholes will be filled with cement bentonite grout to the surface of the native soils, and with soil cuttings to the ground surface.

At each borehole, soil samples will be collected on a continuous basis using conventional 2-foot long, 2-inch inside diameter, split-spoon samplers (or as required based upon geologic conditions). Each sample will be examined to identify soil types and any visible chemical staining or discoloration. A portion of the sample (approximately 4 ounces) will be placed in an 8-ounce sample jar and covered with aluminum foil. Each jar will be maintained at a temperature of about 20°C for 1 hour to permit volatile organic constituents to volatilize into the headspace. The volatile organic concentration in the head space will be measured by inserting a PID probe through the foil. Continuous split-spoon soil sampling shall continue until two successive apparently unimpacted split-spoon samples are obtained.

Approximately five undisturbed samples of clay will be obtained using a thin-walled "Shelby Tube" sampler from within the deeper borehole locations. Each Shelby Tube sample will be submitted to a geotechnical testing laboratory where it will be carefully extruded, examined and characterized by grain size analysis. A falling head permeability test will

then be conducted on an undisturbed portion of the sample in order to determine the vertical hydraulic conductivity of the clay layer below the Site.

In order to provide a vertical profile of potential contamination, three or four fill/soil samples will be collected from each borehole and submitted for chemical analysis. The chemical analyses will serve to provide additional definition regarding the exact nature of the contamination. Samples will be collected using the following protocol:

1. One or two samples from the fill materials based on visible or PID identification of contaminants;
2. One sample from a depth of approximately 1 to 2 feet into the native clay soil stratum; and
3. The last sample collected from the bottom of the borehole.

Samples will be submitted for the following chemical analyses.

TCL/TAL	1 per borehole
TCL-VOC, TAL	3 per borehole

All equipment/machinery will be decontaminated prior to moving to each boring location. Sampling equipment will be decontaminated by steam cleaning or an Alconox scrub followed by rinses with clean water and then deionized water. All water used during decontamination procedures will be collected and containerized in 55-gallon drums. On completion of the field work the drums will be sampled and characterized, prior to disposal as required by State and Federal Laws.

All samples will be collected, preserved, documented and handled using procedures and protocol defined in the HASP and QAPP.

4.2.2 Task B.2 - Monitoring Wells/Groundwater Sampling

Six groundwater monitoring wells will be installed within the deep boreholes proposed in Section 4.2.1, as indicated on Figure 4.2. The wells will be screened through any perched groundwater zone encountered.

All monitoring wells installed at the Site will consist of 2-inch diameter stainless steel riser pipe with a 5-foot long stainless steel well screen, as presented on Figure 4.3. The screens will be packed with a clean quartz sand where the natural formation does not collapse. The sand pack will be extended to 2 feet above the top of the screen. A 2-foot bentonite pellet plug will be placed on the sand pack. The remainder of the boring annulus will be backfilled with a cement bentonite grout. A lockable protective cap will be installed at the ground surface. Each monitoring well will be provided with knockdown protection. The details of each monitoring well installation will be outlined on a monitoring well construction log.

Each monitoring well will be developed following the completion of the installation. This development will be completed in accordance with requirements defined in the QAPP.

4.2.2.1 Groundwater Sampling

Two rounds of groundwater sampling will be completed. The first round will be conducted after the monitoring wells are developed. During the first round, all monitoring wells will be sampled for unfiltered TCL analysis and filtered TAL inorganics analysis.

The second round of sampling will be conducted for a Site-specific parameter list (SSPL). The SSPL will be based on first round groundwater monitoring results and will be subject to approval by GM.

Static water level measurements will be obtained throughout the EOC study from each monitoring well prior to purging and sampling, using an electronic tape. The water level data will be used to

calculate the water column height in the well casing as well as to determine on-Site groundwater flow directions. A minimum of five well casing volumes will be purged from each well prior to sampling. The pH and conductivity of the well water measurements will be obtained following removal of each casing volume to determine when water quality is stabilizing. Well purging may be conducted by either an electric pump or a stainless steel (or teflon) bailer. A stainless steel (or teflon) bailer will be used to obtain samples following completion of purging. The QAPP provides additional details on the purging of wells, sample collection, preservation, documentation and handling. All QAPP quality control and decontamination procedures will be followed.

The results of the water level measurements will be used to determine groundwater gradients and flow directions.

4.2.2.2 Hydraulic Parameter Testing

In situ hydraulic parameter testing will be conducted in all new wells. The testing will be done following completion of first round water sampling, upon recovery of the wells to their static water level.

The hydraulic parameter testing will be conducted by either insertion of a slug (slug test), or removal of a volume of water (bail test), and measurement of the rate of recovery to static levels. Water level measurements will be obtained by either an electronic tape, or a pressure transducer and an electric data logger. All equipment will be decontaminated prior to each test. Additional test details and decontamination procedures are provided in the QAPP.

The results of the hydraulic parameter testing will be used to estimate the horizontal hydraulic conductivity to determine if significant flow is possible through the perched zone. Either the Hvorslev (1951) or Bouwer and Rice (1976) methods will be used to calculate the hydraulic conductivity. Groundwater flow velocities will be estimated based on the hydraulic conductivities and measured groundwater gradients.

4.2.3 Task B.3 - Data Validation

U.S. EPA Functional Guidelines for Evaluating Organic and Inorganic Analysis will be utilized in the validation of all laboratory data. Validation will ensure that all sampling and analysis protocols outlined in the QAPP were suitably adhered to. The data validation report prepared by the project Quality Assurance Officer (QAO) will be provided in the EOC report.

4.2.4 Task B.4 - Data Evaluation

Data compilation and evaluation will be an ongoing task commencing upon the completion of the soil sampling. Data from each task will be compared to the investigation objectives. The following data evaluation activities will be conducted:

- Data Reduction/Tabulation:
  - A database of validated data will be prepared,
  - Data package tracking and data entry will be done following QAPP protocol;

- Chemical-Analytical Data Evaluation:
  - Summaries will be computed of the number of occurrences/number of samples, concentration ranges, and statistical average concentrations,
  - Significant chemical results will be plotted on figures to provide a graphical presentation of the results,
  - Summary tables of chemical-physical properties will be generated; and

- Hydrogeologic Data Evaluation:
  - Definition of Site geology and hydrogeology through the evaluation of borehole logs, monitoring well logs, groundwater level tables and the like,
  - Determination of approximate groundwater flow directions, if any, and
  - Preparation of maps and cross-sections, as appropriate.

4.3 REPORTING

4.3.1 Task C.1 - EOC Report Preparation

An Extent of Contamination (EOC) report will be prepared which presents all of the data which has been collected and evaluated. The report will provide the basis for evaluation of the scope of alternative response actions.

4.3.2 Task C.2 - Engineering Evaluation and Cost Analysis (EECA)

Following the completion of the EOC report an Engineering Evaluation and Cost Analysis (EECA) shall be completed. The activities involved in the EECA are summarized in the following subsections.

4.3.2.1 Development of Alternatives

A range of response alternatives will be developed. These alternatives will be based on the results of the EOC. Each response action alternative developed will be assessed to determine its effectiveness in meeting the response objectives established for the Site.

4.3.2.1.1 Establishment of Response Objectives

Site-specific objectives for the response actions will be developed based upon an assessment of the following:

1. Information obtained during the EOC and previous investigations which describe conditions at the Site; and
2. Public health and environmental concerns.

4.3.2.1.2 Alternative Response Actions

Response technologies will be combined and assembled into a limited number of response actions alternatives. As a minimum, the alternatives developed will include the following:

1. Alternatives for source control that would eliminate the need for long-term management;

2. Treatment alternatives that would effectively reduce the toxicity, mobility or volume of hazardous contaminants at the Site;

3. Containment alternatives that would require little or no treatment, but also provide protection of human health and welfare and the environment, primarily by preventing potential exposure or by reducing the mobility of the hazardous contaminants; and

4. The no-action alternative.

4.3.2.2 Initial Screening of Alternatives

Criteria which will be developed to screen and evaluate alternative response actions will consider the following:

1. Public health and environmental factors:

- Impacts on groundwater,
- Impacts on air;

2. Cost factors, including capital and long-term operation, maintenance and monitoring; and

3. Technical feasibility, considering:
   a) Performance based on effectiveness and useful life,
   b) Reliability based on operation and maintenance requirements and demonstrated performance,
   c) Implementability based on the relative ease of installation and time required to achieve a given level of response, and
   d) Safety.

The database developed through the EOC described in earlier sections will be thoroughly evaluated in conjunction with a review of potential soil treatment technologies in order to identify non-viable alternatives.

This initial screening will effectively narrow the list of potential response actions for the evaluation of alternatives. However, as a minimum, a range of alternatives as described in Section 4.3.2.1.2 will be preserved for further analysis.

4.3.2.3 Remedial Alternatives Evaluation

The objective of the Remedial Alternatives Evaluation is to complete screening of the assembled response action alternatives through detailed analysis.

4.3.2.3.1 Detailed Analyses of Alternatives

This subtask concludes the screening process for alternative response actions by performing detailed analyses of the response

alternatives remaining after the initial screening. Each detailed analysis will consist of the following:

1. technical analysis,
2. environmental analysis,
3. public health analysis,
4. institutional analysis, and
5. cost analysis.

These categories are discussed in the following subsections. Once the detailed analyses are complete, the alternatives will be compared on the basis of the preliminary response objectives identified in Section 4.3.2.1.1.

A matrix will be developed to assist in the evaluation of response actions. Factors upon which the alternatives will be compared will include:

1. cost (total),
2. health impacts,
3. environmental impacts,
4. reliability and implementability,
5. degree of compliance with ARARs and technical regulatory requirements, and
6. community effects.

Technical Analysis

The technical analysis of each response alternative will involve the following:

1. description of the alternative,
2. compliance with other environmental programs,
3. operation, maintenance and monitoring requirements,
4. degree of permanence,
5. health impacts during implementation,

6. time for implementation including phasing of components, and
7. special engineering or Site preparation requirements.

Environmental Analysis

The environmental analysis will involve the preparation of an environmental evaluation for each of the response alternatives. The environmental assessment will include the following:

1. an evaluation of each alternative's environmental effects;
2. analysis of measures to mitigate adverse effects,
3. physical or legal constraints and compliance with regulatory requirements,
4. the results of the no-action alternative will be described,
5. the level of exposure to contaminants and the reduction over time will be described, and
6. for source control measures or when criteria, standards or guidelines are not available, the comparison will be made based on the relative effectiveness.

Public Health analysis

The public health analysis of each response alternative will involve the following:

1. assessing of alternatives relative to the degree to which they mitigate long-term exposure to residual contamination as well as their relative protection of public health during and after remediation,
2. description of the levels and characteristics of contaminants, potential exposure routes and the potentially affected population, and
3. comparison of the relative reduction to adverse public health impact to the non-action alternative.

Institutional Analysis

The institutional analysis will involve the comparison of each alternative on the basis of regulatory requirements, permits and community relations.

Cost Analysis

The cost analysis will require that a present worth cost, consisting of both capital and annual operating, maintenance and monitoring costs, be computed for each alternative.

4.3.2.3.2 Preferred Response Action

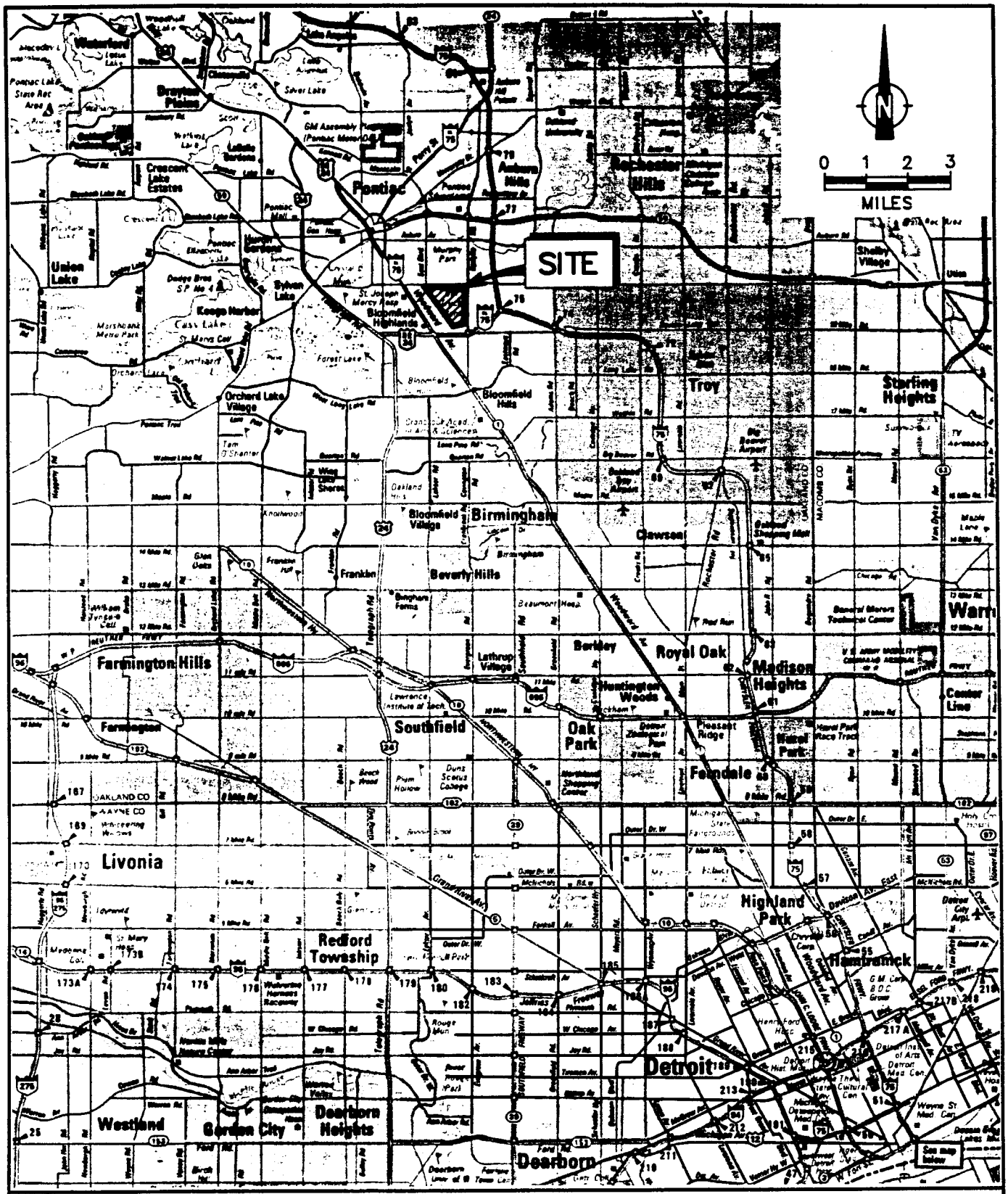
The EECA will recommend the preferred alternative response action or combination of actions for the Site. The preferred response will:

1. be protective of public health, welfare and the environment,
2. attain or waive (consistent with the NCP and MERA) applicable or relevant and appropriate Federal, State and Municipal public health and the environmental requirements identified for the Site, and
3. be cost effective.

5.0 SCHEDULE

The schedule for the EOC/EECA is provided on Figure 5.1. It should be noted, however, that the schedule will be necessarily modified dependent upon review and approval periods required by GM.

As indicated on Figure 5.1, the preparation for and implementation of the EOC field investigation will begin after GM approval of the Work Plan (subject to weather conditions).



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

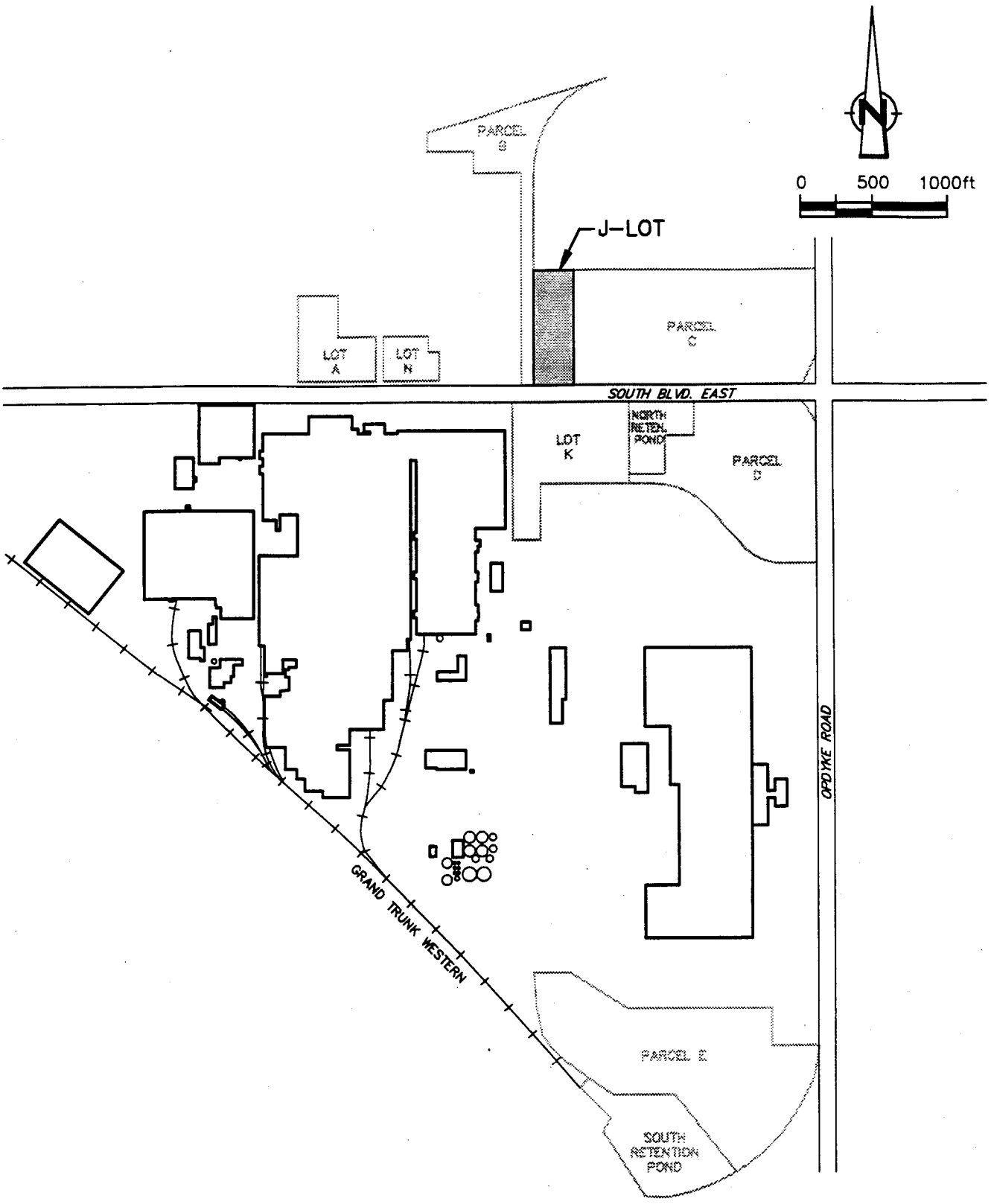


figure 1.2

SITE LOCATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) OCT 06/94(W) REV.0 (P-43)

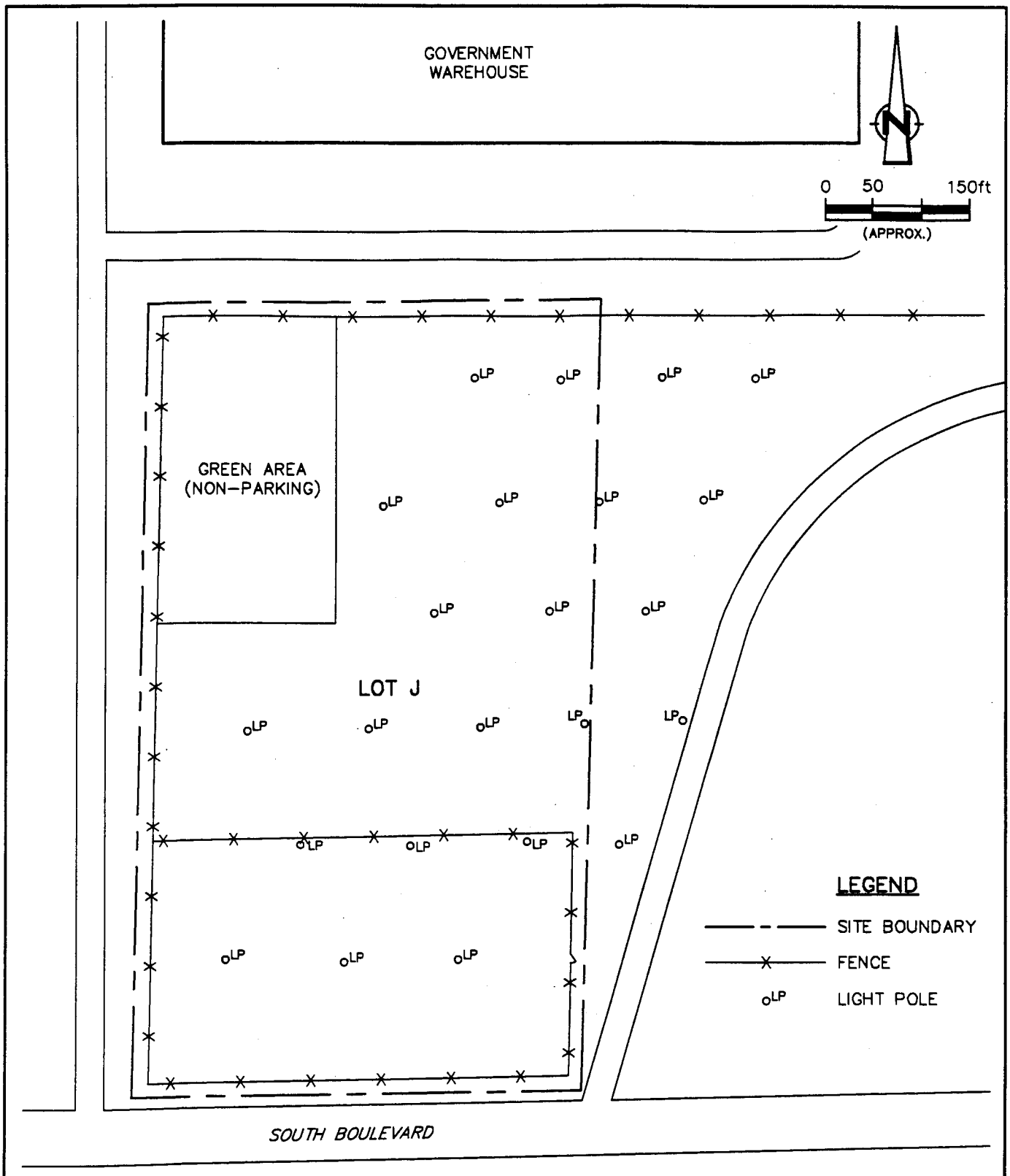


figure 1.3

SITE PLAN
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) OCT 06/94(W) REV.0 (P-44)

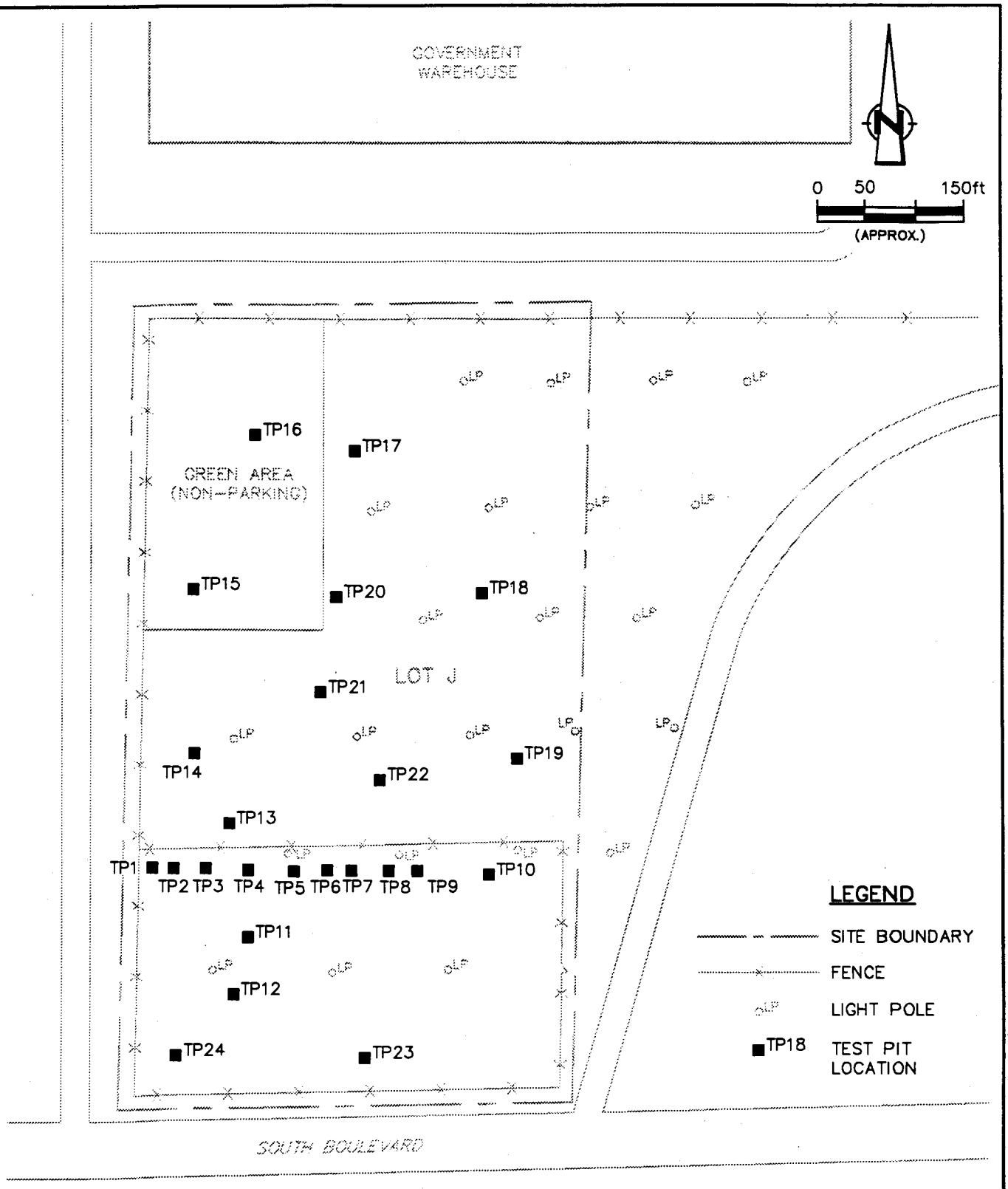


figure 3.1

TEST PIT LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) OCT 06/94(W) REV.0 (P-45)

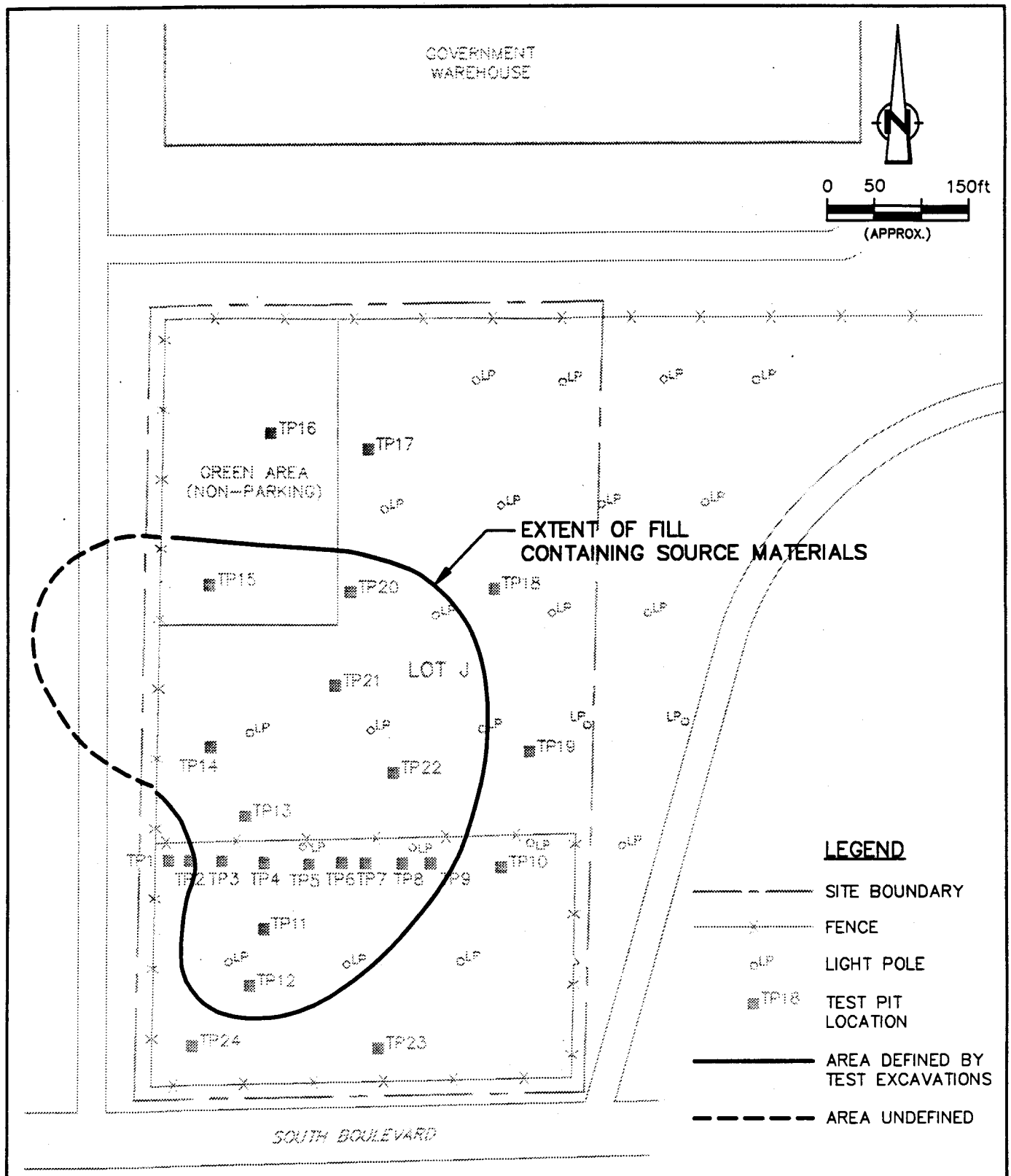


figure 3.2

EXTENT OF FILL CONTAINING SOURCE MATERIALS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) OCT 06/94(W) REV.0 (P-46)

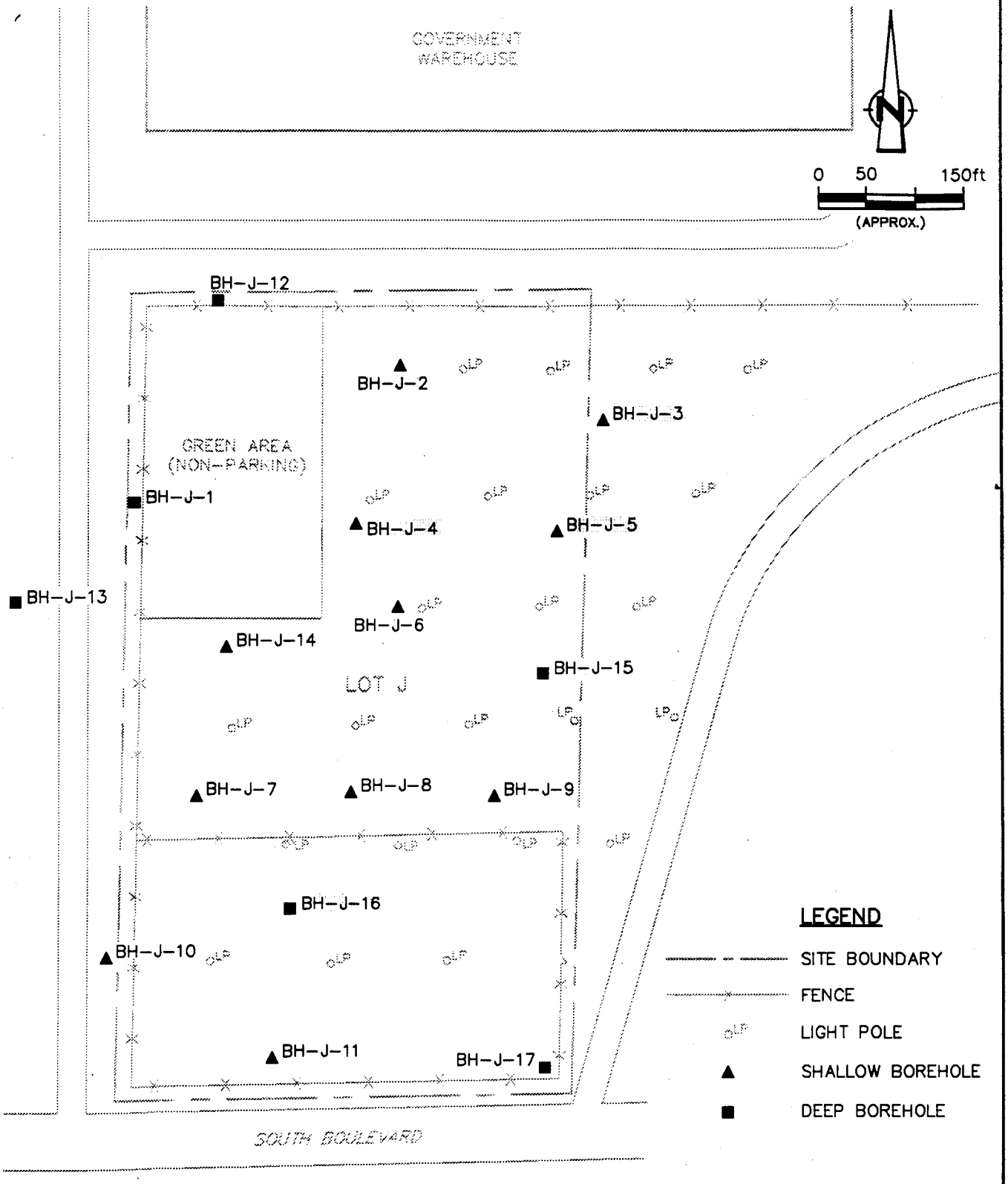


figure 4.1

PROPOSED BOREHOLE/SOIL SAMPLING LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) NOV 02/94(W) REV.0 (P-47)

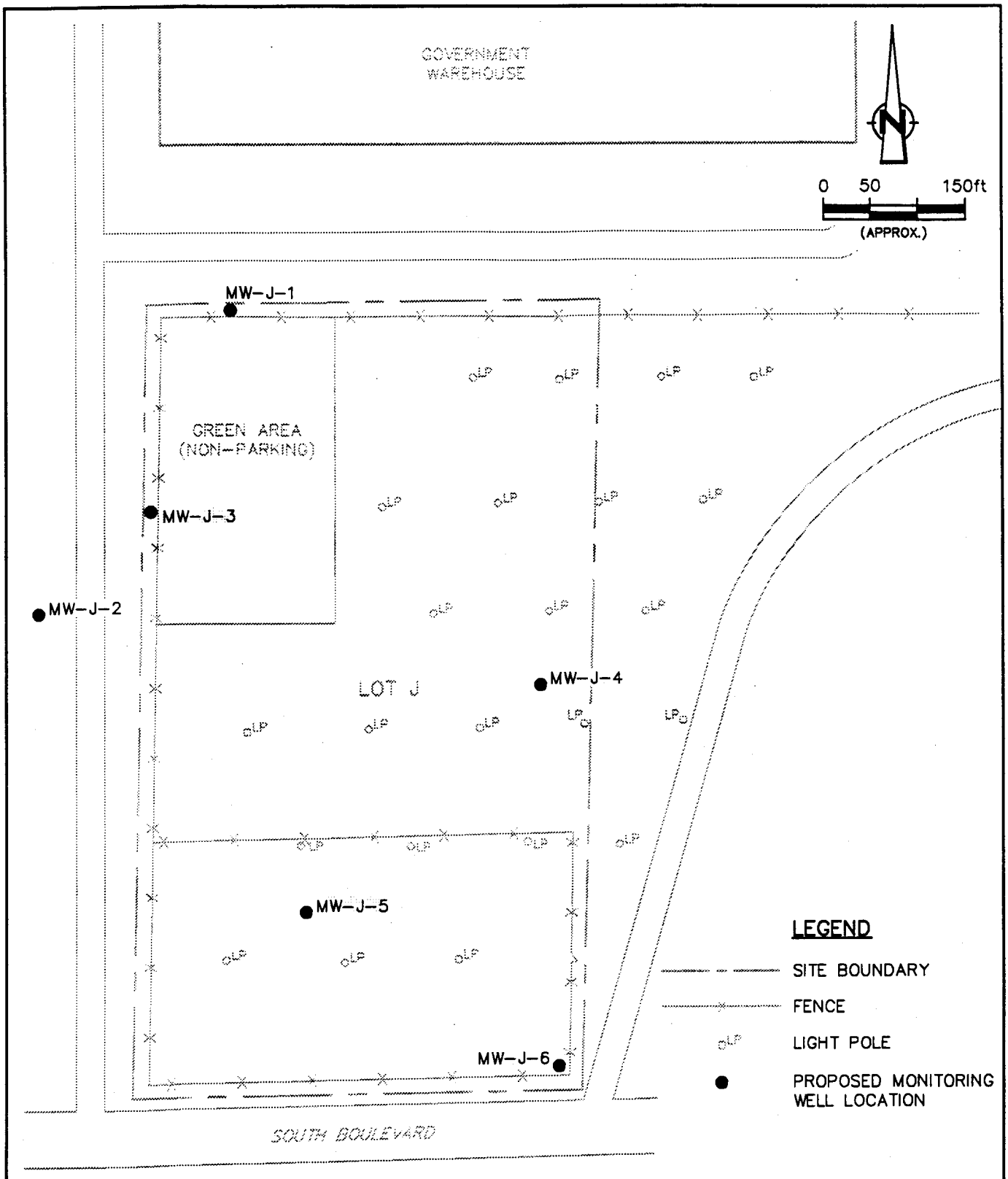


figure 4.2

PROPOSED MONITORING WELL LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) NOV 02/94(W) REV.0 (P-48)

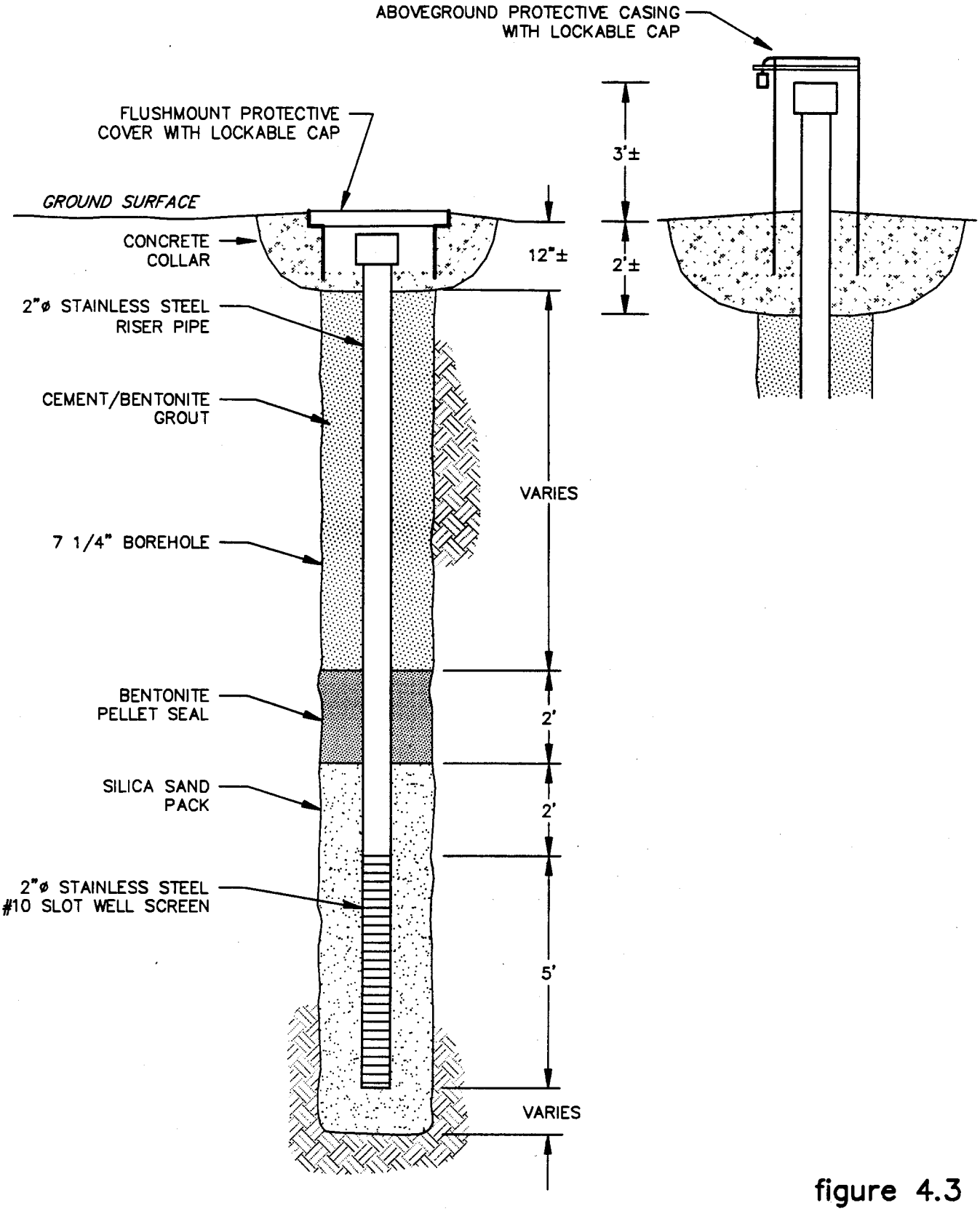
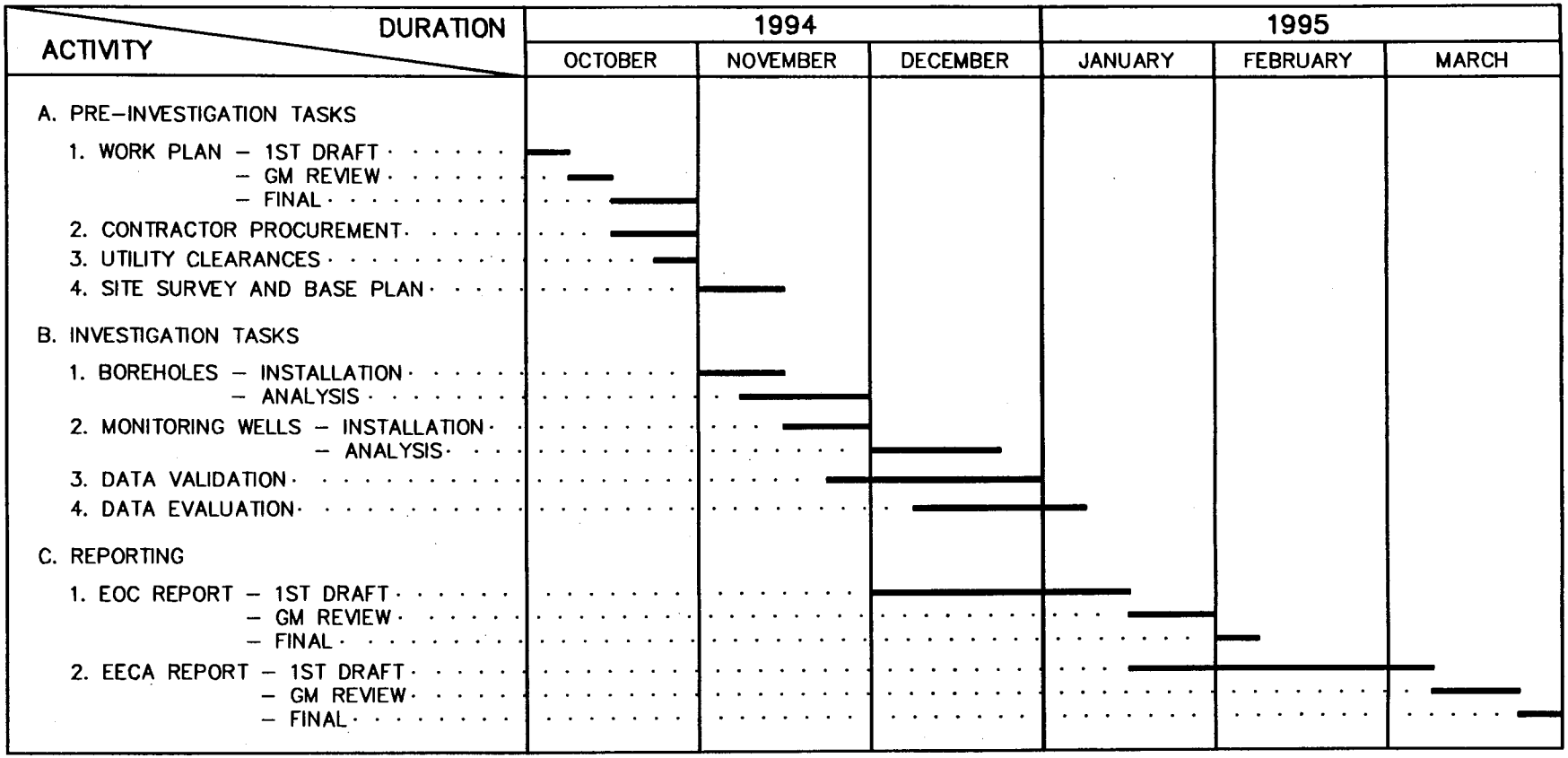


figure 4.3

TYPICAL MONITORING WELL DETAIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) OCT 06/94(W) REV.0 (D-01)



LEGEND

CONTINUOUS ACTIVITY

figure 5.1

SCHEDULE
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (11) NOV 02/94(W) REV.0 (S-03)

TABLE 3.1

TEST EXCAVATIONS SUMMARY
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample/Depth (ft bgs)*	*PID (ppm)*
TP1	0-2	Brown sand and stone (Fill)		
	2-10	Debris - fire brick, metal, concrete, etc. No black soil or odor (Fill)		
TP2	0-2	Brown sand and stone (Fill)		
	2-6	Debris - some black sand, little odor (Fill)		
TP3	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	
	9-11	Green/grey sandy clay Dry yellow silt (Fill)	FR305/11	
	11-13	Brown mottled clay		
TP4	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	
	9-11	Green/grey sandy clay (Fill)	FR304/11	
	11-13	Brown mottled clay		
TP5	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	
	9-11	Green/grey sandy clay (Fill)		
	11-13	Brown mottled clay		
TP6	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	
	9-11	Green/grey sandy clay (Fill)		
	11-13	Brown mottled clay		

TABLE 3.1

TEST EXCAVATIONS SUMMARY
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample/Depth (ft bgs)*	*PID (ppm)*
TP7	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)		
	9-11	Green/grey sandy clay (Fill)		
	11-13	Brown mottled clay		
TP8	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)		
	9-11	Green/grey sandy clay (Fill)		
	11-13	Brown mottled clay		
TP9	0-2	Brown sand and stone (Fill)		
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)		
	9-11	Green/grey sandy clay (Fill)		
	11-13	Brown mottled clay		
TP10	0-2	Brown sand and stone (Fill)		
	2-12	Brown sand and concrete (Fill)		
TP11	0-2	Brown sand and stone (Fill)		
	2-18	Black sand (Fill)	FR301/9	
	18	Clay	FR303/18	
TP12	0-2	Brown sand and stone (Fill)		
	2-18	Black sand (Fill)		
	18	Clay		

TABLE 3.1

TEST EXCAVATIONS SUMMARY
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample/Depth (ft bgs)*	*PID (ppm)*
TP13	0-2.5	Damp and loose brown sandy silt with several cobbles (Fill)		0
	2.5-13	Ash, metal, foundry sand, yellow and green paint Yellow staining at 12 ft BGS Occasional strong odor, petrochemical and solvent in nature (Fill)	RP1/12	0-25
TP14	0-2.5	Damp and loose brown sandy silt (Fill)		0
	2.5-11	Foundry sand and soil matrix containing paint, filter cloth, tar, tar paper, small crushed drums and other metal Filter material (Fill)	RP2	0-15
	11-13	Moist and soft clayey brown silt		0
TP15	0-2	Damp and loose brown sandy silt (Fill)		0
	2-4.5	Dry and loose, fine black foundry sand (Fill)		0
	4.5-5.5	Brown sand matrix containing construction rubble including bricks and mortar (Fill)		0
	5.5-8	Damp and loose brown clayey silt (Native, possibly weathered till)		0
TP16	0-6.5	Sand and silt topsoil (Fill)		0
	6.5-11	Moist grey sandy to clayey silt Strong methane/swamp odor		0
TP17	0-1	Soils with 6 inches of foundry sand (Fill)	RP3/0.5	0
	1-7	Moist and loose brown sandy silt		0
TP18	0-9.5	Moist and loose brown sandy silt (Fill) Water seepage at 6-foot depth		0
	9.5-11	Moist grey sandy to clayey silt Strong methane/swamp odor		0

TEST EXCAVATIONS SUMMARY
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample/Depth (ft bgs)*	*PID (ppm)*
TP19	0-5	Damp and loose brown sandy silt soil matrix with building rubble including brick, concrete, mortar, plastic, glass, etc. No odor (Fill)		0
	5-5.5	Moist and loose black sandy topsoil		0
	5.5-8	Moist and loose brown sandy silt		0
TP20	0-3.5	Brown sandy silt fill with some black foundry sand near the surface (Fill)		0
	3.5-12	Moist and soft clayey silt till, mottled grey and brown		0
TP21 South End of Excavation	0-4	Loose and damp brown sandy silt with occasional creosoted wood blocks (Fill)		0
	4-5	Gravel from former parking lot (Fill)		0
	5-10	Damp and loose brown sandy silt soil matrix with paint, crushed drums, brick, creosoted wood blocks, glass, plastic, concrete, tar paper, asphalt, etc. (Fill) Grey and yellow paint materials	RP4	0
	10-14	Soft and moist grey clayey silt till		0
North End of Excavation	0-4.5	Damp and loose dark brown sandy silt		0
	4.5-6.5	Moist and loose brown sandy silt		0
	6.5-10	Soft and moist grey/green clayey silt till No odor		0
TP22	0-3.5	Fill - dark brown sandy silt fill with occasional bricks (Fill)		0

TEST EXCAVATIONS SUMMARY
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample/Depth (ft bgs)*	*PID (ppm)*
	3.5-5	Gravel from former parking lot with a 2-inch steel conduit of unknown origin (Fill)		0
	5-11.5	Foundry sand matrix with cinder blocks, tar, creosoted wood blocks No odor (Fill)	RP5	0
	11.5-13.5	Black sandy, peaty topsoil		0
	13.5-16.5	Soft and moist grey clayey silt No odor		0
TP23	0-10.5	Damp brown sandy matrix with building rubble including bricks, roof tile, blocks, asphalt, and wood blocks (Fill)		0
	10.5-12.5	Moist brown to grey sandy to clayey silt No odor		0
TP24	0-10	Loose brown to grey sandy silt matrix with associated building rubble including blocks, brick, concrete and asphalt (Fill)		0
	10-14	Soft and moist clayey silt till No odor		0

TABLE 3.2

TEST EXCAVATION ANALYTICAL RESULTS
PONTIAC CENTRAL MANUFACTURING FACILITY

Compound	*MDNR Type A Limits*	*MDNR Type B Limits*		*MDNR Type C Limits*		*Sample Location*									
						TP 3 (9-11)	*TP 4*	*TP 3,4,5,6* (2-9)	*TP 11 (9 ft bgs)*	*TP 11 (18 ft bgs)*	*TP13*	*TP14*	*TP17*	*TP21*	*TP22*
		20X DW	DCV	Industrial	Commercial III										
Volatile Compounds (µg/kg)															
Trans-1,2-Dichloroethene		2400	1300000	2500000	3500000	ND	ND	ND	ND	51	ND	ND	ND	NA	NA
Vinyl Chloride		0.32	180	1100	1600	ND	ND	ND	ND	580	ND	ND	ND	NA	NA
Methylene Chloride		92	51000	15000	4600000	ND	ND	ND	ND	ND	37	150	45	NA	NA
Acetone		14000	7800000	15000000	2100000	140	ND	620	ND	ND	340E	ND	ND	NA	NA
cis-1,2-Dichloroethene		1500	860000	1600000	2300000	ND	ND	ND	ND	230	ND	ND	ND	NA	NA
Benzene		24	13000	85000	120000	ND	ND	ND	ND	190	54	250	ND	NA	NA
Toluene		16000	17000000	33000000	46000000	ND	ND	ND	15000	ND	58	79000E	ND	NA	NA
Ethylbenzene		1500	7500000	14000000	20000000	ND	ND	280	9000	30	12000	140000E	ND	NA	NA
Total Xylenes		5600	1.4E+08	270000000	370000000	ND	ND	900	67000	87	59000	600000E	ND	NA	NA
Base Neutral Acids (µg/kg)															
Naphthalene		5000	9300000	32000000	45000000	ND	ND	6000	14400	ND	NA	NA	NA	NA	NA
2-Methylnaphthalene		ID	ID		ID	ND	ND	ND	14000	ND	NA	NA	NA	NA	NA
Di-n-butylphthalate		17000	31000000	110000000	150000000	ND	ND	4000	ND	ND	NA	NA	NA	NA	NA
Target Analyte List (mg/kg)															
Aluminum	6900	1	ID	ID	ID	7000	7600	15000	4500	4800	7400	680	4900	1400	NA
Antimony		0.048	91	310	440	2	0.29	120	0.88	1	<6.6	<7.7	<6.7	<7.9	NA
Arsenic	5.8	0.0004	0.72	8.6	12.0	5.4	3.8	35	150	2.8	26	<13	29	25	NA
Barium	75	48	18000	63000	88000	220	41	2900	87	33	6300	6600	64	7800	NA
Berylium						0.3	0.39	0.41	2	0.21	<0.55	<0.64	<0.55	<0.66	NA
Cadmium	1.2	0.07	130	450	630	0.67	0.22	74	0.99	0.31	27	1.3	<0.56	55	NA
Calcium						24000	4600	27000	2600	60000	13000	1900	2300	32000	NA
Chromium	18	2.4	1200	1000000	1000000	12	13	940	9	12	12000	8800	9.6	13000	NA
Cobalt	6.8					7.5	6.6	36	8.8	4.5	68	37	5.8	60	NA
Copper	32	20	9800	ID	48000	10	10	2900	36	21	1700	18	17	84	NA
Iron	12000	6	ID	ID	ID	43000	18000	110000	5500	11000	33000	1400	6900	9200	NA
Lead	21	0.08	400	400	400	6.1	4.8	6100	20	7	13000	3600	20	7500	NA
Magnesium						10000	3600	8400	360	19000	6100	1000	870	3500	NA
Maganese	440	1	1200	4300	6000	2300	270	960	15	240	480	37	89	200	NA
Mercury	0.13	0.042	78	2700	3800	0.038	<0.02	0.21	<0.029	<0.02	74	NA	NA	NA	NA
Nickel	20	11	20000	68000	96000	18	14	340	18	14	74	8.6	10	21	NA
Potassium						1200	870	1100	520	730	3600	3000	340	3700	NA
Selenium	0.41	0.7	1300	4500	6300	<1.2	<1.8	<1.9	<1.9	<1.3	<11	<13	<11	<13	NA
Silver	1.0	0.66	1200	4200	5900.0	0.044	<0.036	8.9	0.055	0.076	<1.1	<1.3	<1.1	<1.3	NA
Sodium		3000	1000000	1000000.0	1000000	340	180	1100	440	170	870	900	74	330	NA
Thallium		0.012	22	60	84	<0.049	<0.053	<0.064	0.49	<0.051	NA	NA	NA	NA	NA
Vanadium		1.2	2200	7800	11000	21	22	17	26	11	30	9.5	18	27	NA
Zinc	47	46	86000	300000	420000	25	43	5300	12	49	19000	11000	27	47000	NA
Cyanide (mg/kg)	0.39	3	5700	20000	28000	NA	NA	NA	NA	NA	3.67	3.51	<0.22	1.13	<0.21

Notes:

ID - Inadequate data to develop criterion
NA - Not Analysed
ND - Not Detected

APPENDIX A

ERM REPORT

FINAL REPORT

Privileged and Confidential
Prepared at General Motors Counsel's Request

General Motors Corporation

Limited Phase II Environmental Assessment

Lot J, North Parcels

GM Truck and Bus Complex

Centerpoint

Pontiac, Michigan

August 1994

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855 Springdale Drive
Exton, Pennsylvania 19341

ERM.

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(215) 524-3500
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10 August 1994

Mr. Ralph E. Mitchell, AIA
General Motors Corporation
Truck And Bus Division
820 Opdyke Road
Pontiac, MI 48341-3123

ERM

Re: Findings - Phase II Environmental Assessment
Lot J, North Parcels
Truck and Bus Complex, Pontiac, Michigan
ERM Proposal No: P94-1328A

Dear Mr. Mitchell:

This letter report summarizes the results of a preliminary investigation performed by Environmental Resources Management, Inc. (ERM) for General Motors Corporation (GM) at Lot J of the Truck and Bus Complex, Pontiac, Michigan.

PURPOSE

This investigation was designed to provide a preliminary indication of whether cyanide or petroleum contamination existed in the near surface soils underlying Lot J. A secondary goal was to generally characterize the presence of concrete fill materials under the south half of Lot J.

INTRODUCTION

The Lot J parking area is located north of South Boulevard and the main Truck and Bus Facility and west of Opdyke Road. The lot is bordered to the east by a green, non-parking area, to the north by a government warehouse facility, and to the west by an access road to the government warehouse. A generalized site map is presented in Figure 1, Attachment 1.

The investigation consisted of advancing 14 soil borings, five borings with split spoon sampling, and nine borings for general characterization of soil materials via the auger cuttings. The first five borings were

completed on 20 May, and the remaining nine borings were completed on 24 May 1994. Boring locations are shown on Figure 2, Attachment 1.

When ground water was encountered, a PVC bailer was used to collect samples for laboratory analysis. Five soil samples and two ground water samples were sent to the laboratory for cyanide and total petroleum hydrocarbon (TPH) analyses. Drilling was performed by Mateco Drilling Company, Grand Rapids, Michigan, under contract to ERM.

ERM

Laboratory analyses were performed by Shrader Laboratories, Inc., Detroit, Michigan. ERM's proposal indicated that Shrader Lab would be compensated directly from GM. However, ERM was informed that Shrader's purchase order with GM had expired. Therefore, ERM contracted with Shrader for the analytical services and will bill GM in accordance with the Standard Terms and Conditions.

PROCEDURES

Soil borings were advanced using continuous flight hollow stem augers from a trailer mounted CME 45C drill rig. Soil samples for the first five soil borings were collected using a two-inch nominal diameter split spoon. The remaining nine borings were advanced with no split spoon sampling. Observations, changes in drilling conditions, material descriptions, boring designations, sample numbers, and blow counts were noted in the field note book.

Soil samples were composited from a selected split spoon and placed clear glass jars provided by the laboratory. One jar provided sufficient sample for both TPH and cyanide analyses.

Ground water was collected from the augers or the bore hole using a disposable PVC bailer. Water samples to be analyzed for TPH were placed in amber jars preserved with sulfuric acid, and water samples to be analyzed for cyanide were placed in polyethylene bottles preserved with sodium hydroxide. Bottles were provided, with the preservatives added, by the laboratory.

RESULTS AND DISCUSSION

Soil borings B-1 through B-5 were advanced using hollow stem auger techniques and split spoon sampling on 20 May 1994. A soil boring log summary is presented in Attachment 2. Soil borings B-6 through B-14 were advanced using hollow stem auger techniques on 24 May 1994. A soil boring log summary based on characterization of the auger cuttings is presented in Attachment 3.

ERM

A review of the boring logs from soil borings B-1 and B-2 indicate that this area is did not have any fill operations and is undisturbed. The remaining borings are all interpreted to be in disturbed or fill locations. All borings, not terminated early because of auger refusal, were interpreted to have encountered a virgin clay till at about 10 to 15 feet below grade surface throughout the site. Broken concrete was found or assumed to be present in borings B-5, -7, -8, -9, -11, -13, and -14.

Table 1 presents the results of the laboratory analysis of the five soil samples. TPH results ranged from below the 20 milligrams per kilogram (mg/kg) detection limit to 24,400 mg/kg in soil boring B-5. No cyanide was reported at the detection limit of 20 mg/kg.

Table 1 *Soil Analytical Results, Lot J Sampling*

Sample ID	Sample Type	Date	TPH (mg/kg)	Cyanide (mg/kg)
B-1-18	Split spoon	5/20/94	<20	<20
B-3-16	Split spoon	5/20/94	<20	<20
B-3-9	Split spoon	5/20/94	24	<20
B-4-13	Auger cuttings	5/20/94	40	<20
B-5-11	Split spoon	5/20/94	24,400	<20

Note:
Last number in Sample ID indicates approximate feet below grade surface of sample point.
(Example: B-1-18 was collected 18 feet below ground surface)

Ground water was found in only two soil borings, B-3 and B-8. Ground water from B-3 was collected through the augers and labeled BW-3. Ground water from B-8 was collected from the boring after the augers had been pulled, and labeled BW-8.

Table 2 presents the results from the bore water analyses for ground water from boring B-3 and B-8. Bore water from B-3 was reported to have a TPH concentration of 33 mg/kg. Note that the results are reported on a mass basis due to the high concentration of suspended solids in the sample. A kilogram is approximately equal to a liter for data conversion purposes.

ERM

Table 2 *Ground Water Analytical Results, Lot J Sampling*

Sample ID	Matrix	Date	TPH (mg/kg)	Cyanide (mg/kg)
BW-3	Bore water*	5/20/94	33	<20
BW-8	Bore water**	5/24/94	<20	<20

Notes:
* Sample was approximately 20% solids by volume (mg/kg=mg/liter)
** Sample was approximately 10% solids by volume

Based on the soil boring log summaries and the lab results, an area of potential petroleum contamination was delineated and is presented in Figure 3, Attachment 1.

CONCLUSIONS

Based on the results of this investigation, ERM has developed the following conclusions concerning Lot J:

- The "Green Area" in the northwest corner of the site does not appear to have been impacted by parking lot operations or fill materials.
- Ground water is discontinuous across the site and is interpreted to exist in "perched" conditions.
- A continuous virgin clay till material appears to underlie most, if not all of the site.

- There are indications of petroleum contamination on the west side of Lot J.
- Broken concrete was used as fill for much of the are investigated.
- The depth of fill is estimated at 10 to 15 feet below ground surface for the area investigated.

ERM

RECOMMENDATIONS

ERM recommends that GM initiate a Remedial Investigation to determine the areal and vertical extent of the petroleum contamination at Lot J. The investigation should be limited to the near surface soils (less than 20 feet below grade) unless subsequent results indicate otherwise. Samples should be analyzed for polynuclear aromatic hydrocarbon compounds.

ERM is prepared to meet with you to discuss this report, and to prepare a scope of services for continuing the investigation at this site. If you have any questions, please contact Todd King at (313) 769-6080 or Paul Morin at (610) 524-3746 at your earliest convenience.

Respectfully submitted,
Environmental Resources Management, Inc.

Todd W. King, P.E.
Project Engineer

Paul R. Morin, P.G., CEI
Project Director

cc: Keith West, GM Environmental
File

Attachment 1
Figures

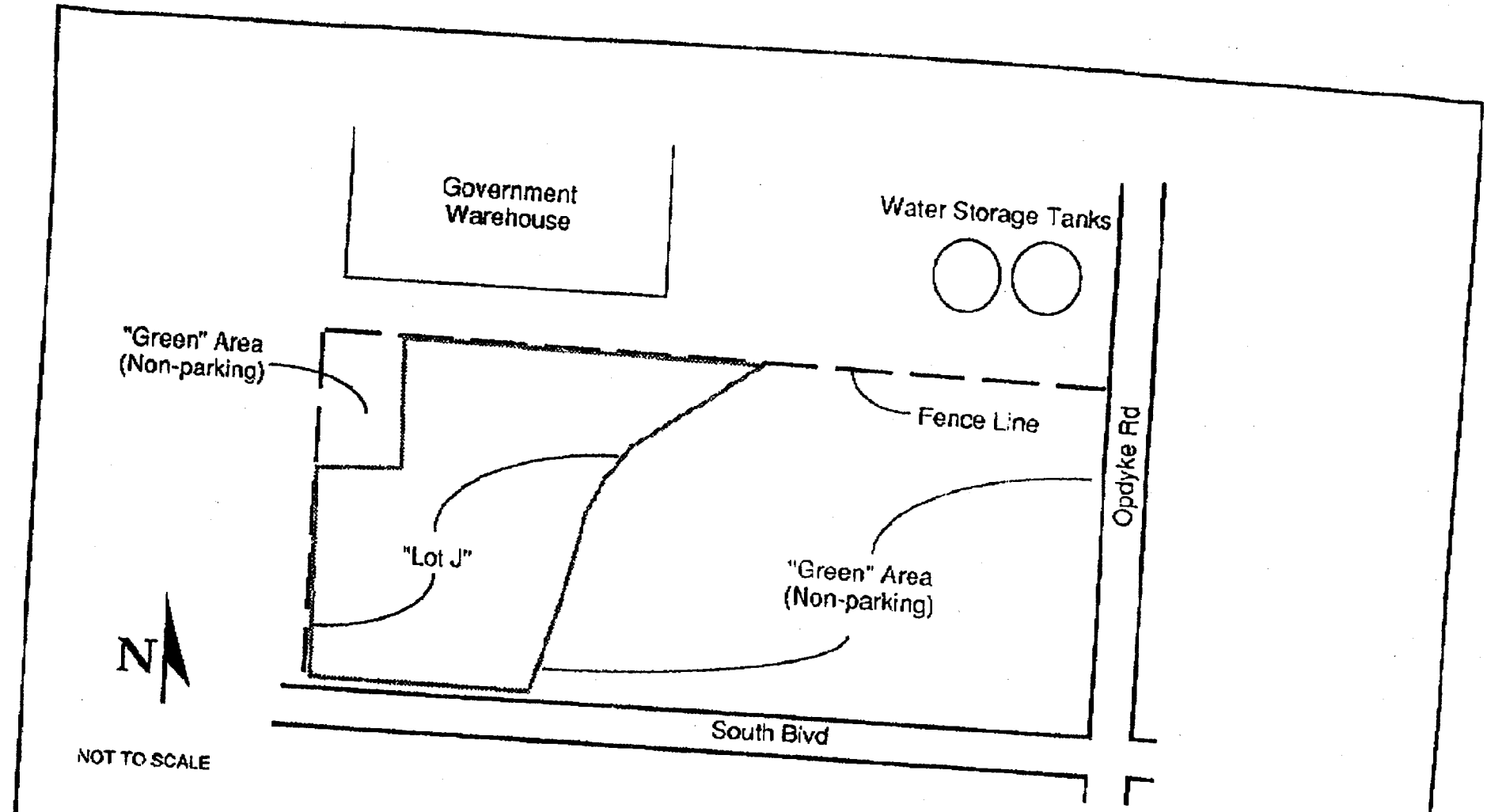


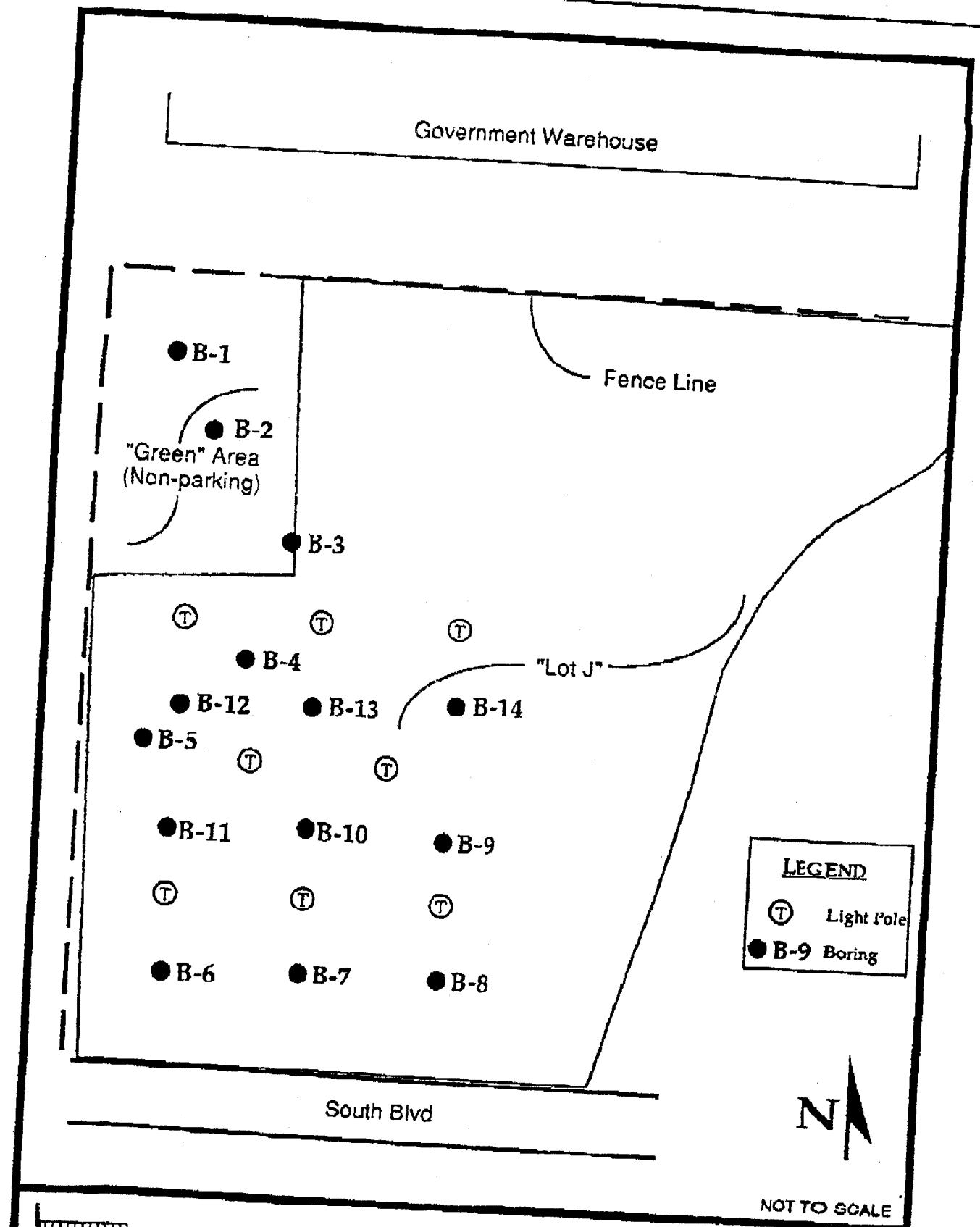
Figure 1
Site Map
General Motors Corporation - Pontiac Truck & Bus

Drawn by / Date: T. W. King 23 May 1994

Checked by / Date:

ERM

05-94 WED 16:55 REMEDIATION TEAM FAX NO. 5560803 P. 09

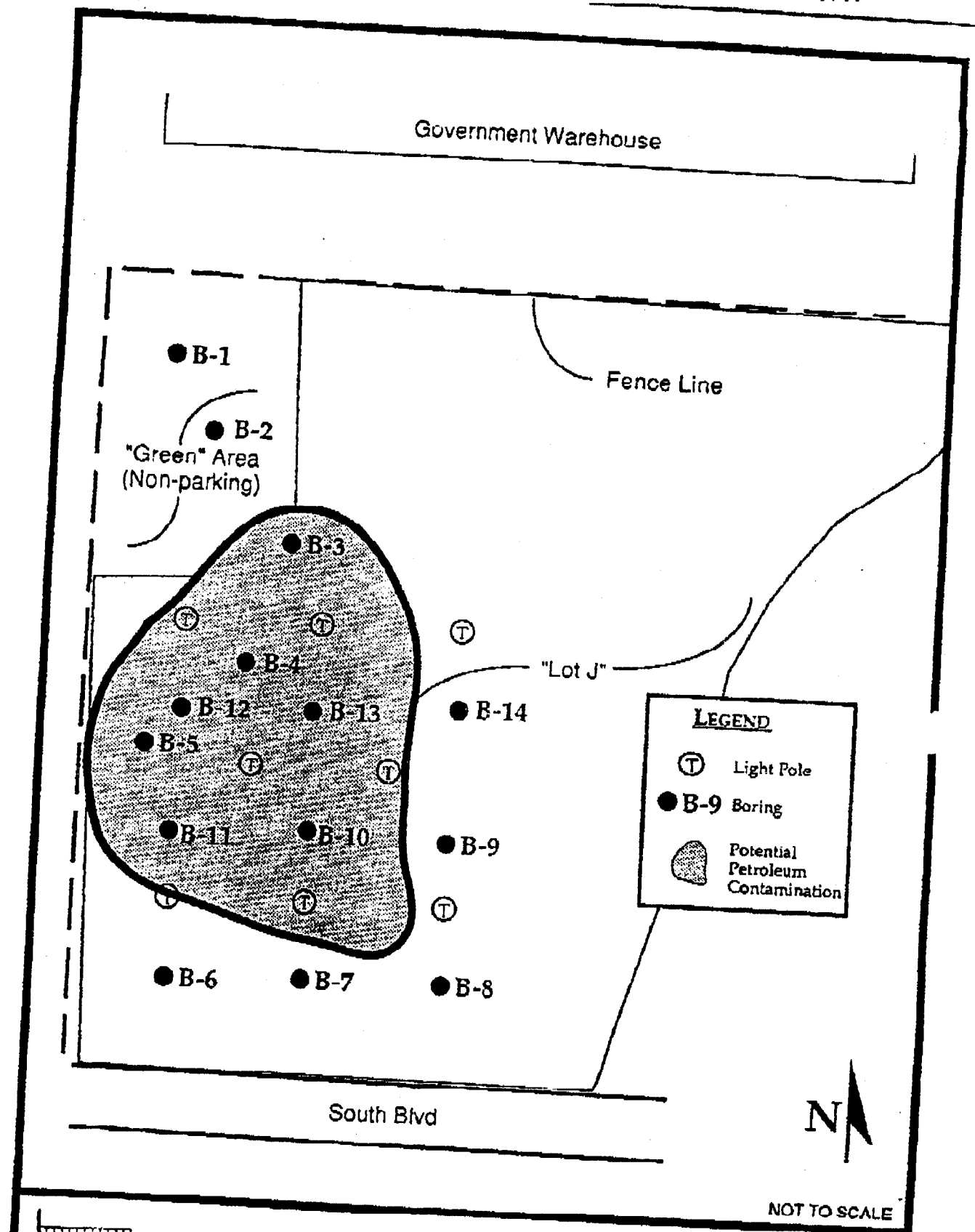


ERM

Figure 2

Boring Location Map

General Motors Corporation, Truck & Bus, Pontiac, MI



ERM

Figure 3

Area of Potential Petroleum Contamination

General Motors Corporation, Truck & Bus, Pontiac, MI

Attachment 2
Soil Boring Logs - 20 May 1994

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Friday, 20 May 1994

ERM

Boring No:	Interval (feet BGS)	Blow Count	Rec-overy	Material	Comments
B-1	1-3	3/5/5/7	75%	Dark brown fine sandy topsoil	Split spoon sample
	8-10	3/4/8/11	75%	Light brown silty sand w/ fine to coarse sand, moist	Split spoon sample
	11				Slower drilling, sandy clay in cuttings
	14				Drilling easier
	15-17	3/4/4/6	50%	Brown medium sands saturated	
	17.5				Drilling change, slower, clay in cuttings
	17.5-19.5	5/7/7/10	50%	Lens of grey clay 6" thick, saturated well graded light and dark brown sand	Took soil sample ERM-B-1-18
B-2	1-3	3/2/3/5	75%	Black topsoil - 3" Light brown fine sand w/ trace silt, poorly graded	
	8-10	3/4/8/13	100%	8-9:Light to dark brown sand 9-10:Lt brwn sand w/ green silt	
	13				Drilling change, slower, clay in cuttings
	15-17	3/4/7/10	100%	Grey clay	
					No lab samples collected for this boring
B-3	Ground				Gravel and debris on top in circular pattern. Possible former burn pit.
	1-3	7/10/13/11	25%	Dark brown sand w/ silt, some 1/2" gravel	
	8-10	8/7/7/8	100%	8-8.75':Dark brown sand 8.75-10:Light brown sand	Sampled at interface. Soil sample ERM-B-3-9
	15-17	3/6/9/12		16.25-17:Grey clay	Collected soil sample ERM-B-3-16 and water sample ERM-BW-3
	10				Static water elevation

hsl\Borings 6/20/94

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Friday, 20 May 1994

ERM

Boring No:	Interval (feet BGS)	Blow Count	Recovery	Material	Comments
B-4	1-3	4/6/4/4	50%	Dark colored fill material, fine medium sand, some gravel and asphalt	
	8-10	1/1/1/1	0%	No recovery, rock in split spoon	
	12.5				Drilling change, wet dark grey material in cuttings. No odor.
	15-17	2/5/7/9	100%	Grey and brown clay w/ small gravel and coarse sand	
					Took sample of wet grey material from auger cuttings. Sample ERM-B-4-13
B-5	1-3	3/3/10/10	75%	1-2:Fine to medium sand, well graded w/ some silt 2-3:Fill with asphalt/sand/fines brown and black	
	6				
	8				Drilling change, slow, jerky
	8-10	7/6/4/3	30%	Broken concrete in spoon	Drilling change, faster
	10-12	2/3/4/4	50%	Black fine to medium sand	Petroleum smell. Sample ERM-B-5-11
	12.5				Drilling change, slow, clay in augers
	15-17	6/6/7/8	100%	Brown/grey clay	

Attachment 3
Soil Boring Logs - 24 May 1994

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Tuesday, 24 May 1994

ERM

Boring No:	Interval (feet BGS)	Material (as characterized from auger cuttings)	Comments
B-6	0-5	Fill-dark grey to brown sand mixed with clay, gravel	
	5	Grey clay	Drilling change, assumed virgin clay till
B-7	0-3.5	Fill-dark grey to brown sand mixed with wood, steel, clay, gravel	
	3.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-8	0-4	Fill-dark grey to brown sand mixed with clay, gravel	
	4-8	Brown sand w/ some silt, fine to coarse	
	8-10	Brown sand w/ some silt, fine to coarse	Obstruction, could be cobble, saturated soils
	10-16	Brown sand w/ some silt, fine to coarse	
	16	Grey clay	Drilling change, assumed virgin clay till
			Sampled borewater from hole for TPH & cyanide, ERM BW-8
B-9	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-3.5		Obstructions, hard drilling
	3.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-10	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-3	Fill-black sand mixed with clay, gravel	Petroleum odor
	3-9	Fill-black sand mixed with clay, gravel, steel, broken concrete	Petroleum odor
	9-12	Fill-black sand mixed with clay, gravel	Petroleum odor
	12	Grey clay	Drilling change, assumed virgin clay till
B-11	0-1.5	Fill-dark grey to brown sand mixed with clay, gravel	
	1.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-12	0-3	Fill-dark grey to brown sand mixed with clay, gravel	
	3-11.5	Fill-black sand mixed with clay, gravel	Petroleum odor, more saturated with depth, no free standing liquid in hole
	11.5		Drilling change, assumed virgin clay till

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Tuesday, 24 May 1994

ERM

Boring No:	Interval (feet BGS)	Material (as characterized from auger cuttings)	Comments
B-13	0-3.5	Fill-dark grey sand mixed with clay, gravel, glass, plastic	
	3.5-4.5	Fill-dark grey sand mixed with clay,	Obstructions, hard drilling
	8.5	Clay	Drilling change, assumed virgin clay till
B-14	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-4	Fill-dark grey to brown sand mixed with clay, gravel	Obstructions, hard drilling
	4-6	Fill-black sand mixed with clay, gravel	No odor
	6-10.5	Brown sand, fine to medium	
	10.5	Grey clay with some sand	Drilling change, assumed virgin clay till

APPENDIX M.2

J-LOT EOC

REVISED DRAFT
EXTENT OF CONTAMINATION (EOC) STUDY REPORT

J-Lot
General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

FEBRUARY 1995
REF. NO. 5770 (15)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM), on behalf of the Pontiac Central Manufacturing Facility (Facility), to prepare an Extent of Contamination Study/Engineering Evaluation and Cost Analysis (EOC/EECA) for the area known as the J-Lot Site (Site). The Site is located at the Central Manufacturing Facility in Pontiac, Michigan (See Figure 1.1, 1.2 and 1.3).

This document presents the EOC Study Report prepared for the Site.

1.1 STATEMENT OF PURPOSE

The primary objective of the EOC study was to characterize the nature and extent of affected or potentially affected media at the Site. To effectively meet the stated objective for the EOC, a Work Plan was prepared and implemented. In addition, a Quality Assurance Project Plan (QAPP) and a Health and Safety Plan (HASP) were developed as Project Plans to aid in the effective implementation of the Work Plan.

The Work Plan, QAPP, and HASP were developed consistent with United States Environmental Protection Agency (U.S. EPA) and Michigan Department of Natural Resources (MDNR) guidance and are presented under separate cover.

1.2 SPECIFIC OBJECTIVES

Specific objectives of the EOC were defined in the Work Plan and include:

1. Investigating the nature and extent of contamination (including Target Compound List/Target Analyte List (TCL/TAL) chemical analysis) across the entire area of the Site;

2. Investigating the hydrogeologic conditions at the Site, specifically with respect to the continuity of the perched water table;

3. Investigating the groundwater quality (if present) of the perched water table at the Site;

4. Investigating the nature and extent of the clay/till aquitard underlying the Site.

1.3 SITE DESCRIPTION

The Site is located in an industrial area of Pontiac Michigan, on the north side of South Boulevard, north of the Facility and west of Opdyke Road. The Site is bordered to the south by South Boulevard, to the north by an abandoned Government warehouse, and to the east and west by vacant properties. The facility location is presented on Figure 1.1. The Site location is presented on Figure 1.2. A Site Plan is presented on Figure 1.3.

The surface materials at the Site consist of earth fill. The sub-surface material at the Site consists of earth fill, construction debris, metal scraps, and process sand.

Access to the Site is from an entrance point off South Boulevard. Entry to the Site along the road is restricted to vehicles by a locked security gate. Pedestrian access to the Site is restricted by a 6-foot chain link security fence.

The south third of the Site is flat, gravel covered, and enclosed by a 6-foot security fence with one locked car gate on the east side.

The middle third of the Site is currently being utilized to stockpile clean soil (excavated on the South side of South Boulevard during

Facility re-development activities). Approximately 30,000 cubic yards of clean soil are stockpiled in this area.

The north third of the Site is generally flat. The north west corner of the Site supports vegetation, including grass, brush and small trees.

1.4 SITE BACKGROUND

The Site is part of the GM Pontiac Central Manufacturing Facility which was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

It was reported by GM personnel that the J-Lot area was formerly a low lying area which was filled to its present grade for use as a parking lot.

1.5 LAND USE

The current local land use consists of industrial, public service, and residential properties. The Site has been utilized for industrial purposes since the 1920's.

Immediately north of the Site is a government warehouse. East of the Site is vacant lot that extends east to Opdyke Road. South of the Site across South Boulevard is the GM Pontiac Central Manufacturing Facility. West of the Site is an access road for the government warehouse. Further west is a thin undeveloped parcel of land owned by GM and west of this parcel are residential properties.

The current "Future Land Use Map" indicates that the property will continue to be utilized for industrial purposes (City of Pontiac Planning Commission, December 1991). In addition, the "Future Land Use Map" indicates that the residential area west of the Site will be utilized for industrial purposes in the future. A copy of the "Future Land Use Map" for the City of Pontiac is reproduced as Figure 1.4.

1.6 PRIOR SITE INVESTIGATIONS

Two known field investigations were conducted at the Site prior to the EOC Study field investigation. These two field investigations were conducted by Environmental Resources Management, Inc. (ERM) and CRA, on behalf of GM. These investigations have identified the existence of fill and various debris at the Site.

1.6.1 ERM Investigation

An initial subsurface investigation of the Site was conducted by ERM in May 1994. A report entitled "Limited Phase II Environmental Assessment, 5, North Parcels", dated August 1994, was prepared by ERM, and is provided in Appendix A.

The ERM investigation identified the extent of "Potential Petroleum Contamination" at the Site by means of a series of boreholes placed throughout the Site. Approximate borehole locations are presented on Figure 1.5. Soil and water samples were collected and analyzed for Total Petroleum Hydrocarbons (TPH) and cyanide. A summary of the analytical results is presented in Table 1.1. The report indicates that the extent of contamination was not suitably defined, and an additional investigation was recommended.

1.6.2 CRA Investigation

An additional investigation was carried out by CRA to further define the extent of affected soils identified in the ERM investigation.

The investigation was conducted on August 22 and 23, 1994, and consisted of the excavation of 24 Test Pits to identify the extent and condition of fill materials placed at the Site.

The test pit excavations were completed using a hydraulic backhoe and were located as presented on Figure 1.6.

A summary log of the test pit excavations is provided on Table 1.2. Generally, the excavations identified construction debris and soil fill ranging from 1 to 13 feet below ground surface (bgs). Fill materials included ash, foundry sand, wood and brick construction debris, filter cloth, paint, tar and tar paper, in a soil matrix.

Samples were collected from various fill materials and underlying soil and submitted for chemical analysis. A summary of the analytical results is presented on Table 1.3. The results indicated that potential source materials could affect the environment.

Based on the findings of the investigation it was determined that an additional broader investigation was warranted to identify any possible migration pathways for constituents encountered. As a result, an EOC/EECA work plan was prepared for further investigation of the Site.

1.7 REPORT ORGANIZATION

This EOC report is presented in the following sections:

Section 2.0 Filed Investigation Summary
Section 3.0 Regional Setting
Section 4.0 Site Setting
Section 5.0 Chemical Distribution
Section 6.0 Summary

2.0 FIELD INVESTIGATION SUMMARY

The characterization of the nature and extent of affected or potentially affected media at the Site was achieved by conducting a variety of Site investigative activities. The purpose of this section is to provide a summary of the investigative activities which were completed. The field investigation at the Site included the following activities:

- Site survey and base plan preparation;
- installation of seventeen boreholes;
- installation of six monitoring wells;
- collection of soil samples for laboratory, chemical and geotechnical analysis;
- collection of groundwater samples for laboratory chemical analysis; and
- water level measurements in all monitoring wells.

The field investigations and subsequent follow-up activities are summarized in the following subsections:

Section 2.1 Procurement of Subcontractors
Section 2.2 Preparation of Base Plan and Survey of Sample Locations
Section 2.3 Soil Investigation
Section 2.4 Groundwater Investigation
Section 2.5 Data Validation
Section 2.6 Data Evaluation

2.1 PROCUREMENT OF SUBCONTRACTORS

Prior to the initiation of field activities, CRA procured the following subcontractors in order to implement or support the Site investigative activities.

Subcontractor	*Activities*
• Darrell D. Hughes and Associates	Site Survey/Base Map Preparation
• Mateco Drilling Services	Borehole/Monitoring Well Installation
• EarthTech Analytical Services	Chemical Analyses
• Materials Testing Consultants, Inc.	Geotechnical Analyses

2.2 PREPARATION OF BASE PLAN AND SURVEY OF SAMPLE LOCATIONS

A Site base plan (Figure 1.3) was prepared by Darrell Hughes and Associates of Fowlerville, Michigan under direct supervision of CRA. The Site plan was prepared using traditional land surveying methods. The base plan developed through this activity is utilized throughout this report to present the results of the investigations. The following additional surveying activities were also conducted at the Site:

- Survey of borehole locations and elevations; and
- Survey of monitoring well locations and elevations.

2.3 SOIL INVESTIGATION

In order to characterize the subsurface conditions within, around, and below the fill materials, seventeen boreholes were completed at locations shown on Figure 2.1. The boreholes were advanced to depths of 16 to 44 feet bgs. Stratigraphic Logs are presented in Appendix B. Eleven of the boreholes were advanced to a depth of approximately 5 to 10 feet into the native clay soils which underlie the surficial fill material. Six of the boreholes were advanced approximately 30 feet into the clay to investigate the hydraulic properties of the clay aquitard.

The boreholes were advanced utilizing 4 1/4 inch ID Hollow-Stem Augers (HSA). On completion, the boreholes were filled with cement bentonite grout to ground surface.

At each borehole, soil samples were collected on a continuous basis using stainless steel 2-foot long, 2-inch inside diameter, split-spoon samplers. Each sample was examined by a CRA field representative to identify soil type and any visible chemical staining, discoloration or odor. A portion of the sample (approximately 4 ounces) was placed in an 8-ounce sample jar and covered with aluminum foil. Each jar was maintained at a temperature of approximately 20°C for 1 hour to permit volatile organic constituents to volatilize into the headspace. The volatile organic concentration in the head space was measured by inserting a Photoionization Detector (PID) probe through the foil. Field observations were recorded on the stratigraphic logs and utilized to select samples to be submitted for laboratory chemical analysis.

Five undisturbed samples of the glacial clay/till were obtained using thin-walled "Shelby Tube" samplers from boreholes BH-J-1, 13, 15, 16, and 17. Shelby Tube samples were submitted to MTC, extruded, examined and characterized by grain size analysis. A falling head permeability test was then conducted on an undisturbed portion of the sample in order to determine the vertical hydraulic conductivity of the glacial clay/till. Geotechnical testing results are presented in Appendix C.

In order to provide a vertical profile of potential contamination, two to four fill/soil samples were collected from each borehole and submitted for chemical analysis. Samples were selected using the following protocol:

1. One or two samples from the fill materials based on visible or PID identification of contaminants;
2. One sample from a depth of approximately 1 to 2 feet into the native clay/till soil; and
3. The last sample collected at the bottom of the borehole.

Samples were submitted for the Target Compound List (TCL) for VOC, SVOC, PCB/Pesticide and Target Analyte List (TAL) for inorganic chemical analysis. Laboratory analytical results for soil samples are presented in Appendix D.

All equipment/machinery was decontaminated by steam cleaning prior to moving to each boring location. Sampling equipment was decontaminated by an Alconox scrub followed by rinses with deionized water, isopropal alcohol, and deionized water, in that order. All water used during decontamination procedures was collected and containerized in 55-gallon drums and left on Site for future disposal.

All samples were collected, preserved, documented and handled using procedures and protocols defined in the HASP and QAPP. Chain-of-Custody Records are presented in Appendix E.

2.4 GROUNDWATER INVESTIGATION

Six groundwater monitoring wells, MW-J-1, 2, 3, 4, 5, and 6, were installed in boreholes BH-J-12, 13, 1, 15, 16, and 17, respectively. Monitoring well locations are presented on Figure 2.2.

All monitoring wells installed at the Site consist of a two-inch diameter stainless steel riser pipe with a five-foot long stainless steel well screen. The screens are packed with a clean quartz sand where the natural formation did not collapse. The sand packs extend two feet above the top of the screen. A 2-foot bentonite pellet plug was placed on the sand pack. The remainder of the boring annulus was backfilled with a cement bentonite grout. A lockable protective casing was installed over each monitoring well. Select monitoring wells were provided with knockdown protection. The monitoring well instrumentation details are outlined on the monitoring well construction logs presented in Appendix B.

Two of the monitoring wells, MW-J-4 and 5, are dry wells. MW-J-4 and 5 were noted dry on November 30 and again on December 7, 1994. No groundwater samples were collected from these monitoring wells.

Each monitoring well which contained water was developed following the completion of the installation. This development was completed in accordance with requirements defined in the QAPP. Each well was developed until three consecutive consistent readings of pH, conductivity, and temperature were obtained. More than seven well volumes were removed from each well during development. Well development logs are presented in Appendix F, and are dated November 30, 1994.

Prior to collecting groundwater samples, a minimum of three well volumes were purged from each well monitoring well. The pH, conductivity and temperature of the water were obtained following removal of each well volume to determine when groundwater quality stabilized (see well development logs dated December 7, 1994 in Appendix F). A dedicated stainless steel bailer was used to obtain samples from each of the wells following completion of purging. The QAPP provides additional details on the purging of wells, sample collection, preservation, documentation and handling. All QAPP quality control and decontamination procedures were followed.

Groundwater samples were collected from MW-J-1, 2, 3, and 6 and analyzed for TCL VOC, SVOC, PCB/Pesticides, and TAL inorganics. Groundwater samples collected for TCL VOC, SVOC and PCB/Pesticides analysis were unfiltered. Groundwater samples collected for TAL inorganics analysis were field filtered using a 0.45 micron filter.

No hydraulic parameter testing was conducted in the monitoring wells and a second round of groundwater sampling was not conducted because no continuous water bearing zone was identified.

2.5 DATA VALIDATION

U.S. EPA Functional Guidelines for Evaluating Organic and Inorganic Analyses were utilized in the validation of all laboratory data. Validation ensured that all sampling and analytical protocols outlined in the QAPP were suitably adhered to. Data validation reports prepared by the project Quality Assurance Officer (QAO) are presented in Appendix H.

2.6 DATA EVALUATION

Data compilation and evaluation was ongoing commencing upon the completion of the soil sampling. Collected data was compared to the investigation objectives. The following data evaluation activities were conducted:

- Data Reduction/Tabulation
  - A data base of validated data was prepared.
  - Data package tracking and data entry were completed following QAPP protocol.

- Chemical-Analytical Data Evaluation
  - Summaries were compiled of the laboratory analytical data from the samples and were compared to the State of Michigan regulatory limits.
  - Significant analytical results were used to define the extent of affected materials.

- Geologic and Hydrogeologic Data Evaluation
  - Site geology and hydrogeology were defined through the evaluation of borehole stratigraphic logs, monitoring well logs, groundwater levels, and geotechnical test results.
  - Geologic cross-sections were prepared through the evaluation of borehole logs.

3.0 REGIONAL SETTING

The purpose of this section is to provide an overview of the geology, hydrogeology and hydrology of the regional area surrounding the Site.

3.1 REGIONAL GEOLOGY

The Facility and Site are located in an area of glacial till and outwash deposits formed during the Wisconsin glacial age of the Pleistocene Epoch. The glacial till is composed of low permeability clay, silty clay and sandy clay. Smaller sand and gravel units are also encountered occasionally within the clay till unit. The low permeability clay till unit has a reported depth of approximately 250 to 300 feet and overlies bedrock.

The Facility is located at the interface of two glacially deposited soil units, known as the Fort Wayne Moraine and the Defiance Moraine Outer Ridge. Historically, these moraines formed the divide between the Clinton River and the Rouge River drainage basins.

Shallow native soil materials underlying the Site are predominately comprised of glacial tills of low to very low permeability. The glacial till materials are generally comprised of medium to low plasticity clays. Sand lenses and outwash channels of limited extent are also encountered within the surficial native soil materials. The regional surficial geology is presented on Figure 3.1.

The bedrock unit underlying the overburden glacial till is reported to be Early Mississipian-age Coldwater Shale. The regional bedrock geology is presented on Figure 3.2.

3.2 REGIONAL HYDROGEOLOGY

In the regional area surrounding the Site, water supply well logs indicate water bearing zones at 50, 120, and 250 feet bgs. Regional well logs are presented in Appendix I.

Regional well logs available for the well locations identified on Figure 3.3 were used to construct an approximate east-west geologic cross-section (Figure 3.4). This stratigraphic information was not incorporated into the Site geology database due to a lack of elevation control. Aquifer characterization presented on Figure 3.5 indicates that the Site is located in an area where usable aquifers generally located at depth in the glacial drift. Figure 3.6 presents the regional aquifer vulnerability to surface contamination. These figures indicate that the area in the vicinity of the Site is located in a zone where glacial tills and clay (at surface) serve to protect the usable aquifers from surface impact.

In 1981, Camp Dresser and McKee (CDM) performed a hydrogeologic assessment of the GM Facility. The results were presented in a report entitled "Mathematical Simulation of Groundwater Flow Conditions under GM's Truck and Coach Division, Pontiac, Michigan" (CDM, 1981).

The CDM report identified three primary sand and sand/gravel aquifers beneath the Facility. These aquifers occur at depths of 120, 150, and 210 bgs and are approximately 7, 25, and 50 feet thick, respectively. The "210-foot aquifer" is a known local source for the municipal water supply.

Shallow groundwater has been encountered in several areas of the GM Facility, generally at depths of 10 to 20 feet bgs. This groundwater is perched above the clay till in layers of fill material or sand (or sand and gravel) seams of limited extent. As the clay till layer is approximately 100 feet thick between the perched groundwater and the 120-foot aquifer, the perched groundwater is not considered to be hydraulically connected with the lower water bearing zones. In addition, the

water is considered water not in an aquifer for purposes of regulatory compliance.

3.3 REGIONAL HYDROLOGY

The Site is located at the divide between the Clinton and Rouge River drainage basins. Construction activities at the Facility have influenced the divide, and the Facility now drains to the Clinton River, through the Murphy Drain, and ultimately discharges to Lake St. Clair. The Murphy Drain and Clinton River are located north and east of the Facility. The Site location, as related to the Clinton River Basin, is presented on Figure 3.7.

4.0 SITE SETTING

The purpose of this section is to provide a Site-specific description of the geology, hydrogeology and hydrology identified at the Site.

4.1 SITE GEOLOGY

The Site geology presented in this section is based upon the regional geologic information presented in Section 3.1 and the stratigraphic information obtained from seventeen boreholes and six monitoring wells installed at the Site as part of this investigation.

Utilizing the Site-specific information, two geologic cross-sections were prepared for the alignments identified on Figure 4.1. The cross-sections identified on Figure 4.1 are presented on Figures 4.2 (B-B') and 4.3 (C-C'), respectively. The cross-sections were prepared based on the stratigraphic logs presented in Appendix B of this report.

A glacial clay/till deposit exists immediately below and around the fill material in the area. The clay/till unit is continuous across the Site (see Figure 4.2 and 4.3). Borehole stratigraphic logs indicate this clay layer extends to a depth of at least 44 feet bgs at the Site. The thickness of this clay/till unit was not determined by on Site borings but as identified in Section 3.1 to be approximately 100 to 250 feet thick.

4.2 SITE HYDROGEOLOGY

The Site hydrogeology has been characterized through the installation of seventeen boreholes, six monitoring wells, static water level measurements, and laboratory geotechnical tests. In general, no distinct hydrostratigraphic units were identified at the Site. Only perched, discontinuous water zones were identified to exist within the glacial clay/till during the Site investigation.

During the installation of the boreholes and monitoring wells, perched water zones were identified on Site. The perched water zones exist at the south and north ends of the Site, and off Site to the west. The perched water zones are not continuous across the Site.

Water level elevations for the six monitoring wells are presented on Table 4.1 (monitoring well locations are presented on Figure 2.2). Water level elevations for monitoring wells MW-J-2, 887.24 feet AMSL, and MW-J-3, 887.87 feet AMSL, do not correlate with the water level elevation in near by monitoring well MW-J-1, 912.74 feet AMSL. This illustrates that the perched water off Site to the west is not hydraulically connected to the perched water at the north end of the Site.

Monitoring wells MW-J-4 and MW-J-5 are located near the middle of the Site, no water was identified during installation, and the wells were later identified to be "dry". This indicates that the perched water encountered at the north end of the Site is not hydraulically connected to the perched water identified at the south end of the Site.

No hydraulic parameter testing was conducted. Hydraulic parameter testing was not conducted because no continuous water bearing zones were identified. Also, a second round of groundwater sampling was not conducted because the identified water was not a continuous water bearing zone and was not identified as hydraulically or otherwise connected to a drinking water source.

During the installation of the seventeen boreholes, five Shelby Tube samples were collected from the glacial clay/till. The samples were collected from borings BH-J-1, 13, 15, 16, and 17 and analyzed for grain size and permeability. The geotechnical testing report is presented in Appendix C. A summary of the geotechnical testing results is presented on Table 4.2. The grainsize analysis indicates that the glacial clay/till is mostly comprised of clay and silt with some sand. The hydraulic conductivity of the samples ranged from 1.6×10^{-8} to 4.1×10^{-7} cm/sec.

The lack of a continuous water bearing zone, and the low hydraulic conductivity of the glacial clay/till, combine to effectively limit the flow of groundwater on or off Site.

4.3 HYDROLOGY

The Site is generally flat, bare soil with the exception of the northwest corner which is covered with vegetation. Precipitation either infiltrates through the surface soil to form perched water zones, evaporates, or leaves the Site as runoff draining into the City of Pontiac storm water drainage system.

5.0 CHEMICAL DISTRIBUTION

The purpose of this section is to present the results of the chemical distribution identified in the various environmental media sampled at the Site. The chemical analytical data for collected samples of subsurface borehole soil and groundwater are presented respectively in Appendices D and G. Chain-of-Custody records are presented in Appendix E. The data validation reports are presented in Appendix H. The chemical distribution in various on-Site environmental media is presented in the following subsections:

Section 5.1 Subsurface Soils; and
Section 5.2 Groundwater;

5.1 SUBSURFACE SOILS

During the field activities, 59 subsurface borehole soil samples were collected from the locations identified in Figure 2.1. A summary of samples collected is presented in Table 5.1. Soil samples were collected as discussed in Section 2.3. The analytical results are presented in Appendix D, and discussed in the following subsections.

5.1.1 VOCs

Fifty-nine (59) subsurface borehole soil samples were collected and analyzed for VOCs. A summary of detected VOCs in soil is presented in Table 5.2.

Acetone was detected in BH-J-16, sample BTH-037 at 4 to 6 feet bgs, at the Michigan Type B 20x Drinking Water Cleanup Criteria for soil of 14,000 µg/kg. Benzene, ethylbenzene, 4-methyl-2-pentanone, and total xylenes were detected in BH-J-7, sample BTH-041 at 8 to 10 feet bgs, above the Michigan Type B 20x Drinking Water Cleanup Criteria for soil. No other VOCs were detected above the Michigan Type B 20x Drinking Water Cleanup Criteria.

No VOCs were detected at concentrations above either the Michigan Type B or C Direct Contact Cleanup Criteria for soil.

5.1.2 SVOCs

Seventeen soil samples were collected and analyzed for semi-volatile organic compounds (SVOC). A summary of detected SVOCs in soil is presented in Table 5.3.

Several SVOCs (benzo (a) anthracene, benzo (a) pyrene, benzo (b) flouranthene, dibenzo(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene) were detected in BH-J-16, sample BTH-037 at 4 to 6 feet bgs, above the Michigan Type B 20x Drinking Water Cleanup Criteria for soil. Phenanthrene was also detected in BH-J-7, sample BTH-041 at 8 to 10 bgs, at a concentration of 740 µg/kg, which is above the Michigan Type B 20x Drinking Water Cleanup Criteria for soil of 500 µg/kg. No other SVOCs were detected above the Michigan Type B 20x Drinking Water Cleanup Criteria for soil.

Five of the SVOCs identified above (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene) were identified at concentrations exceeding the Michigan Type B Direct Contact Cleanup Criteria for soil.

Only benzo(a)pyrene was identified at a concentration exceeding the Michigan Type C Direct Contact Cleanup Criteria for soil.

5.1.3 PCBs/Pesticides

Seventeen soil samples were collected and analyzed for PCBs and Pesticides. A summary of detected PCBs/Pesticides is presented in Table 5.4.

No pesticides were detected above the Michigan Type B 20x Drinking Water Cleanup Criteria for soil.

Aroclor 1254 was detected in BH-J-7, 11, and 14, samples BTH-041, 030, and 055 at 8 to 10, 4 to 6, and 6 to 8 feet bgs, respectively, above Michigan Type B 20x Drinking Water Cleanup Criteria for soil. Aroclor 1254 was the only PCB detected in the samples collected and analyzed. The maximum concentration identified was 2,100 µg/kg. No pesticides were detected above the Michigan Type B Direct Contact Cleanup Criteria for soil.

The Michigan Type B 20x Drinking Water and Type B Direct Contact Cleanup Criteria are both 1,000 µg/kg, therefore the Aroclor 1254 identified above is also above the Michigan Type B Direct Contact Cleanup Criteria for soil.

No PCBs or pesticides were detected above Michigan Type C Direct Contact Cleanup Criteria for soil which is 7.5 mg/kg.

5.1.4 Inorganics

Fifty-nine (59) subsurface borehole soil samples were collected and analyzed for TAL metals. A summary of detected metals is presented in Table 5.5.

Site specific background levels were calculated according to MDNR MERA Operational Memorandum number 15, September 30, 1993. Site specific background levels were calculated from soil samples collected from BH-J-2, 3, 5, and 15. The Site specific background levels were calculated using the mean value plus three standard deviations for each parameter. Site specific background levels are presented on Table 5.6. Several of the inorganic parameters presented in Table 5.5 exceed the Michigan Type B 20x Drinking Water Cleanup Criteria.

Lead exceeds the Michigan Type C Direct Contact Criteria at BH-J-16, sample numbers BTH-037 at 4 to 6 feet bgs and BTH-038 at 8 to 10 feet bgs, and BH-J-7, sample numbers BTH-041 at 8 to 10 feet bgs and BTH-042 at 12 to 14 feet bgs, and BH-J-14, sample number BTH-056 at 16 to 18 feet bgs. Lead concentrations in the samples identified above range from 740 mg/kg to 4,740 mg/kg.

Arsenic exceeds the Michigan Type C Direct Contact Cleanup Criteria and the Site specific background level at BH-J-7, sample number BTH-042 at 12 to 14 feet bgs, at a concentration of 19 mg/kg, and at BH-J-4, sample number BTH-055 at 6 to 8 feet bgs, at a concentration of 13 mg/kg.

No other inorganic parameters analyzed exceed either the Michigan Type B or Type C Direct Contact Cleanup Criteria for soil.

5.2 GROUNDWATER

Groundwater samples were collected as discussed in Section 2.4. Samples were collected from four monitoring wells, MW-J-1,2,3, and 6 as identified on Figure 2.2. Monitoring wells MW-J-4 and 5 were dry, therefore no samples were collected from these monitoring wells. Analytical results for the groundwater samples are presented in Appendix G. Since no aquifer is associated with the perched water zones encountered, only soil criteria apply.

5.2.1 VOCs

Samples were collected and analyzed from the four monitoring wells previously identified.

No VOCs were identified above Michigan Type B Drinking Water Cleanup Criteria.

5.2.2 SVOCs

Samples were collected and analyzed from the four monitoring wells previously identified.

No SVOCs were detected above the Michigan Type B Drinking Water Cleanup Criteria.

5.2.3 PCBs/Pesticides

Samples were collected and analyzed from the four monitoring wells previously identified.

No PCBs or pesticides were detected above Michigan Type B Drinking Water Cleanup Criteria.

5.2.4 Inorganics

Samples were collected and analyzed from the four monitoring wells previously identified. Samples were field filtered using a 0.45 micron filter prior to analysis.

Three inorganic parameters, antimony, arsenic, and manganese, were detected above Michigan Type B Drinking Water Cleanup Criteria as presented in Table 5.7.

Inorganic parameters are naturally occurring, therefore Site Specific background levels are normally calculated according to groundwater flow direction across the Site. However, no background inorganic levels have been calculated because there is no continuous flow of groundwater across the Site as identified in Section 2.4.

Arsenic is the only inorganic parameter of the three previously identified that is above the Type C Drinking Water Cleanup Criteria. Arsenic was detected above Michigan Type C Drinking Water Cleanup Criteria in MW-J-3.

5.3 SUMMARY

The purpose of this section is to provide a summary of the analytical results presented in this report. The summary is presented for bot soil and groundwater analytical results.

A summary of the detected constituents which exceed Michigan Type B or C cleanup levels is presented in Tables 5.9 and 5.10, and discussed below. The comparison of detected constituents to Michigan Type B and C cleanup levels are for comparison purposes only. Michigan Type B cleanup levels are from MERA Operational Memorandum #8, Revision 3 (dated February 4, 1994) and addendum dated June 21, 1994. Michigan Type C cleanup levels are from MERA Operational Memorandum #14, dated June 21, 1994.

5.3.1 Soil Summary

Detected compounds in soil above the Michigan Type B 20x Drinking Water Criteria are presented on Table 5.8.

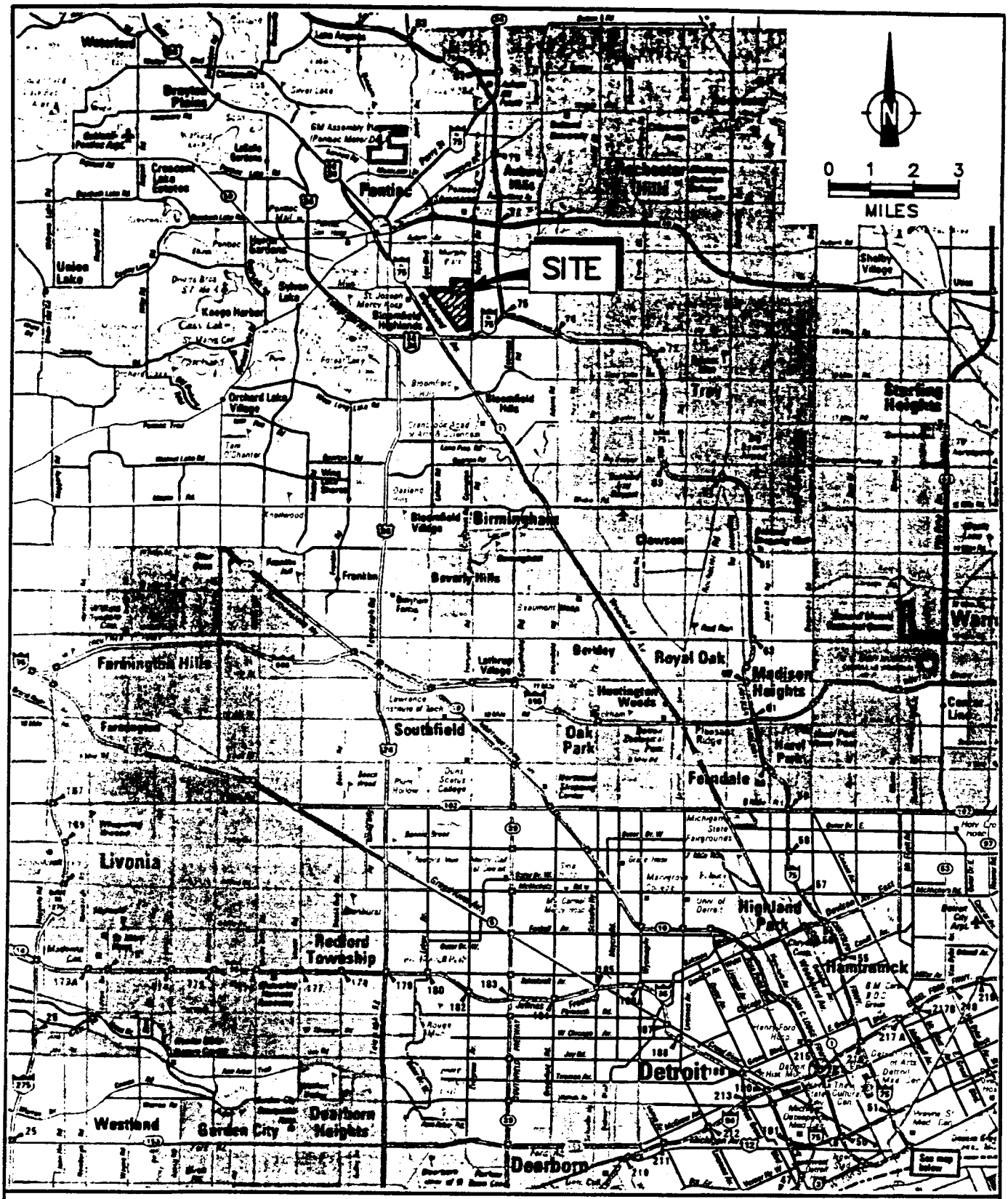
Detected compounds in soil above the Michigan Type B Direct Contact Criteria are presented on Table 5.9. The compounds listed on Table 5.9 were detected in boreholes BH-J-7, 11, 14, and 16. An estimate of the area of affected material is presented on Figure 5.1. Approximately 50,000 cubic yards of material are estimated to contain concentrations of the compounds listed on Table 5.9 above the Michigan Type B Direct Contact Criteria.

Detected compounds in soil above the Michigan Type C Direct Contact Criteria are presented on Table 5.10. Arsenic, lead and benzo(a)pyrene were detected above Michigan Type C Direct Contact Criteria in BH-J-7, 14 and 16 at depths of four to eighteen feet bgs. An estimate of the area of affected material is presented on Figure 5.1. Approximately 40,000 cubic yards of material are estimated to contain concentrations of arsenic, lead or benzo(a)pyrene above the Michigan Type C Direct Contact Criteria.

5.3.2 Groundwater Summary

Compounds detected above the Michigan Type B Drinking Water Cleanup Criteria are presented on Table 5.7.

Arsenic was detected in MW-J-3 at 15 µg/L which is above the Michigan Type C Drinking Water Cleanup Criteria.



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

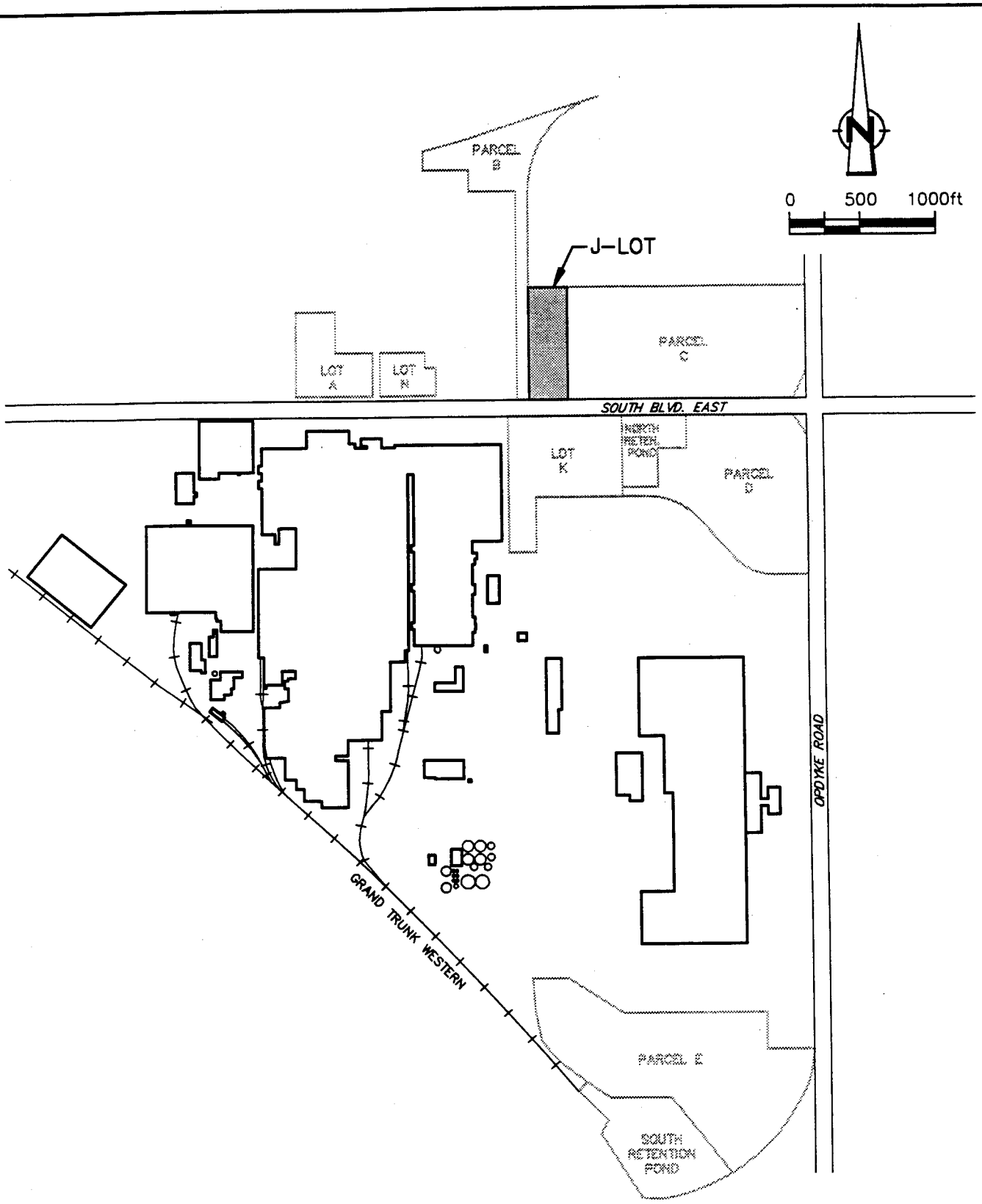


figure 1.2
SITE LOCATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-60)

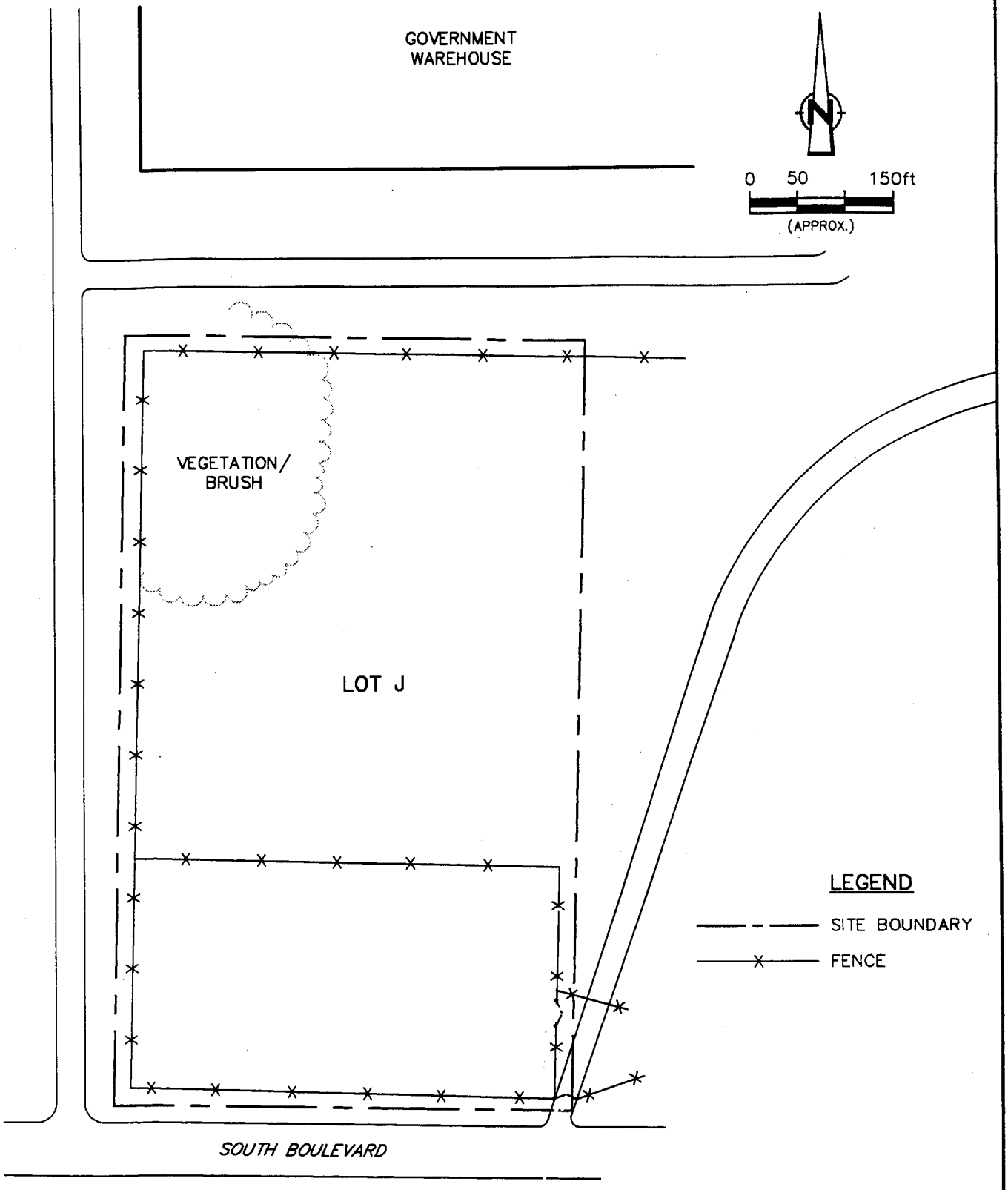
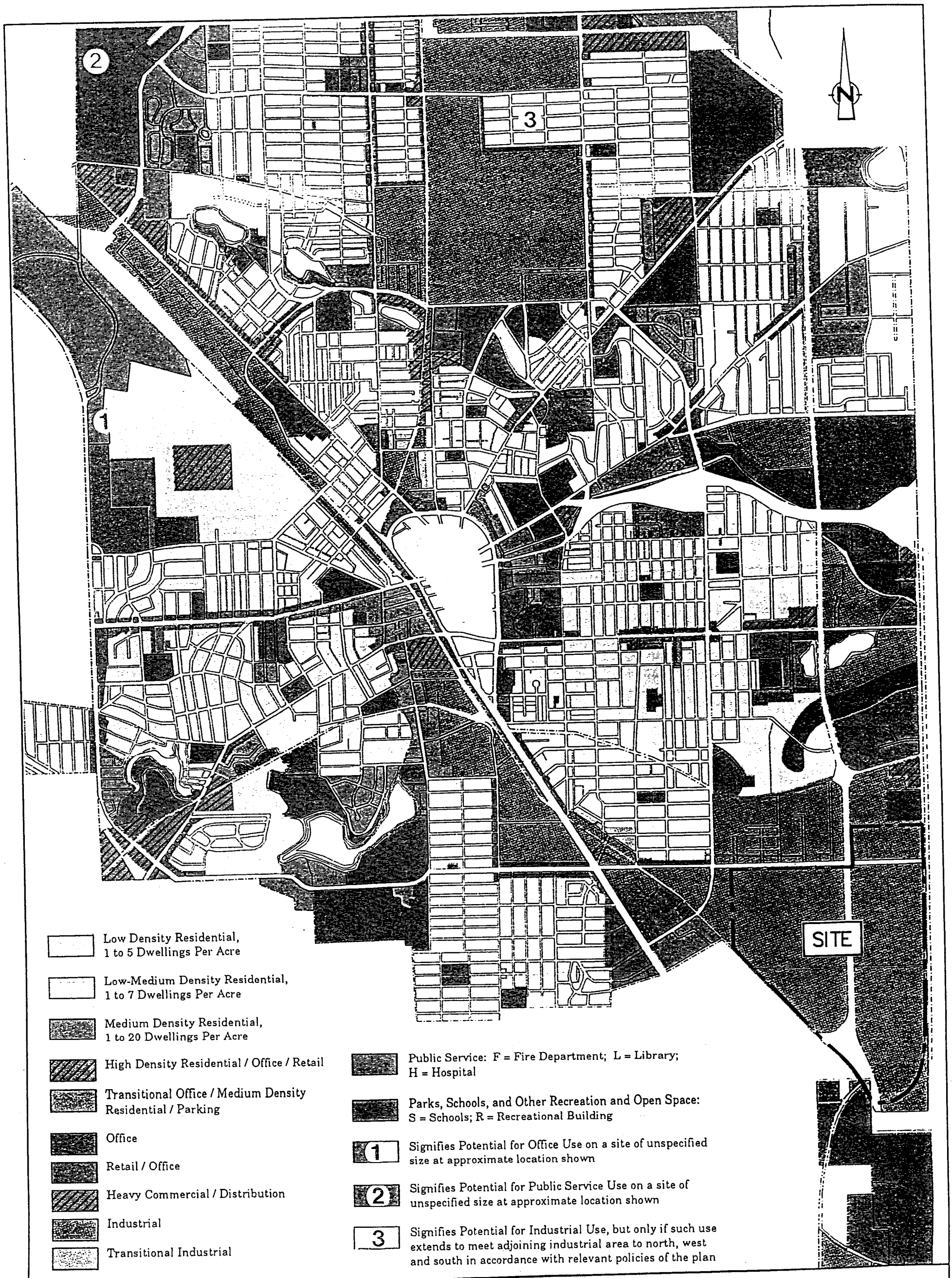


figure 1.3

SITE PLAN
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-54)



Low Density Residential,
1 to 5 Dwellings Per Acre

Low-Medium Density Residential,
1 to 7 Dwellings Per Acre

Medium Density Residential,
1 to 20 Dwellings Per Acre

High Density Residential / Office / Retail

Transitional Office / Medium Density Residential / Parking

Office

Retail / Office

Heavy Commercial / Distribution

Industrial

Transitional Industrial

Public Service: F = Fire Department; L = Library; H = Hospital

Parks, Schools, and Other Recreation and Open Space: S = Schools; R = Recreational Building

1 Signifies Potential for Office Use on a site of unspecified size at approximate location shown

2 Signifies Potential for Public Service Use on a site of unspecified size at approximate location shown

3 Signifies Potential for Industrial Use, but only if such use extends to meet adjoining industrial area to north, west and south in accordance with relevant policies of the plan

figure 1.4

FUTURE LAND USE MAP
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

SOURCE: CITY OF PONTIAC PLANNING COMMISSION

CRA

5770 (15) JAN 13/95 (W) REV.0

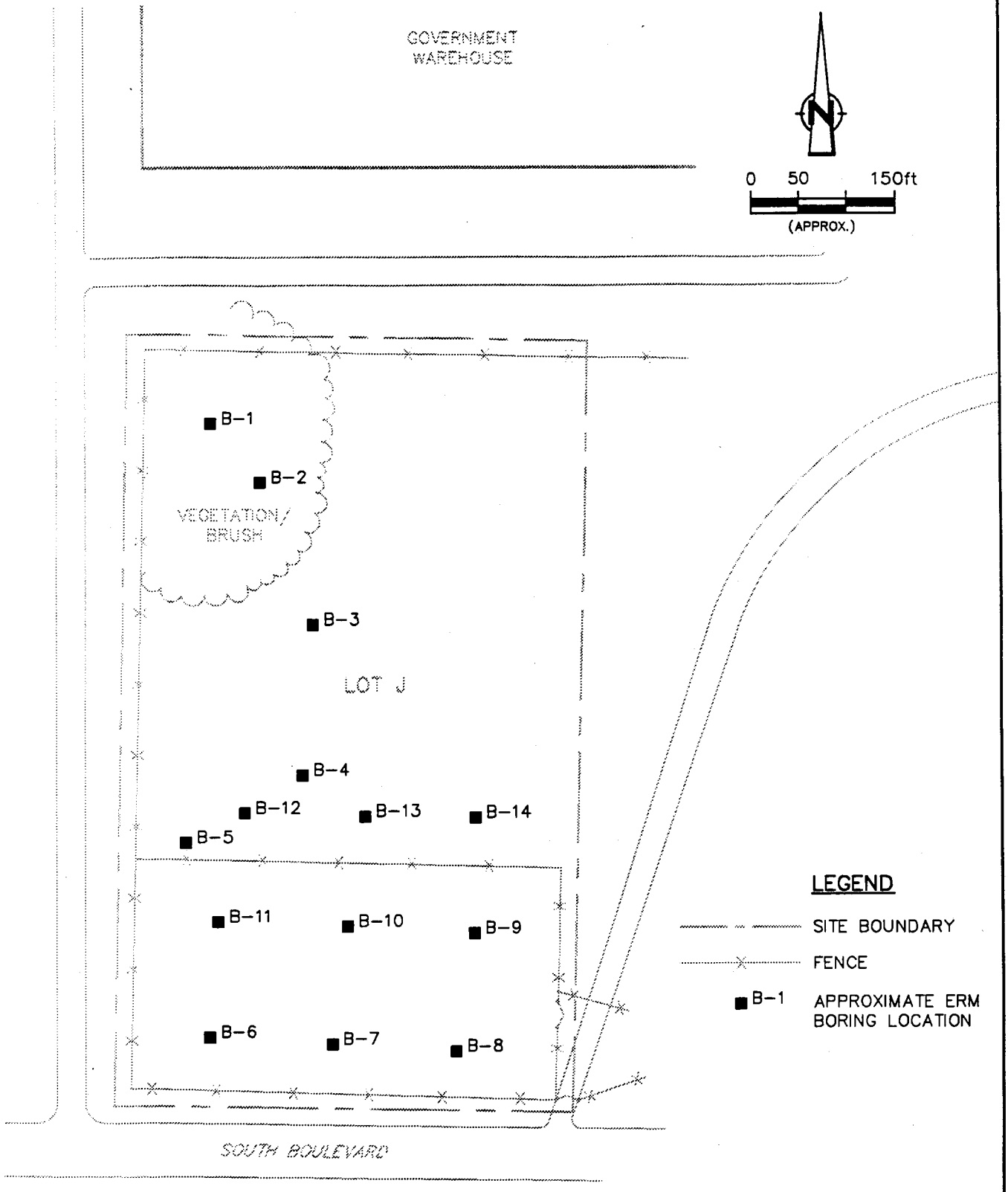


figure 1.5

APPROXIMATE ERM BORING LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-55)

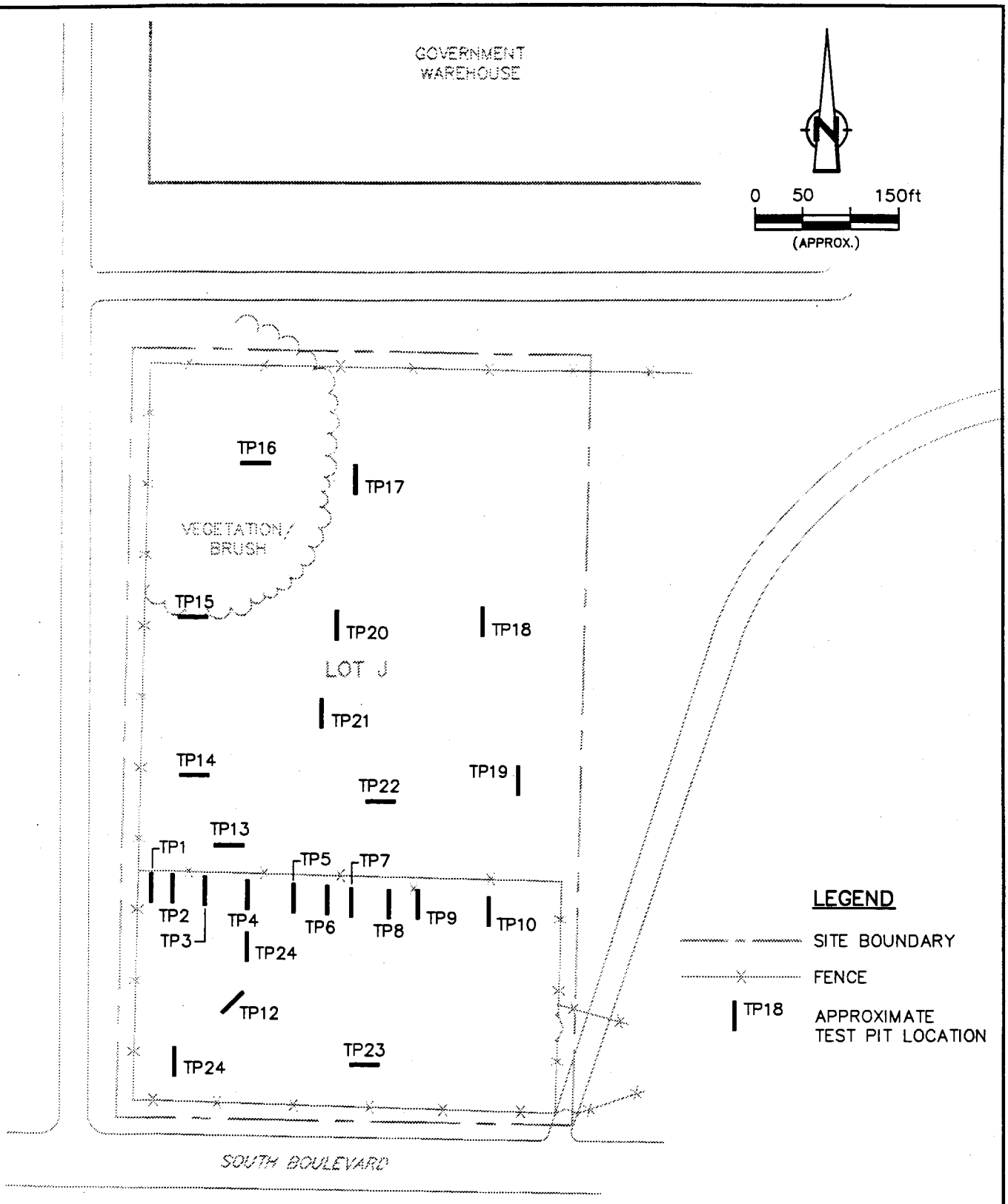


figure 1.6

APPROXIMATE TEST PIT LOCATIONS
J–LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P–56)

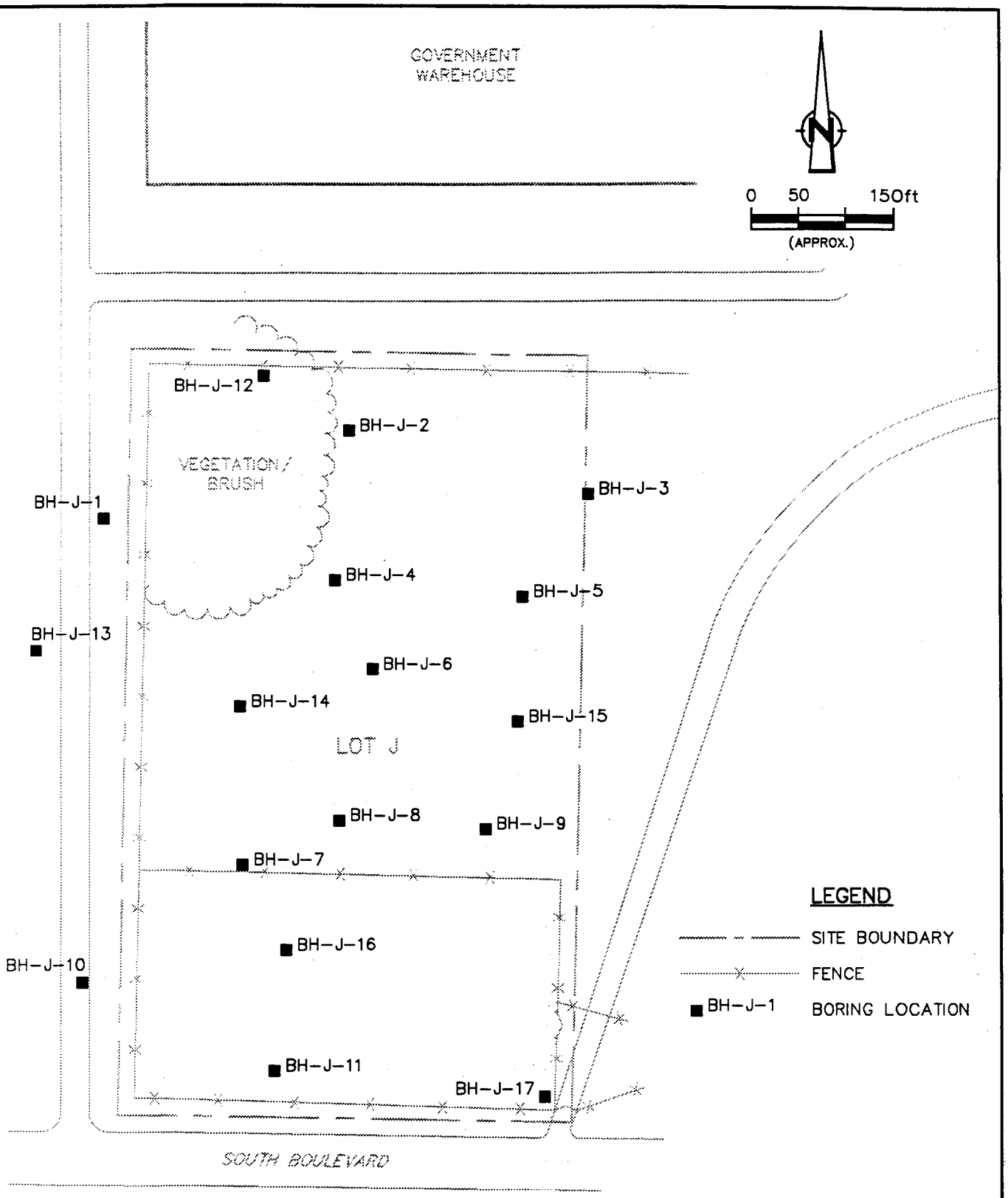


figure 2.1
BORING LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-57)

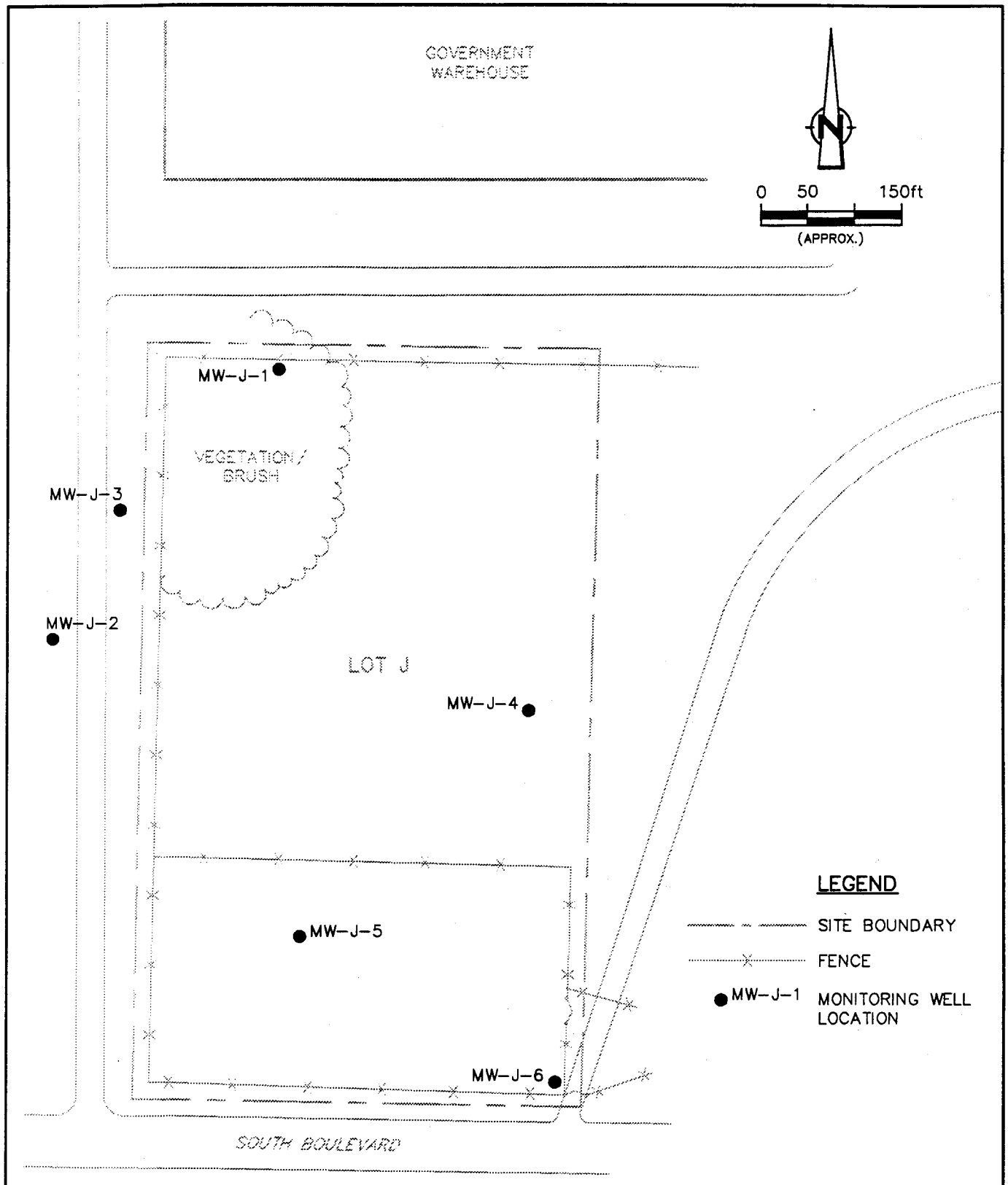


figure 2.2

MONITORING WELL LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-58)

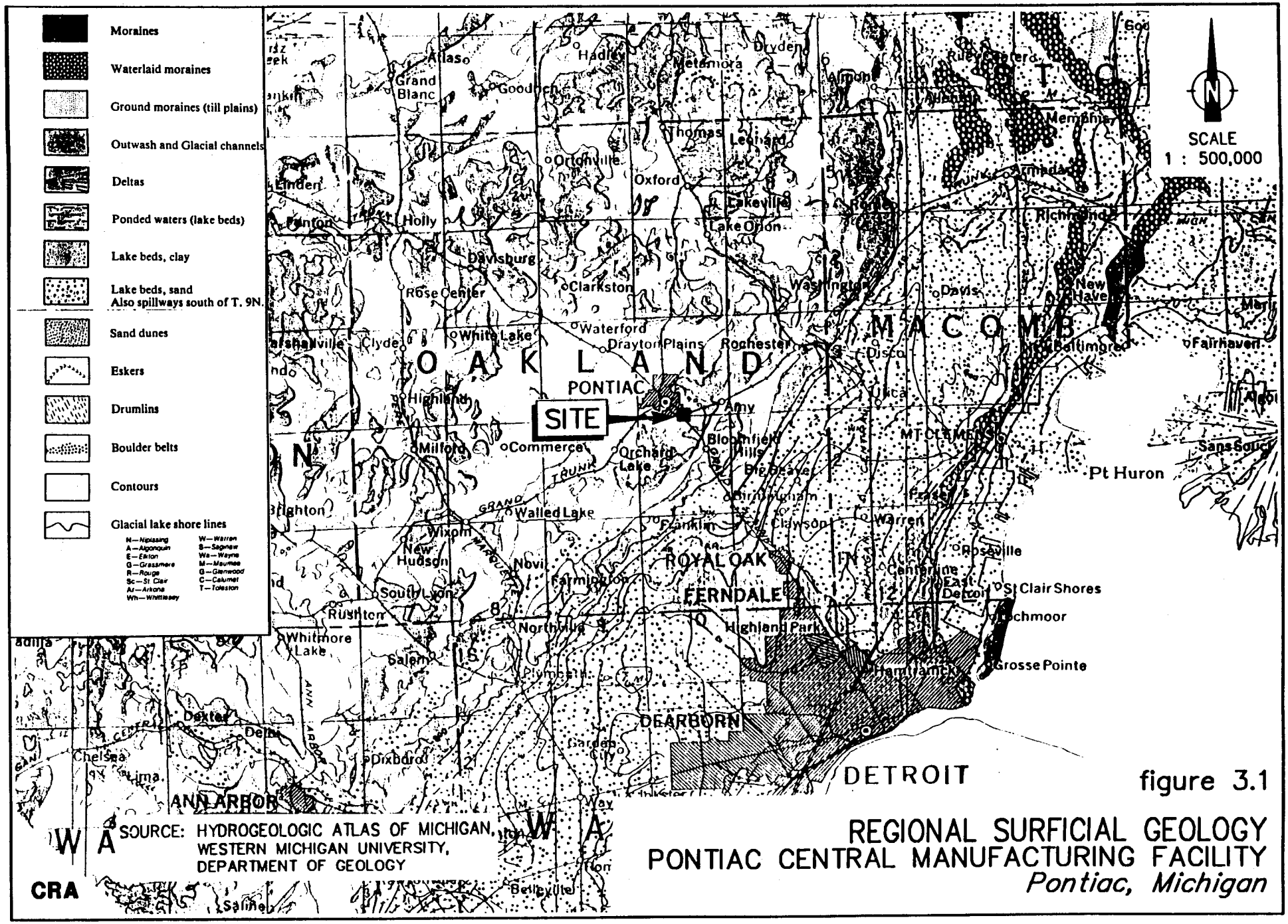


figure 3.1

REGIONAL SURFICIAL GEOLOGY
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

5770 (15) JAN 12/95 (W) REV.0

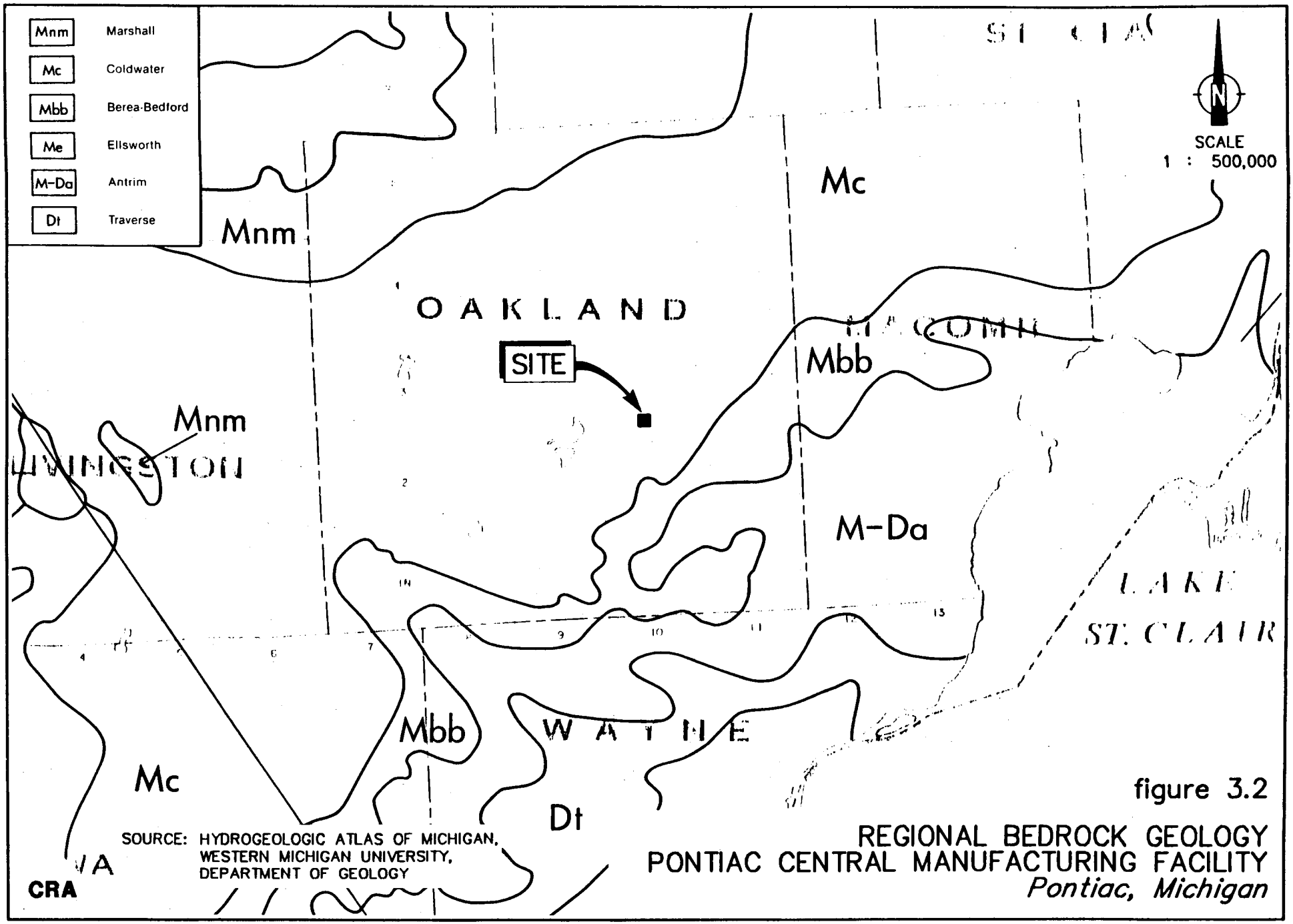
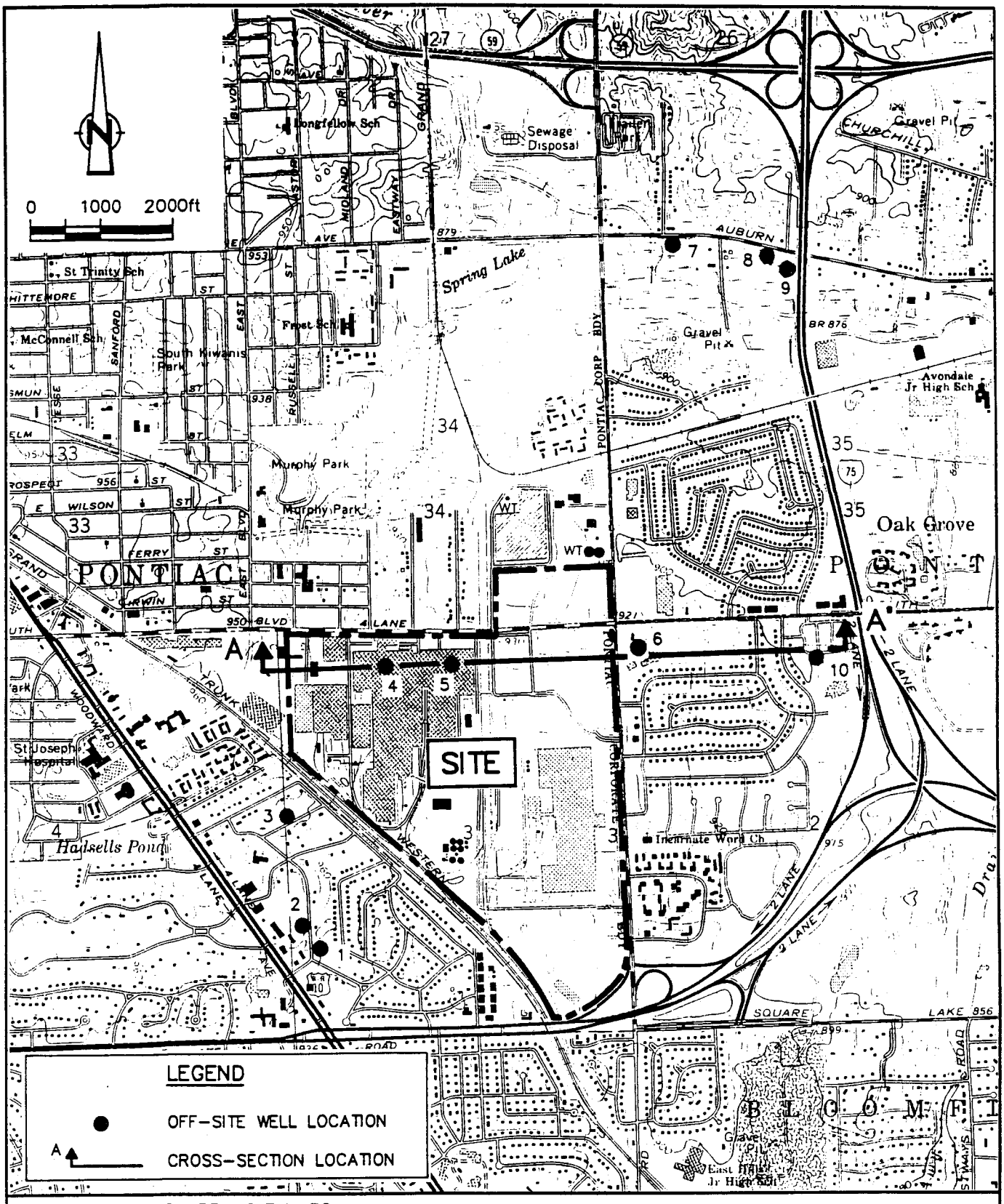


figure 3.2

REGIONAL BEDROCK GEOLOGY
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan



SOURCE: USGS QUADRANGLE MAPS;
PONTIAC NORTH, PONTIAC SOUTH,
BIRMINGHAM AND ROCHESTER, MICHIGAN

figure 3.3

OFF-SITE WELL LOCATION PLAN AND REGIONAL GEOLOGIC CROSS-SECTION LOCATION PONTIAC CENTRAL MANUFACTURING FACILITY

Pontiac, Michigan

CRA

5770 (15) JAN 11/95 (W) REV.0

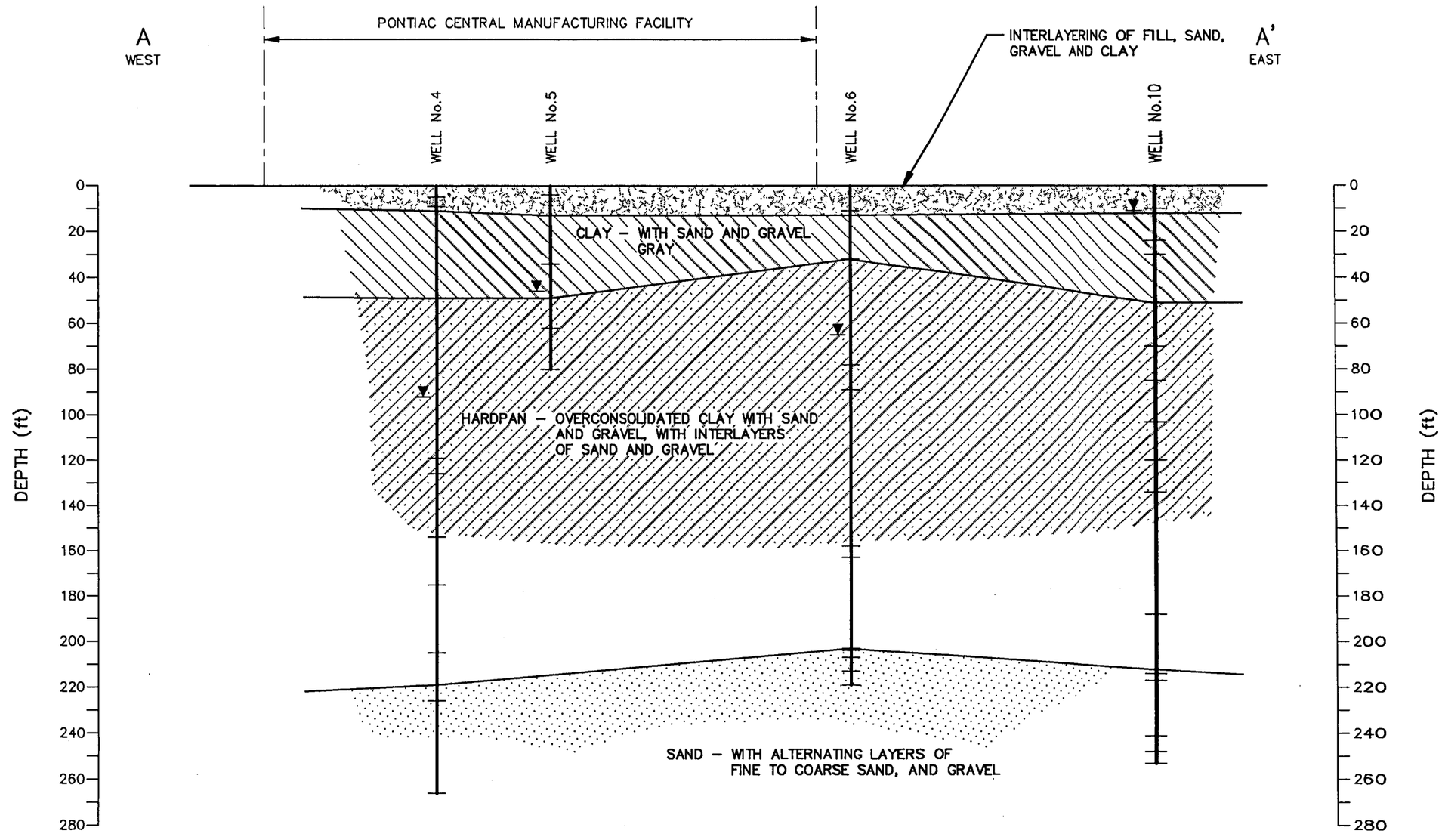
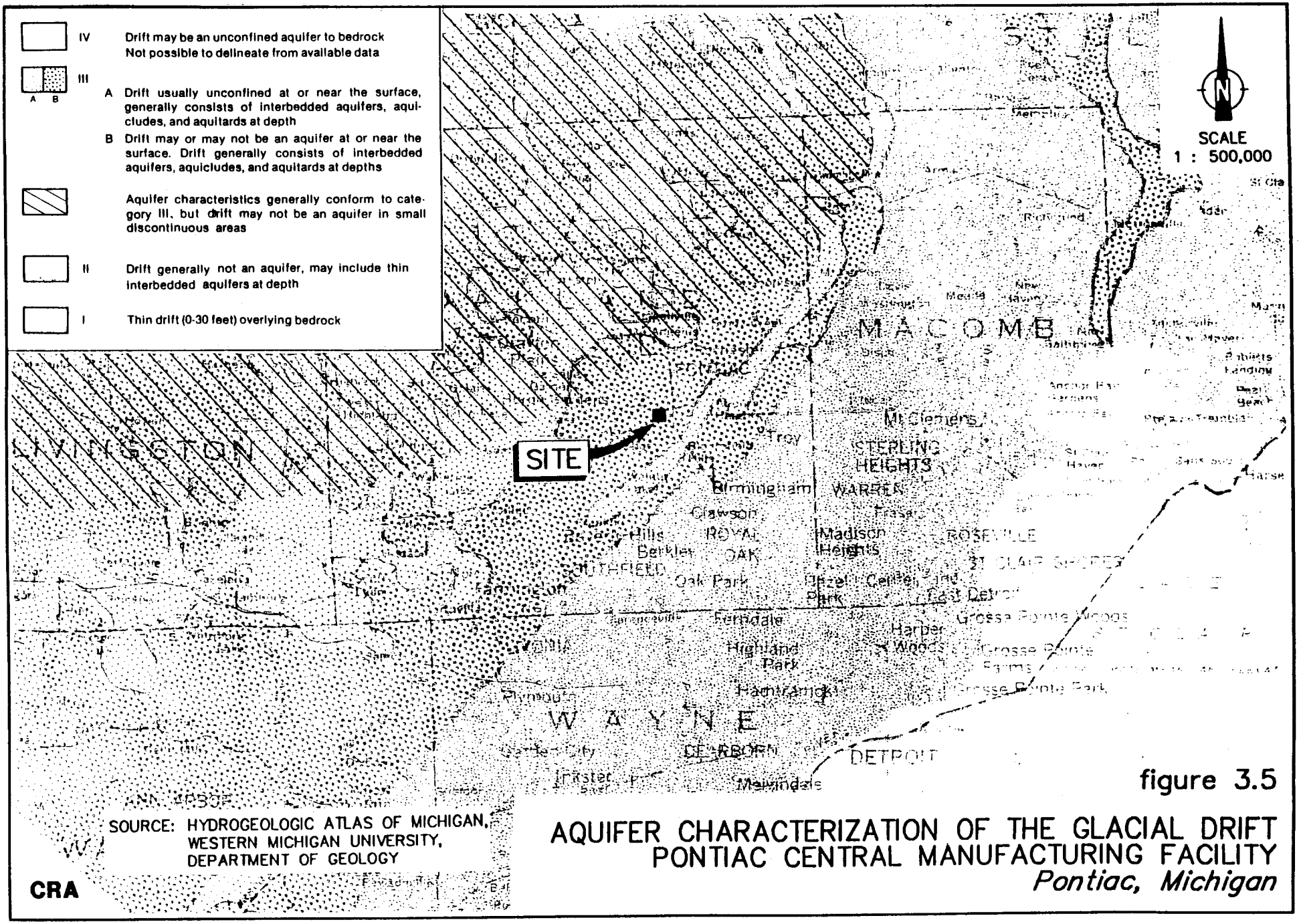


figure 3.4
REGIONAL GEOLOGIC CROSS-SECTION A-A'
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 19/95(W) REV.0 (X-12)



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, WESTERN MICHIGAN UNIVERSITY, DEPARTMENT OF GEOLOGY

CRA

figure 3.5

AQUIFER CHARACTERIZATION OF THE GLACIAL DRIFT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

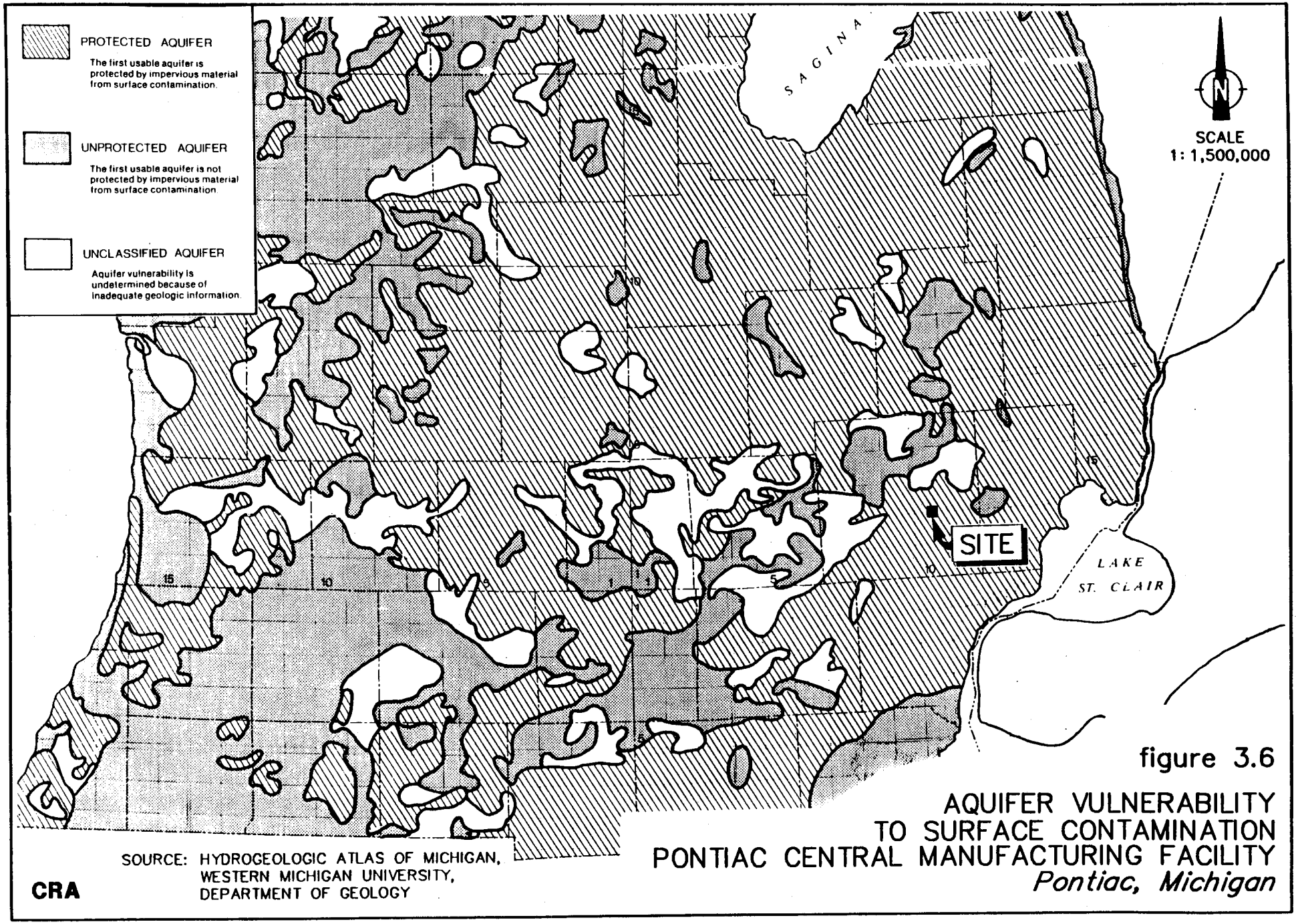


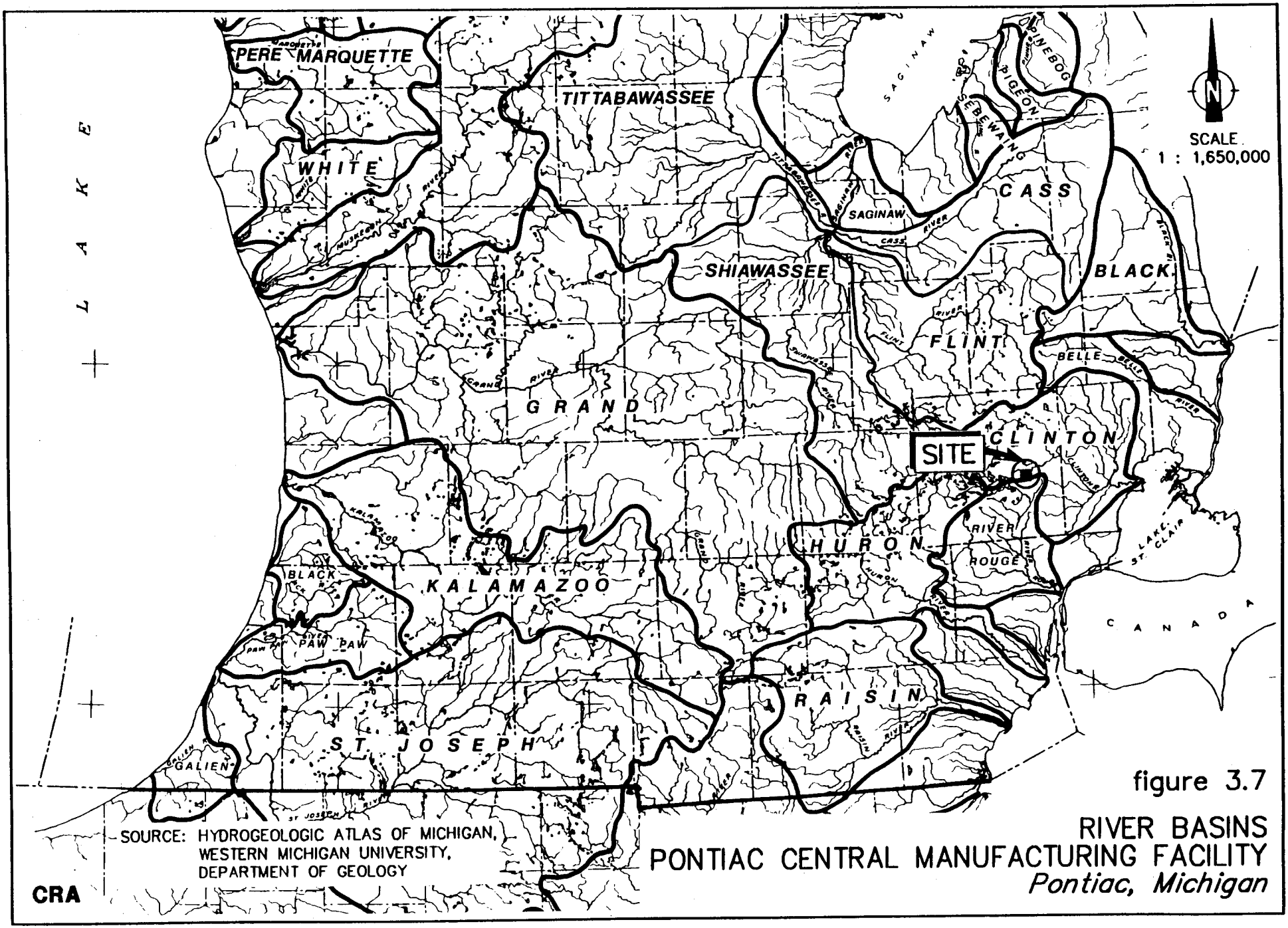
figure 3.6

AQUIFER VULNERABILITY
TO SURFACE CONTAMINATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN,
WESTERN MICHIGAN UNIVERSITY,
DEPARTMENT OF GEOLOGY

CRA

5770 (15) JAN 12/95 (W) REV.0



SOURCE: HYDROGEOLOGIC ATLAS OF MICHIGAN, WESTERN MICHIGAN UNIVERSITY, DEPARTMENT OF GEOLOGY

CRA

figure 3.7

RIVER BASINS

PONTIAC CENTRAL MANUFACTURING FACILITY

Pontiac, Michigan

5770 (15) JAN 12/95 (W) REV.0

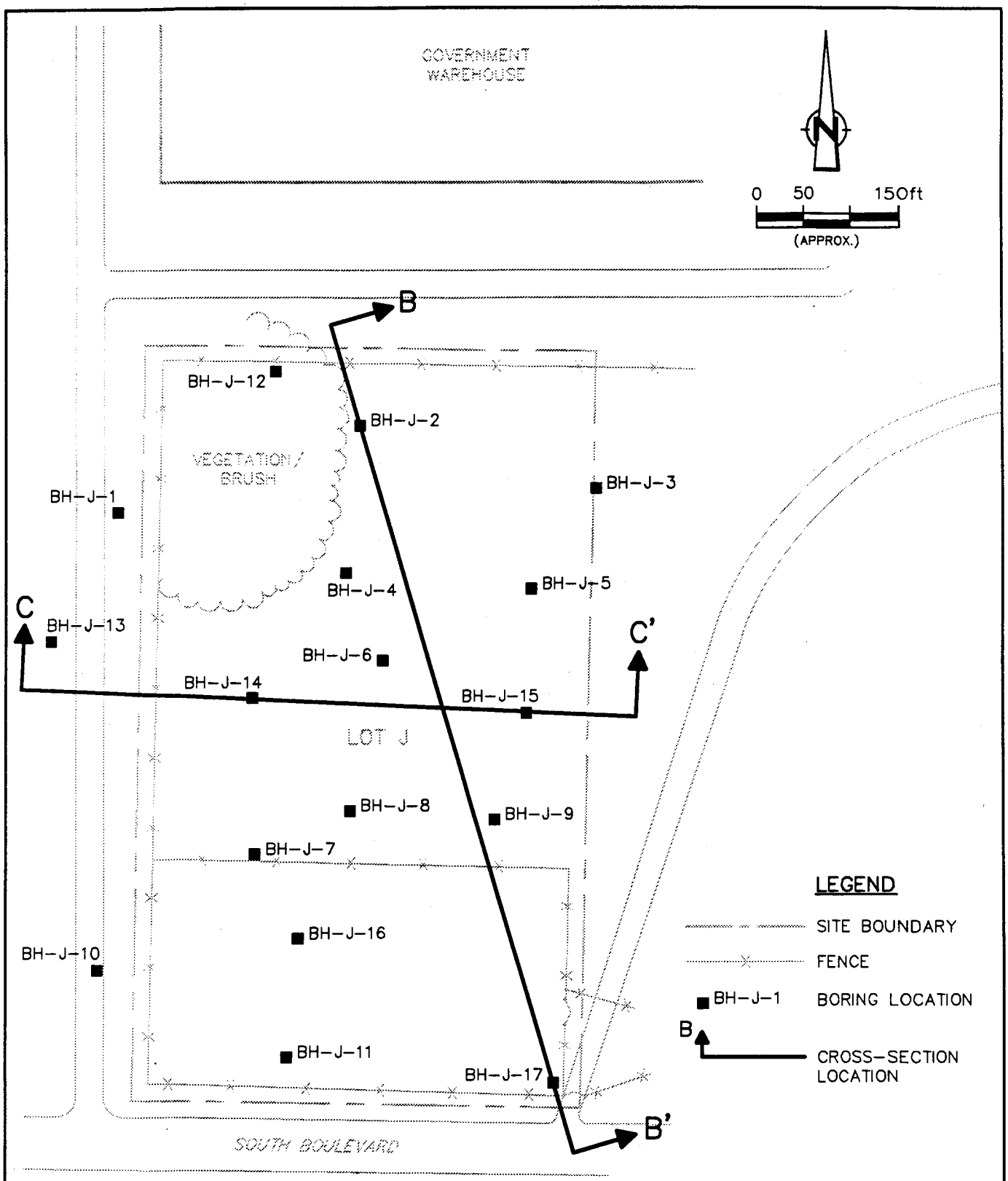


figure 4.1

GEOLOGIC CROSS-SECTION LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 11/95(W) REV.0 (P-59)

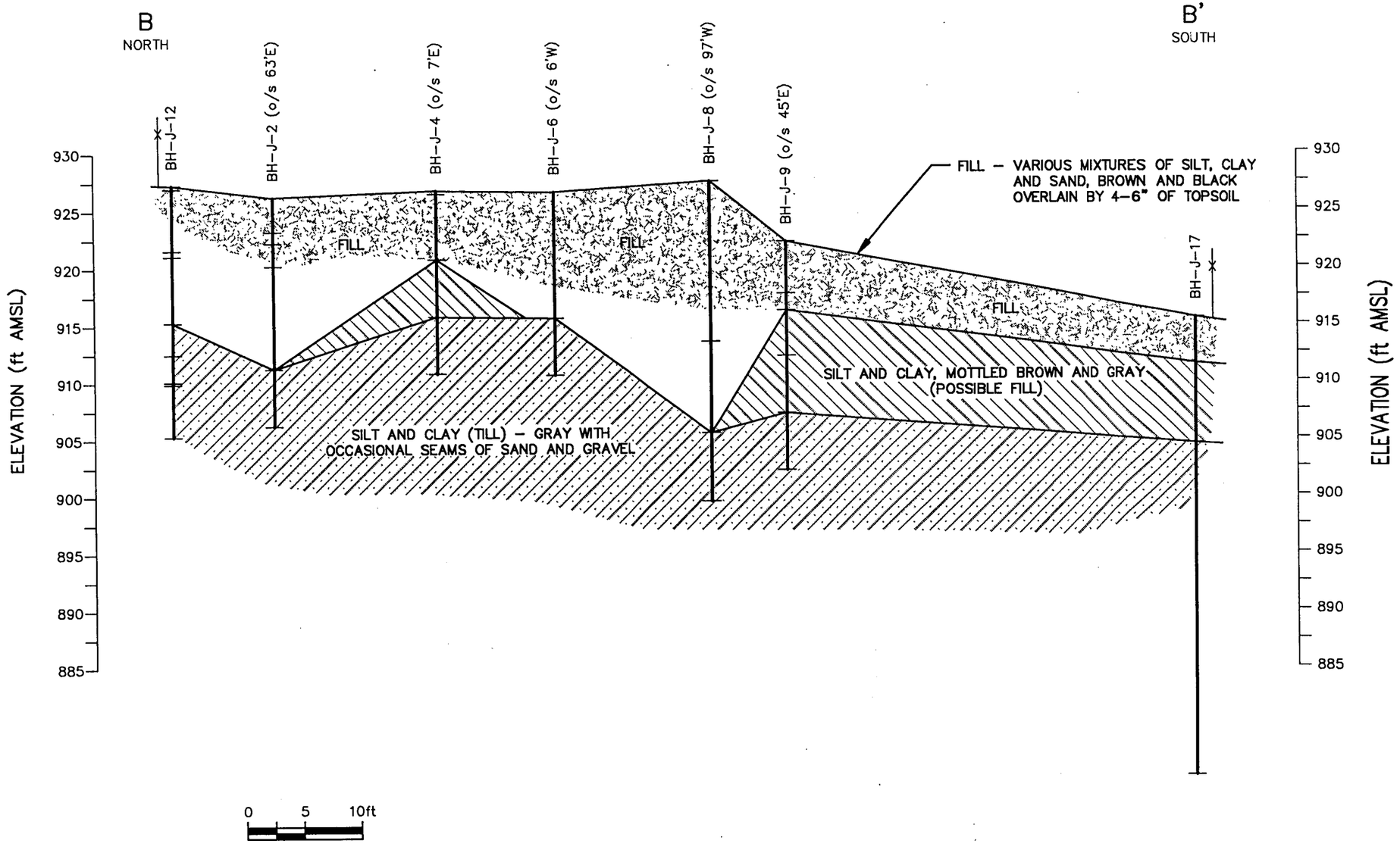


figure 4.2

GEOLOGIC CROSS-SECTION B-B'
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 19/95(W) REV.0 (X-10)

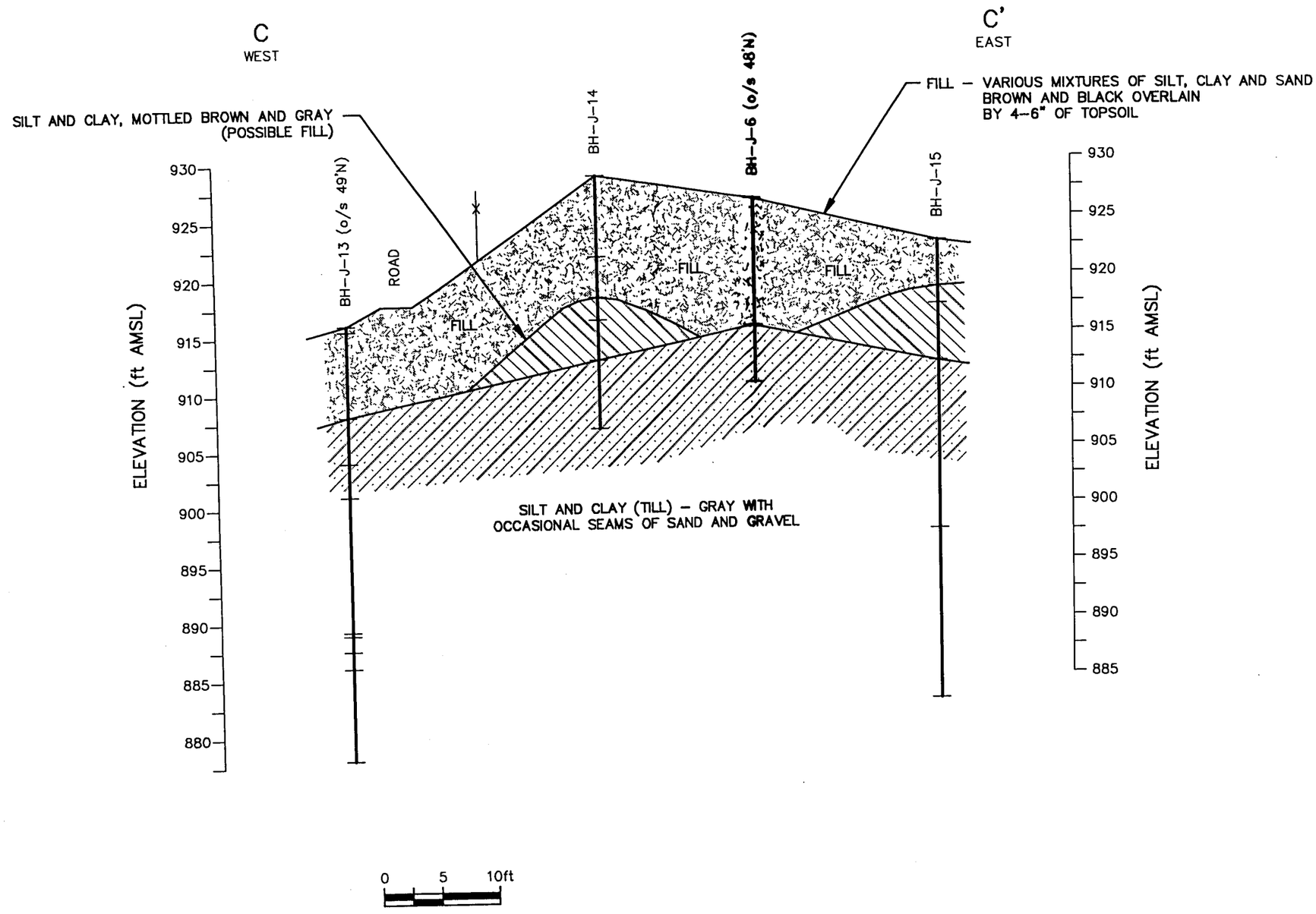


figure 4.3

GEOLOGIC CROSS–SECTION C–C'
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 19/95(W) REV.0 (X–11)

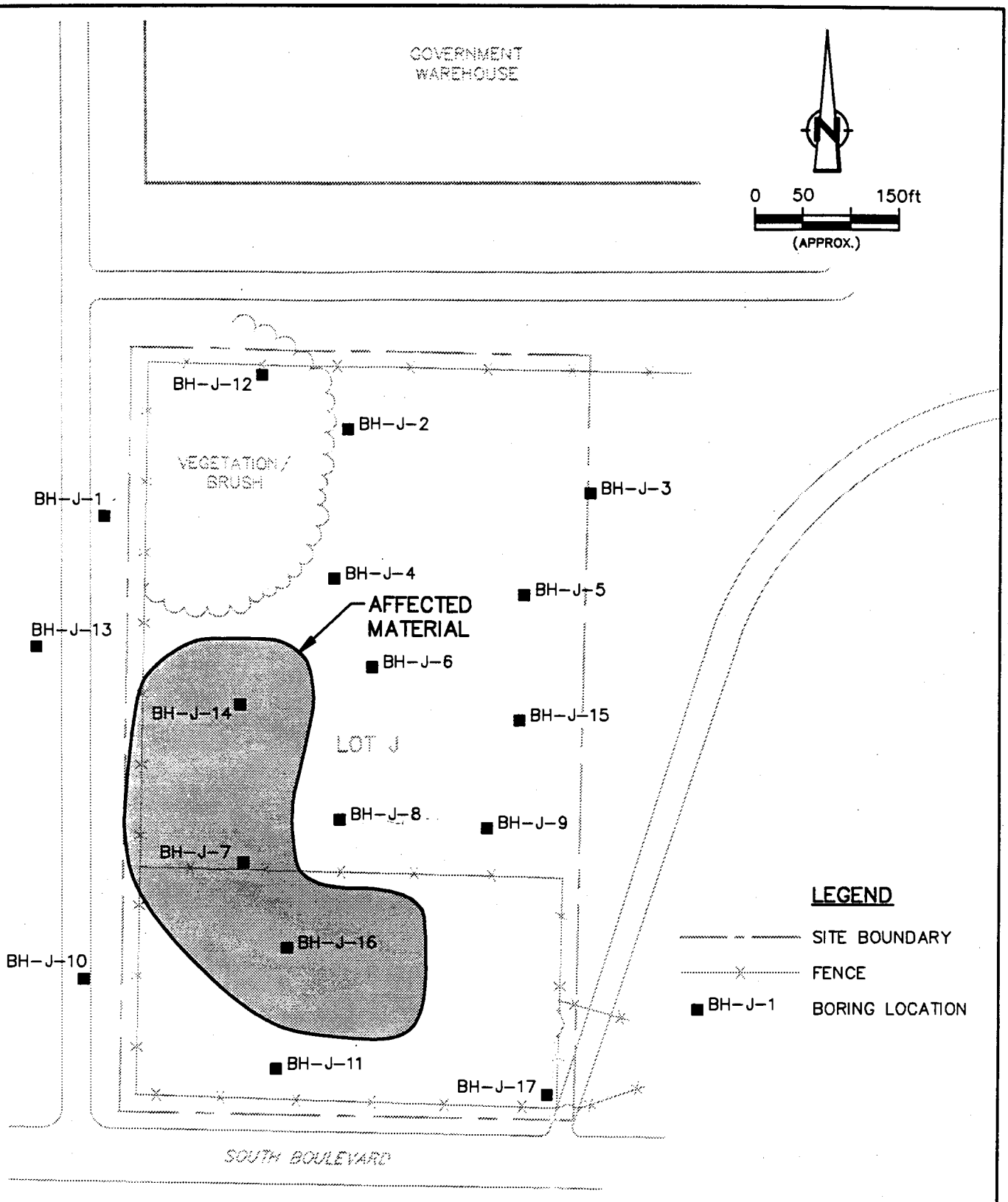


figure 5.1

ESTIMATED AREA OF AFFECTED MATERIAL
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (15) JAN 19/95(W) REV.0 (P-65)

TABLE 1.1

SUMMARY OF ANALYTICAL RESULTS
ERM INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Number	*Sample Location*	*Sample Depth (feet bgs)*	*Media*	*Date*	*TPH Concentration (mg/kg)*	*Cyanide Concentration (mg/kg)*
B-1-18	B-1	18	Soil	5/20/94	<20	<20
B-3-16	B-3	16	Soil	5/20/94	<20	<20
B-3-9	B-3	9	Soil	5/20/94	24	<20
B-4-13	B-4	13	Soil	5/20/94	40	<20
B-5-11	B-5	11	Soil	5/20/94	24,400	<20
BW-3	B-3	--	Water	5/20/94	33 (1)	<20 (1)
BW-8	B-8	--	Water	5/24/94	<20 (1)	<20 (1)

Notes:

(1) - Results are reported on a mass basis (mg/kg) due to a high concentration of suspended solids (10-20%) in the samples

- bgs = below ground surface

TABLE 1.2

TEST PIT EXCAVATION LOGS
CRA INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Pit Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample Depth (ft bgs)*	*PID (ppm)*
TP1	0-2	Brown sand and stone (Fill)	--	--
	2-10	Debris - fire brick, metal, concrete, etc. No black soil or odor (Fill)	--	--
TP2	0-2	Brown sand and stone (Fill)	--	--
	2-6	Debris - some black sand, little odor (Fill)	--	--
TP3	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	--
	9-11	Green/gray sandy clay Dry yellow silt (Fill)	FR305/11	--
	11-13	Brown mottled clay	--	--
TP4	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	--
	9-11	Green/gray sandy clay (Fill)	FR304/11	--
	11-13	Brown mottled clay	--	--
TP5	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	--
	9-11	Green/gray sandy clay (Fill)	--	--
	11-13	Brown mottled clay	--	--
TP6	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	FR302/6	--
	9-11	Green/gray sandy clay (Fill)	--	--

TEST PIT EXCAVATION LOGS
CRA INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Pit Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample Depth (ft bgs)*	*PID (ppm)*
	11-13	Brown mottled clay	--	--
TP7	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	--	--
	9-11	Green/gray sandy clay (Fill)	--	--
	11-13	Brown mottled clay	--	--
TP8	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	--	--
	9-11	Green/gray sandy clay (Fill)	--	--
	11-13	Brown mottled clay	--	--
TP9	0-2	Brown sand and stone (Fill)	--	--
	2-9	Black sand, debris consisting of metal, drum carcasses, concrete, ash, paint (Fill)	--	--
	9-11	Green/gray sandy clay (Fill)	--	--
	11-13	Brown mottled clay	--	--
TP10	0-2	Brown sand and stone (Fill)	--	--
	2-12	Brown sand and concrete (Fill)	--	--
TP11	0-2	Brown sand and stone (Fill)	--	--
	2-18	Black sand (Fill)	FR301/9	--
	18	Clay	FR303/18	--
TP12	0-2	Brown sand and stone (Fill)	--	--
	2-18	Black sand (Fill)	--	--

TABLE 1.2

TEST PIT EXCAVATION LOGS
CRA INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Pit Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample Depth (ft bgs)*	*PID (ppm)*
	18	Clay	--	--
TP13	0-2.5	Damp and loose brown sandy silt with several cobbles (Fill)	--	0
	2.5-13	Ash, metal, foundry sand, yellow and green paint Yellow staining at 12 ft BGS Occasional strong odor, petrochemical and solvent in nature (Fill)	RP1/12	0-25
TP14	0-2.5	Damp and loose brown sandy silt (Fill)	--	0
	2.5-11	Foundry sand and soil matrix containing paint, filter cloth, tar, tar paper, small crushed drums and other metal	--	0-15
		Filter material (Fill)	RP2	--
	11-13	Moist and soft clayey brown silt	--	0
TP15	0-2	Damp and loose brown sandy silt (Fill)	--	0
	2-4.5	Dry and loose, fine black foundry sand (Fill)	--	0
	4.5-5.5	Brown sand matrix containing construction rubble including bricks and mortar (Fill)	--	0
	5.5-8	Damp and loose brown clayey silt (Native, possibly weathered till)	--	0
TP16	0-6.5	Sand and silt topsoil (Fill)	--	0
	6.5-11	Moist gray sandy to clayey silt Strong methane/swamp odor	--	0
TP17	0-1	Soils with 6 inches of foundry sand (Fill)	RP3/0.5	0
	1-7	Moist and loose brown sandy silt	--	0
TP18	0-9.5	Moist and loose brown sandy silt (Fill)	--	0

TABLE 1.2

TEST PIT EXCAVATION LOGS
CRA INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Pit Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample Depth (ft bgs)*	*PID (ppm)*
		Water seepage at 6-foot depth		
	9.5-11	Moist gray sandy to clayey silt Strong methane/swamp odor	–	0
TP19	0-5	Damp and loose brown sandy silt soil matrix with building rubble including brick, concrete, mortar, plastic, glass, etc. No odor (Fill)	–	0
	5-5.5	Moist and loose black sandy topsoil	–	0
	5.5-8	Moist and loose brown sandy silt	–	0
TP20	0-3.5	Brown sandy silt fill with some black foundry sand near the surface (Fill)	–	0
	3.5-12	Moist and soft clayey silt till, mottled gray and brown	–	0
TP21 South End of Excavation	0-4	Loose and damp brown sandy silt with occasional creosoted wood blocks (Fill)	–	0
	4-5	Gravel from former parking lot (Fill)	–	0
	5-10	Damp and loose brown sandy silt soil matrix with paint, crushed drums, brick, creosoted wood blocks, glass, plastic, concrete, tar paper, asphalt, etc. (Fill) Grey and yellow paint materials	– RP4	0
	10-14	Soft and moist gray clayey silt till	–	0
North End of Excavation	0-4.5	Damp and loose dark brown sandy silt	–	0
	4.5-6.5	Moist and loose brown sandy silt	–	0
	6.5-10	Soft and moist gray/green clayey silt till	–	0

TEST PIT EXCAVATION LOGS
CRA INVESTIGATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Test Pit Excavation	*Depth (ft bgs)*	*Soil Conditions*	*Sample Depth (ft bgs)*	*PID (ppm)*
		No odor		
TP22	0-3.5	Fill - dark brown sandy silt fill with occasional bricks (Fill)	--	0
	3.5-5	Gravel from former parking lot with a 2-inch steel conduit of unknown origin (Fill)	--	0
	5-11.5	Foundry sand matrix with cinder blocks, tar, creosoted wood blocks No odor (Fill)	RP5	0
	11.5-13.5	Black sandy, peaty topsoil	--	0
	13.5-16.5	Soft and moist gray clayey silt No odor	--	0
TP23	0-10.5	Damp brown sandy matrix with building rubble including bricks, roof tile, blocks, asphalt, and wood blocks (Fill)	--	0
	10.5-12.5	Moist brown to gray sandy to clayey silt No odor	--	0
TP24	0-10	Loose brown to gray sandy silt matrix with associated building rubble including blocks, brick, concrete and asphalt (Fill)	--	0
	10-14	Soft and moist clayey silt till No odor	--	0

not all ND
parameters
included for
VOCs & BAAs

sampled 11/9/94

TABLE 1.3

SUMMARY OF ANALYTICAL RESULTS
CRA TEST PIT EXCAVATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	*MICHIGAN TYPE B*	*FR305*	FR304	*FR302*	*FR301*	*FR303*	*RP1*	*RP2*	*RP3*	RP4	*RP5*
SAMPLE LOCATION	*20 x DRINKING WATER*	*TP 3*	*TP 4*	*TP 3,4,5,6*	*TP11*	*TP11*	TP13	*TP14*	*TP17*	*TP21*	*TP22*
SAMPLE DEPTH (feet below ground surface)	*CLEANUP CRITERIA*	11	11	6	9	18	12	2.5-11	0.5	5-10	5-11.5
Volatile Compounds (µg/kg)											
Trans-1,2-Dichloroethene	2400	ND	ND	ND	ND	51	ND	ND	ND	NA	NA
Vinyl Chloride	0.32	ND	ND	ND	ND	580	ND	ND	ND	NA	NA
Methylene Chloride	92	ND	ND	ND	ND	ND	37	150	45	NA	NA
Acetone	14000	140	ND	620	ND	ND	340E	ND	ND	NA	NA
cis-1,2-Dichloroethene	1500	ND	ND	ND	ND	230	ND	ND	ND	NA	NA
Benzene	24	ND	ND	ND	ND	190	54	250	ND	NA	NA
Toluene	16000	ND	ND	ND	15000	ND	58	79000E	ND	NA	NA
Ethylbenzene	1500	ND	ND	280	9000	30	12000	140000E	ND	NA	NA
Total Xylenes	5600	ND	ND	900	67000	87	59000	600000E	ND	NA	NA
Base Neutral Acids (µg/kg)											
Naphthalene	5000	ND	ND	6000	14000 (14400 ×)	ND	NA	NA	NA	NA	NA
2-Methylnaphthalene	–	ND	ND	ND	14000	ND	NA	NA	NA	NA	NA
Di-n-butylphthalate	17000	ND	ND	4000	ND	ND	NA	NA	NA	NA	NA
Target Analyte List (mg/kg)											
Aluminum	6900 (1)	7000	7600	15000	4500	4800	7400	680	4900	1400	NA
Antimony	0.048	2 x 12	0.29	120	0.88	1 × 11	<6.6	<7.7	<6.7	<7.9	NA
Arsenic	5.8 (1)	5.4	3.8	35	150	2.8	26	<13	29	25	NA
Barium	75 (1)	220	41	2900	87	33	6300	6600	64	7800	NA
Berylium	–	0.3	0.39	0.41	2	0.21	<0.55	<0.64	<0.55	<0.66	NA
Cadmium	1.2 (1)	0.67	0.22	74	0.99	0.31	27	1.3	<0.56	55	NA
Calcium	–	24000 x 31000	4600	27000 × 35000	2600	60000 x 79000	13000	1900	2300	32000	NA
Chromium	18 (1)	12	13	940	9	12	12000	8800	9.6	13000	NA
Cobalt	6.8 (1)	7.5	6.6	36	8.8	4.5	68	37	5.8	60	NA
Copper	32 (1)	10	10	2900	36	21	1700	18	17	84	NA
Iron	12000 (1)	43000 x 54000	18000	110000 × 13000	5500	11000	33000	1400	6900	9200	NA
Lead	21 (1)	6.1	4.8	6100	20	7	13000	3600	20	7500	NA
Magnesium	–	10000	3600	8400	360	19000	6100	1000	870	3500	NA
Manganese	440 (1)	2300	270	960	15	240	480	37	89	200	NA
Mercury	0.13 (1)	0.038	<0.02	0.21	<0.029	<0.02	74	NA	NA	NA	NA
Nickel	20 (1)	18	14	340	18	14	74	8.6	10	21	NA
Potassium	–	1200	870	1100	520	730	3600	3000	340	3700	NA
Selenium	0.7	<1.2	<1.8	<1.9	<1.9	<1.3	<11	<13	<11	<13	NA
Silver	1.0 (1)	0.044	<0.036	8.9	0.055	0.076	<1.1	<1.3	<1.1	<1.3	NA
Sodium	3000	340	180	1100	440	170	870	900	74	330	NA
Thallium	0.012	<0.049	<0.053	<0.064	0.49	<0.051	NA	NA	NA	NA	NA
Vanadium	1.2	21	22	17	26	11	30	9.5	18	27	NA
Zinc	47 (1)	25	43	5300	12	49	19000	11000	27	47000	NA
Cyanide	0.30	NA	NA	NA	NA	NA	3.67	3.51	<0.22	1.13	<0.21

Notes:
(1) - Michigan default Type A Cleanup Criteria has been substituted when exceeding the Michigan Type B Cleanup Criteria.
NA - Not Analysed
ND - Not Detected
E - Value is outside of the quantitation limit and is therefore an estimated quantity.

TABLE 4.1

WATER LEVEL ELEVATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Monitoring Well	*TOC Elevation (ft. AMSL)*	*Depth to Water (ft. below TOC) 11/30/94*	*Water Level Elevation (ft. AMSL) 11/30/94*	*Depth to Water (ft. below TOC) 12/7/94*	*Water Level Elevation (ft. AMSL) 12/7/94*
MW-J-1	930.28	17.54	910.74	17.34	912.94
MW-J-2	919.89	32.65	887.24	32.62	887.27
MW-J-3	922.77	36.9	885.87	36.88	885.89
MW-J-4	925.29	Dry	Dry	Dry	Dry
MW-J-5	927.44	Dry	Dry	Dry	Dry
MW-J-6	918.35	28.24	890.11	28.35	890

Notes:

AMSL = Above Mean Sea Level
TOC = Top Of Casing

TABLE 4.2

SUMMARY OF GEOTECHNICAL TESTING RESULTS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Location	*Sample Depth, (feet bgs)*	*Specimen Depth, (feet bgs)*	*Moisture Content, (percent)*	*Wet Unit Weight, (pcf)*	*Dry Unit Weight, (pcf)*	*Hydraulic Conductivity, (cm/sec)*
BH-J-1	21.2-22.2	21.7-21.9	12.1	142.9	127.5	2.4×10^{-8}
BH-J-13	19.2-20.0	19.4-19.7	13.2	141.0	124.5	2.6×10^{-8}
BH-J-15	13.2-14.0	13.2-13.4	10.1	142.7	129.6	2.6×10^{-8}
BH-J-16	21.2-22.0	21.2-21.4	13.1	140.4	124.1	1.6×10^{-8}
BH-J-17	14.9-15.7	15.2-15.5	11.5	140.8	126.3	4.1×10^{-7}

Notes:

pcf = pounds per cubic foot
bgs = below ground surface

TABLE 5.1

SUMMARY OF SAMPLES
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Number	*Location*	*Depth (feet below ground surface)*	*Analysis*
S-5770-110394-BTH-001	BH-J-2	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110394-BTH-002	BH-J-2	14-16	TCL VOC, TAL Metals
S-5770-110394-BTH-003	BH-J-2	18-20	TCL VOC, TAL Metals
S-5770-110394-BTH-004	BH-J-12	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110394-BTH-005	BH-J-12	12-14	TCL VOC, TAL Metals
S-5770-110394-BTH-006	BH-J-12	20-22	TCL VOC, TAL Metals
S-5770-110394-BTH-007	BH-J-4	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110394-BTH-008	BH-J-4	10-12	TCL VOC, TAL Metals
S-5770-110394-BTH-009	BH-J-4	14-16	TCL VOC, TAL Metals
S-5770-110494-BTH-010	BH-J-6	Rinsate	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110494-BTH-011	BH-J-6	6-8	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110494-BTH-012	BH-J-6	10-12	TCL VOC, TAL Metals
S-5770-110494-BTH-013	BH-J-6	14-16	TCL VOC, TAL Metals
S-5770-110494-BTH-014	BH-J-9	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110494-BTH-015	BH-J-9	14-16	TCL VOC, TAL Metals
S-5770-110494-BTH-016	BH-J-9	18-20	TCL VOC, TAL Metals
S-5770-110494-BTH-017	BH-J-5	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110494-BTH-018	BH-J-5	12-14	TCL VOC, TAL Metals
S-5770-110494-BTH-019	BH-J-5	16-18	TCL VOC, TAL Metals
S-5770-110794-BTH-020	BH-J-15	6-8	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110794-BTH-021	BH-J-15	10-12	TCL VOC, TAL Metals
S-5770-110794-BTH-021MSMSD	BH-J-15	10-12 (Dup)	TCL VOC, TAL Metals
SHELBY TUBE	BH-J-15	12-14	Grain Size, Permeability
S-5770-110794-BTH-022	BH-J-15	38-40	TCL VOC, TAL Metals
S-5770-110894-BTH-023	BH-J-8	Rinsate	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110894-BTH-024	BH-J-8	8-10	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110894-BTH-025	BH-J-8	22-24	TCL VOC, TAL Metals
S-5770-110894-BTH-026	BH-J-8	26-28	TCL VOC, TAL Metals
S-5770-110894-BTH-027	BH-J-3	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110894-BTH-028	BH-J-3	12-14	TCL VOC, TAL Metals
S-5770-110894-BTH-029	BH-J-3	16-18	TCL VOC, TAL Metals
S-5770-110894-BTH-030	BH-J-11	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110894-BTH-031	BH-J-11	16-18	TCL VOC, TAL Metals
S-5770-110894-BTH-032	BH-J-11	20-22	TCL VOC, TAL Metals
S-5770-110994-BTH-033	BH-J-17	2-4	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-110994-BTH-034	BH-J-17	12-14	TCL VOC, TAL Metals
SHELBY TUBE	BH-J-17	14-16	Grain Size, Permeability
S-5770-110994-BTH-035	BH-J-17	38-40	TCL VOC, TAL Metals
S-5770-111094-BTH-036	BH-J-16	Rinsate	TCL VOC, SVOC, PCB/Pest, TAL Me
S-5770-111094-BTH-037	BH-J-16	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111094-BTH-038	BH-J-16	8-10	TCL VOC, TAL Metals

TABLE 5.1

SUMMARY OF SAMPLES
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Sample Number	*Location*	*Depth (feet below ground surface)*	*Analysis*
S-5770-111094-BTH-039	BH-J-16	16-18	TCL VOC, TAL Metals
SHELBY TUBE	BH-J-16	22-24	Grain Size, Permeability
S-5770-111094-BTH-040	BH-J-16	42-44	TCL VOC, TAL Metals
S-5770-111194-BTH-041	BH-J-7	8-10	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111194-BTH-042	BH-J-7	12-14	TCL VOC, TAL Metals
S-5770-111194-BTH-042MSMSD	BH-J-7	12-14 (Dup)	TCL VOC, TAL Metals
S-5770-111194-BTH-043	BH-J-7	20-22	TCL VOC, TAL Metals
S-5770-111194-BTH-044	BH-J-7	22-24	TCL VOC, TAL Metals
S-5770-111194-BTH-045	BH-J-10	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111194-BTH-046	BH-J-10	20-22	TCL VOC, TAL Metals
S-5770-111194-BTH-047	BH-J-10	22-24	TCL VOC, TAL Metals
S-5770-111594-BTH-048	BH-J-1	Rinsate	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111594-BTH-049	BH-J-1	4-6	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111594-BTH-050	BH-J-1	12-14	TCL VOC, TAL Metals
SHELBY TUBE	BH-J-1	20-22	Grain Size, Permeability
S-5770-111594-BTH-051	BH-J-1	40-42	TCL VOC, TAL Metals
S-5770-111694-BTH-052	BH-J-13	2-4	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111694-BTH-053	BH-J-13	8-10	TCL VOC, TAL Metals
SHELBY TUBE	BH-J-13	18-20	Grain Size, Permeability
S-5770-111694-BTH-054	BH-J-13	36-38	TCL VOC, TAL Metals
S-5770-111894-BTH-055	BH-J-14	6-8	TCL VOC, SVOC, PCB/Pest, TAL Metals
S-5770-111894-BTH-056	BH-J-14	16-18	TCL VOC, TAL Metals
S-5770-111194-BTH-057	BH-J-14	20-22	TCL VOC, TAL Metals
GW-5770-120794-BTH-001	MW-J-6	Water	TCL VOC, SVOC, PCB/Pest, TAL Metals
GW-5770-120794-BTH-002	MW-J-6	Water (Dup)	TCL VOC, SVOC, PCB/Pest, TAL Metals
GW-5770-120794-BTH-003	MW-J-3	Water	TCL VOC, SVOC, PCB/Pest, TAL Metals
GW-5770-120794-BTH-004	MW-J-2	Water	TCL VOC, SVOC, PCB/Pest, TAL Metals
GW-5770-120794-BTH-005	MW-J-1	Water	TCL VOC, SVOC, PCB/Pest, TAL Metals
GW-5770-120794-BTH-006	-	Rinsate	TCL VOC, SVOC, PCB/Pest, TAL Metals

TABLE 5.2

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-001	BTH-002	BTH-003	BTH-004	BTH-005	BTH-006	BTH-007
SAMPLE LOCATION		BH-J-2	BH-J-2	BH-J-2	BH-J-12	BH-J-12	BH-J-12	BH-J-4
SAMPLE INTERVAL (feet bgs)		(4-6)'	(14-16)'	(18-20)'	(4-6)'	(12-14)'	(20-22)'	(4-6)'
DATE SAMPLED		11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94
UNITS		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	CAS Number							
Volatile Compounds								
Acetone	67-64-1	270 (100)	2200 J (100)	3200 J (100)	410 J (100)	340 (100)	790 J (100)	< 100 (100)
Benzene	71-43-2	ND(10)	ND(10)	ND(10)	ND (10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	< 100 (100)	<100 UJ (100)	<100 UJ (100)	ND (100)	< 100 (100)	<100 UJ (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND(100)	ND (100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	ND(10)	ND (10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	ND(10)	ND(10)	ND(10)	ND (10)	ND(10)	ND(10)	ND(10)
Methylene chloride	75-09-2	< 10 (10)	<10 UJ (10)	<10 UJ (10)	ND (10)	13 (10)	18 J (10)	< 10 (10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND(100)	ND (100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	< 10 (10)	14 J (10)	19 J (10)	ND (10)	< 10 (10)	21 J (10)	ND(10)
Vinyl Acetate	108-05-4	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	ND(30)	ND(30)	<30 UJ (30)	ND (30)	< 30 (30)	<30 UJ (30)	ND(30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-008	BTH-009	BTH-010	BTH-011	BTH-012	BTH-013	BTH-014
SAMPLE LOCATION		BH-J-4	BH-J-4	BH-J-6	BH-J-6	BH-J-6	BH-J-6	BH-J-9
SAMPLE INTERVAL (feet bgs)		(10-12)'	(14-16)'	RINSATE	(6-8)'	(10-12)'	(14-16)'	(4-6)'
DATE SAMPLED		11/3/94	11/3/94	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94
UNITS		ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	**CAS Number**							
Volatile Compounds								
Acetone	67-64-1	170 J (100)	1000 J (100)	<50 (50)	590 (100)	5400 (100)	240 (100)	2200 (100)
Benzene	71-43-2	ND(10)	ND(10)	ND (1.0)	ND(10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	<100 UJ (100)	100 UJ (100)	ND (50)	ND(100)	< 100 (100)	< 100 (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND (50)	ND(100)	< 100 (100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	ND (1.0)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	ND(10)	ND(10)	ND (1.0)	ND(10)	ND(10)	ND(10)	ND(10)
Methylene chloride	75-09-2	17 J (10)	18 J (10)	ND (1.0)	12 (10)	20 (10)	< 10 (10)	ND(10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	23 J (10)	10 J (10)	ND (1.0)	< 10 (10)	28 (10)	14 (10)	ND(10)
Vinyl Acetate	108-05-4	ND(100)	ND(100)	<50 (50)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	<30 UJ (30)	ND(30)	ND (3.0)	ND(30)	< 30 (30)	< 30 (30)	ND(30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
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- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.2

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-015	BTH-016	BTH-017	BTH-018	BTH-019	BTH-020	BTH-021
SAMPLE LOCATION		BH-J-9	BH-J-9	BH-J-5	BH-J-5	BH-J-5	BH-J-15	BH-J-15
SAMPLE INTERVAL (feet bgs)		(14-16)'	(18-20)'	(4-6)'	(12-14)'	(16-18)'	(6-8)'	(10-12)'
DATE SAMPLED		11/4/94	11/4/94	11/4/94	11/4/94	11/4/94	11/7/94	11/7/94
UNITS		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	**CAS Number**							
Volatile Compounds								
Acetone	67-64-1	1600 (100)	2900 (100)	1900 (100)	470 (100)	4800 (1000)	260 (100)	5200 (100)
Benzene	71-43-2	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	< 100 (100)	< 100 (100)	< 100 (100)	< 100 (100)	< 100 (100)	< 100 (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Methylene chloride	75-09-2	< 10 (10)	< 10 (10)	< 10 (10)	< 10 (10)	10 (10)	< 10 (10)	< 10 (10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	17 (10)	< 10 (10)	ND(10)	< 10 (10)	23 (10)	< 10 (10)	< 10 (10)
Vinyl Acetate	108-05-4	ND(100)	< 100 (100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	< 30 (30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)	ND(30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
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- J = associated value is an estimated quantity.
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DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-021 MSMSD	BTH-022	BTH-023	BTH-024	BTH-025	BTH-026	BTH-027
SAMPLE LOCATION		BH-J-15	BH-J-15	BH-J-8	BH-J-8	BH-J-8	BH-J-8	BH-J-3
SAMPLE INTERVAL (feet bgs)		(10-12)'	(38-40)'	RINSATE	(8-10)'	(22-24)'	(26-28)'	(4-6)'
DATE SAMPLED		11/7/94	11/8/94	11/8/94	11/8/94	11/8/94	11/8/94	11/8/94
UNITS		ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg
		DUPLICATE						
Parameter	CAS Number							
Volatile Compounds								
Acetone	67-64-1	810 (100)	700J	ND (50)	1900 (100)	1400 J (100)	2600 J (100)	440 (100)
Benzene	71-43-2	ND(10)	ND(10)	ND(1.0)	ND (10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	<100 (100)	<100UJ (100)	ND (50)	<100 (100)	<100 UJ (100)	<100 UJ (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND 50)	ND (100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	3.4 (1.0)	ND (10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	ND (10)	14J (10)	ND (1.0)	ND (10)	<10 UJ (10)	ND(10)	ND(10)
Methylene chloride	75-09-2	<10 (10)	<10UJ (10)	ND (1.0)	<10 (10)	<10 UJ (10)	<10 UJ (10)	ND(10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND (50)	ND (100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	12 (10)	67 (10)	ND (1.0)	<10 (10)	32 J (10)	12 J (10)	ND(10)
Vinyl Acetate	108-05-4	ND(100)	ND(100)	ND (50)	ND (100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	<30 (30)	62 (30)	ND (3.0)	ND (30)	<30 UJ (30)	ND(30)	ND(30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
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- ND = Not Detected.

TABLE 5.2

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-028	BTH-029	BTH-030	BTH-031	BTH-032	BTH-033	BTH-034
SAMPLE LOCATION		BH-J-3	BH-J-3	BH-J-11	BH-J-11	BH-J-11	BH-J-17	BH-J-17
SAMPLE INTERVAL (feet bgs)		(12-14)'	(16-18)'	(4-6)'	(16-18)'	(20-22)'	(2-4)'	(12-14)'
DATE SAMPLED		11/8/94	11/8/94	11/8/94	11/8/94	11/8/94	11/9/94	11/9/94
UNITS		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	CAS Number							
Volatile Compounds								
Acetone	67-64-1	500 J (100)	3600 (100)	990 (100)	900 (100)	460 (100)	850 (100)	230 (100)
Benzene	71-43-2	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	ND(100)	< 100 (100)	ND(100)	< 100 (100)	< 100 (100)	140 (100)	ND(100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	<10 UJ (10)	ND(10)	< 10 (10)	ND(10)	< 10 (10)	ND(10)	< 10 (10)
Methylene chloride	75-09-2	<10 UJ (10)	< 10 (10)	ND(10)	< 10 (10)	< 10 (10)	ND(10)	< 10 (10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	35 J (10)	< 10 (10)	12 (10)	< 10 (10)	12 (10)	< 10 (10)	22 (10)
Vinyl Acetate	108-05-4	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	<30 UJ (30)	ND(30)	< 30 (30)	ND(30)	< 30 (30)	ND(30)	< 30 (30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
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- bgs = below ground surface.
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- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-035	BTH-036	BTH-037	BTH-038	BTH-039	BTH-040	BTH-041
SAMPLE LOCATION		BH-J-17	BH-J-16	BH-J-16	BH-J-16	BH-J-16	BH-J-16	BH-J-7
SAMPLE INTERVAL (feet bgs)		(38-40)'	RINSATE	(4-6)'	(8-10)'	(16-18)'	(42-44)'	(8-10)'
DATE SAMPLED		11/9/94	11/10/94	11/10/94	11/10/94	11/10/94	11/11/94	11/11/94
UNITS		ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	**CAS Number**							
Volatile Compounds								
Acetone	67-64-1	**1100 (100)**	ND (50)	**14000 (100)**	**5000 J (100)**	**820 J (100)**	**1500 J (100)**	**2800 (200)**
Benzene	71-43-2	ND(10)	ND (1.0)	< 10 (10)	**17 J (10)**	ND(10)	ND(10)	**200 (200)**
2-Butanone	78-93-3	< 100 (100)	ND (50)	< 100 (100)	**230 J (100)**	<100 UJ (100)	<100 UJ (100)	**4200 (200)**
Carbon Disulfide	75-15-0	ND(100)	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	**3.0 (1.0)**	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	< 10 (10)	ND (1.0)	< 10 (10)	**13 J (10)**	<10 UJ (10)	ND(10)	**25000 (5000)**
Methylene chloride	75-09-2	< 10 (10)	ND (1.0)	ND(10)	<10 UJ (10)	<10 UJ (10)	<10 UJ (10)	**13 (10)**
4-Methyl-2-pentanone	108-10-1	ND(100)	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)	**45000 (5000)**
Toluene	108-88-3	**17 (10)**	ND (1.0)	< 10(10)	**21 J (10)**	**14 J (10)**	**19 J (10)**	**2400 (200)**
Vinyl Acetate	108-05-4	ND(100)	ND (50)	ND (100)	<100 UJ (100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	< 30 (30)	ND (3.0)	< 30 (30)	<30 UJ(30)	<30 UJ(30)	<30 UJ (30)	**50000 (5000)**

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.2

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-042	BTH-042 MSMSD	BTH-043	BTH-044	BTH-045	BTH-046	BTH-047
SAMPLE LOCATION		BH-J-7	BH-J-7	BH-J-7	BH-J-7	BH-J-10	BH-J-10	BH-J-10
SAMPLE INTERVAL (feet bgs)		(12-14)'	(12-14)'	(20-22)'	(22-24)'	(4-6)'	(20-22)'	(22-24)'
DATE SAMPLED		11/11/94	11/11/94	11/11/94	11/11/94	11/11/94	11/11/94	11/11/94
UNITS		ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
			DUPLICATE					
Parameter	CAS Number							
Volatile Compounds								
Acetone	67-64-1	3700 (10)	1200 (1000)	770 (10)	3500 (10)	3000 (10)	740 (10)	1700 (10)
Benzene	71-43-2	ND(10)	<10 (10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	< 100 (100)	<100 (100)	ND(100)	< 100 (100)	< 100 (100)	< 100 (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND (100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND (10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	140 (10)	260 (10)	< 10 (10)	14 (10)	ND(10)	ND(10)	ND(10)
Methylene chloride	75-09-2	< 10 (10)	13 (10)	15 (10)	17 (10)	< 10 (10)	< 10 (10)	14 (10)
4-Methyl-2-pentanone	108-10-1	ND(100)	ND (10)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	18 (10)	14(10)	<10 (10)	14 (10)	ND(10)	ND(10)	< 10 (10)
Vinyl Acetate	108-05-4	ND(100)	ND (10)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	320 (30)	490 (30)	35 (30)	< 30 (30)	ND(30)	ND(30)	ND(30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-048	BTH-049	BTH-050	BTH-051	BTH-052	BTH-053	BTH-054
SAMPLE LOCATION		BH-J-1	BH-J-1	BH-J-1	BH-J-1	BH-J-13	BH-J-13	BH-J-13
SAMPLE INTERVAL (feet bgs)		RINSATE	(4-6)'	(12-14)'	(40-42)'	(2-4)'	(8-10)'	(36-38)'
DATE SAMPLED		11/15/94	11/15/94	11/15/94	11/15/94	11/16/94	11/16/94	11/16/94
UNITS		ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	**CAS Number**							
Volatile Compounds								
Acetone	**67-64-1**	ND (50)	**3100 (1000)**	**6400 J (100)**	**1900 J (100)**	**1400 (100)**	**2000 (100)**	**320 (100)**
Benzene	**71-43-2**	ND (1.0)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
2-Butanone	**78-93-3**	ND (50)	< 100 (100)	ND(100)	<100 UJ (100)	**380 (100)**	ND(100)	ND(100)
Carbon Disulfide	**75-15-0**	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Chloroform	**67-66-3**	ND (1.0)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	**100-41-4**	ND (1.0)	< 10 (10)	<10 UJ (10)	**15 J (10)**	ND(10)	ND(10)	ND(10)
Methylene chloride	**75-09-2**	ND (1.0)	ND(10)	ND(10)	<10 UJ (10)	ND(10)	ND(10)	ND(10)
4-Methyl-2-pentanone	**108-10-1**	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Toluene	**108-88-3**	ND (1.0)	ND(10)	<10 UJ (10)	**14 J (10)**	ND(10)	< 10 (10)	< 10 (10)
Vinyl Acetate	**108-05-4**	ND (50)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	**1330-20-7**	ND (3.0)	**35 (30)**	<30 UJ (30)	**95 J (30)**	ND(30)	< 30 (30)	< 30 (30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.2

DETECTED VOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-055	BTH-056	BTH-057
SAMPLE LOCATION		BH-J-14	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(6-8)'	(16-18)'	(20-22)'
DATE SAMPLED		11/18/94	11/18/94	11/18/94
UNITS		ug/kg	ug/kg	ug/kg
Parameter	**CAS Number**			
Volatile Compounds				
Acetone	67-64-1	**610 (100)**	**450 (100)**	**590 (100)**
Benzene	71-43-2	ND(10)	ND(10)	ND(10)
2-Butanone	78-93-3	< 100 (100)	< 100 (100)	< 100 (100)
Carbon Disulfide	75-15-0	ND(100)	ND(100)	ND(100)
Chloroform	67-66-3	ND(10)	ND(10)	ND(10)
Ethylbenzene	100-41-4	ND(10)	ND(10)	< 10 (10)
Methylene chloride	75-09-2	< 10 (10)	< 10 (10)	**15 (10)**
4-Methyl-2-pentanone	108-10-1	ND(100)	ND(100)	ND(100)
Toluene	108-88-3	ND(10)	< 10 (10)	**17 (10)**
Vinyl Acetate	108-05-4	ND(100)	ND(100)	ND(100)
Total Xylenes	1330-20-7	< 30 (30)	< 30 (30)	< 30 (30)

Notes:

- All samples were analyzed for the Target Compound List for Volatile Organic Compounds. VOCs not listed above were not detected in any of the samples collected.
VOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED SVOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-001	BTH-004	BTH-007	BTH-010	BTH-011	BTH-014	BTH-017	BTH-020	BTH-023	BTH-024	BTH-027
SAMPLE LOCATION		BH-J-2	BH-J-12	BH-J-4	BH-J-6	BH-J-6	BH-J-9	BH-J-5	BH-J-15	BH-J-8	BH-J-8	BH-J-3
SAMPLE INTERVAL (feet bgs)		(4-6)'	(4-6)'	(4-6)'	RINSATE	(6-8)'	(4-6)'	(4-6)'	(6-8)'	RINSATE	(8-10)'	(4-6)'
DATE SAMPLED		11/3/94	11/3/94	11/3/94	11/4/94	11/4/94	11/4/94	11/4/94	11/7/94	11/8/94	11/8/94	11/8/94
UNITS		ug/kg	ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/L	ug/kg	ug/kg
Parameter	CAS Number											
Semi-volatile Compounds												
2-Methylnaphthalene	91-57-6	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Acenapthene	83-32-9	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Acenapthylene	208-96-8	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Anthracene	120-12-7	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)
Benzo(a)anthracene	56-55-3	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Benzo(a)pyrene	50-32-8	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Benzo(b)fluoranthene	205-99-2	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)
Benzo(k)fluoranthene	207-08-9	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Benzo(g,h,i)perylene	191-24-2	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Bis(2-Ethylhexyl)phthalate	117-81-7	ND(330)	ND(330)	ND(330)	<5.0 (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	<5.0 (5.0)	ND(330)	ND(330)
Butlybenzylphthalate	85-68-7	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Di-n-butylphthalate	84-74-2	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Chrysene	218-01-9	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Dibenzo(a,h)anthracene	53-70-3	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Di-n-octylphthalate	117-84-0	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Fluoranthene	206-44-0	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)
Fluorene	86-73-7	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Indeno(1,2,3-c,d)pyrene	193-39-5	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Naphthalene	91-20-3	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
N-Nitrosodimethylamine	62-75-9	ND(330)	ND(330)	ND(330)	5.3 (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)
Phenanthrene	85-01-8	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)
Pyrene	129-00-0	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)

Notes:

- All samples were analyzed for the Target Compound List for Semi-volatile Organic Compounds. The compounds listed above were detected at or above the method detection limit. SVOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.3

DETECTED SVOCs IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-030	BTH-033	BTH-036	BTH-037	BTH-041	BTH-045	BTH-048	BTH-049	BTH-052	BTH-055
SAMPLE LOCATION		BH-J-11	BH-J-17	BH-J-16	BH-J-16	BH-J-7	BH-J-10	BH-J-1	BH-J-1	BH-J-13	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(2-4)'	RINSATE	(4-6)'	(8-10)'	(4-6)'	RINSATE	(4-6)'	(2-4)'	(6-8)'
DATE SAMPLED		11/8/94	11/9/94	11/10/94	11/10/94	11/11/94	11/11/94	11/15/94	11/15/94	11/16/94	11/18/94
UNITS		ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg
Parameter	CAS Number										
Semi-volatile Compounds											
2-Methylnaphthalene	91-57-6	ND(330)	ND(330)	ND (5.0)	**400 (330)**	**430 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
Acenapthene	83-32-9	ND(330)	ND(330)	ND (5.0)	**2200 (330)**	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Acenapthylene	208-96-8	ND(330)	ND(330)	ND (5.0)	< 330 (330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Anthracene	120-12-7	ND(330)	ND(330)	ND (5.0)	**3100 (330)**	< 330 (330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Benzo(a)anthracene	56-55-3	**360 (330)**	ND(330)	ND (5.0)	**7200 (6,600)**	**360 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
Benzo(a)pyrene	50-32-8	ND(330)	ND(330)	ND (5.0)	**5000 (330)**	< 330 (330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Benzo(b)fluoranthene	205-99-2	**550 (330)**	< 330 (330)	ND (5.0)	**8900 (6,600)**	**460 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Benzo(k)fluoranthene	207-08-9	ND(330)	ND(330)	ND (5.0)	ND(330)	< 330 (330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Benzo(g,h,i)perylene	191-24-2	ND(330)	ND(330)	ND (5.0)	**5600 (330)**	**520 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Bis(2-Ethylhexyl)phthalate	117-81-7	ND(330)	ND(330)	**7.1 (5.0)**	ND(330)	**1000 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	**980 (330)**
Butlybenzylphthalate	85-68-7	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
Di-n-butylphthalate	84-74-2	ND(330)	ND(330)	ND (5.0)	ND(330)	**800 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
Chrysene	218-01-9	**360 (330)**	ND(330)	ND (5.0)	**8700 (6,600)**	**480 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
Dibenzo(a,h)anthracene	53-70-3	ND(330)	ND(330)	ND (5.0)	**1300 (330)**	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Di-n-octylphthalate	117-84-0	ND(330)	ND(330)	<5.0 (5.0)	ND(330)	< 330 (330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Fluoranthene	206-44-0	**510 (330)**	ND(330)	ND (5.0)	**17000 (6,600)**	**600 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	**660 (330)**
Fluorene	86-73-7	ND(330)	ND(330)	ND (5.0)	**1700 (330)**	< 330 (330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Indeno(1,2,3-c,d)pyrene	193-39-5	**430 (330)**	ND(330)	ND (5.0)	**4700 (330)**	**380 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Naphthalene	91-20-3	ND(330)	ND(330)	ND (5.0)	**910 (330)**	**1700 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	< 330 (330)
N-Nitrosodimethylamine	62-75-9	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)	ND (5.0)	ND(330)	ND(330)	ND(330)
Phenanthrene	85-01-8	**430 (330)**	ND(330)	ND (5.0)	**14000 (6,600)**	**740 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	**420 (330)**
Pyrene	129-00-0	ND(330)	ND(330)	ND (5.0)	**12000 (6,600)**	**940 (330)**	ND(330)	ND (5.0)	ND(330)	ND(330)	**500 (330)**

Notes:

- All samples were analyzed for the Target Compound List for Semi-volatile Organic Compounds. The compounds listed above were detected at or above the method detection limit. SVOCs not listed above were not detected in any of the samples collected.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED PCBs/PESTICIDES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-001	BTH-004	BTH-007	BTH-010	BTH-011	BTH-014	BTH-017	BTH-020	BTH-023	BTH-024	BTH-027	BTH-030	BTH-033
SAMPLE LOCATION		BH-J-2	BH-J-12	BH-J-4	BH-J-6	BH-J-6	BH-J-9	BH-J-5	BH-J-15	BH-J-8	BH-J-8	BH-J-3	BH-J-11	BH-J-17
SAMPLE INTERVAL (feet bgs)		(4-6)'	(4-6)'	(4-6)'	RINSATE	(6-8)'	(4-6)'	(4-6)'	(6-8)'	RINSATE	(8-10)'	(4-6)'	(4-6)'	(2-4)'
DATE SAMPLED		11/3/94	11/3/94	11/3/94	11/4/94	11/4/94	11/4/94	11/4/94	11//94	11/8/94	11/8/94	11/8/94	11/8/94	11/9/94
UNITS		ug/kg	ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg	ug/kg
Parameter	CAS Number													
PCBs/Pesticides														
Aldrin	309-00-2	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
alpha-BHC	319-84-6	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
beta-BHC	319-85-7	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
delta-BHC	319-86-8	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
gamma-BHC (Lindane)	58-89-9	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
4,4'-DDD	72-54-8	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
4,4'-DDE	72-55-9	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
4,4'-DDT	50-29-3	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Dieldrin	60-57-1	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	**4.5 (3.3)**
Endosulfan I	959-98-8	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.01 (0.01)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Endosulfan II	33213-65-9	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Endosulfan Sulfate	1031-07-08	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Endrin	72-20-8	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Endrin Aldehyde	7421-93-4	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
Heptachlor	76-44-8	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
Heptachlor Epoxide	1024-57-3	ND(1.9)	ND(1.9)	ND(1.9)	<0.01 (0.01)	<1.7 (1.7)	<1.8 (1.8)	<1.9 (1.9)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.8 (1.8)
Toxaphene	8001-35-2	ND(19)	ND(19)	ND(19)	<1.0 (1.0)	<170 (170)	<190 (190)	<190 (190)	<170 (170)	<1.0 (1.0)	< 170 (170)	< 170 (170)	< 420 (420)	<190 (190)
Methoxychlor	72-43-5	ND(1.9)	ND(1.9)	ND(1.9)	<0.5 (0.5)	<50 (50)	<50 (50)	<50 (50)	<50 (50)	<0.5 (0.5)	<50 (50)	<50 (50)	<50 (50)	<50 (50)
Endrin Ketone	53494-70-4	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<1.7 (1.7)	<1.7 (1.7)	<1.9 (1.9)	<1.7 (1.7)	<0.02 (0.02)	<1.7 (1.7)	<1.7 (1.7)	<36 (36)	<1.7 (1.7)
alpha-Chlordane	5103-71-9	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<1.7 (1.7)	<3.3 (3.3)	<1.9 (1.9)	<1.7 (1.7)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
gamma-Chlordane	5103-74-2	ND(1.9)	ND(1.9)	ND(1.9)	<0.02 (0.02)	<1.7 (1.7)	<3.3 (3.3)	<1.9 (1.9)	<1.7 (1.7)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<36 (36)	<3.3 (3.3)
PCB Aroclor 1016	12674-11-2	ND(9.6)	ND(9.6)	ND(9.3)	<0.2 (0.2)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)
PCB Aroclor 1221	11104-28-2	ND(9.6)	ND(9.6)	ND(9.3)	<0.2 (0.2)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)
PCB Aroclor 1232	11141-16-5	ND(9.6)	ND(9.6)	ND(9.3)	<0.4 (0.4)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.4 (0.4)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)
PCB Aroclor 1242	53469-21-9	ND(9.6)	ND(9.6)	ND(9.3)	<0.2 (0.2)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)
PCB Aroclor 1248	12672-29-6	ND(9.6)	ND(9.6)	ND(9.3)	<0.2 (0.2)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)
PCB Aroclor 1254	11097-69-1	ND(9.6)	ND(9.6)	**17 (9.3)**	<0.2 (0.2)	<330 (330)	**730 (330)**	**800 (330)**	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	**1700 (420)**	**900 (330)**
PCB Aroclor 1260	11096-82-5	ND(9.6)	ND(9.6)	ND(9.3)	<0.2 (0.2)	<330 (330)	<330 (330)	<330 (330)	<330 (330)	<0.2 (0.2)	< 330 (330)	< 330 (330)	< 420 (420)	<330 (330)

Notes:

- All samples were analyzed for the Target Compound List for PCBs and Pesticides. The compounds listed above were detected at or above the method detection limit.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.4

DETECTED PCBs/PESTICIDES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-036	BTH-037	BTH-041	BTH-045	BTH-048	BTH-049	BTH-052	BTH-055
SAMPLE LOCATION		BH-J-16	BH-J-16	BH-J-7	BH-J-10	BH-J-1	BH-J-1	BH-J-13	BH-J-14
SAMPLE INTERVAL (feet bgs)		RINSATE	(4-6)'	(8-10)'	(4-6)'	RINSATE	(4-6)'	(2-4)'	(6-8)'
DATE SAMPLED		11/10/94	11/10/94	11/11/94	11/11/94	11/15/94	11/15/94	11/16/94	11/18/94
UNITS		ug/l	ug/kg	ug/kg	ug/kg	ug/l	ug/kg	ug/kg	ug/kg
Parameter	CAS Number								
PCBs/Pesticides									
Aldrin	309-00-2	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
alpha-BHC	319-84-6	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
beta-BHC	319-85-7	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
delta-BHC	319-86-8	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
gamma-BHC (Lindane)	58-89-9	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
4,4'-DDD	72-54-8	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
4,4'-DDE	72-55-9	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
4,4'-DDT	50-29-3	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Dieldrin	60-57-1	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Endosulfan I	959-98-8	<0.01 (0.01)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.01 (0.01)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Endosulfan II	33213-65-9	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Endosulfan Sulfate	1031-07-08	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Endrin	72-20-8	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Endrin Aldehyde	7421-93-4	<0.02 (0.02)	<18 (18)	<20 (20)	<3.3 (3.3)	<0.02 (0.02)	<3.3 (3.3)	<3.3 (3.3)	<20 (20)
Heptachlor	76-44-8	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
Heptachlor Epoxide	1024-57-3	<0.01 (0.01)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.01 (0.01)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
Toxaphene	8001-35-2	<1.0 (1.0)	<190 (190)	<410 (410)	<170 (170)	<1.0 (1.0)	<170 (170)	<170 (170)	<400 (400)
Methoxychlor	72-43-5	<0.5 (0.5)	<50 (50)	<50 (50)	<50 (50)	<0.5 (0.5)	<50 (50)	<50 (50)	<50 (50)
Endrin Ketone	53494-70-4	<0.02 (0.02)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.02 (0.02)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
alpha-Chlordane	5103-71-9	<0.02 (0.02)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.02 (0.02)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
gamma-Chlordane	5103-74-2	<0.02 (0.02)	<18 (18)	<20 (20)	<1.7 (1.7)	<0.02 (0.02)	<1.7 (1.7)	<1.7 (1.7)	<20 (20)
PCB Aroclor 1016	12674-11-2	<0.2 (0.2)	<330 (330)	<410 (410)	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	<400 (400)
PCB Aroclor 1221	11104-28-2	<0.2 (0.2)	<330 (330)	<410 (410)	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	<400 (400)
PCB Aroclor 1232	11141-16-5	<0.4 (0.4)	<330 (330)	<410 (410)	<330 (330)	<0.4 (0.4)	<330 (330)	<330 (330)	<400 (400)
PCB Aroclor 1242	53469-21-9	<0.2 (0.2)	<330 (330)	<410 (410)	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	<400 (400)
PCB Aroclor 1248	12672-29-6	<0.2 (0.2)	<330 (330)	<410 (410)	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	<400 (400)
PCB Aroclor 1254	11097-69-1	<0.2 (0.2)	**800 (330)**	**2100 (410)**	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	**1500 (400)**
PCB Aroclor 1260	11096-82-5	<0.2 (0.2)	<330 (330)	<410 (410)	<330 (330)	<0.2 (0.2)	<330 (330)	<330 (330)	<400 (400)

Notes:

- All samples were analyzed for the Target Compound List for PCBs and Pesticides. The compounds listed above were detected at or above the method detection limit.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-001	BTH-002	BTH-003	BTH-004	BTH-005	BTH-006	BTH-007	BTH-008	BTH-009
SAMPLE LOCATION	BH-J-2	BH-J-2	BH-J-2	BH-J-12	BH-J-12	BH-J-12	BH-J-4	BH-J-4	BH-J-4
SAMPLE INTERVAL (feet bgs)	(4-6)'	(14-16)'	(18-20)'	(4-6)'	(12-14)'	(20-22)'	(4-6)'	(10-12)'	(14-16)'
DATE SAMPLED	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94	11/3/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Parameter									
Inorganic Analytes									
Aluminum	6,070 (4)	5320 (4)	4990 (4)	5840 (4)	8730 (4)	4760 (4)	5060 (4)	6260 (4)	5860 (4)
Antimony	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Arsenic	11 (0.1)	3.8 (0.1)	4.4 (0.1)	3.4 (0.1)	3.7 (0.1)	3.9 (0.1)	5.1 (0.1)	4.1 (0.1)	3.5 (0.1)
Barium	20 (0.4)	20 (0.4)	24 (0.4)	23 (0.4)	26 (0.4)	15 (0.4)	19 (0.4)	25 (0.4)	28 (0.4)
Beryllium	0.39 (0.2)	0.4 (0.2)	0.39 (0.2)	0.38 (0.2)	0.55 (0.2)	0.34 (0.2)	0.34 (0.2)	0.4 (0.2)	0.43 (0.2)
Cadmium	0.11 (0.05)	< 0.05 (0.05)	< 0.05 (0.05)	< 0.05 (0.05)	0.3 (0.05)	0.098 (0.05)	< 0.05 (0.05)	0.05 (0.05)	< 0.05 (0.05)
Calcium	51700 (10)	74600 (10)	81500 (10)	67800 (10)	75400 (10)	63700 (10)	72200 (10)	73700 (10)	91600 (10)
Chromium	9.8 (1.6)	8.7 (1.6)	8.1 (1.6)	8.5 (1.6)	14 (1.6)	7.8 (1.6)	8.4 (1.6)	10(1.6)	9.7 (1.6)
Cobalt	18 (0.2)	17 (0.2)	17 (0.2)	16 (0.2)	24 (0.2)	14 (0.2)	16 (0.2)	17 (0.2)	19 (0.2)
Copper	12 (0.6)	11 (0.6)	12 (0.6)	12 (0.6)	15 (0.6)	12 (0.6)	9.7 (0.6)	13 (0.6)	12 (0.6)
Iron	13700 (2)	12300 (2)	12000 (2)	11800 (2)	17000 (2)	9580 (2)	11400 (2)	13400 (2)	13700 (2)
Lead	8.3 (1)	7.8 (1)	7.7 (1)	7.2 (1)	9.1 (1)	8.7 (1)	7 (1)	7.8 (1)	8 (1)
Magnesium	17200 (10)	21400 (10)	22200 (10)	19700 (10)	19300 (10)	12600 (10)	20500 (10)	20100 (10)	21700 (10)
Manganese	296 (0.2)	265 (0.2)	287 (0.2)	259 (0.2)	269 (0.2)	263 (0.2)	270 (0.2)	225 (0.2)	263 (0.2)
Mercury	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	15 (0.2)	14 (0.2)	14 (0.2)	13 (0.2)	23 (0.2)	12 (0.2)	12 (0.2)	16 (0.2)	17 (0.2)
Potassium	707 (10)	1070 (10)	1060 (10)	831 (10)	1580 (10)	595 (10)	772 (10)	1070 (10)	1180 (10)
Selenium	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2(0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)
Sodium	89 (10)	72 (10)	56(10)	36 (10)	56 (10)	37 (10)	88 (10)	64 (10)	56 (10)
Thallium	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Vanadium	16 (2)	15 (2)	15 (2)	15 (2)	21(2)	13 (2)	15 (2)	17 (2)	16 (2)
Zinc	38 (1)	38 (1)	36 (1)	36 (1)	51 (1)	38 (1)	33 (1)	41 (1)	42(1)

Notes:

- All samples were analyzed for the Target Analyte List for Inorganic Analytes. The analytes listed above were detected at or above the method detection limit.
- Inorganic analytes not listed above were not detected in any of the samples.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.5

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-010	BTH-011	BTH-012	BTH-013	BTH-014	BTH-015	BTH-016	BTH-017	BTH-018
SAMPLE LOCATION	BH-J-6	BH-J-6	BH-J-6	BH-J-6	BH-J-9	BH-J-9	BH-J-9	BH-J-5	BH-J-5
SAMPLE INTERVAL (feet bgs)	RINSATE	(6-8)'	(10-12)'	(14-16)'	(4-6)'	(14-16)'	(18-20)'	(4-6)'	(12-14)'
DATE SAMPLED	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94	11/4/94
UNITS	mg/l	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Parameter									
Inorganic Analytes									
Aluminum	0.22 (0.2)	6170 (4)	6970 (4)	6300 (4)	5550 (4)	6630 (4)	5710 (4)	6350 (4)	5510 (4)
Antimony	<0.002 (0.002)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Arsenic	<0.001 (0.001)	5.1 (0.1)	5.4 (0.1)	3.9 (0.1)	3.3 (0.1)	2.2 (0.1)	6.4 (0.1)	4.7 (0.1)	2.9 (0.1)
Barium	<0.01 (0.01)	28 (0.4)	34 (0.4)	32 (0.4)	27 (0.4)	40 (0.4)	28 (0.4)	43 (0.4)	28 (0.4)
Beryllium	<0.01 (0.01)	0.42 (0.2)	0.55 (0.2)	0.46 (0.2)	0.26 (0.2)	0.46 (0.2)	0.45 (0.2)	0.4 (0.2)	0.4 (0.2)
Cadmium	<0.0002 (0.0002)	0.063 (0.05)	0.21 (0.05)	0.09 (0.05)	0.28 (0.05)	< 0.05 (0.05)	< 0.05 (0.05)	0.33 (0.05)	< 0.05 (0.05)
Calcium	3.9 (0.5)	72200 (10)	70000 (10)	70000 (10)	23600 (10)	84000 (10)	73000 (10)	27000 (10)	78000 (10)
Chromium	<0.05 (0.05)	9 (1.6)	10 (1.6)	9.9 (1.6)	9.1 (1.6)	12 (1.6)	9.3 (1.6)	9.9 (1.6)	8.5 (1.6)
Cobalt	<0.01 (0.01)	18 (0.2)	24 (0.2)	20 (0.2)	11 (0.2)	18 (0.2)	20 (0.2)	15 (0.2)	17 (0.2)
Copper	<0.01 (0.01)	11 (0.6)	12 (0.6)	12 (0.6)	7.5 (0.6)	11 (0.6)	17 (0.6)	11 (0.6)	11 (0.6)
Iron	0.37 (0.01)	12500 (2)	18000 (2)	13000 (2)	8440 (2)	13000 (2)	13000 (2)	11500 (2)	11000 (2)
Lead	<0.001 (0.001)	6.9 (1)	8.2 (1)	7.7 (1)	25 (1)	7 (1)	9.1 (1)	17(1)	6.5 (1)
Magnesium	1.0 (0.5)	19900 (10)	20000 (10)	20000 (10)	4240 (10)	32000 (10)	21000 (10)	7790 (10)	20000 (10)
Manganese	0.016 (0.010)	289 (0.2)	230 (0.2)	270 (0.2)	142 (0.2)	250 (0.2)	280 (0.2)	362 (0.2)	220 (0.2)
Mercury	<0.0002 (0.0002)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	<0.01 (0.01)	14 (0.2)	18 (0.2)	17 (0.2)	7.6 (0.2)	14 (0.2)	16 (0.2)	11(0.2)	13 (0.2)
Potassium	<0.5 (0.5)	1150 (10)	1500 (10)	1300 (10)	577 (10)	1400 (10)	1300 (10)	571 (10)	980 (10)
Selenium	<0.002 (0.002)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	<0.0002 (0.0002)	< 0.2 (0.2)	0.21 (0.2)	0.2 (0.2)	< 0.2 (0.2)	0.22 (0.2)	0.22 (0.2)	< 0.2 (0.2)	0.2 (0.2)
Sodium	<0.5 (0.5)	76 (10)	56 (10)	72 (10)	58 (10)	110 (10)	66 (10)	89 (10)	57(10)
Thallium	<0.002 (0.002)	< 0.25 (0.25)	0.36 (0.25)	0.41 (0.25)	< 0.25 (0.25)	0.29 (0.25)	0.41 (0.25)	< 0.25 (0.25)	0.3 (0.25)
Vanadium	<0.02 (0.02)	17 (2)	18 (2)	16 (2)	13 (2)	17(2)	16(2)	16 (2)	14 (2)
Zinc	<0.02 (0.02)	35 (1)	44 (1)	42 (1)	30 (1)	29 (1)	41 (1)	44 (1)	34 (1)

Notes:

- All samples were analyzed for the Target Analyte List for Inorganic Analytes. The analytes listed above were detected at or above the method detection limit.
- Inorganic analytes not listed above were not detected in any of the samples.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-019	BTH-020	BTH-021	BTH-021 MSMSD	BTH-022	BTH-023	BTH-024	BTH-025	BTH-026
SAMPLE LOCATION	BH-J-5	BH-J-15	BH-J-15	BH-J-15	BH-J-15	BH-J-8	BH-J-8	BH-J-8	BH-J-8
SAMPLE INTERVAL (feet bgs)	(16-18)'	(6-8)'	(10-12)'	(10-12)'	(38-40)'	RINSATE	(8-10)'	(22-24)'	(26-28)'
DATE SAMPLED	11/4/94	11/7/94	11/7/94	11/7/94	11/7/94	11/8/94	11/8/94	11/8/94	11/8/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/kg	mg/kg	mg/kg
				DUPLICATE					
Parameter									
Inorganic Analytes									
Aluminum	6480 (4)	4100 (4)	5300 (4)	6400 (4)	4000 (4)	1.86 (0.2)	4200 (4)	6600 (4)	5300 (4)
Antimony	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	<0.25 (0.25)	< 0.25 (0.25)	<0.002 (0.002)	0.26 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Arsenic	4.1 (0.1)	3.7 (0.1)	4.2 (0.1)	4.6 (0.1)	9.2 (0.1)	0.0036 (0.001)	4.4 (0.1)	2 (0.1)	4.3 (0.1)
Barium	28 (0.4)	22 (0.4)	25 (0.4)	25 (0.4)	22 (0.4)	0.031 (0.01)	25 (0.4)	31 (0.4)	25 (0.4)
Beryllium	0.44 (0.2)	0.3 (0.2)	0.37 (0.2)	0.39 (0.2)	0.32 (0.2)	<0.01 (0.01)	0.32 (0.2)	0.46 (0.2)	0.42 (0.2)
Cadmium	< 0.05 (0.05)	< 0.05 (0.05)	0.13 (0.05)	0.15 (0.05)	< 0.05 (0.05)	<0.0005 (0.0002)	0.35 (0.05)	< 0.05 (0.05)	0.14 (0.05)
Calcium	76000 (10)	76000 (10)	71000 (10)	81000 (10)	80000 (10)	89 (0.5)	77000 (10)	80000 (10)	74000 (10)
Chromium	9.7 (1.6)	6.4 (1.6)	8.8 (1.6)	8.6 (1.6)	6.6 (1.6)	<0.05 (0.05)	7.2 (1.6)	11(1.6)	8.3 (1.6)
Cobalt	17 (0.2)	16 (0.2)	19 (0.2)	20 (0.2)	16 (0.2)	<0.01 (0.01)	18 (0.2)	21 (0.2)	21 (0.2)
Copper	11 (0.6)	8.9 (0.6)	11(0.6)	11 (0.6)	9 (0.6)	0.013 (0.01)	13 (0.6)	11 (0.6)	12 (0.6)
Iron	12000 (2)	9900 (2)	13000 (2)	13000 (2)	9900 (2)	4.58 (0.01)	12000 (2)	14000 (2)	14000 (2)
Lead	6.3 (1)	6 (1)	7.1 (1)	7.7 (1)	5.8 (1)	0.0041 (0.001)	12 (1)	8.3 (1)	7.6 (1)
Magnesium	22000 (10)	21000 (10)	20000 (10)	20000 (10)	22000 (10)	25.0 (0.5)	20000 (10)	24000 (10)	22000 (10)
Manganese	230 (0.2)	220 (0.2)	240 (0.2)	270 (0.2)	220 (0.2)	0.24 (0.010)	270 (0.2)	300 (0.2)	260 (0.2)
Mercury	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	<0.1 (0.1)	< 0.1 (0.1)	<0.0002 (0.0002)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	15 (0.2)	11 (0.2)	14 (0.2)	14 (0.2)	11 (0.2)	<0.01 (0.01)	13 (0.2)	15 (0.2)	16 (0.2)
Potassium	1400 (10)	600 (10)	980 (10)	910 (10)	790 (10)	0.88 (0.5)	700 (10)	1300 (10)	980 (10)
Selenium	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	<0.5 (0.5)	< 0.5 (0.5)	<0.002 (0.002)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	<0.2 (0.2)	<0.2 (0.2)	<0.0002 (0.0002)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)
Sodium	68 (10)	46 (10)	55 (10)	49 (10)	54 (10)	<0.5 (0.5)	200 (10)	95 (10)	70 (10)
Thallium	0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	<0.25 (0.25)	0.29 (0.25)	<0.002 (0.002)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Vanadium	16 (2)	11 (2)	16 (2)	15 (2)	13 (2)	<0.02 (0.02)	13 (2)	17 (2)	15 (2)
Zinc	41 (1)	31 (1)	40 (1)	36 (1)	40 (1)	0.02 (0.02)	62 (1)	56 (1)	40 (1)

Notes:

- All samples were analyzed for the Target Analyte List for Inorganic Analytes. The analytes listed above were detected at or above the method detection limit.
- Inorganic analytes not listed above were not detected in any of the samples.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.5

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-027	BTH-028	BTH-029	BTH-030	BTH-031	BTH-032	BTH-033	BTH-034	BTH-035
SAMPLE LOCATION	BH-J-3	BH-J-3	BH-J-3	BH-J-11	BH-J-11	BH-J-11	BH-J-17	BH-J-17	BH-J-17
SAMPLE INTERVAL (feet bgs)	(4-6)'	(12-14)'	(16-18)'	(4-6)'	(16-18)'	(20-22)'	(2-4)'	(12-14)'	(38-40)'
DATE SAMPLED	11/8/94	11/8/94	11/8/94	11/8/94	11/8/94	11/8/94	11/9/94	11/9/94	11/9/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Parameter									
Inorganic Analytes									
Aluminum	8200 (4)	5700 (4)	5500 (4)	3900 (4)	6000 (4)	5700 (4)	6600 (4)	7700 (4)	5200 (4)
Antimony	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	0.83 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	0.3 (0.25)	<0.25 (0.25)	< 0.25 (0.25)
Arsenic	2.3 (0.1)	3.2 (0.1)	6.6 (0.1)	5.9 (0.1)	6.8 (0.1)	4.2 (0.1)	3.7 (0.1)	4.1 (0.1)	4.3 (0.1)
Barium	37 (0.4)	30 (0.4)	31 (0.4)	75 (0.4)	26 (0.4)	29 (0.4)	43 (0.4)	27 (0.4)	25 (0.4)
Beryllium	0.53 (0.2)	0.4 (0.2)	0.45 (0.2)	0.37 (0.2)	0.46 (0.2)	0.44 (0.2)	0.37 (0.2)	0.51 (0.2)	0.34 (0.2)
Cadmium	0.3 (0.05)	0.14 (0.05)	0.42 (0.05)	0.97 (0.05)	0.29 (0.05)	0.26 (0.05)	0.7 (0.05)	0.32 (0.05)	< 0.05 (0.05)
Calcium	66000 (10)	65000 (10)	66000 (10)	54000 (10)	70000 (10)	85000 (10)	19000 (10)	84000 (10)	86000 (10)
Chromium	11 (1.6)	9.4 (1.6)	9.1 (1.6)	16 (1.6)	9.4 (1.6)	9.1 (1.6)	15 (1.6)	13 (1.6)	7.4 (1.6)
Cobalt	22 (0.2)	20 (0.2)	23 (0.2)	16 (0.2)	24 (0.2)	22 (0.2)	9.6 (0.2)	15 (0.2)	11 (0.2)
Copper	15 (0.6)	13 (0.6)	12 (0.6)	44 (0.6)	18 (0.6)	15 (0.6)	60 (0.6)	17 (0.6)	11 (0.6)
Iron	15000 (2)	12000 (2)	16000 (2)	11000 (2)	16000 (2)	14000 (2)	14000 (2)	16000 (2)	11000 (2)
Lead	9.2 (1)	8 (1)	7.7 (1)	130 (1)	10 (1)	8 (1)	41 (1)	10 (1)	6.8 (1)
Magnesium	15000 (10)	18000 (10)	19000 (10)	14000 (10)	21000 (10)	19000 (10)	5400 (10)	25800 (10)	22000 (10)
Manganese	290 (0.2)	230 (0.2)	250 (0.2)	310 (0.2)	300 (0.2)	300 (0.2)	320 (0.2)	330 (0.2)	260 (0.2)
Mercury	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	16 (0.2)	16 (0.2)	17 (0.2)	18 (0.2)	20 (0.2)	19 (0.2)	19 (0.2)	20 (0.2)	13 (0.2)
Potassium	1400 (10)	940 (10)	960 (10)	440 (10)	1000 (10)	1100 (10)	470 (10)	1800 (10)	1100 (10)
Selenium	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	0.39 (0.2)	0.32 (0.2)
Sodium	210 (10)	110 (10)	77 (10)	130 (10)	87 (10)	65 (10)	130 (10)	110 (10)	59 (10)
Thallium	< 0.25 (0.25)	< 0.25 (0.25)	0.25 (0.25)	0.26 (0.25)	0.33 (0.25)	0.37 (0.25)	< 0.25 (0.25)	0.36 (0.25)	0.3 (0.25)
Vanadium	20 (2)	15 (2)	14 (2)	12 (2)	15 (2)	14 (2)	15 (2)	18 (2)	14 (2)
Zinc	41 (1)	39 (1)	46 (1)	100 (1)	48 (1)	48 (1)	55 (1)	58 (1)	36 (1)

Notes:

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- Inorganic analytes not listed above were not detected in any of the samples.
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- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity
- ND = Not Detected.

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-036	BTH-037	BTH-038	BTH-039	BTH-040	BTH-041	BTH-042	BTH-042 MSMSD	BTH-043
SAMPLE LOCATION	BH-J-16	BH-J-16	BH-J-16	BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-15	BH-J-7
SAMPLE INTERVAL (feet bgs)	RINSATE	(4-6)'	(8-10)'	(16-18)'	(42-44)'	(8-10)'	(12-14)'	(10-12)'	(20-22)'
DATE SAMPLED	11/10/94	11/10/94	11/10/94	11/10/94	11/11/94	11/11/94	11/11/94	11/7/94	11/11/94
UNITS	mg/l	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg DUPLICATE	mg/kg
Parameter									
Inorganic Analytes									
Aluminum	0.850 (0.2)	3600 (4)	9000 (4)	7200 (4)	4400 (4)	11300 (4)	7950 (4)	5670 (4)	6310 (4)
Antimony	<0.002 (0.002)	29 (0.25)	8.5 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	20 (0.25)	1.9 (0.25)	0.6 (0.25)	< 0.25 (0.25)
Arsenic	0.002 (0.001)	12 (0.1)	11 (0.1)	3.9 (0.1)	3.3 (0.1)	10 (0.1)	19 (0.1)	56 (0.1)	5.7 (0.1)
Barium	<0.01 (0.01)	2300 (0.4)	700 (0.4)	51 (0.4)	20 (0.4)	2220 (0.4)	541 (0.4)	280 (0.4)	27 (0.4)
Beryllium	<0.01 (0.01)	2 (0.2)	0.82 (0.2)	0.42 (0.2)	0.28 (0.2)	0.98 (0.2)	1.9 (0.2)	1.8 (0.2)	0.47 (0.2)
Cadmium	<0.0002 (0.0002)	19 (0.05)	17 (0.05)	0.63 (0.05)	< 0.05 (0.05)	42 (0.05)	17 (0.05)	15 (0.05)	0.2 (0.05)
Calcium	24 (0.5)	42000 (10)	52000 (10)	60000 (10)	82000 (10)	47200 (10)	7620 (10)	4780 (10)	62400 (10)
Chromium	<0.05 (0.05)	93 (1.6)	120 (1.6)	13 (1.6)	6.6 (1.6)	641 (1.6)	225 (1.6)	124 (1.6)	9.3 (1.6)
Cobalt	<0.01 (0.01)	136 (0.2)	57 (0.2)	13 (0.2)	9.4 (0.2)	95 (0.2)	161 (0.2)	159 (0.2)	19 (0.2)
Copper	<0.01 (0.01)	211 (0.6)	1000 (0.6)	26 (0.6)	9.6 (0.6)	1020 (0.6)	189 (0.6)	547 (0.6)	13 (0.6)
Iron	2.46 (0.01)	120000 (2)	60000 (2)	17000 (2)	9500 (2)	56300 (2)	95600 (2)	94600 (2)	13700 (2)
Lead	0.0015 (0.001)	740 (1)	880 (1)	40 (1)	5.8 (1)	4740 (1)	945 (1)	754(1)	8.2 (1)
Magnesium	5.5 (0.5)	8300 (10)	15000 (10)	19000 (10)	23000 (10)	10900 (10)	2670 (10)	1940 (10)	21100 (10)
Manganese	0.077 (0.010)	980 (0.2)	590 (0.2)	450 (0.2)	240 (0.2)	844 (0.2)	688 (0.2)	439 (0.2)	264 (0.2)
Mercury	<0.0002 (0.0002)	0.18 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	0.45 (0.1)	0.17 (0.1)	<0.1 (0.1)	< 0.1 (0.1)
Nickel	<0.01 (0.01)	59 (0.2)	140 (0.2)	19 (0.2)	10 (0.2)	94 (0.2)	31 (0.2)	32 (0.2)	15 (0.2)
Potassium	<0.5 (0.5)	580 (10)	1300 (10)	950 (10)	1000 (10)	1400 (10)	893 (10)	610 (10)	1580 (10)
Selenium	<0.002 (0.002)	0.8 (0.5)	1.3 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	2.3 (0.5)	< 0.5 (0.5)	<0.5 (0.5)	< 0.5 (0.5)
Silver	<0.0002 (0.0002)	0.96 (0.2)	2.3 (0.2)	0.34 (0.2)	0.31 (0.2)	2.9 (0.2)	0.62 (0.2)	470 (0.2)	< 0.2 (0.2)
Sodium	<0.5 (0.5)	440 (10)	430 (10)	190(10)	61 (10)	911 (10)	583 (10)	357 (10)	159 (10)
Thallium	<0.002 (0.002)	< 0.25 (0.25)	< 0.25 (0.25)	0.33 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	<0.25 (0.25)	0.33 (0.25)
Vanadium	<0.02 (0.02)	19 (2)	19 (2)	16 (2)	12 (2)	26 (2)	47 (2)	42 (2)	19 (2)
Zinc	<0.02 (0.02)	1800 (1)	1500 (1)	76 (1)	36 (1)	4390 (1)	1020 (1)	413 (1)	39 (1)

Notes:

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- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
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- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.5

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-044	BTH-045	BTH-046	BTH-047	BTH-048	BTH-049	BTH-050	BTH-051	BTH-052
SAMPLE LOCATION	BH-J-7	BH-J-10	BH-J-10	BH-J-10	BH-J-1	BH-J-1	BH-J-1	BH-J-1	BH-J-13
SAMPLE INTERVAL (feet bgs)	(22-24)'	(4-6)'	(20-22)'	(22-24)'	RINSATE	(4-6)'	(12-14)'	(40-42)'	(2-4)'
DATE SAMPLED	11/11/94	11/11/94	11/11/94	11/11/94	11/15/94	11/15/94	11/15/94	11/15/94	11/16/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/l	mg/kg	mg/kg	mg/kg	mg/kg
Parameter									
Inorganic Analytes									
Aluminum	7220 (4)	10200 (4)	4770 (4)	5300 (4)	0.100 (0.02)	6580 (4)	6330 (4)	3720 (4)	6770 (4)
Antimony	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	0.43 (0.25)	0.0021 (0.002)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)
Arsenic	7.6 (0.1)	5.1 (0.1)	2.6 (0.1)	5.4 (0.1)	<0.001 (0.001)	4.4 (0.1)	3.3 (0.1)	3.9 (0.1)	2.9 (0.1)
Barium	32 (0.4)	42 (0.4)	14 (0.4)	21 (0.4)	<0.01 (0.01)	38 (0.4)	27 (0.4)	17 (0.4)	34 (0.4)
Beryllium	0.54 (0.2)	0.57 (0.2)	0.33 (0.2)	0.42 (0.2)	<0.01 (0.01)	0.4 (0.2)	0.43 (0.2)	0.3 (0.2)	0.32 (0.2)
Cadmium	0.41 (0.05)	0.42 (0.05)	< 0.05 (0.05)	0.091 (0.05)	0.0003 (0.0002)	0.35 (0.05)	0.067 (0.05)	0.2 (0.05)	0.24 (0.05)
Calcium	63100 (10)	52500 (10)	66900 (10)	6210 (10)	4.5 (0.5)	33100 (10)	66900 (10)	72200 (10)	24500 (10)
Chromium	11 (1.6)	13 (1.6)	6.8 (1.6)	8.1 (1.6)	<0.05 (0.05)	9.4 (1.6)	9.2 (1.6)	4.7 (1.6)	9.4 (1.6)
Cobalt	23 (0.2)	24 (0.2)	14 (0.2)	19 (0.2)	<0.01 (0.01)	16 (0.2)	19 (0.2)	16 (0.2)	12 (0.2)
Copper	18 (0.6)	15 (0.6)	9.4 (0.6)	11 (0.6)	<0.01 (0.01)	9.1 (0.6)	12 (0.6)	9.5 (0.6)	14 (0.6)
Iron	16600 (2)	17600 (2)	9650 (2)	13000 (2)	1.17 (0.01)	11500 (2)	12700 (2)	10100 (2)	13600 (2)
Lead	10 (1)	9.3 (1)	5.9 (1)	7.5 (1)	<0.001 (0.001)	9.6 (1)	8.5 (1)	5.5 (1)	15 (1)
Magnesium	20600 (10)	12200 (10)	22200 (10)	20400 (10)	1.1 (0.5)	8250 (10)	22900 (10)	18200 (10)	5590 (10)
Manganese	284 (0.2)	421 (0.2)	237 (0.2)	265 (0.2)	0.017 (0.010)	334 (0.2)	283 (0.2)	255 (0.2)	262 (0.2)
Mercury	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	<0.0002 (0.0002)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	20 (0.2)	16 (0.2)	10 (0.2)	14 (0.2)	<0.01 (0.01)	9.6 (0.2)	15 (0.2)	11 (0.2)	11 (0.2)
Potassium	1660 (10)	1310 (10)	1030 (10)	1060 (10)	<0.5 (0.5)	536 (10)	1260 (10)	831 (10)	467 (10)
Selenium	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	<0.002 (0.002)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	<0.0002 (0.0002)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)
Sodium	161 (10)	64 (10)	128 (10)	65 (10)	<0.5 (0.5)	42 (10)	65 (10)	50 (10)	< 10 (10)
Thallium	0.52 (0.25)	< 0.25 (0.25)	0.26 (0.25)	0.29 (0.25)	<0.002 (0.002)	< 0.25 (0.25)	< 0.25 (0.25)	0.26 (0.25)	< 0.25 (0.25)
Vanadium	21 (2)	22 (2)	15 (2)	15 (2)	<0.1 (0.1)	17 (2)	16 (2)	12 (2)	15 (2)
Zinc	48 (1)	43 (1)	35 (1)	41 (1)	<0.02 (0.02)	30 (1)	34 (1)	44 (1)	39 (1)

Notes:

- All samples were analyzed for the Target Analyte List for Inorganic Analytes. The analytes listed above were detected at or above the method detection limit.
- Inorganic analytes not listed above were not detected in any of the samples.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

DETECTED INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER	BTH-053	BTH-054	BTH-055	BTH-056	BTH-057
SAMPLE LOCATION	BH-J-13	BH-J-13	BH-J-14	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)	(8-10)'	(36-38)'	(6-8)'	(16-18)'	(20-22)'
DATE SAMPLED	11/16/94	11/16/94	11/18/94	11/18/94	11/18/94
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Parameter					
Inorganic Analytes					
Aluminum	17500 (4)	4080 (4)	14000 (0.5)	8900 (0.5)	7200 (0.5)
Antimony	< 0.25 (0.25)	< 0.25 (0.25)	ND(0.5)	0.63 (0.5)	ND(0.5)
Arsenic	4.3 (0.1)	4 (0.1)	13 (0.1)	9.5 (0.1)	9.2 (0.1)
Barium	62 (0.4)	15 (0.4)	67 (1)	92 (1)	34 (1)
Beryllium	0.6 (0.2)	0.24 (0.2)	ND(1.0)	ND(1.0)	ND(1.0)
Cadmium	0.076 (0.05)	< 0.05 (0.05)	2.2 (0.05)	4.1 (0.05)	1.1 (0.05)
Calcium	10400 (10)	112000 (10)	12000 9 (0.8)	11000 (0.8)	12000 (0.8)
Chromium	19 (1.6)	5.3 (1.6)	19 (2.5)	40 (2.5)	11 (2.5)
Cobalt	24 (0.2)	13 (0.2)	9.7 (0.8)	6.9 (0.8)	6 (0.8)
Copper	16 (0.6)	7.3 (0.6)	30 (1)	230 (1)	16 (1)
Iron	30700 (2)	10800 (2)	41000 (2)	29000 (2)	19000 (2)
Lead	14 (1)	7.1 (1)	77 (1)	910 (1)	11 (1)
Magnesium	35600 (10)	27000 (10)	4800 (3.8)	4700 (3.8)	5200 (3.8)
Manganese	336 (0.2)	227 (0.2)	670 (2)	280 (2)	300 (2)
Mercury	< 0.1 (0.1)	0.11 (0.1)	0.23 (0.1)	ND(0.1)	ND(0.1)
Nickel	21 (0.2)	8.6 (0.2)	25 (1)	25 (1)	15 (1)
Potassium	2490 (10)	892 (10)	2700 (5)	1700 (5)	1600 (5)
Selenium	< 0.5 (0.5)	< 0.5 (0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Silver	< 0.2 (0.2)	< 0.2 (0.2)	ND(0.5)	ND(0.5)	ND(0.5)
Sodium	103 (10)	45 (10)	260 (1)	220 (1)	180 (1)
Thallium	< 0.25 (0.25)	0.29 (0.25)	ND(0.5)	ND(0.5)	ND(0.5)
Vanadium	29 (2)	12 (2)	20 (1)	15 (1)	13 (1)
Zinc	46 (1)	27 (1)	97 (1)	260 (1)	45 (1)

Notes:

- All samples were analyzed for the Target Analyte List for Inorganic Analytes. The analytes listed above were detected at or above the method detection limit.
- Inorganic analytes not listed above were not detected in any of the samples.
- Numbers in parenthesis indicate the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- UJ = associated value is an estimate and may be inaccurate or imprecise.
- J = associated value is an estimated quantity.
- ND = Not Detected.

TABLE 5.6

SITE SPECIFIC BACKGROUND CONCENTRATIONS FOR INORGANIC ANALYTES
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	Range (1)		Background (2) (mg/kg)	Michigan Type A (3) (mg/kg)	Site Specific Background (mg/kg)
	Minimum (mg/kg)	Maximum (mg/kg)			
Aluminum	820	6,480	9,653	6,900	9,653
Antimony	<0.25	<0.25	0.25	NA	0.25
Arsenic	2.3	11	12.5	5.8	12.5
Barium	20	43	47.56	75	75
Beryllium	0.3	0.53	0.57	NA	0.57
Cadmium	<0.05	0.42	0.52	1.2	1.2
Calcium	27,000	81,000	114,020	NA	114,020
Chromium	6.4	11	12.64	18	18
Iron	9,900	16,000	17,738	12,000	17,738
Lead	5.8	17	16.64	21	21
Magnesium	7,790	22,200	30,726	NA	30,726
Manganese	220	362	384	NA	384
Mercury	<0.10	<0.10	6.10	0.13	6.10
Nickel	11	17	19.86	20	20
Potassium	571	1,400	1,719	NA	1,719
Selenium	0.5	0.5	0.5	0.41	0.5
Silver	0.2	0.2	0.2	1	1
Sodium	46	210	210	NA	210
Thallium	<0.25	0.29	0.31	NA	0.31
Vanadium	11	20	21.26	NA	21.26
Zinc	31	46	50.8	47	50.8

Notes:

(1) Taken from boreholes from BH-J-2,3,5,15.
(2) Site-specific background level calculated in accordance with MERA Operational Memorandum #15, September 30, 1993 (mean + 3 standard deviations).
(3) MERA Operation Memorandum #15: Default Type A Cleanup Criteria (September 30, 1993).
NA Background level not available
ND Analyte not detected.
( ) Quantitation limit.
< Analyte was detected at an unquantifiable concentration below the method detection limit

TAb... 5.7

DETECTED INORGANIC ANALYTES IN GROUNDWATER COMPARED TO MICHIGAN TYPE B DRINKING WATER CLEANUP CRITERIA
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-001	BTH-002	BTH-003	BTH-004	BTH-005	BTH-006
SAMPLE LOCATION		MW-J-6	MW-J-6	MW-J-3	MW-J-2	MW-J-1	RINSATE
DATE SAMPLED		12/7/94	12/7/94	12/7/94	12/7/94	12/7/94	12/7/94
UNITS		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	Michigan Type B Drinking Water Cleanup Criteria (ug/L)						
Antimony	2.4	**2.8(2.0)**	**3.1(2.0)**	**4.1(2.0)**	<2.0(2.0)	<2.0(2.0)	<2.0(2.0)
Arsenic	1	**1.9(1.0)**	**1.2(1.0)**	**15(1.0)**	<1.0(1.0)	<1.0(1.0)	<1.0(1.0)
Manganese	170	<10(10.0)	<10(10.0)	**210(10.0)**	130(10.0)	**280(10.0)**	<10.0(10.0)

Notes:

- Antimony, arsenic, and manganese are the only parameters detected in groundwater sample with concentrations above the Michigan Type B Drinking Water Cleanup Criteria.
- Number in parenthesis are the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit

TABLE 5.8

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x GROUNDWATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-005	BTH-012	BTH-014	BTH-030	BTH-033	BTH-034
SAMPLE LOCATION		BH-J-12	BH-J-6	BH-J-9	BH-J-11	BH-J-17	BH-J-17
SAMPLE INTERVAL (feet bgs)		(12-14)'	(10-12)'	(4-6)'	(4-6)'	(2-4)'	(12-14)'
DATE SAMPLED		11/3/94	11/4/94	11/4/94	11/8/94	11/9/94	11/9/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Aluminum	9653 (c)	8730 (4)	6970 (4)	5550 (4)	3900 (4)	6600 (4)	7700 (4)
Antimony	0.50	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	0.83 (0.25)	0.3 (0.25)	<0.25 (0.25)
Arsenic	12.5 (c)	3.7 (0.1)	5.4 (0.1)	3.3 (0.1)	5.9 (0.1)	3.7 (0.1)	4.1 (0.1)
Barium	75 (a)	26 (0.4)	34 (0.4)	27 (0.4)	**75 (0.4)**	43 (0.4)	27 (0.4)
Cadmium	1.2 (a)	0.3 (0.05)	0.21 (0.05)	0.28 (0.05)	0.97 (0.05)	0.7 (0.05)	0.32 (0.05)
Chromium	18 (a)	14 (1.6)	10 (1.6)	9.1 (1.6)	16 (1.6)	15 (1.6)	13 (1.6)
Copper	32 (a)	15 (0.6)	12 (0.6)	7.5 (0.6)	**44 (0.6)**	**60 (0.6)**	17 (0.6)
Iron	17738 (c)	17000 (2)	**18000 (2)**	8440 (2)	11000 (2)	14000 (2)	16000 (2)
Lead	21 (a)	9.1 (1)	8.2 (1)	**25 (1)**	**130 (1)**	**41 (1)**	10 (1)
Manganese	440 (a)	269 (0.2)	230 (0.2)	142 (0.2)	310 (0.2)	320 (0.2)	330 (0.2)
Mercury	0.13 (a)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	20 (a)	23 (0.2)	18 (0.2)	7.6 (0.2)	18 (0.2)	19 (0.2)	**20 (0.2)**
Selenium	0.70	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	1.0 (a)	< 0.2 (0.2)	0.21 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	0.39 (0.2)
Thallium	0.5(b)	< 0.25 0.25)	0.36 (0.25)	< 0.25 (0.25)	0.26 (0.25)	< 0.25 (0.25)	0.36 (0.25)
Vanadium	21.3 (c)	21(2)	18 (2)	13 (2)	**12 (2)**	15 (2)	18 (2)
Zinc	50.8 (c)	**51 (1)**	44 (1)	30 (1)	**100 (1)**	**55 (1)**	**58 (1)**
Volatile Compounds (ug/kg)							
Acetone	14000	340 (100)	5400 (100)	2200 (100)	990 (100)	850 (100)	230 (100)
Benzene	24	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	1500	ND(10)	ND(10)	ND(10)	< 10 (10)	ND(10)	< 10 (10)
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	5600	< 30 (30)	< 30 (30)	ND(30)	< 30 (30)	ND(30)	< 30 (30)
Semi-volatile Compounds (ug/kg)							
Benzo(a)anthracene	1800	NA	NA	ND(330)	360 (330)	ND(330)	NA
Benzo(a)pyrene	330 (b)	NA	NA	ND(330)	ND(330)	ND(330)	NA
Benzo(b)fluoranthene	1800	NA	NA	ND(330)	550 (330)	< 330 (330)	NA
Dibenzo(a,h)anthracene	330 (b)	NA	NA	ND(330)	ND(330)	ND(330)	NA
Fluoranthene	17000	NA	NA	ND(330)	510 (330)	ND(330)	NA
Indeno(1,2,3-c,d)pyrene	1,800	NA	NA	ND(330)	430 (330)	ND(330)	NA
Phenanthrene	500	NA	NA	ND(330)	430 (330)	ND(330)	NA
Pyrene	10000	NA	NA	ND(330)	ND(330)	ND(330)	NA
PCBs/Pesticides (ug/kg)							
PCB Aroclor 1254	1000	NA	NA	730 (330)	**1700 (420)**	900 (330)	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 5.8

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x GROUNDWATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-037	BTH-038	BTH-039	BTH-041	BTH-042	BTH-044
SAMPLE LOCATION		BH-J-16	BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-7
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(16-18)'	(8-10)'	(12-14)'	(22-24)'
DATE SAMPLED		11/10/94	11/10/94	11/10/94	11/11/94	11/11/94	11/11/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Aluminum	9653 (c)	3600 (4)	9000 (4)	7200 (4)	**11300 (4)**	7950 (4)	7220 (4)
Antimony	0.50	**29 (0.25)**	**8.5 (0.25)**	< 0.25 (0.25)	**20 (0.25)**	**1.9 (0.25)**	< 0.25 (0.25)
Arsenic	12.5 (c)	12 (0.1)	11 (0.1)	3.9 (0.1)	10 (0.1)	**19 (0.1)**	7.6 (0.1)
Barium	75 (a)	**2300 (0.4)**	**700 (0.4)**	51 (0.4)	**2220 (0.4)**	**541 (0.4)**	32 (0.4)
Cadmium	1.2 (a)	**19 (0.05)**	**17 (0.05)**	0.63 (0.05)	**42 (0.05)**	**17 (0.05)**	0.41 (0.05)
Chromium	18 (a)	**93 (1.6)**	**120 (1.6)**	13 (1.6)	**641 (1.6)**	**225(1.6)**	11 (1.6)
Copper	32 (a)	**211 (0.6)**	**1000 (0.6)**	26 (0.6)	**1020 (0.6)**	**189 (0.6)**	18 (0.6)
Iron	17738 (c)	**120000 (2)**	**60000 (2)**	17000 (2)	**56300 (2)**	**95600 (2)**	16600 (2)
Lead	21 (a)	**740 (1)**	**880 (1)**	**40 (1)**	**4740 (1)**	**945 (1)**	10 (1)
Manganese	440 (a)	**980 (0.2)**	**590 (0.2)**	**450 (0.2)**	**844 (0.2)**	**688 (0.2)**	284 (0.2)
Mercury	0.13 (a)	**0.18 (0.1)**	< 0.1 (0.1)	< 0.1 (0.1)	**0.45 (0.1)**	**0.17 (0.1)**	< 0.1 (0.1)
Nickel	20 (a)	**59 (0.2)**	**140 (0.2)**	19 (0.2)	**94 (0.2)**	**31 (0.2)**	**20 (0.2)**
Selenium	0.70	**0.8 (0.5)**	**1.3(0.5)**	< 0.5 (0.5)	**2.3 (0.5)**	< 0.5 (0.5)	< 0.5 (0.5)
Silver	1.0 (a)	0.96 (0.2)	**2.3(0.2)**	0.34 (0.2)	**2.9 (0.2)**	0.62 (0.2)	< 0.2 (0.2)
Thallium	0.5(b)	< 0.25 (0.25)	< 0.25 (0.25)	0.33 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	**0.52 (0.25)**
Vanadium	21.3 (c)	19 (2)	19 (2)	16 (2)	**26 (2)**	**47 (2)**	21 (2)
Zinc	50.8 (c)	**1800 (1)**	**1500 (1)**	**76 (1)**	**4390 (1)**	**1020 (1)**	48 (1)
Volatile Compounds (ug/kg)							
Acetone	14000	**14000 (100)**	5000 J (100)	820 J (100)	2800 (200)	3700 (10)	3500 (10)
Benzene	24	< 10 (10)	17 J (10)	ND(10)	**200 (200)**	ND(10)	ND(10)
Ethylbenzene	1500	< 10 (10)	13 J (10)	<10 UJ (10)	**25000 (5000)**	**140 (10)**	**14 (10)**
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	**45000 (5000)**	ND(100)	ND(100)
Total Xylenes	5600	< 30 (30)	<30 UJ(30)	<30 UJ(30)	**50000 (5000)**	**320 (30)**	< 30 (30)
Semi-volatile Compounds (ug/kg)							
Benzo(a)anthracene	1800	**7200 (6,600)**	NA	NA	360 (330)	NA	NA
Benzo(a)pyrene	330 (b)	**5000 (330)**	NA	NA	< 330 (330)	NA	NA
Benzo(b)fluoranthene	1800	**8900 (6,600)**	NA	NA	460 (330)	NA	NA
Dibenzo(a,h)anthracene	330 (b)	**1300 (330)**	NA	NA	ND(330)	NA	NA
Fluoranthene	17000	**17000 (6,600)**	NA	NA	600 (330)	NA	NA
Indeno(1,2,3-c,d)pyrene	1,800	**4700 (330)**	NA	NA	380 (330)	NA	NA
Phenanthrene	500	**14000 (6,600)**	NA	NA	**740 (330)**	NA	NA
Pyrene	10000	**12000 (6,600)**	NA	NA	940 (330)	NA	NA
PCBs/Pesticides (ug/kg)							
PCB Aroclor 1254	1000	800 (330)	NA	NA	**2100 (410)**	NA	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 5.8

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x GROUNDWATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-045	BTH-053	BTH-055	BTH-056	BTH-057
SAMPLE LOCATION		BH-J-10	BH-J-13	BH-J-14	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(6-8)'	(16-18)'	(20-22)'
DATE SAMPLED		11/11/94	11/16/94	11/18/94	11/18/94	11/18/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria					
Inorganic Analytes (mg/kg)						
Aluminum	9653 (c)	**10200 (4)**	**17500 (4)**	**14000 (0.5)**	8900 (0.5)	7200 (0.5)
Antimony	0.50	< 0.25 (0.25)	< 0.25 (0.25)	ND(0.5)	**0.63 (0.5)**	ND(0.5)
Arsenic	12.5 (c)	5.1 (0.1)	4.3 (0.1)	**13 (0.1)**	9.5 (0.1)	9.2 (0.1)
Barium	75 (a)	42 (0.4)	62 (0.4)	67 (1)	**92 (1)**	34 (1)
Cadmium	1.2 (a)	0.42 (0.05)	0.076 (0.05)	**2.2 (0.05)**	**4.1 (0.05)**	1.1 (0.05)
Chromium	18 (a)	13 (1.6)	**19 (1.6)**	**19 (2.5)**	**40 (2.5)**	11 (2.5)
Copper	32 (a)	15 (0.6)	16 (0.6)	30 (1)	**230 (1)**	16 (1)
Iron	17738 (c)	17600 (2)	**30700 (2)**	**41000 (2)**	**29000 (2)**	**19000 (2)**
Lead	21 (a)	9.3 (1)	14 (1)	**77 (1)**	**910 (1)**	11 (1)
Manganese	440 (a)	421 (0.2)	336 (0.2)	**670 (2)**	280 (2)	300 (2)
Mercury	0.13 (a)	< 0.1 (0.1)	< 0.1 (0.1)	**0.23 (0.1)**	ND(0.1)	ND(0.1)
Nickel	20 (a)	16 (0.2)	**21 (0.2)**	**25 (1)**	**25 (1)**	15 (1)
Selenium	0.70	< 0.5 (0.5)	< 0.5 (0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Silver	1.0 (a)	< 0.2 (0.2)	< 0.2 (0.2)	ND(0.5)	ND(0.5)	ND(0.5)
Thallium	0.5(b)	< 0.25 (0.25)	< 0.25 (0.25)	ND(0.5)	ND(0.5)	ND(0.5)
Vanadium	21.3 (c)	**22 (2)**	**29 (2)**	20 (1)	15 (1)	13 (1)
Zinc	50.8 (c)	43 (1)	46 (1)	**97 (1)**	**260 (1)**	45 (1)
Volatile Compounds (ug/kg)						
Acetone	14000	3000 (10)	2000 (100)	610 (100)	450 (100)	590 (100)
Benzene	24	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	1500	ND(10)	ND(10)	ND(10)	ND(10)	< 10 (10)
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	5600	ND(30)	< 30 (30)	< 30 (30)	< 30 (30)	< 30 (30)
Semi-volatile Compounds (ug/kg)						
Benzo(a)anthracene	1800	ND(330)	NA	< 330 (330)	NA	NA
Benzo(a)pyrene	330 (b)	ND(330)	NA	ND(330)	NA	NA
Benzo(b)fluoranthene	1800	ND(330)	NA	ND(330)	NA	NA
Dibenzo(a,h)anthracene	330 (b)	ND(330)	NA	ND(330)	NA	NA
Fluoranthene	17000	ND(330)	NA	660 (330)	NA	NA
Indeno(1,2,3-c,d)pyrene	1,800	ND(330)	NA	ND(330)	NA	NA
Phenanthrene	500	ND(330)	NA	420 (330)	NA	NA
Pyrene	10000	ND(330)	NA	500 (330)	NA	NA
PCBs/Pesticides (ug/kg)						
PCB Aroclor 1254	1000	<330 (330)	NA	**1500 (400)**	NA	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 5.9

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B DIRECT CONTACT CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-014	BTH-030	BTH-033	BTH-037	BTH-038	BTH-041	BTH-042	BTH-055	BTH-056
SAMPLE LOCATION		BH-J-9	BH-J-11	BH-J-17	BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(4-6)'	(2-4)'	(4-6)'	(8-10)'	(8-10)'	(12-14)'	(6-8)'	(16-18)'
DATE SAMPLED		11/4/94	11/8/94	11/9/94	11/10/94	11/10/94	11/11/94	11/11/94	11/18/94	11/18/94
Parameter	Michigan Type B Direct Contact Cleanup Criteria									
Inorganic Analytes (mg/kg)										
Arsenic	12.5 (b)	3.3 (0.1)	5.9 (0.1)	3.7 (0.1)	12 (0.1)	11 (0.1)	10 (0.1)	**19 (0.1)**	**13 (0.1)**	9.5 (0.1)
Lead	400	25 (1)	130 (1)	41 (1)	**740 (1)**	**880 (1)**	**4740 (1)**	**945 (1)**	77 (1)	**910 (1)**
Semi-volatile Compounds (ug/kg)										
Benzo(a)anthracene	1800	ND(330)	360 (330)	ND(330)	**7200 (6,600)**	NA	360 (330)	NA	< 330 (330)	NA
Benzo(a)pyrene	330 (a)	ND(330)	ND(330)	ND(330)	**5000 (330)**	NA	< 330 (330)	NA	ND(330)	NA
Benzo(b)fluoranthene	1800	ND(330)	550 (330)	< 330 (330)	**8900 (6,600)**	NA	460 (330)	NA	ND(330)	NA
Dibenzo(a,h)anthracene	330 (a)	ND(330)	ND(330)	ND(330)	**1300 (330)**	NA	ND(330)	NA	ND(330)	NA
Indeno(1,2,3-c,d)pyrene	1,800	ND(330)	430 (330)	ND(330)	**4700 (330)**	NA	380 (330)	NA	ND(330)	NA
PCBs/Pesticides (ug/kg)										
PCB Aroclor 1254	1000	730 (330)	**1700 (420)**	900 (330)	800 (330)	NA	**2100 (410)**	NA	**1500 (400)**	NA

Notes:

(a) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B Direct Contact Cleanup Criteria

(b) Site specific background levels have been substituted for the Michigan Type B Direct Contact Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit.
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 5.10

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE C DIRECT CONTACT CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-037	BTH-038	BTH-041	BTH-042	BTH-055	BTH-056
SAMPLE LOCATION		BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(8-10)'	(12-14)'	(6-8)'	(16-18)'
DATE SAMPLED		11/10/94	11/10/94	11/11/94	11/11/94	11/18/94	11/18/94
Parameter	Michigan Type C Direct Contact Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Arsenic	12.5 (a)	12 (0.1)	11 (0.1)	10 (0.1)	**19 (0.1)**	**13 (0.1)**	9.5 (0.1)
Lead	400	**740 (1)**	**880 (1)**	**4740 (1)**	**945 (1)**	**77 (1)**	**910 (1)**
Semi-volatile Compounds (ug/kg)							
Benzo(a)pyrene	2,100	**5000 (330)**	NA	< 330 (330)	NA	ND(330)	NA

Notes:

(a) Site specific background levels have been substituted for the Michigan Type C Direct Contact Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit.
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

APPENDIX A

ERM REPORT

FINAL REPORT

Privileged and Confidential
Prepared at General Motors Counsel's Request

General Motors Corporation

Limited Phase II Environmental Assessment

Lot J, North Parcels

GM Truck and Bus Complex

Centerpoint

Pontiac, Michigan

August 1994

Environmental Resources Management, Inc.
855 Springdale Drive
Exton, Pennsylvania 19341

ERM.

Environmental
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855 Springdale Drive
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(215) 524-3500
(215) 524-7335 (Fax)

10 August 1994

Mr. Ralph E. Mitchell, AIA
General Motors Corporation
Truck And Bus Division
820 Opdyke Road
Pontiac, MI 48341-3123

ERM

Re: Findings - Phase II Environmental Assessment
Lot J, North Parcels
Truck and Bus Complex, Pontiac, Michigan
ERM Proposal No: P94-1328A

Dear Mr. Mitchell:

This letter report summarizes the results of a preliminary investigation performed by Environmental Resources Management, Inc. (ERM) for General Motors Corporation (GM) at Lot J of the Truck and Bus Complex, Pontiac, Michigan.

PURPOSE

This investigation was designed to provide a preliminary indication of whether cyanide or petroleum contamination existed in the near surface soils underlying Lot J. A secondary goal was to generally characterize the presence of concrete fill materials under the south half of Lot J.

INTRODUCTION

The Lot J parking area is located north of South Boulevard and the main Truck and Bus Facility and west of Opdyke Road. The lot is bordered to the east by a green, non-parking area, to the north by a government warehouse facility, and to the west by an access road to the government warehouse. A generalized site map is presented in Figure 1, Attachment 1.

The investigation consisted of advancing 14 soil borings, five borings with split spoon sampling, and nine borings for general characterization of soil materials via the auger cuttings. The first five borings were

completed on 20 May, and the remaining nine borings were completed on 24 May 1994. Boring locations are shown on Figure 2, Attachment 1.

When ground water was encountered, a PVC bailer was used to collect samples for laboratory analysis. Five soil samples and two ground water samples were sent to the laboratory for cyanide and total petroleum hydrocarbon (TPH) analyses. Drilling was performed by Mateco Drilling Company, Grand Rapids, Michigan, under contract to ERM.

Laboratory analyses were performed by Shrader Laboratories, Inc., Detroit, Michigan. ERM's proposal indicated that Shrader Lab would be compensated directly from GM. However, ERM was informed that Shrader's purchase order with GM had expired. Therefore, ERM contracted with Shrader for the analytical services and will bill GM in accordance with the Standard Terms and Conditions.

PROCEDURES

Soil borings were advanced using continuous flight hollow stem augers from a trailer mounted CME 45C drill rig. Soil samples for the first five soil borings were collected using a two-inch nominal diameter split spoon. The remaining nine borings were advanced with no split spoon sampling. Observations, changes in drilling conditions, material descriptions, boring designations, sample numbers, and blow counts were noted in the field note book.

Soil samples were composited from a selected split spoon and placed clear glass jars provided by the laboratory. One jar provided sufficient sample for both TPH and cyanide analyses.

Ground water was collected from the augers or the bore hole using a disposable PVC bailer. Water samples to be analyzed for TPH were placed in amber jars preserved with sulfuric acid, and water samples to be analyzed for cyanide were placed in polyethylene bottles preserved with sodium hydroxide. Bottles were provided, with the preservatives added, by the laboratory.

RESULTS AND DISCUSSION

Soil borings B-1 through B-5 were advanced using hollow stem auger techniques and split spoon sampling on 20 May 1994. A soil boring log summary is presented in Attachment 2. Soil borings B-6 through B-14 were advanced using hollow stem auger techniques on 24 May 1994. A soil boring log summary based on characterization of the auger cuttings is presented in Attachment 3.

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A review of the boring logs from soil borings B-1 and B-2 indicate that this area is did not have any fill operations and is undisturbed. The remaining borings are all interpreted to be in disturbed or fill locations. All borings, not terminated early because of auger refusal, were interpreted to have encountered a virgin clay till at about 10 to 15 feet below grade surface throughout the site. Broken concrete was found or assumed to be present in borings B-5, -7, -8, -9, -11, -13, and -14.

Table 1 presents the results of the laboratory analysis of the five soil samples. TPH results ranged from below the 20 milligrams per kilogram (mg/kg) detection limit to 24,400 mg/kg in soil boring B-5. No cyanide was reported at the detection limit of 20 mg/kg.

Table 1 *Soil Analytical Results, Lot J Sampling*

Sample ID	Sample Type	Date	TPH (mg/kg)	Cyanide (mg/kg)
B-1-18	Split spoon	5/20/94	<20	<20
B-3-16	Split spoon	5/20/94	<20	<20
B-3-9	Split spoon	5/20/94	24	<20
B-4-13	Auger cuttings	5/20/94	40	<20
B-5-11	Split spoon	5/20/94	24,400	<20

Note:
Last number in Sample ID indicates approximate feet below grade surface of sample point. (Example: B-1-18 was collected 18 feet below ground surface)

Ground water was found in only two soil borings, B-3 and B-8. Ground water from B-3 was collected through the augers and labeled BW-3. Ground water from B-8 was collected from the boring after the augers had been pulled, and labeled BW-8.

Table 2 presents the results from the bore water analyses for ground water from boring B-3 and B-8. Bore water from B-3 was reported to have a TPH concentration of 33 mg/kg. Note that the results are reported on a mass basis due to the high concentration of suspended solids in the sample. A kilogram is approximately equal to a liter for data conversion purposes.

Table 2 Ground Water Analytical Results, Lot J Sampling

Sample ID	Matrix	Date	TPH (mg/kg)	Cyanide (mg/kg)
BW-3	Bore water*	5/20/94	33	<20
BW-8	Bore water**	5/24/94	<20	<20

Notes:
* Sample was approximately 20% solids by volume (mg/kg=mg/liter)
** Sample was approximately 10% solids by volume

Based on the soil boring log summaries and the lab results, an area of potential petroleum contamination was delineated and is presented in Figure 3, Attachment 1.

CONCLUSIONS

Based on the results of this investigation, ERM has developed the following conclusions concerning Lot J:

- The "Green Area" in the northwest corner of the site does not appear to have been impacted by parking lot operations or fill materials.
- Ground water is discontinuous across the site and is interpreted to exist in "perched" conditions.
- A continuous virgin clay till material appears to underlie most, if not all of the site.

- There are indications of petroleum contamination on the west side of Lot J.
- Broken concrete was used as fill for much of the are investigated.
- The depth of fill is estimated at 10 to 15 feet below ground surface for the area investigated.

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RECOMMENDATIONS

ERM recommends that GM initiate a Remedial Investigation to determine the areal and vertical extent of the petroleum contamination at Lot J. The investigation should be limited to the near surface soils (less than 20 feet below grade) unless subsequent results indicate otherwise. Samples should be analyzed for polynuclear aromatic hydrocarbon compounds.

ERM is prepared to meet with you to discuss this report, and to prepare a scope of services for continuing the investigation at this site. If you have any questions, please contact Todd King at (313) 769-6080 or Paul Morin at (610) 524-3746 at your earliest convenience.

Respectfully submitted,
Environmental Resources Management, Inc.

Todd W. King, P.E.
Project Engineer

Paul R. Morin, P.G., CEI
Project Director

cc: Keith West, GM Environmental
File

Attachment 1
Figures

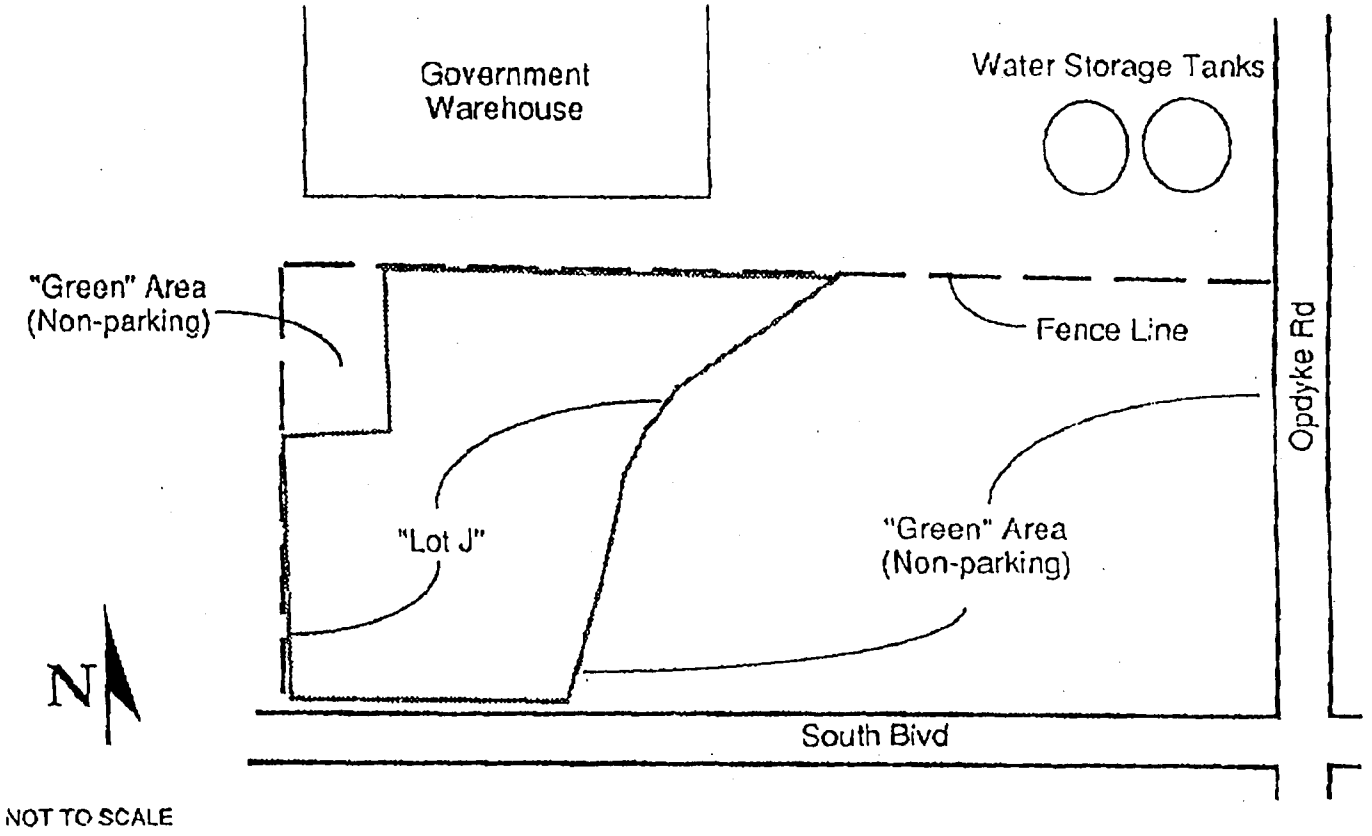


Figure 1

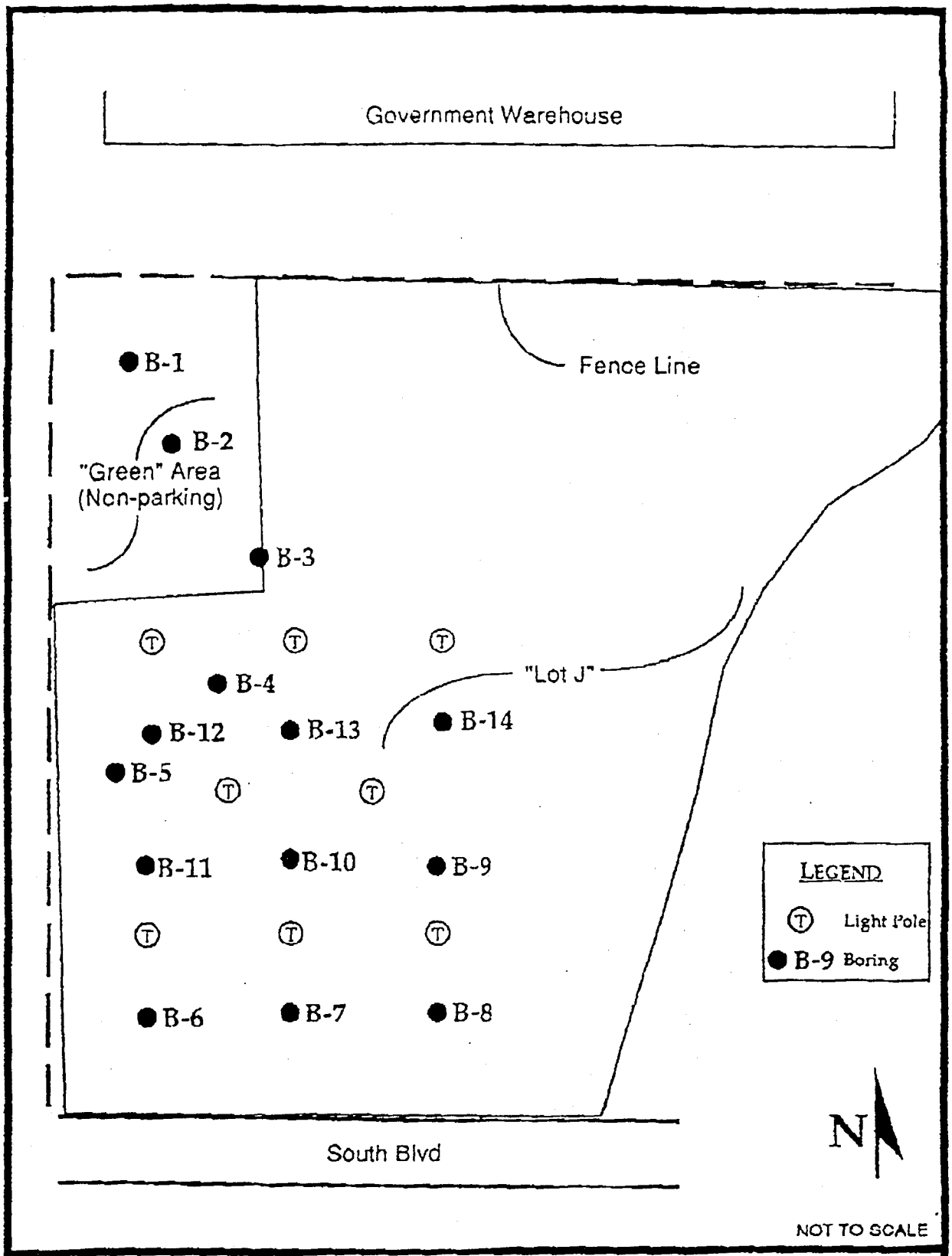
Site Map

General Motors Corporation - Pontiac Truck & Bus

Drawn by / Date: T. W. King 23 May 1994

Checked by / Date:

ERM

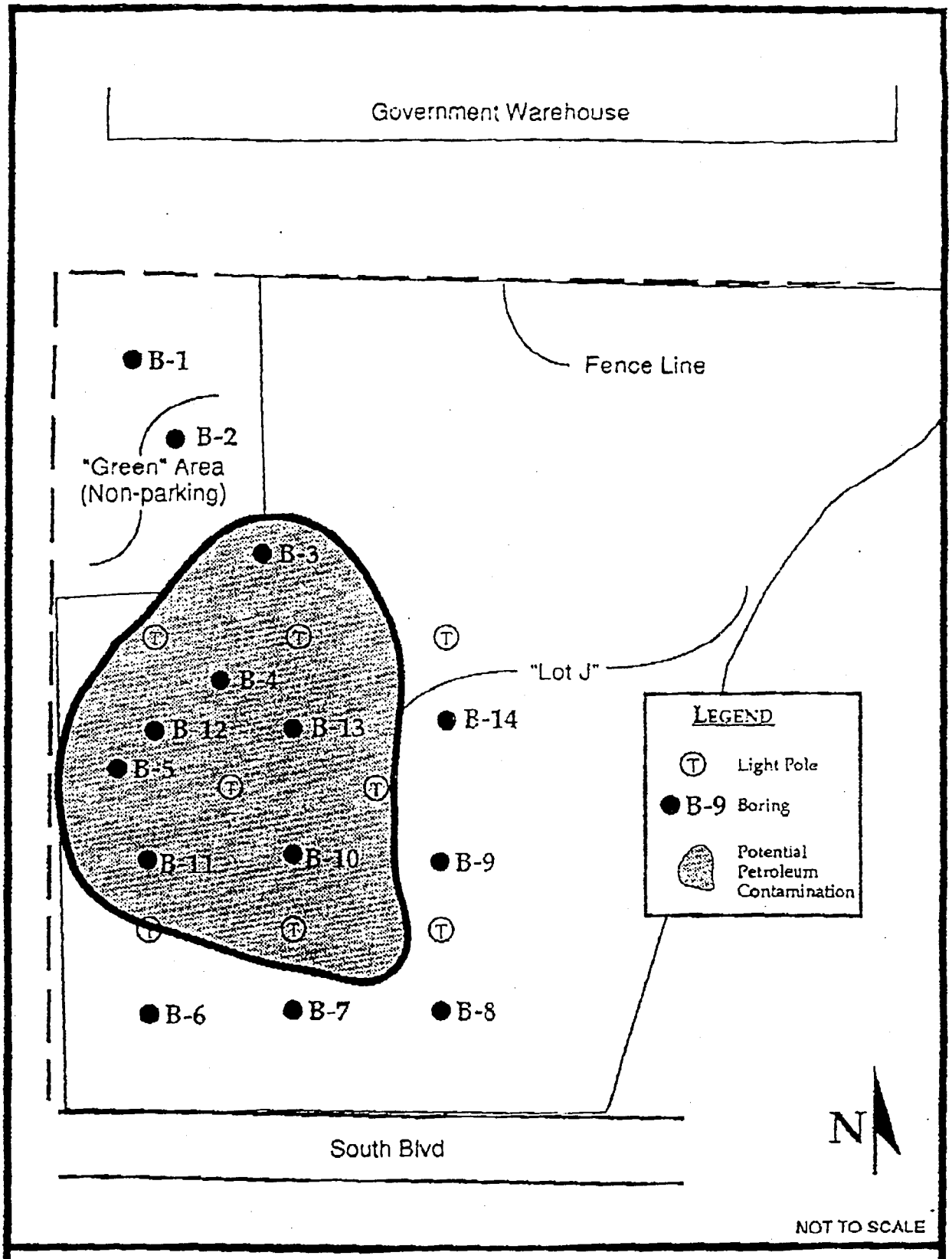


ERM

Figure 2

Boring Location Map

General Motors Corporation, Truck & Bus, Pontiac, MI



ERM

Figure 3

Area of Potential Petroleum Contamination

General Motors Corporation, Truck & Bus, Pontiac, MI

Attachment 2
Soil Boring Logs - 20 May 1994

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Friday, 20 May 1994

ERM

Boring No:	Interval (feet BGS)	Blow Count	Recovery	Material	Comments
B-1	1-3	3/5/5/7	75%	Dark brown fine sandy topsoil	Split spoon sample
	8-10	3/4/8/11	75%	Light brown silty sand w/ fine to coarse sand, moist	Split spoon sample
	11				Slower drilling, sandy clay in cuttings
	14				Drilling easier
	15-17	3/4/4/6	50%	Brown medium sands saturated	
	17.5				Drilling change, slower, clay in cuttings
	17.5-19.5	5/7/7/10	50%	Lens of grey clay 6" thick, saturated well graded light and dark brown sand	Took soil sample ERM-B-1-18
B-2	1-3	3/2/3/5	75%	Black topsoil - 3" Light brown fine sand w/ trace silt, poorly graded	
	8-10	3/4/8/13	100%	8-9:Light to dark brown sand 9-10:Lt brwn sand w/ green silt	
	13				Drilling change, slower, clay in cuttings
	15-17	3/4/7/10	100%	Grey clay	
					No lab samples collected for this boring
B-3	Ground				Gravel and debris on top in circular pattern. Possible former burn pit.
	1-3	7/10/13/11	25%	Dark brown sand w/ silt, some 1/2" gravel	
	8-10	8/7/7/8	100%	8-8.75':Dark brown sand 8.75-10:Light brown sand	Sampled at interface. Soil sample ERM-B-3-9
	15-17	3/6/9/12		16.25-17:Grey clay	Collected soil sample ERM-B-3-16 and water sample ERM-BW-3
	10				Static water elevation

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Friday, 20 May 1994

ERM

Boring No:	Interval (feet BGS)	Blow Count	Recovery	Material	Comments
B-4	1-3	4/6/4/4	50%	Dark colored fill material, fine medium sand, some gravel and asphalt	
	8-10	1/1/1/1	0%	No recovery, rock in split spoon	
	12.5				Drilling change, wet dark grey material in cuttings. No odor.
	15-17	2/5/7/9	100%	Grey and brown clay w/ small gravel and coarse sand	
					Took sample of wet grey material from auger cuttings. Sample ERM-B-4-13
B-5	1-3	3/3/10/10	75%	1-2:Fine to medium sand, well graded w/ some silt 2-3:Fill with asphalt/sand/fines brown and black	
	6				Drilling change, slow, jerky
	8				Drilling change, faster
	8-10	7/6/4/3	30%	Broken concrete in spoon	
	10-12	2/3/4/4	50%	Black fine to medium sand	Petroleum smell. Sample ERM-B-5-11
	12.5				Drilling change, slow, clay in augers
	15-17	6/6/7/8	100%	Brown/grey clay	

Attachment 3
Soil Boring Logs - 24 May 1994

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Tuesday, 24 May 1994

ERM

Boring No:	Interval (feet BGS)	Material (as characterized from auger cuttings)	Comments
B-6	0-5	Fill-dark grey to brown sand mixed with clay, gravel	
	5	Grey clay	Drilling change, assumed virgin clay till
B-7	0-3.5	Fill-dark grey to brown sand mixed with wood, steel, clay, gravel	
	3.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-8	0-4	Fill-dark grey to brown sand mixed with clay, gravel	
	4-8	Brown sand w/ some silt, fine to coarse	
	8-10	Brown sand w/ some silt, fine to coarse	Obstruction, could be cobble, saturated soils
	10-16	Brown sand w/ some silt, fine to coarse	
	16	Grey clay	Drilling change, assumed virgin clay till
			Sampled borewater from hole for TPH & cyanide, ERM BW-8
B-9	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-3.5		Obstructions, hard drilling
	3.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-10	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-3	Fill-black sand mixed with clay, gravel	Petroleum odor
	3-9	Fill-black sand mixed with clay, gravel, steel, broken concrete	Petroleum odor
	9-12	Fill-black sand mixed with clay, gravel	Petroleum odor
	12	Grey clay	Drilling change, assumed virgin clay till
B-11	0-1.5	Fill-dark grey to brown sand mixed with clay, gravel	
	1.5		Hit obstruction, auger refusal, assumed to be broken concrete
B-12	0-3	Fill-dark grey to brown sand mixed with clay, gravel	
	3-11.5	Fill-black sand mixed with clay, gravel	Petroleum odor, more saturated with depth, no free standing liquid in hole
	11.5		Drilling change, assumed virgin clay till

Soil Boring Log Summary

General Motors Corporation, Truck & Bus, Pontiac, MI
Logged by: Todd King
Driller: Mateco Drilling, Grand Rapids
Date: Tuesday, 24 May 1994

ERM

Boring No:	Interval (feet BGS)	Material (as characterized from auger cuttings)	Comments
B-13	0-3.5	Fill-dark grey sand mixed with clay, gravel, glass, plastic	
	3.5-4.5	Fill-dark grey sand mixed with clay,	Obstructions, hard drilling
	8.5	Clay	Drilling change, assumed virgin clay till
B-14	0-2	Fill-dark grey to brown sand mixed with clay, gravel	
	2-4	Fill-dark grey to brown sand mixed with clay, gravel	Obstructions, hard drilling
	4-6	Fill-black sand mixed with clay, gravel	No odor
	6-10.5	Brown sand, fine to medium	
	10.5	Grey clay with some sand	Drilling change, assumed virgin clay till

APPENDIX B

STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-77)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-1/MW-J-3
(Page 1 of 2)
DATE COMPLETED: NOVEMBER 15, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE	919.90					
	SC/CL-SAND and CLAY, little gravel, brown	919.4		1SS		14	0
	CL/ML-CLAY and SILT, little gravel, brown and black, mottled						
2.5				2SS		14	0
5.0		914.4		3SS		16	6.3
	SC-SAND, some clay, little gravel, well graded, brown	913.9					
	GW/SW-GRAVEL and SAND, well graded, moist	913.4		4SS		9	5.1
7.5	CL/ML-CLAY and SILT, little gravel, brown, moist	911.5		5SS		13	3.3
	CL/SC-CLAY and SAND, some gravel, saturated						
10.0				6SS		4	1.9
		907.9	8"ø BOREHOLE				
12.5	CL/ML-SILT and CLAY(TILL), little gravel, little sand, gray, moist			7SS		9	1.2
15.0	- dry			8SS		8	6.2
				9SS		13	4.2
17.5			CEMENT/ BENTONITE GROUT				
				10SS		16	3.1
20.0				11ST			
22.5				12SS		16	4.9
25.0				13SS		21	5.2
				14SS		18	4.6
27.5				15SS		9	5.3
30.0				16SS		15	2.5
32.5				17SS		14	2.7

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-77)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-1/MW-J-3 (Page 2 of 2)
DATE COMPLETED: NOVEMBER 15, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0	– moist		CEMENT/ BENTONITE GROUT	18SS		7	4.9
37.5		881.9		19SS		16	5.2
	SW–SAND, some gravel, little clay, gray, saturated		8"ø BOREHOLE	20SS		16	7.1
40.0				21SS		14	4.2
42.5	END OF HOLE @ 42.0 FT. BGS	877.9					
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

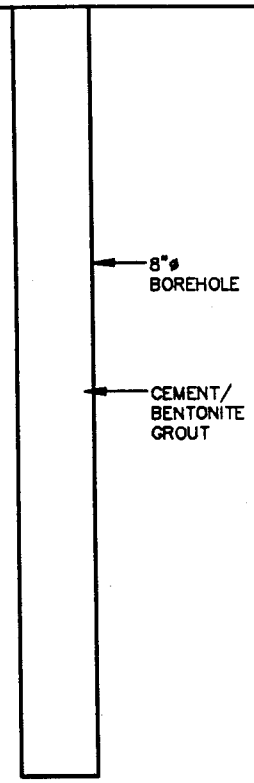
(L-78)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-2
DATE COMPLETED: NOVEMBER 15, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL
	GROUND SURFACE	926.24
2.5	SM/ML-SAND and SILT(FILL), concrete fragments	
	SC/CL-SAND and CLAY, cobbles	923.2
5.0	CL-CLAY, little sand, brown with red staining, moist	922.2
7.5	CL/ML-CLAY and SILT, trace gravel, brown and black mottled, moist	920.2
10.0		
12.5		
15.0	CL/ML-SILT and CLAY(TILL), trace gravel, gray	911.2
17.5		
20.0	END OF HOLE @ 20.0 FT. BGS	906.2
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		0	
2SS		0.2	
3SS		23.6	
4SS		12.9	
5SS		7.2	
6SS		6.4	
7SS		15.6	
8SS		54.3	
9SS		9	
10SS		9.5	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-79)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-3
DATE COMPLETED: NOVEMBER 8, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	926.02					
2.5	CL/ML-CLAY and SILT(FILL), some sand, concrete fragments, brown and black, mottled			1SS		11	1.7
				2SS		9	4.1
5.0		920.5		3SS		7	6.9
7.5	CL/ML-CLAY and SILT, trace gravel, brown, moist		8"ø BOREHOLE	4SS		9	3.2
				5SS		9	4.1
10.0			CEMENT/ BENTONITE GROUT	6SS		14	8
12.5	CL/ML-CLAY and SILT(TILL), little gravel, gray	914.0		7SS		22	3.1
	No recovery			8SS		58	
15.0							
17.5				9SS		16	1.2
	END OF HOLE @ 18.0 FT. BGS	908.0					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-80)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-4
DATE COMPLETED: NOVEMBER 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	926.79					
	TOPSOIL	926.5					
	CL/ML-CLAY and SILT, little sand, little gravel, soft, brown and black mottled, moist			1SS		6	1.1
2.5				2SS		4	2.6
5.0			8"ø BOREHOLE	3SS		10	4.6
	CL/ML-CLAY and SILT, some sand, little gravel, brown and gray mottled	920.8		4SS		9	4.4
7.5			CEMENT/ BENTONITE GROUT	5SS		19	4.2
10.0				6SS		13	9.5
	CL/ML-CLAY and SILT(TILL), trace gravel, hard, gray, moist	915.8		7SS		12	7.2
12.5				8SS		14	7.1
15.0							
	END OF HOLE @ 16.0 FT. BGS	910.8					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-81)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-5
DATE COMPLETED: NOVEMBER 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	925.16					
2.5	SC-SAND(FILL), some sand and gravel, concrete fragments, brown and gray, black streaks			1SS		8	0
				2SS		10	3.2
5.0				3SS		7	4.2
7.5	CL/ML-CLAY and SILT, soft, brown and gray, wet No recovery	919.0	8"ø BOREHOLE	4SS		9	3.3
			CEMENT/ BENTONITE GROUT	5SS		9	
10.0				6SS		10	2.1
12.5	CL/ML-CLAY and SILT(TILL), trace gravel, gray	912.7		7SS		17	7.7
15.0				8SS		15	0
17.5				9SS		14	0
	END OF HOLE @ 18.0 FT. BGS	907.2					
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-82)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-6
DATE COMPLETED: NOVEMBER 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	926.64					
	CL/ML-CLAY and SILT(FILL), some gravel and sand, brown and black mottled			1SS		11	0
2.5				2SS		7	0
5.0			8"ø BOREHOLE	3SS		12	7.2
				4SS		10	22
7.5			CEMENT/ BENTONITE GROUT				
				5SS		15	21.5
10.0							
	CL/ML-CLAY and SILT(TILL), little gravel, gray	915.6		6SS		13	6.9
12.5				7SS		15	5.5
15.0				8SS		12	4.2
	END OF HOLE @ 16.0 FT. BGS	910.6					
17.5							
20.0							
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-83)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-7
DATE COMPLETED: NOVEMBER 11, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	925.03					
2.5	CL/ML-CLAY and SILT(FILL), some gravel, little sand, brown and black, dry			1SS		10	0
				2SS		16	5.1
		921.2					
5.0	SC/CL-SAND and CLAY(FILL), some gravel, concrete fragments, metal wire, bolts, wood, black, strong odor No recovery			3SS		9	13.2
				4SS		23	
7.5			8"ø BOREHOLE				
				5SS		16	13.3
10.0				6SS		8	-
		913.0	CEMENT/ BENTONITE GROUT				
12.5	CL/ML-CLAY and SILT(FILL), little gravel, brown and black mottled, odor No recovery			7SS		9	98.2
15.0				8SS		11	
				9SS		15	7
17.5				10SS		5	25.3
		905.5					
20.0	CL/ML-CLAY and SILT(TILL), little gravel and sand, gray			11SS		14	6.3
22.5				12SS		10	4.1
		901.0					
25.0	END OF HOLE @ 24.0 FT. BGS						
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-84)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
HOLE DESIGNATION: BH-J-8

PROJECT NO.: 5770
DATE COMPLETED: NOVEMBER 8, 1994

CLIENT: GENERAL MOTORS
DRILLING METHOD: 4 1/4" ID HSA

LOCATION: J-LOT
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	927.53					
2.5	ML/CL-SILT and CLAY(FILL), some sand and gravel, brown and black mottled No recovery			1SS		8	0
				2SS		5	
5.0				3SS		5	0
7.5				4SS		17	6
10.0			8"ø BOREHOLE	5SS		6	7.2
				6SS		5	0
12.5				7SS		4	0
15.0	CL/ML-CLAY and SILT(FILL), some sand, little gravel, brick fragments, gray and black, mottled No recovery	913.5	CEMENT/ BENTONITE GROUT	8SS		5	6.3
17.5				9SS		9	
20.0				10SS		8	3.9
				11SS		20	2.4
22.5	CL/ML-CLAY and SILT(TILL), trace gravel, gray, moist	905.5		12SS		18	0.4
25.0				13SS		22	0
27.5				14SS		13	0
	END OF HOLE @ 28.0 FT. BGS	899.5					
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-85)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-9
DATE COMPLETED: NOVEMBER 4, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	922.25					
2.5	ML/SM-SILT and SILT(FILL), some clay, cement fragments, cobbles, black staining, steel fragments			1SS		25	8.4
				2SS		29	4
5.0	SP-SAND, poorly graded, brown with black staining, moist	917.8		3SS		6	8.9
7.5	CL/ML-CLAY and SILT, little gravel, brown and gray, mottled No recovery	916.3	8"ø BOREHOLE	4SS		9	
				5SS		18	0
10.0	SC/CL-SAND and CLAY, trace gravel, brown, No recovery	912.3	CEMENT/ BENTONITE GROUT	6SS		43	
12.5				7SS		14	5.2
15.0	CL/ML-CLAY and SILT(TILL), little gravel, gray	907.3		8SS		16	4.1
17.5				9SS		26	0
20.0	END OF HOLE @ 20.0 FT. BGS	902.3		10SS		21	0
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-86)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-10
DATE COMPLETED: NOVEMBER 11, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	925.72					
	ML/CL-SILT and CLAY(FILL), some sand and gravel, brown			1SS		18	2
2.5				2SS		18	10.9
5.0				3SS		10	12.2
7.5				4SS		16	5.1
			8"ø BOREHOLE	5SS		18	3.3
10.0				6SS		17	5.8
			CEMENT/ BENTONITE GROUT				
12.5				7SS		22	4.2
15.0				8SS		16	3.3
		909.7					
	SC/CL-SAND and CLAY, little gravel, black, moist	908.7		9SS		15	1.1
17.5	CL/ML-CLAY and SILT, little gravel and sand, brown			10SS		11	2.1
20.0							
		904.7		11SS		9	2.7
	CL/ML-SILT and CLAY(TILL), little gravel, gray, moist						
22.5				12SS		17	1.1
		901.7					
	END OF HOLE @ 24.0 FT. BGS						
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-87)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-11
DATE COMPLETED: NOVEMBER 8, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	922.72					
	CL/ML-CLAY and SILT(FILL), some sand and silt, cobbles, brown	920.7		1SS		7	3.2
2.5	SC/CL-SAND and CLAY(FILL), some gravel, brick fragments, black			2SS		21	5.9
5.0				3SS		9	7.2
7.5			8"ø BOREHOLE	4SS		11	2
				5SS		7	2
10.0	CL/ML-CLAY and SILT(FILL), concrete fragments, gray and brown mottled	912.7	CEMENT/ BENTONITE GROUT	6SS		8	1.9
12.5	No recovery			7SS		9	2.5
15.0				8SS		14	
	CL/ML-CLAY and SILT(TILL), little gravel, gray	906.7		9SS		15	1.9
17.5				10SS		14	0
20.0				11SS		17	0
	END OF HOLE @ 22.0 FT. BGS	900.7					
22.5							
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

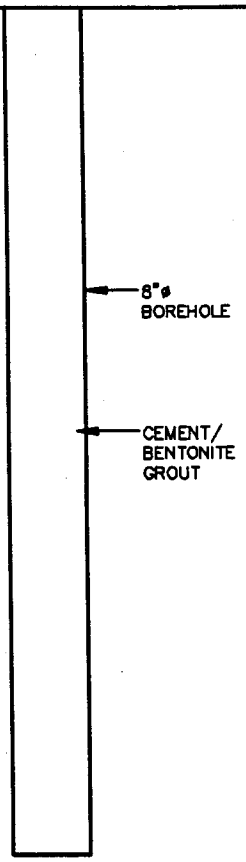
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-88)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-12/MW-J-1
DATE COMPLETED: NOVEMBER 3, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	927.30				
	TOPSOIL	927.0				
	CL/ML-CLAY and SILT, little sand and gravel, brown, moist		1SS		9	0
2.5			2SS		14	2.1
5.0			(3SS)		9	9.4
		921.6				
	SC/CL-SAND and CLAY, trace gravel, brown fragments, gray and brown mottled	921.1	4SS		11	3.7
7.5	CL/ML-CLAY and SILT, little sand and gravel, brown, moist					
			5SS		4	0
10.0			6SS		17	5.4
		915.3				
12.5	CL/ML-CLAY and SILT(TILL), trace gravel, hard, gray		(7SS)		31	0.5
		912.5				
15.0	SW-SAND, trace gravel, well graded, moist		8SS		15	1.2
		910.1	9SS		12	0
17.5	CL-CLAY, some silt, wet	909.9	10SS		12	0
	SW-SAND, some gravel, well graded, saturated					
20.0			(11SS)		10	0
		905.3				
22.5	END OF HOLE @ 22.0 FT. BGS					
25.0						
27.5						
30.0						
32.5						



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-89)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-13/MW-J-2 (Page 1 of 2)
DATE COMPLETED: NOVEMBER 16, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	916.00					
	TOPSOIL	915.5					
	SC/CL-SAND and CLAY, little gravel, black						
2.5							
5.0							
7.5		908.0					
	CL/ML-CLAY and SILT(TILL), little gravel and sand, gray			1SS		9	1.9
10.0				2SS		8	5.2
		904.0	8"ø BOREHOLE				
12.5	SC/CL-SAND and CLAY, some gravel, saturated			3SS		6	4.3
15.0		901.0		4SS		11	1.7
	CL-CLAY(TILL), some silt, trace gravel, gray, dry			5SS		15	1.1
17.5			CEMENT/ BENTONITE GROUT	6ST			
20.0				7SS		16	2.2
22.5	- moist			8SS		13	2.7
25.0				9SS		16	3.1
		889.2		10SS		12	4
27.5	SW-SAND, some gravel, little silt, gray	888.9					
	CL/ML-CLAY and SILT(TILL), little sand, trace gravel, gray	887.5		11SS		23	1.1
	SC/CL-SAND and CLAY, some gravel, wet						
30.0	CL/ML-CLAY and SILT(TILL), some sand, gray, moist	886.0		12SS		22	1.9
32.5				13SS		14	0.5

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-89)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-13/MW-J-2 (Page 2 of 2)
DATE COMPLETED: NOVEMBER 16, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0	– moist		8"ø BOREHOLE; CEMENT/ BENTONITE GROUT	14SS		18	0.5
37.5				15SS		19	0.5
	END OF HOLE @ 38.0 FT. BGS	878.0					
	NOTES: 1. Hand augered to 8.0 ft BGS.						
40.0							
42.5							
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-90)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-14
DATE COMPLETED: NOVEMBER 18, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	928.75					
2.5	CL/ML-CLAY and SILT(FILL), some sand and gravel, concrete fragments, black and brown, dry			1SS		7	3.2
				2SS		10	3.4
5.0				3SS		17	3.9
7.5	SP-SAND(FILL), little clay, glass fragments, black	921.8	8" ø BOREHOLE	4SS		2	5.2
				5SS		6	4.1
10.0	CL-CLAY, little silt, soft, black and brown streaks	918.3	CEMENT/ BENTONITE GROUT	6SS		4	3.5
12.5	CL/ML-CLAY and SILT, little sand and gravel, brown and gray mottled	916.3		7SS		22	5.2
15.0				8SS		22	5
17.5	CL/ML-CLAY and SILT(TILL), trace gravel, stiff, gray	912.8		9SS		20	0
				10SS		19	1
20.0				11SS		18	1.1
22.5	END OF HOLE @ 22.0 FT. BGS	906.8					
25.0							
27.5							
30.0							
32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (oval) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-91)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-15/MW-J-4 (Page 1 of 2)
DATE COMPLETED: NOVEMBER 7, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	922.80					
	ML/CL-SILT and CLAY(FILL), some sand, little gravel, black and brown			1SS		13	0
2.5				2SS		6	0
		918.8					
	SC/CL-SAND and CLAY, little gravel, moist			3SS		11	11.5
5.0		917.3					
	CL/ML-CLAY and SILT, little sand and gravel, brown			4SS		14	12.2
7.5				5SS		16	0
10.0		912.3					
	CL/ML-CLAY and SILT(TILL), little gravel, gray		8"ø BOREHOLE	6SS		20	0
12.5				7ST			
15.0				8SS		10	0
				9SS		9	0
17.5			CEMENT/ BENTONITE GROUT				
				10SS		14	0
20.0				11SS		15	0
22.5				12SS		28	0
25.0		897.6		13SS		28	0
	SP/GP-SAND and GRAVEL, gray, wet	897.3					
	stiff, gray			14SS		22	0
	CL/ML-CLAY and SILT(TILL), trace gravel, dry						
27.5				15SS		20	0
30.0				16SS		10	0
32.5				17SS		20	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (○) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-91)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-15/MW-J-4 (Page 2 of 2)
DATE COMPLETED: NOVEMBER 7, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0			CEMENT/ BENTONITE GROUT	18SS		13	0
37.5				19SS		13	0
40.0	END OF HOLE @ 40.0 FT. BGS	882.8	8"ø BOREHOLE	(20SS)		16	0
42.5							
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (20SS) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-92)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-16/MW-J-5 (Page 1 of 2)
DATE COMPLETED: NOVEMBER 10, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	923.80					
2.5	CL-CLAY(FILL), some gravel, some sand, concrete fragments, brown No recovery			1SS		13	0
				2SS			
5.0	SP-SAND(FILL), some gravel, little clay, black No recovery	919.8		3SS		4	10.2
7.5				4SS		14	
10.0				5SS		11	35.8
				6SS		2	5.7
12.5	CL/ML-CLAY and SILT, little gravel, brown	911.8	8"ø BOREHOLE	7SS		11	4.2
15.0				8SS		11	2.1
17.5	CL/ML-CLAY and SILT(TILL), little gravel, gray	907.8	CEMENT/ BENTONITE GROUT	9SS		16	0.7
20.0				10SS		12	0
				11SS		17	3.8
22.5				12ST			
25.0				13SS		21	1.7
27.5	- wet			14SS		15	1.1
				15SS		10	0
30.0				16SS		13	0
32.5				17SS		9	3.7

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(L-92)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-16/MW-J-5
(Page 2 of 2)
DATE COMPLETED: NOVEMBER 10, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0	No recovery		CEMENT/ BENTONITE GROUT	18SS		12	4.1
37.5				19SS		31	
40.0			8" ø BOREHOLE	20SS		29	1.1
42.5				21SS		38	2.3
				22SS		71	4.5
	Auger refusal	879.8					
45.0	END OF HOLE @ 44.0 FT. BGS						
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-93)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-17/MW-J-6 (Page 1 of 2)
DATE COMPLETED: NOVEMBER 9, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	915.50					
	ML-SILT(FILL), some clay, some sand, little gravel, brick fragments, black and brown			1SS		20	3.7
2.5				2SS		15	12.2
		911.5					
5.0	CL/ML-CLAY and SILT, little gravel, brown and gray mottled, moist			3SS		6	3.7
				4SS		7	7.4
7.5	- wet						
				5SS		13	5.1
10.0				6SS		6	3.2
		904.5					
	CL/ML-CLAY and SILT(TILL), little gravel, gray		8"ø BOREHOLE				
12.5				7SS		8	4.7
				8ST			
15.0							
				9SS		14	10.1
17.5			CEMENT/ BENTONITE GROUT				
				10SS		10	4.9
20.0							
				11SS		10	3.3
22.5				12SS		25	2.1
25.0				13SS		60	2.2
				14SS		60	5.1
27.5							
				15SS		57	3.1
30.0				16SS		41	2.7
32.5				17SS		70	1.1

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS (◯) WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-93)

PROJECT NAME: GM PONTIAC CENTRAL MANUTACTURING
PROJECT NO.: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: BH-J-17/MW-J-6 (Page 2 of 2)
DATE COMPLETED: NOVEMBER 9, 1994
DRILLING METHOD: 4 1/4" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEVATION ft AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
35.0			CEMENT/ BENTONITE GROUT	18SS		26	0
37.5			8"ø BOREHOLE	19SS		68	0
				20SS		25	0
40.0	END OF HOLE @ 40.0 FT. BGS	875.5					
42.5							
45.0							
47.5							
50.0							
52.5							
55.0							
57.5							
60.0							
62.5							
65.0							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ⬭ WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

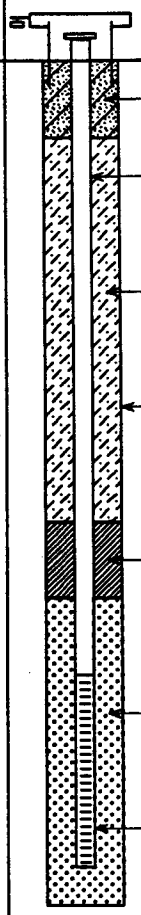
(L-71)
Page 1 of 1

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-1/BH-J-12
DATE COMPLETED: NOVEMBER 3, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	REFERENCE POINT (Top of Riser)	930.28
	GROUND SURFACE	927.30
0	Topsoil	927.00
	CL-CLAY, some silt, little sand and gravel, brown, moist	
2.5		
5.0		
		921.60
	SC-SAND, some clay, trace gravel, brown	921.10
	CL-CLAY, some silt, little gravel and sand, brown, moist	
7.5		
10.0		
		915.30
12.5	CL-CLAY (TILL), trace gravel, hard, gray	
		912.50
15.0	SW-SAND, trace gravel, well graded, moist	
		910.10
17.5	CL-CLAY, some silt, wet	909.90
	SW-SAND, some gravel, well graded, saturated	
20.0		
		905.30
22.5	END OF HOLE @ 22ft BGS	
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SCREEN DETAILS
Screened interval:
16 to 21ft BGS
Length: 5ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
14 to 22ft BGS
Material: No.5 Sand

SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		9	0
2SS		14	2.1
(3SS)		9	9.4
4SS		1	3.7
5SS		4	0
6SS		17	5.4
(7SS)		31	0.5
8SS		15	1.2
9SS		12	0
10SS		12	0
(11SS)		10	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-2/BH-J-13
DATE COMPLETED: NOVEMBER 16, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	919.89 916.00					
	Topsoil	915.50	CONCRETE SEAL				
	SC-SAND, some clay, little gravel, black						
2.5							
5.0			2" STAINLESS STEEL PIPE				
7.5		908.00					
	CL-CLAY (TILL), some silt, little gravel and sand, gray			1SS		9	1.9
10.0				2SS		8	5.2
		904.00	CEMENT/ BENTONITE GROUT				
12.5	SC-SAND, some clay and gravel, saturated			3SS		6	4.3
15.0		901.00		4SS		11	1..
	CL-CLAY (TILL), some silt, trace gravel, gray, dry			5SS		15	1.1
17.5				6ST			
20.0				7SS		16	2.2
22.5	- moist		8" Ø BOREHOLE	8SS		13	2.7
25.0				9SS		16	3.1
		889.20		10SS		12	4
27.5	SW-SAND, some gravel, little silt, gray	888.90					
	CL-CLAY (TILL), some silt, little sand, trace gravel, gray	887.50	BENTONITE SEAL	11SS		21	1.1
	SC-SAND, some clay and gravel, wet						
30.0		886.00					
	CL-CLAY (TILL), some silt and sand, gray, moist		SAND PACK	12SS		22	1.9
32.5				13SS		14	0.5
	- moist		WELL SCREEN	14SS		18	

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-2/BH-J-13
DATE COMPLETED: NOVEMBER 16, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
38.5	END OF HOLE @ 38ft BGS	878.00	SAND PACK SCREEN DETAILS Screened interval: 32 to 37ft BGS Length: 5ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 30 to 38ft BGS Material: No.5 Sand	15SS		19	0.5
41.0							
43.5							
46.0							
48.5							
51.0							
53.5							
56.0							
58.5							
61.0							
63.5							
66.0							
68.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-3/BH-J-1
DATE COMPLETED: NOVEMBER 15, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	922.77					
	GROUND SURFACE	919.90					
	SC-SAND, some clay, little gravel, brown	919.40					
	CL-CLAY, some silt, little gravel, brown and black mottled		CONCRETE SEAL	1SS		14	0
2.5				2SS		14	0
5.0		914.60		3SS		16	6.3
	SW-SAND, some clay, little gravel, brown	913.90					
	GW-GRAVEL, some sand, moist	913.40		4SS		9	5.1
7.5	CL-CLAY, some silt, little gravel, brown, moist		2" STAINLESS STEEL PIPE	5SS		13	3.3
	- some sand and gravel, saturated						
10.0				6SS		4	1.9
		907.90					
12.5	CL-CLAY (TILL), some silt, little gravel and sand, gray, moist			7SS		9	1.2
15.0	- dry		CEMENT/ BENTONITE GROUT	8SS		8	[illegible]
				9SS		13	4.2
17.5				10SS		16	3.1
20.0				11ST			
22.5			8" Ø BOREHOLE	12SS		16	4.9
25.0				13SS		22	5.2
27.5				14SS		18	4.6
				15SS		9	5.3
30.0				16SS		15	2.5
32.5			BENTONITE SEAL	17SS		14	2.7
	- moist			18SS		7	[illegible]

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ⊻
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-3/BH-J-1
DATE COMPLETED: NOVEMBER 15, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-38.5	SW-SAND, some gravel, little clay, gray, saturated	881.90	SAND PACK	19SS		16	5.2
				20SS		16	7.1
-41.0			WELL SCREEN	21SS		14	4.2
	END OF HOLE @ 42ft BGS	877.90					
-43.5			SCREEN DETAILS Screened interval: 36.5 to 41.5ft BGS Length: 5ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 34.5 to 42ft BGS Material: No.5 Sand				
-46.0							
-48.5							
-51.0							
-53.5							
-56.0							
-58.5							
-61.0							
-63.5							
-66.0							
-68.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE: REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-74)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-4/BH-J-15
DATE COMPLETED: NOVEMBER 7, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	925.29					
	GROUND SURFACE	922.80					
	ML-SILT (FILL), some clay and sand, little gravel, black and brown		CONCRETE SEAL	1SS		13	0
2.5				2SS		6	0
		918.80					
	SC-SAND, some clay, little gravel, moist		2" STAINLESS STEEL PIPE	3SS		11	11.5
5.0		917.30					
	CL-CLAY, some silt, little sand and gravel, brown			4SS		14	12.2
7.5				5SS		16	0
10.0		912.30					
	CL-CLAY (TILL), some silt, little gravel, gray			6SS		20	0
12.5				7ST			
15.0			CEMENT/ BENTONITE GROUT	8SS		10	0
17.5				9SS		9	0
20.0				10SS		14	0
				11SS		15	0
22.5			8" Ø BOREHOLE	12SS		28	0
25.0		897.60		13SS		28	0
	SP-SAND, some gravel, gray, wet	897.30					
	CL-CLAY (TILL), some silt, trace gravel, dry			14SS		22	0
27.5				15SS		20	0
30.0			BENTONITE SEAL	16SS		10	0
			SAND PACK	17SS		20	0
32.5			WELL SCREEN	18SS		13	0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-4/BH-J-15
DATE COMPLETED: NOVEMBER 7, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-38.5			WELL SCREEN; SAND PACK	19SS		13	0
				20SS		16	0
	END OF HOLE @ 40ft BGS	*882.80*					
-41.0			SCREEN DETAILS Screened interval: 33 to 38ft BGS Length: 5ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 31 to 40ft BGS Material: No.5 Sand				
-43.5							
-46.0							
-48.5							
-51.0							
-53.5							
-56.0							
-58.5							
-61.0							
-63.5							
-66.0							
-68.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(L-75)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-5/BH-J-16
DATE COMPLETED: NOVEMBER 10, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser)	*927.44*					
	GROUND SURFACE	*923.80*					
	CL-CLAY (FILL), some gravel and sand, brown, concrete fragments		CONCRETE SEAL	1SS		13	0
-2.5				2SS			
	SP-SAND (FILL), some gravel, little clay, black	*919.80*	2" STAINLESS STEEL PIPE	3SS		4	10.2
-5.0				4SS		14	
-7.5				5SS		11	35.8
-10.0				6SS		2	5.7
	CL-CLAY, some silt, little gravel, brown	*911.80*		7SS		11	4.2
-12.5				8SS		11	2..
-15.0			CEMENT/ BENTONITE GROUT				
	CL-CLAY (TILL), some silt, little gravel, gray	*907.80*		9SS		16	0.7
-17.5				10SS		12	0
-20.0				11SS		17	3.8
-22.5				12ST			
-25.0				13SS		21	1.7
	- wet		8" Ø BOREHOLE	14SS		15	1.1
-27.5				15SS		10	0
-30.0				16SS		13	0
-32.5				17SS		9	3.7
			BENTONITE SEAL	18SS		13	4

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-5/BH-J-16
DATE COMPLETED: NOVEMBER 10, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-38.5			SAND PACK	19SS		31	
-41.0			WELL SCREEN	20SS		29	1.1
-43.5				21SS		38	2.3
	END OF HOLE @ 44ft BGS	*879.80*		22SS		71	4.5
-46.0							
-48.5							
-51.0							
-53.5							
-56.0							
-58.5							
-61.0							
-63.5							
-66.0							
-68.5							

SCREEN DETAILS
Screened interval:
38 to 43ft BGS
Length: 5ft
Diameter: 2"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
36 to 44ft BGS
Material: No.5 Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▼ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

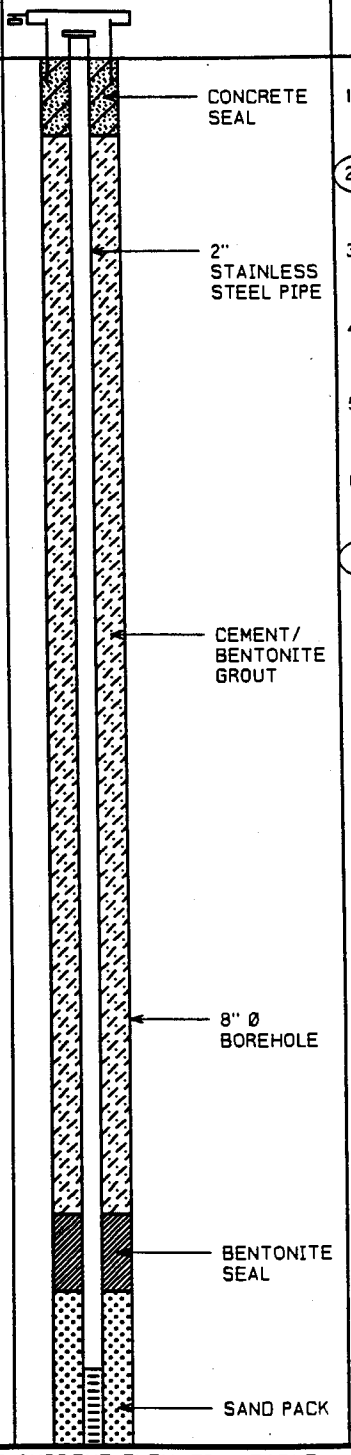
(L-76)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-6/BH-J-17
DATE COMPLETED: NOVEMBER 9, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	REFERENCE POINT (Top of Riser)	918.35
	GROUND SURFACE	915.50
0	ML-SILT (FILL), some clay and sand, little gravel, black and brown, brick fragments	
2.5		
		911.50
5.0	CL-CLAY, some silt, little gravel, brown and gray mottled, moist	
7.5	- wet	
10.0		
		904.50
12.5	CL-CLAY (TILL), some silt, little gravel, gray	
15.0		
17.5		
20.0		
22.5		
25.0		
27.5		
30.0		
32.5		

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS		20	3.7
2SS		15	12.2
3SS		6	3.7
4SS		7	7.4
5SS		13	5.4
6SS		6	3.2
7SS		8	4.7
8ST			5..
9SS		14	11.2
10SS		10	10.1
11SS		10	4.8
12SS		25	3.3
13SS		60	2.1
14SS		60	2.2
15SS		57	5.1
16SS		41	3.1
17SS		70	2.7
18SS		26	-

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: GM PONTIAC CENTRAL MANUFACTURING
PROJECT NUMBER: 5770
CLIENT: GENERAL MOTORS
LOCATION: J-LOT

HOLE DESIGNATION: MW-J-6/BH-J-17
DATE COMPLETED: NOVEMBER 9, 1994
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: B. HOLBROOK

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
-38.5			SAND PACK WELL SCREEN	19SS		68	0
				20SS		25	0
	END OF HOLE @ 40ft BGS	875.50					
-41.0			SCREEN DETAILS Screened interval: 34 to 39ft BGS Length: 5ft Diameter: 2" Slot Size: #10 Material: Stainless Steel Sand Pack: 32 to 40ft BGS Material: No.5 Sand				
-43.5							
-46.0							
-48.5							
-51.0							
-53.5							
-56.0							
-58.5							
-61.0							
-63.5							
-66.0							
-68.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
CHEMICAL ANALYSIS ⬭

APPENDIX C

GEOTECHNICAL TESTING REPORT

Materials Testing Consultants, Inc.
693 PLYMOUTH N.E. GRAND RAPIDS, MI 49505
PHONE (616) 456-5469 • FAX (616) 456-5784

REC'D GRA JUN 3 1995

LETTER OF TRANSMITTAL

DATE	12/28/94
JOB NO.	V0640
ATTENTION	Mr. Brian Holbrook
RE:	Grain Size Distribution Tests
	G.M. J Lot

TO Conestoga-Rovers Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

WE ARE SENDING YOU [X] Attached [ ] Under separate over via _____ the following items:

[ ] Test Boring Logs [ ] Prints [ ] Plans [ ] Samples [ ] Specifications

[ ] Copy of letter [ ] Data Sheets [ ] _____

COPIES	DATE	NO.	DESCRIPTION
	12-21-94	5	Grain Size Distribution Test Reports

THESE ARE TRANSMITTED as checked below:

[ ] For approval
[X] For your use
[ ] As requested
[ ] For review and comment
[ ] Return _____ corrected prints
[ ] _____

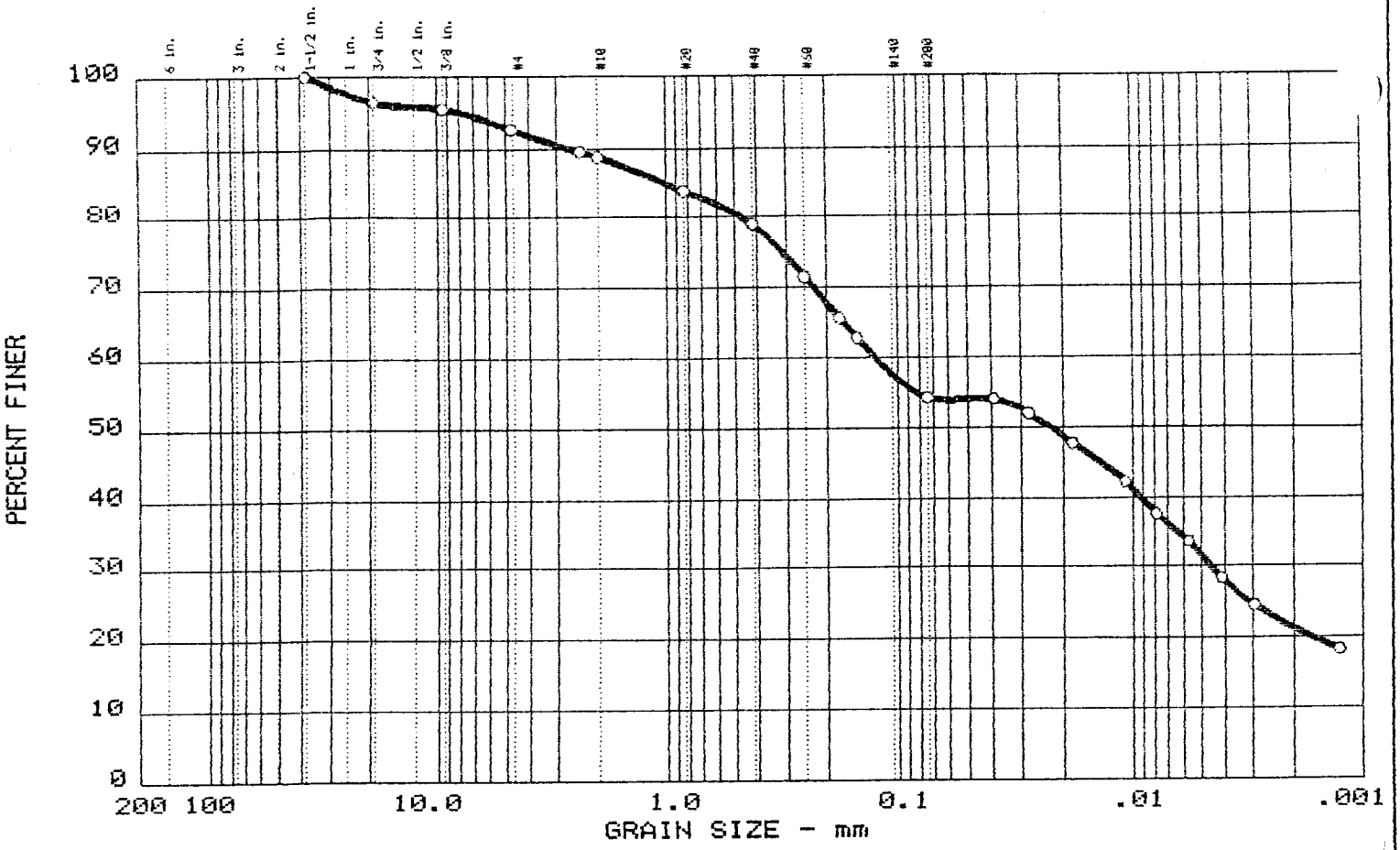
REMARKS Permeability test results to follow. Please call if you have any questions or if we can be of further service.

COPY TO File

SIGNED: Peter T. Johnson
Peter T. Johnson

If enclosures are not as noted, kindly notify us at once.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	38.2	22.8	31.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.00	0.12	0.02	0.005				

	MATERIAL DESCRIPTION	USCS	AASHTO
○			

Project No.: V0640
Project: G.M. J Lot
○ Location: BH 17J, 15.7'-16.0'

Date: 12-21-94

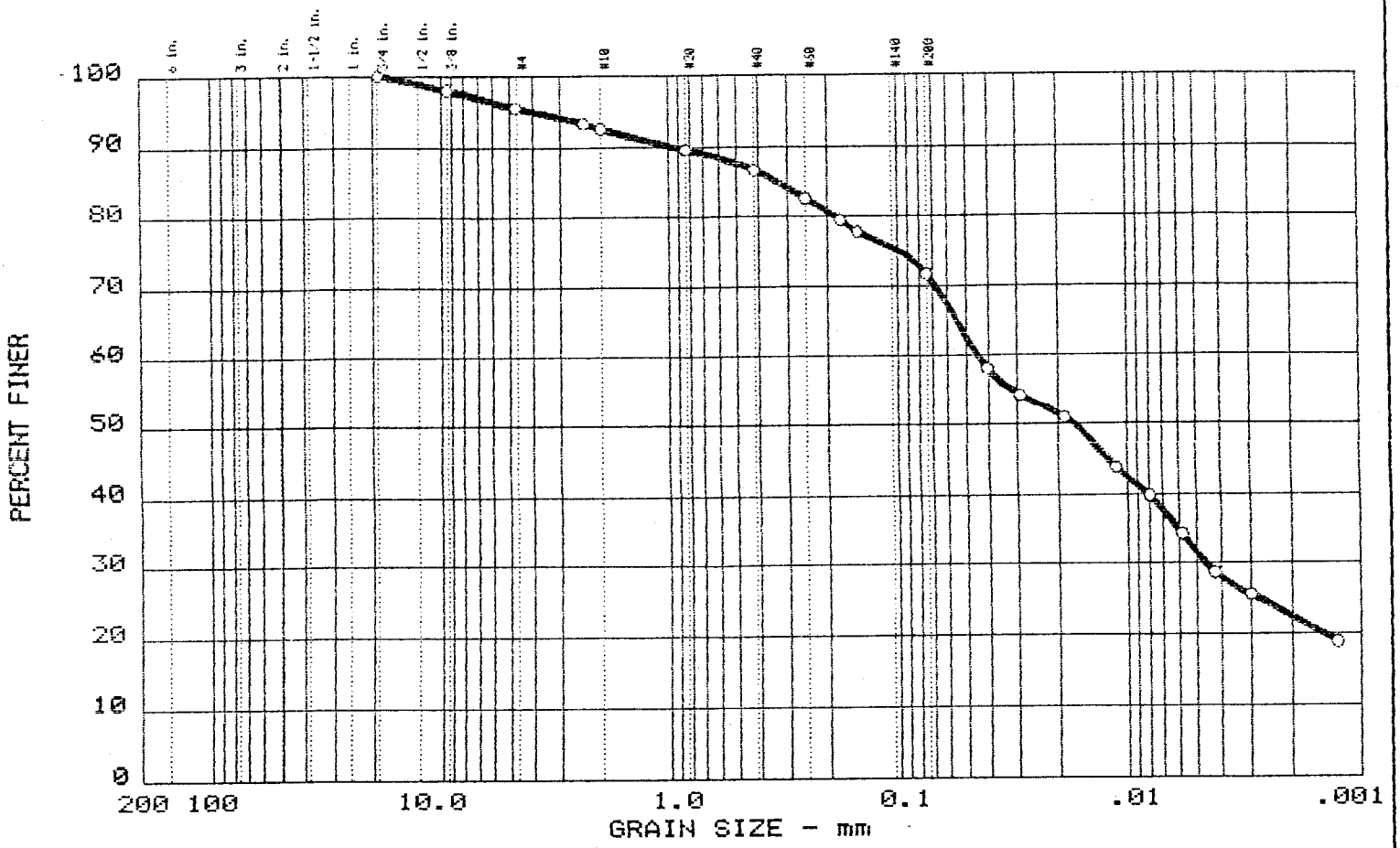
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	4.5	23.8	40.4	31.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.33		0.02	0.005				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J16, 21.0'-21.2'

Date: 12-21-94

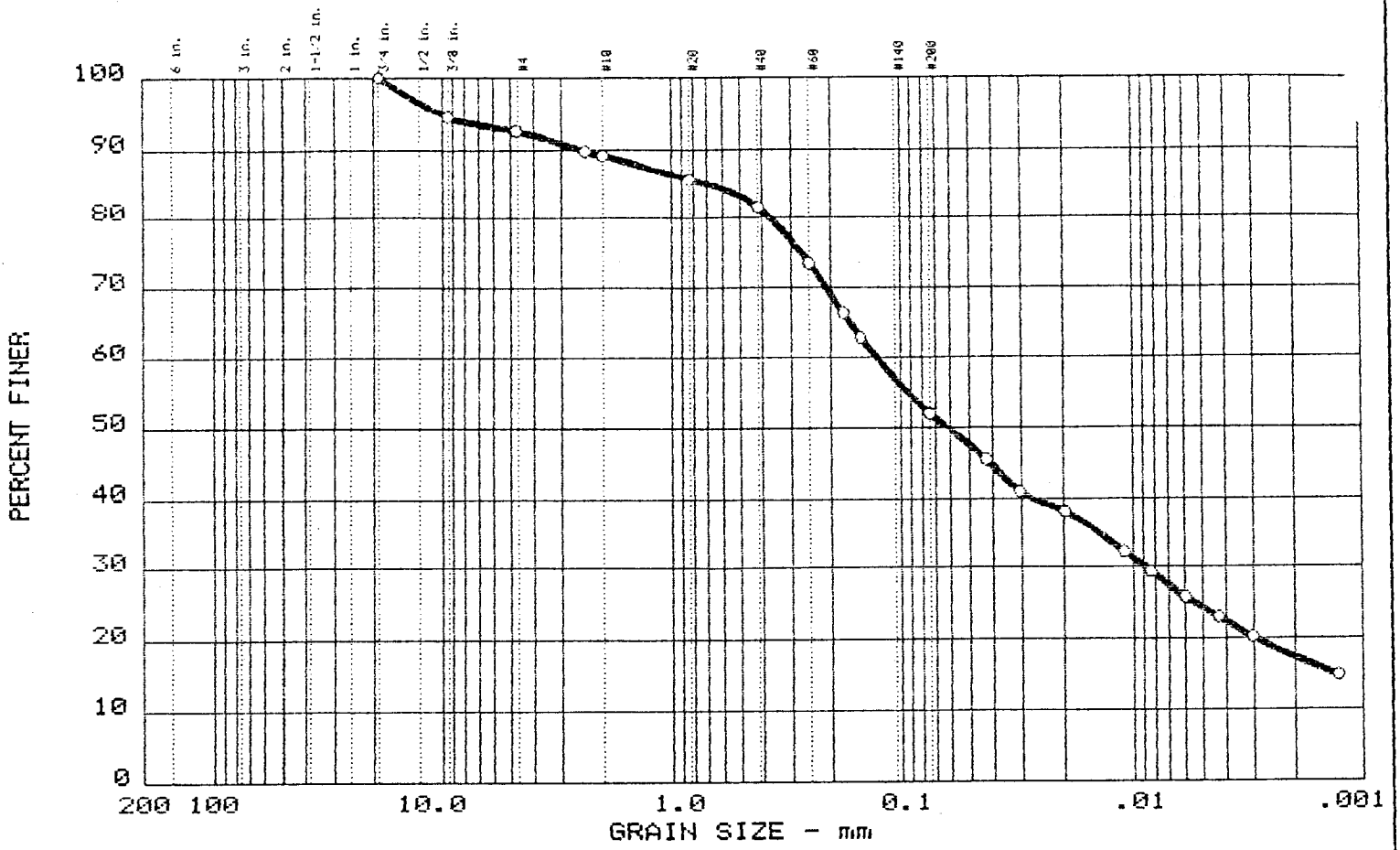
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	40.6	27.8	24.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.71	0.13	0.06	0.009	0.0013			

	MATERIAL DESCRIPTION	USCS	AASHTO
○			

Project No.: V0640
Project: G.M. J Lot
○ Location: BH 15J, 13.0'-13.2'

Date: 12-21-94

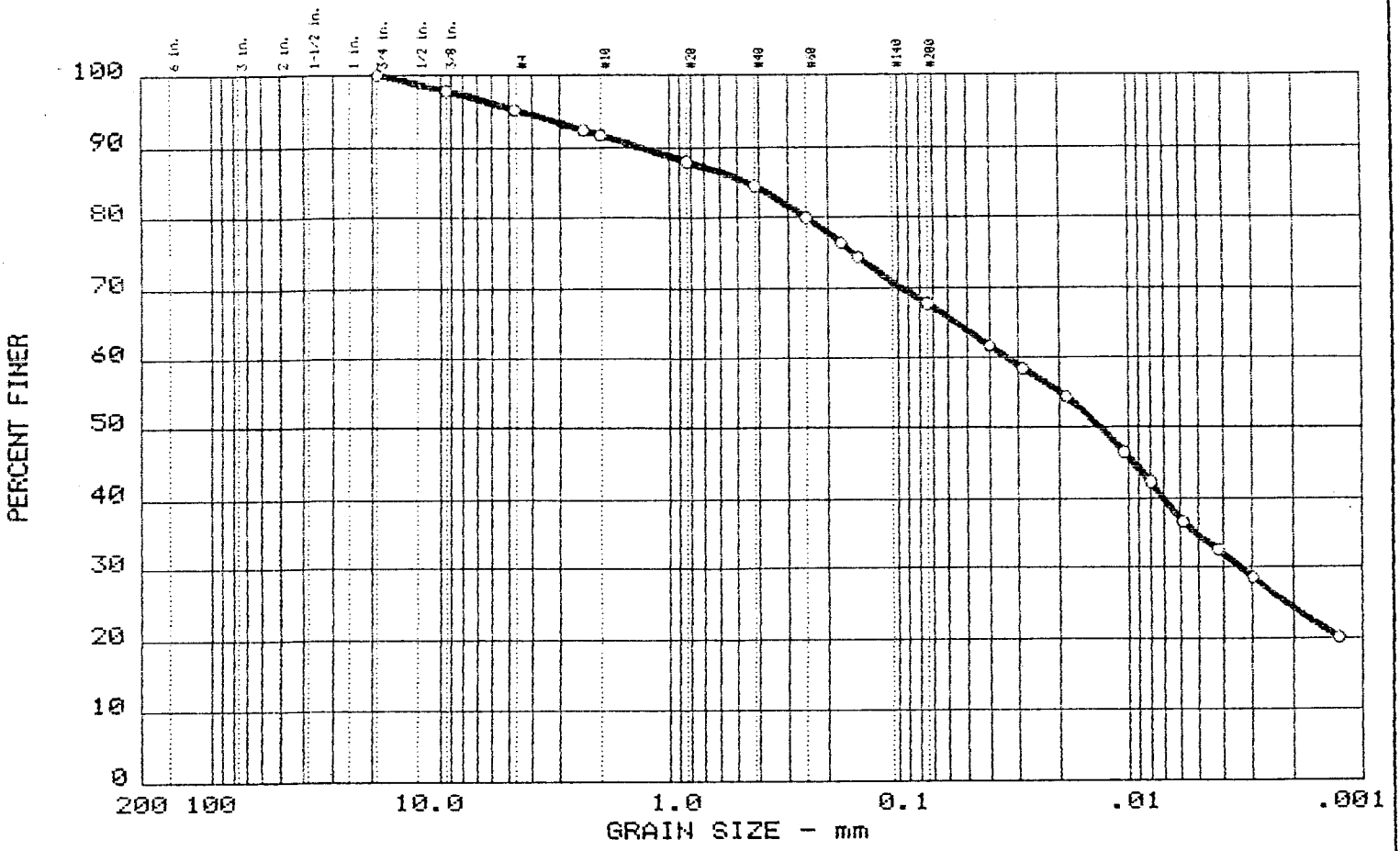
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	4.8	27.3	33.3	34.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.46		0.01	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J13, 19.0'-19.2'

Date: 12-21-94

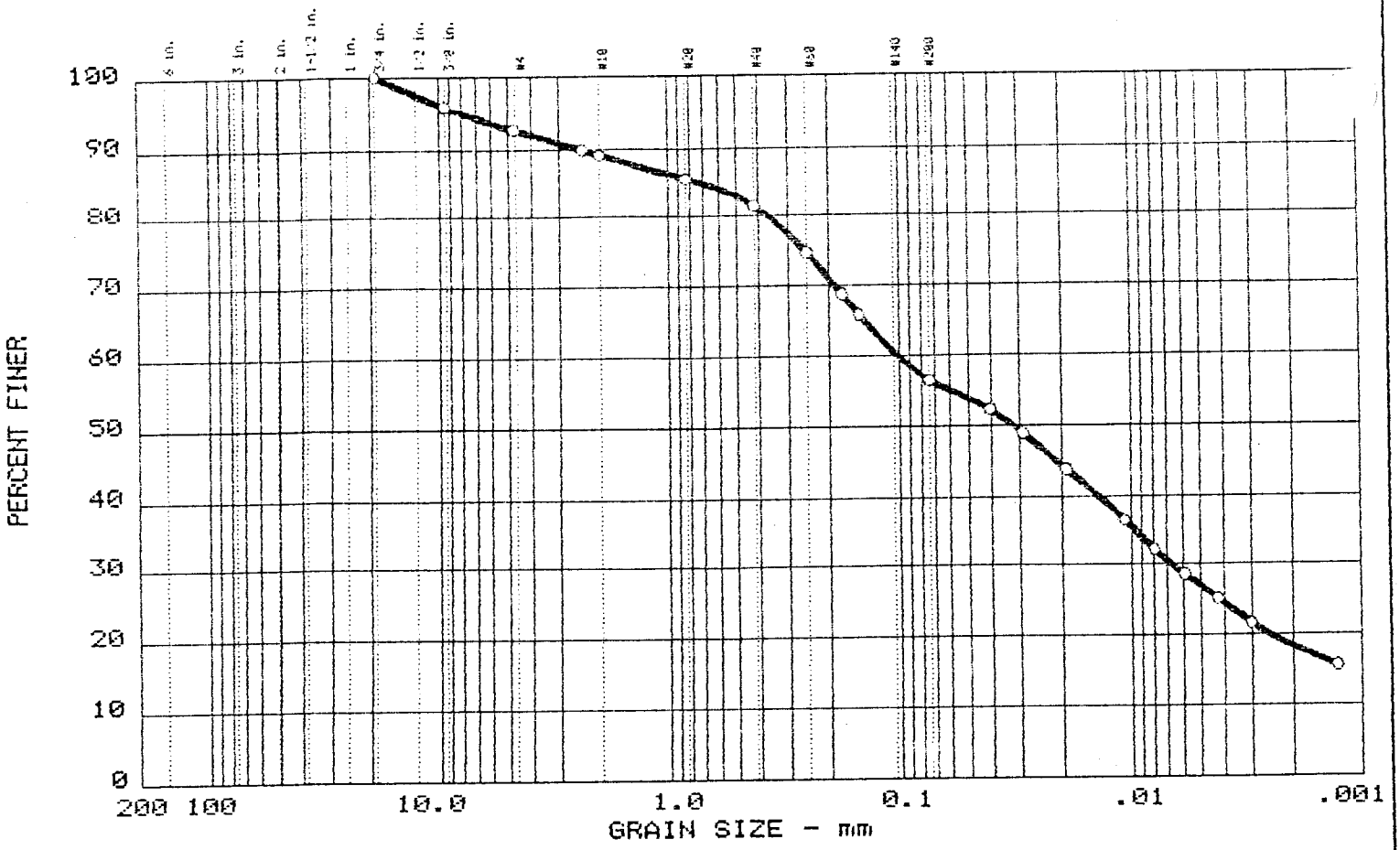
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	36.1	29.7	26.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.74	0.10	0.03	0.007				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J1, 21.0'-21.2'

Date: 12-21-94

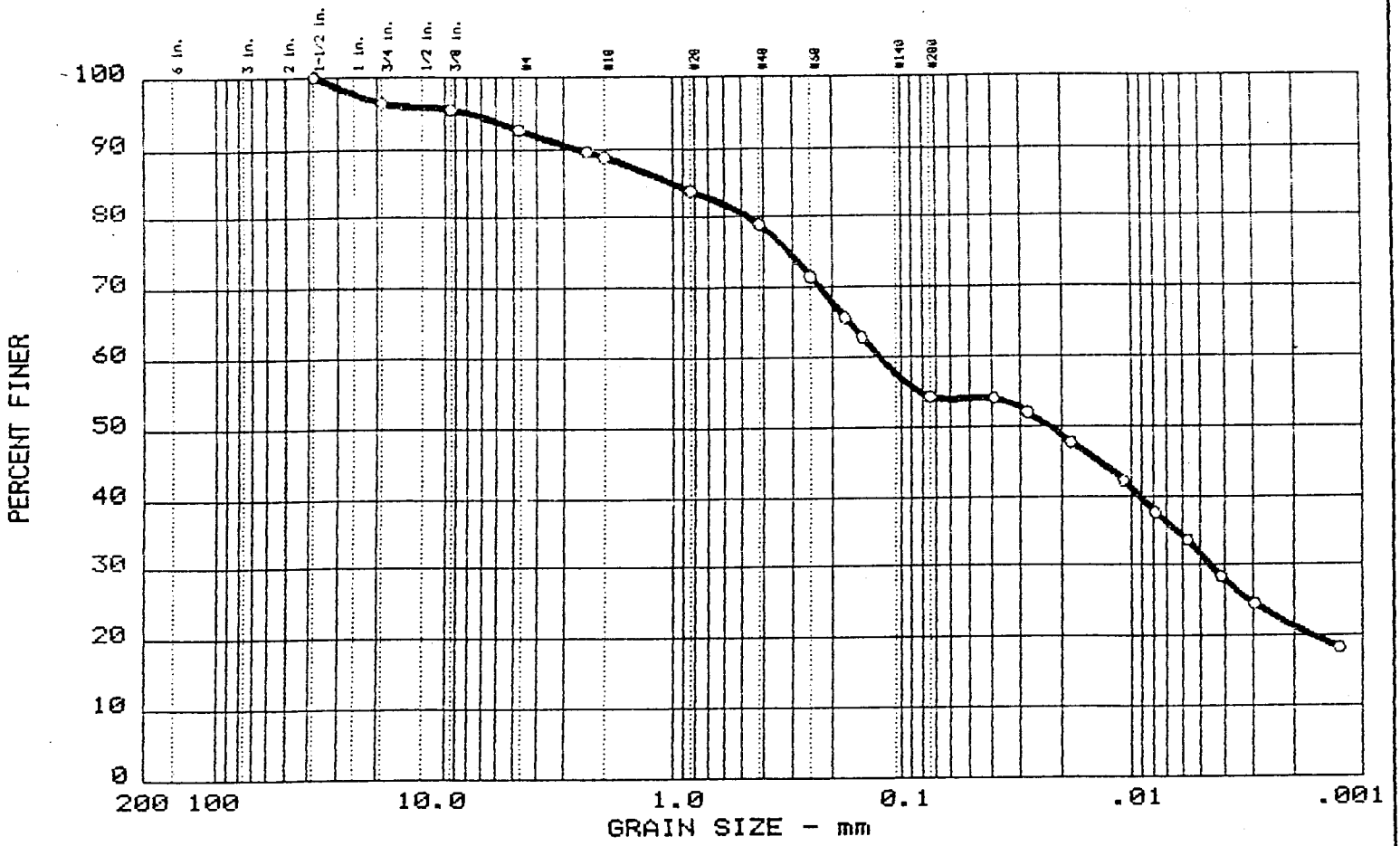
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	38.2	22.8	31.5

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			1.00	0.12	0.02	0.005				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH 17J, 15.7'-16.0'

Date: 12-21-94

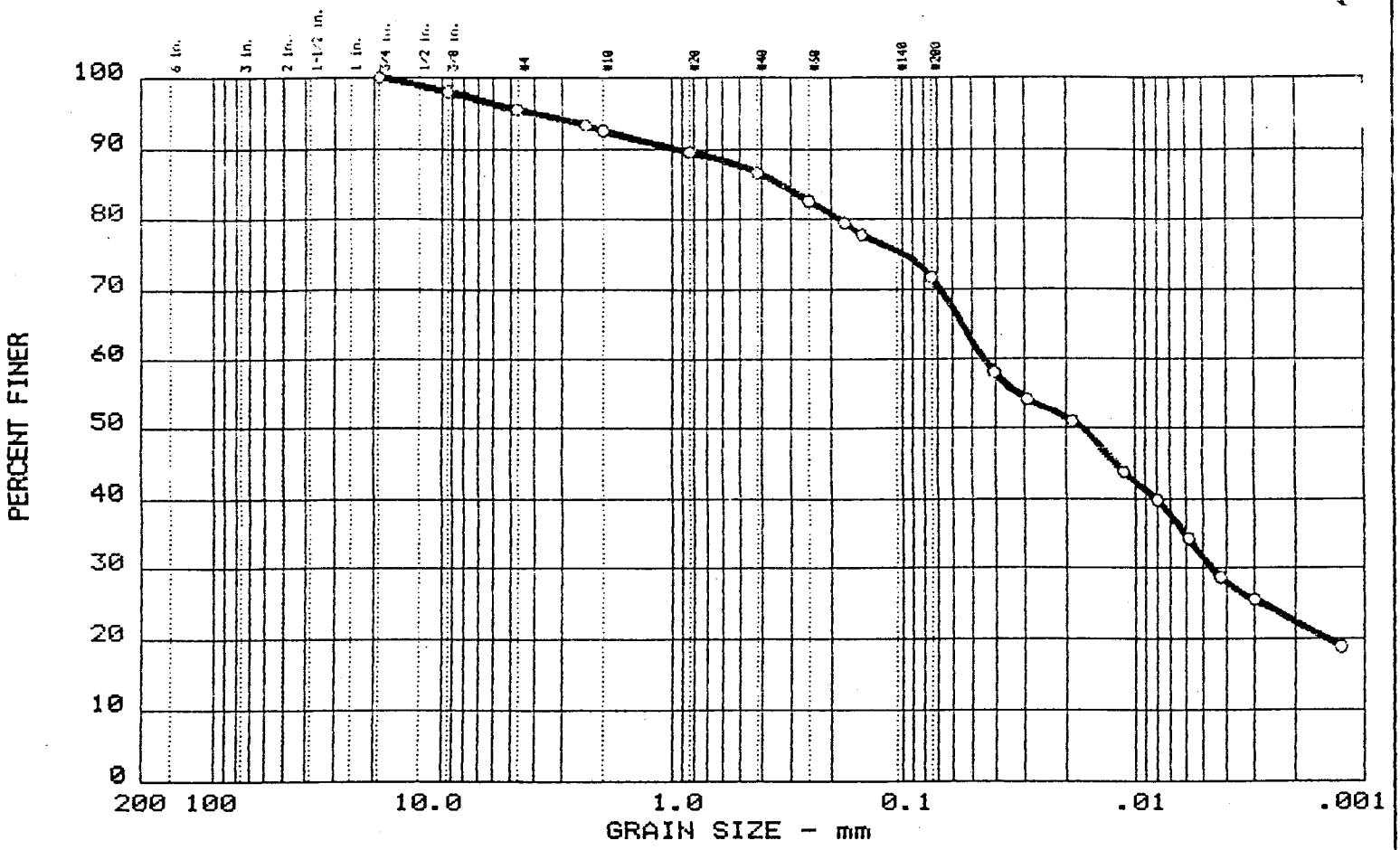
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	4.5	23.8	40.4	31.4

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.33		0.02	0.005				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J16, 21.0'-21.2'

Date: 12-21-94

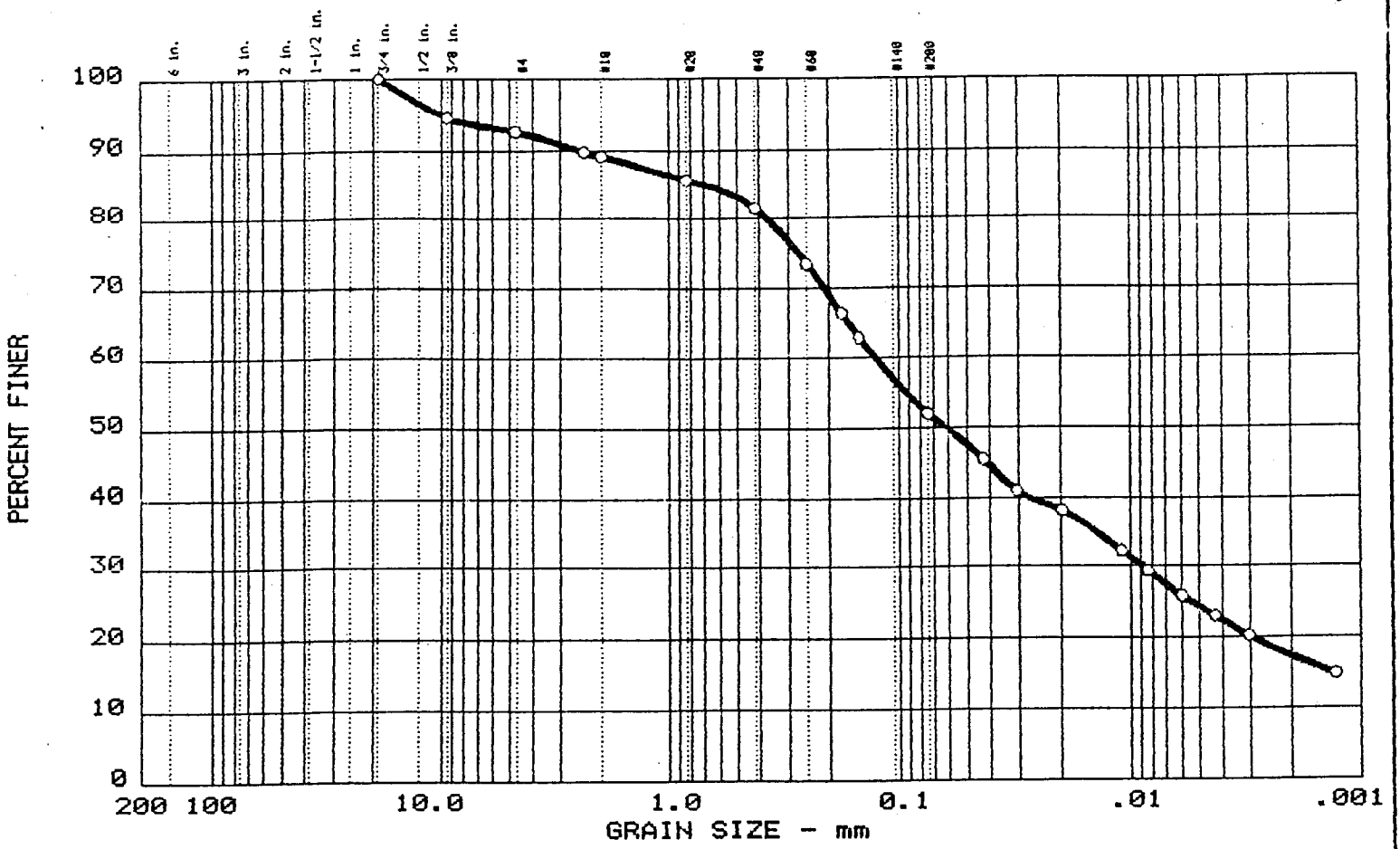
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	40.6	27.8	24.2

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.71	0.13	0.06	0.009	0.0013			

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH 15J, 13.0'-13.2'

Date: 12-21-94

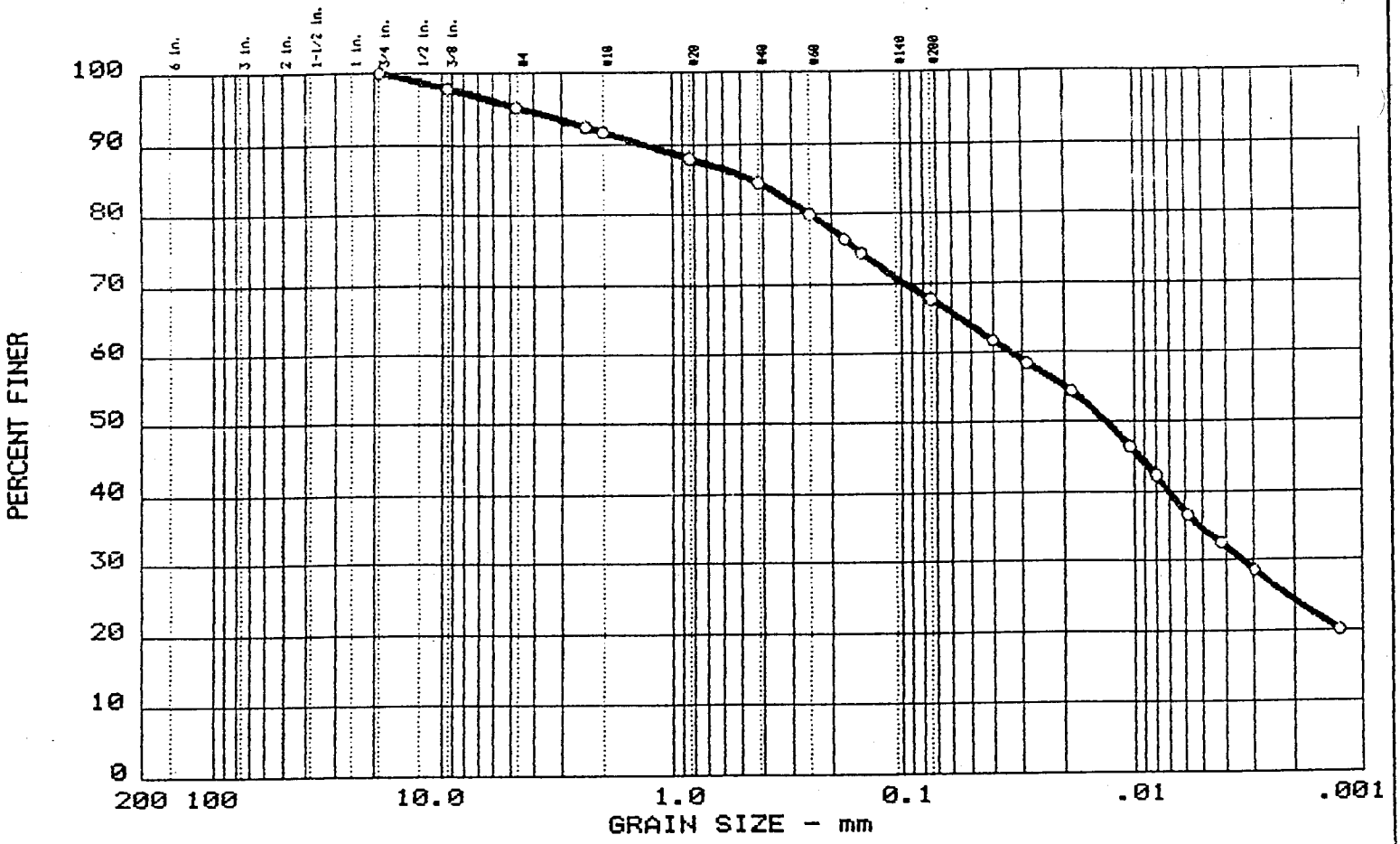
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	4.8	27.3	33.3	34.5

LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
		0.46		0.01	0.003				

MATERIAL DESCRIPTION	USCS	AASHTO
○		

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J13, 19.0'-19.2'

Date: 12-21-94

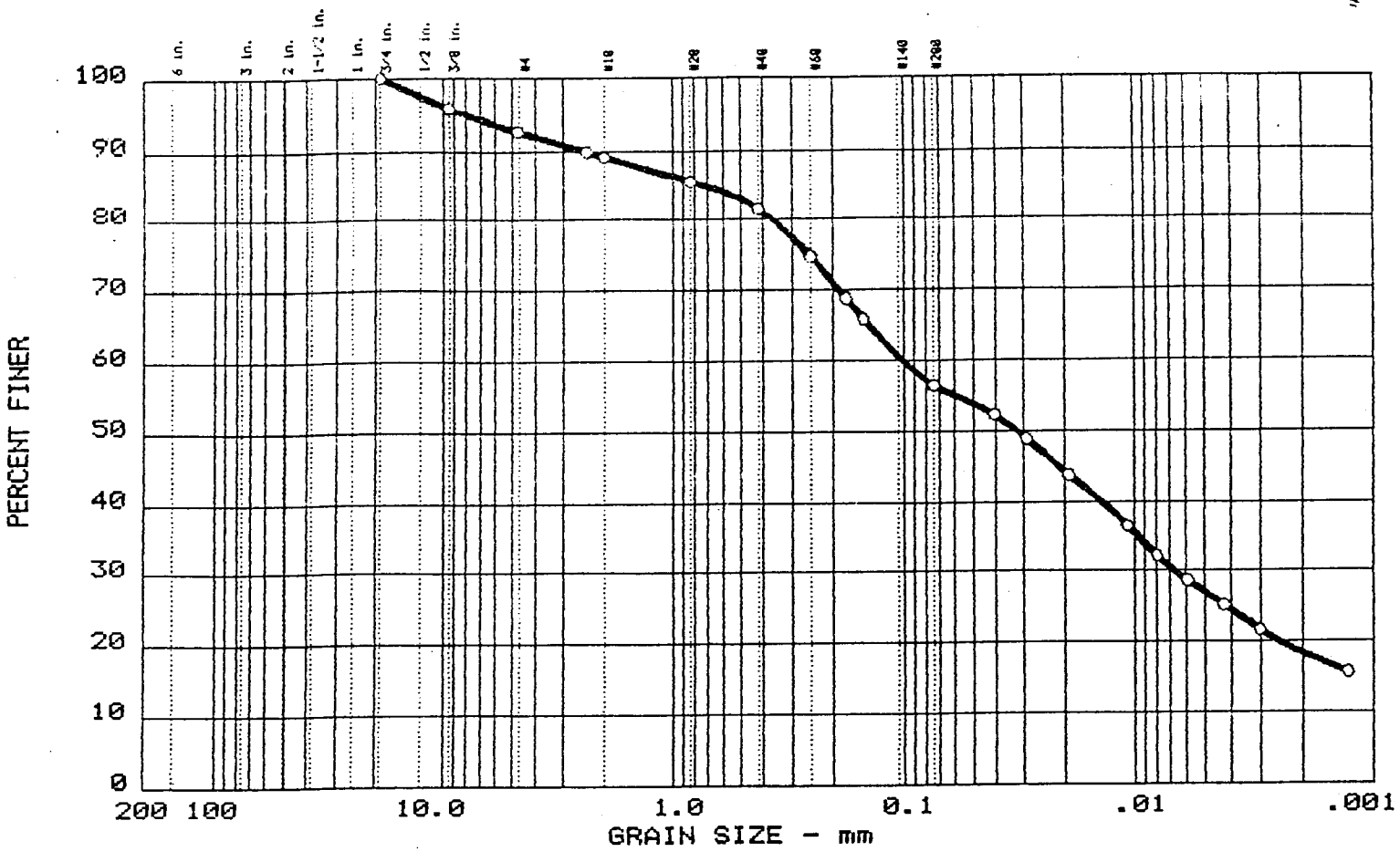
Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

GRAIN SIZE DISTRIBUTION TEST REPORT



	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
○	0.0	7.4	36.1	29.7	26.8

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
○			0.74	0.10	0.03	0.007				

	MATERIAL DESCRIPTION	USCS	AASHTO
○			

Project No.: V0640
Project: G.M. J Lot
○ Location: BH J1, 21.0'-21.2'

Date: 12-21-94

Remarks:

GRAIN SIZE DISTRIBUTION TEST REPORT

MATERIALS TESTING CONSULTANTS

Fig. No.

Materials Testing Consultants, INC.
693 PLYMOUTH N.E. GRAND RAPIDS, MI 49505
PHONE (616) 456-5469 • FAX (616) 456-5784

REC'D CRA
JAN 4 1995

LETTER OF TRANSMITTAL

DATE	01/03/95	JOB NO.	V0640
ATTENTION	Mr. Brian Holbrook		
RE:	G.M. J. Lot		
	Permeability Test Results		

TO Conestoga-Rovers Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

WE ARE SENDING YOU ☐ Attached ☐ Under separate over via _____ the following items:

☐ Test Boring Logs ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Data Sheets ☒ Reports

COPIES	DATE	NO.	DESCRIPTION
	12/27/94	1	Permeability Test Project Summary Sheet
	12/27/94	5	Permeability Test Reports

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Return _____ corrected prints

☒ For your use ☐ _____

☒ As requested

☐ For review and comment

REMARKS All tests were conducted according to ASTM D5084. The remaining samples will be held for a period of 30 days. If you have any questions or if we can be of further service please call.

COPY TO File

SIGNED: Peter T. Johnson

Peter T. Johnson

If enclosures are not as noted, kindly notify us at once.

MATERIALS TESTING CONSULTANTS
MTC Job No. VO640

Table I
Summary of Results

Sample ID	Sample Depth, ft.	Specimen Depth, ft.	Moisture Content, %	Wet Unit Weight, pcf	Dry Unit Weight, pcf	Hydraulic Conductivity, cm/sec.
BHJ1	21.2-22.2	21.7-21.9	12.1	142.9	127.5	2.4×10^{-8}
BHJ13	19.2-20.0	19.4-19.7	13.2	141.0	124.5	2.6×10^{-8}
BH15J	13.2-14.0	13.2-13.4	10.1	142.7	129.6	2.6×10^{-8}
BHJ16	21.2-22.0	21.2-21.4	13.1	140.4	124.1	1.6×10^{-8}
BH17J	14.9-15.7	15.2-15.5	11.5	140.8	126.3	4.1×10^{-7}

ASTM D5084
FALLING HEAD
PERMEABILITY TEST
UNDISTURBED

Date:	December 23, 1994
Project No.:	104875
Client:	Materials Testing Consultants
Project:	MTC Project No. V0640
Location:	BHJ1,
Test Sample Depth:	21.2'-22.0'
Test Specimen Depth:	21.7'-21.9'
Material Description:	Gray Clay and Silt, Some Sand, Some Gravel (Visual)

SPECIMEN DATA:

Dimension, Inches:	
Height:	2.466
Diameter:	2.808
Weight, lbs.:	
Initial:	1.263
Moisture Content, %:	
Initial:	12.1
Final:	12.0
Wet Unit Weight, pcf:	
Initial:	142.9
Final:	142.8
Dry Unit Weight, pcf:	127.5
Permeability, cm/sec.:	
k:	2.4×10^{-8}

ASTM D5084
FALLING HEAD
PERMEABILITY TEST
UNDISTURBED

Date:	December 23, 1994
Project No.:	104875
Client:	Materials Testing Consultants
Project:	MTC Project No. V0640
Location:	BHJ13
Test Sample Depth:	19.2'-20.0'
Test Specimen Depth:	19.4'-19.7'
Material Description:	Gray Clay and Silt, Some Sand, Some Gravel (Visual)

SPECIMEN DATA:

Dimension, Inches:	
Height:	3.106
Diameter:	2.805
Weight, lbs.:	
Initial:	1.566
Moisture Content, %:	
Initial:	13.2
Final:	13.2
Wet Unit Weight, pcf:	
Initial:	141.0
Final:	141.0
Dry Unit Weight, pcf:	124.5
Permeability, cm/sec.:	
k:	2.6×10^{-8}

ASTM D5084
FALLING HEAD
PERMEABILITY TEST
UNDISTURBED

Date:	December 23, 1994
Project No.:	104875
Client:	Materials Testing Consultants
Project:	MTC Project No. V0640
Location:	BH15J
Test Sample Depth:	13.2'-14.0'
Test Specimen Depth:	13.2'-13.5'
Material Description:	Gray Clay and Silt, Some Sand, Some Gravel (Visual)

SPECIMEN DATA:

Dimension, Inches:	
Height:	3.207
Diameter:	2.799
Weight, lbs.:	
Initial:	1.629
Moisture Content, %:	
Initial:	10.1
Final:	10.7
Wet Unit Weight, pcf:	
Initial:	142.7
Final:	143.5
Dry Unit Weight, pcf:	129.6
Permeability, cm/sec.:	
k:	2.6×10^{-8}

ASTM D5084
FALLING HEAD
PERMEABILITY TEST
UNDISTURBED

Date:	December 23, 1994
Project No.:	104875
Client:	Materials Testing Consultants
Project:	MTC Project No. V0640
Location:	BHJ16
Test Sample Depth:	21.2'-22.0'
Test Specimen Depth:	21.2'-21.4'
Material Description:	Gray Clay and Silt, Some Sand, Some Gravel (Visual)

SPECIMEN DATA:

Dimension, Inches:	
Height:	2.742
Diameter:	2.825
Weight, lbs.:	
Initial:	1.397
Moisture Content, %:	
Initial:	13.1
Final:	12.9
Wet Unit Weight, pcf:	
Initial:	140.4
Final:	140.1
Dry Unit Weight, pcf:	124.1
Permeability, cm/sec.:	
k:	1.6×10^{-8}

ASTM D5084
FALLING HEAD
PERMEABILITY TEST
UNDISTURBED

Date:	December 23, 1994
Project No.:	104875
Client:	Materials Testing Consultants
Project:	MTC Project No. V0640
Location:	BH17J
Test Sample Depth:	14.9'-15.7'
Test Specimen Depth:	15.2'-15.5'
Material Description:	Gray Clay and Silt, Some Sand, Some Gravel (Visual)

Note: Specimen contained approximately 1/2" vertical sand and gravel lens.

SPECIMEN DATA:

Dimension, Inches:	
Height:	3.113
Diameter:	2.776
Weight, lbs.:	
Initial:	1.535
Moisture Content, %:	
Initial:	11.5
Final:	10.5
Wet Unit Weight, pcf:	
Initial:	140.8
Final:	139.6
Dry Unit Weight, pcf:	126.3
Permeability, cm/sec.:	
k:	4.1×10^{-7}

APPENDIX D

LABORATORY ANALYTICAL RESULTS - SOIL

WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 113945
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/06/94

Thomas J Geyer, CIH
Signature

12/6/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113945*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 - 9 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 2-4, 6, 8 Parameter: Bromofluorobenzene, 1,2-Dichloroethane-d4 Reason: 7
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	270	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	<10	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	108	0	%	74-121 %		
Bromofluorobenzene	110	0	%	70-121%		
1,2-Dichloethane-d4	100	0	%	81-117 %		
Toluene-d8	11/07/94	0	Month/Day/Year			
Date Analyzed:						
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
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LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	64	0	%	31-115 %		
2-Fluorophenol	55	0	%	25-131 %		
Nitrobenzene-d5	50	0	%	23-120 %		
Phenol-d6	37	0	%	24-113 %		
Terphenyl-d14	98	0	%	18-137 %		
2,4,6-Tribromophenol	40	0	%	19-122 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
		*1		USEPA 608/8080	11/08/94	SB
Pesticides & PCBs in Soil						
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfán II						

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.6	ug/kg			
PCB Aroclor 1221	ND	9.6	ug/kg			
PCB Aroclor 1232	ND	9.6	ug/kg			
PCB Aroclor 1242	ND	9.6	ug/kg			
PCB Aroclor 1248	ND	9.6	ug/kg			
PCB Aroclor 1254	ND	9.6	ug/kg			
PCB Aroclor 1260	ND	9.6	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	100	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWI
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWI
Aluminum (Total)	6070000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	11000	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	20000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	110	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	51700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9800	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8300	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	17200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	296000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	707000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	89000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	87	0.01	%		11/07/94	PWS

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-002
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0002
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	2200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	14	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate				Control Limits		
SURROGATES	Recovery	0	%	74-121 %		
Bromofluorobenzene	140	0	%	70-121%		
1,2-Dichloethane-d4	124	0	%	81-117 %		
Toluene-d8	108	0	%			
Date Analyzed:	11/07/94	0	Month/Day/Year			
Aluminum (Total)	5320000	4000	ug/kg	USEPA 6010	11/10/94	G

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-002
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0002
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3800	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	20000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ng/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	74600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8700	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	12300000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7800	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	21400000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	265000	200	ug/kg	USEPA 7470	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1070000	10000	ug/kg	USEPA 7740	11/11/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/10/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	72000	10000	ug/kg	USEPA 7841	11/08/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 6010	11/10/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg		11/10/94	PW
% Solids	93	0.01	%			

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-003
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0003
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	3200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	19	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	122	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Aluminum (Total)	4990000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-003
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0003
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	24000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	81500000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8100	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	22200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	287000	200	ug/kg	USEPA 7470	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1060000	10000	ug/kg	USEPA 7740	11/11/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/10/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 7841	11/08/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 6010	11/10/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	36000	1000	ug/kg		11/10/94	PWB
% Solids	93	0.01	%			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	410	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	56	0	%	70-121%		
Toluene-d8	114	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RD

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-STH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	1700	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	330	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	31-115 %		
2-Fluorophenol	54	0	%	25-131 %		
Nitrobenzene-d5	42	0	%	23-120 %		
Phenol-d6	50	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	31	0	%	19-122 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/08/94	SS
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS

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JOS NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.6	ug/kg			
PCB Aroclor 1221	ND	9.6	ug/kg			
PCB Aroclor 1232	ND	9.6	ug/kg			
PCB Aroclor 1242	ND	9.6	ug/kg			
PCB Aroclor 1248	ND	9.6	ug/kg			
PCB Aroclor 1254	ND	9.6	ug/kg			
PCB Aroclor 1260	ND	9.6	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	94	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWS
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWS
Aluminum (Total)	5840000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3400	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	23000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	380	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	67800000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8500	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Iron (Total)	11800000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7200	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	259000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	831000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/	GR
Sodium (Total)	36000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	87	0.01	%		11/07/94	PW

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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-005
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D....: 113945-0005
DATE RECEIVED.....: 11/03/94
TIME RECEIVED.....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	340	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	8730000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-005
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0005
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3700	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	26000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	550	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	300	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	75400000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	14000	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/10/9	GR
Iron (Total)	17000000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	9100	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19300000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	269000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	23000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1580000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	21000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	51000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	88	0.01	%		11/10/94	PL

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-006
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0006
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	790	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	18	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	21	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	<30	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES						
Bromofluorobenzene	128	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	4760000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-006
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0006
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	15000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	98	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	63700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	7800	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/9	GR
Iron (Total)	9580000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8700	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	12600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	263000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	12000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	595000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	37000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	81	0.01	%		11/10/94	PL

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	<100	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES		0	%			
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	60	0	%	25-131 %		
Nitrobenzene-d5	50	0	%	23-120 %		
Phenol-d6	40	0	%	24-113 %		
Terphenyl-d14	98	0	%	18-137 %		
2,4,6-Tribromophenol	33	0	%	19-122 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/08/94	SB
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.3	ug/kg			
PCB Aroclor 1221	ND	9.3	ug/kg			
PCB Aroclor 1232	ND	9.3	ug/kg			
PCB Aroclor 1242	ND	9.3	ug/kg			
PCB Aroclor 1248	ND	9.3	ug/kg			
PCB Aroclor 1254	17	9.3	ug/kg			
PCB Aroclor 1260	ND	9.3	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	98	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	74	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
Aluminum (Total)	5060000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	19000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8400	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	9700	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11400000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	20500000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	12000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	772000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	88000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	33000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	90	0.01	%		11/07/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-008
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0008
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	170	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	17	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	23	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	124	0	%	74-121 %		
1,2-Dichloethane-d4	126	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	6260000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-STH-008
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0008
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	73700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	10000	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	13400000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7800	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	20100000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	225000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1070000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	64000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-009
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0009
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	1000	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	18	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	120	0	%	74-121 %		
Bromofluorobenzene	126	0	%	70-121%		
1,2-Dichloethane-d4	106	0	%	81-117 %		
Toluene-d8	11/08/94	0	Month/Day/Year			
Date Analyzed:						
Aluminum (Total)	5860000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-009
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0009
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3500	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	430	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	91600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9700	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	21700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	263000	200	ug/kg	USEPA 7470	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/10/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1180000	10000	ug/kg	USEPA 7740	11/11/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/10/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 7841	11/08/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 6010	11/10/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	42000	1000	ug/kg		11/10/94	PR
% Solids	89	0.01	%			

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DEC 1 1994

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113961
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/06/94

Thomas J Geyer, CIH
Signature

12/6/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113961*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s):	1	Parameter:	Terphenyl-d14	Reason:	7
Explanation:					
Sample No.(s):	3, 10	Parameter:	1,2-Dichloroethane-d4	Reason:	7
Explanation:					
Sample No.(s):	5, MB	Parameter:	Decachlorobiphenyl	Reason:	7
Explanation:					
Sample No.(s):	----	Parameter:	Tetrachloroethene	Reason:	4
Explanation:					
Sample No.(s):	----	Parameter:	4-Nitrophenol	Reason:	4
Explanation:					
Sample No.(s):	MB	Parameter:	Bis(2-Ethylhexyl)phthalate	Reason:	8
Explanation:					
Sample No.(s):	MB, LS, LSD	Parameter:	Phenol-d6, Terphenyl-d14	Reason:	7
Explanation:					
Sample No.(s):	LS, LSD	Parameter:	Pyrene, 2-Fluorobiphenyl	Reason:	4, 7
Explanation:					
Sample No.(s):	5, 8	Parameter:	Pesticide/PCB	Reason:	3
Explanation:					
Sample No.(s):	----	Parameter:	Pesticide/PCB (Soil)	Reason:	10
Explanation:	No matrix spike and spike duplicate due to matrix problems.				
Sample No.(s):	---	Parameter:	BNA (Water)	Reason:	10
Explanation:	Insufficient sample to run analyses for MS/MSD.				
Sample No.(s):	1, 2, 10	Parameter:	Antimony, Calcium, Manganese, Mercury, Potassium	Reason:	5
Explanation:					
Sample No.(s):	2 - 10	Parameter:	Antimony	Reason:	3
Explanation:					

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/08/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	50	ug/l			
2-Hexanone	ND	1.0	ug/l			
Methylene chloride	ND	50	ug/l			
4-Methyl-2-pentanone	ND	1.0	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	<50	50	ug/l			
Vinyl acetate	ND	1.0	ug/l			
Vinyl chloride	ND	3.0	ug/l			
Xylenes (o,m & p)	ND	2.0	ug/l			
cis-1,2-Dichloroethene	Recovery	0	%	Control Limits		
SURROGATES	100	0	%	74-121 %		
Bromofluorobenzene	102	0	%	70-121%		
1,2-Dichloethane-d4	100	0	%	81-117 %		
Toluene-d8	11/08/94	0	Month/Day/Year			
Date Analyzed:						
Method 8270 BNAs in Water		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-STH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	5.3	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	43-116 %		
2-Fluorophenol	34	0	%	21-100 %		
Nitrobenzene-d5	56	0	%	35-114 %		
Phenol-d6	24	0	%	10-94 %		
Terphenyl-d14	144	0	%	33-141 %		
2,4,6-Tribromophenol	62	0	%	10-123 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	74	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	95	0	%	60-150%		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/08/94	GR
BNAs in Water Extraction Date:	11/09/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/09/94	PWB
Aluminum (Total)	220	200	ug/l	USEPA 6010/200.7	11/09/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/10/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Calcium (Total)	3900	500	ug/l	USEPA 6010/200.7	11/09/94	GR
Iron (Total)	370	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Manganese (Total)	16	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/09/94	GR

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(313) 462-3900

LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-STH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/08/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/09/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	11/08/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	11/08/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	11/07/94	GR
Magnesium (Total)	1000	500	ug/l	USEPA 6010/200.7	11/09/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/08/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/10/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/09/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/09/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/08/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	11/08/94	GR

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Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	590	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	12	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	1700	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	330	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	84	0	%	31-115 %		
2-Fluorophenol	81	0	%	25-131 %		
Nitrobenzene-d5	76	0	%	23-120 %		
Phenol-d6	64	0	%	24-113 %		
Terphenyl-d14	102	0	%	18-137 %		
2,4,6-Tribromophenol	70	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	146	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	95	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	6170000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	63	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9000	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Iron (Total)	12500000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	6900	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19900000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	289000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1150000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/9	GR
Sodium (Total)	76000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	35000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/08/94	PWE

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-012
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0003
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	5400	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	<100	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	20	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	28	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	132	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	6970000	4000	ug/kg	USEPA 6010	11/13/94	GR

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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-012
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0003
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	5400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	34000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	550	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	210	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	10000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	18000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8200	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1500000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	210	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	360	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	18000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	90	0.01	%		11/10/94	PL

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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-013
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LASORATORY I.D...: 113961-0004
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	240	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	6300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-013
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0004
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	32000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	90	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9900	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	72000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	410	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	42000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	89	0.01	%		11/10/94	PWB

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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	2200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	ND	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	106	0	%	74-121 %		
Bromofluorobenzene	106	0	%	70-121%		
1,2-Dichloethane-d4	102	0	%	81-117 %		
Toluene-d8	11/10/94	0	Month/Day/Year			
Date Analyzed:						
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	74	0	%	31-115 %		
2-Fluorophenol	77	0	%	25-131 %		
Nitrobenzene-d5	64	0	%	23-120 %		
Phenol-d6	58	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	65	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.8	1.8	ug/kg			
alpha-BHC	<1.8	1.8	ug/kg			
beta-BHC	<1.8	1.8	ug/kg			
delta-BHC	<1.8	1.8	ug/kg			
gamma-BHC (Lindane)	<1.8	1.8	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.8	1.8	ug/kg			
Heptachlor epoxide	<1.8	1.8	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.8	1.8	ug/kg			
alpha-Chlordane	<1.8	1.8	ug/kg			
gamma-Chlordane	<1.8	1.8	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	730	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	212	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	83	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	5550000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3300	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	260	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	280	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	23600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	11000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	7500	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	8440000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	25000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	4240000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	142000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	7600	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	577000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	58000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	30000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	90	0.01	%		11/08/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-015
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0006
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	1600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	110	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	6630000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-015
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0006
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	40000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	84000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	12000	1600	ug/kg	USEPA 6010	11/13/94	GR
alt (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	32000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	250000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	220	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	29000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	86	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-016
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0007
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	ROC
Acetone	2900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	<100	100	ug/kg			
SURROGATES	Recovery	0		Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/09/94	0				
Aluminum (Total)	5710000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-016
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0007
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	450	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	73000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9300	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	17000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	9100	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	280000	200	ug/kg	USEPA 7471	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/13/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 7740	11/15/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/13/94	GR
Silver (Total)	220	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	66000	10000	ug/kg	USEPA 7841	11/13/94	GR
Thallium (Total)	410	250	ug/kg	USEPA 6010	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	41000	1000	ug/kg		11/10/94	PWB
% Solids	91	0.01	%			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	106	0	%	74-121 %		
Bromofluorobenzene	108	0	%	70-121%		
1,2-Dichloethane-d4	104	0	%	81-117 %		
Toluene-d8	11/09/94	0	Month/Day/Year			
Date Analyzed:						
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	80	0	%	31-115 %		
2-Fluorophenol	93	0	%	25-131 %		
Nitrobenzene-d5	70	0	%	23-120 %		
Phenol-d6	68	0	%	24-113 %		
Terphenyl-d14	92	0	%	18-137 %		
2,4,6-Tribromophenol	90	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.9	1.9	ug/kg			
alpha-BHC	<1.9	1.9	ug/kg			
beta-BHC	<1.9	1.9	ug/kg			
delta-BHC	<1.9	1.9	ug/kg			
gamma-BHC (Lindane)	<1.9	1.9	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.9	1.9	ug/kg			
Heptachlor epoxide	<1.9	1.9	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.9	1.9	ug/kg			
alpha-Chlordane	<1.9	1.9	ug/kg			
gamma-Chlordane	<1.9	1.9	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	800	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	140	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	65	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	6350000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4700	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	43000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	330	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	27000000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9900	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	15000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11500000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	17000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	7790000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	362000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	571000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/9.	GR
Sodium (Total)	89000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/08/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-018
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0009
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	470	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	5510000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-STH-018
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0009
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	78000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8500	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6500	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	57000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	300	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	34000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	89	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-019
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0010
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	4800	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	23	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	116	0	%	74-121 %		
Bromofluorobenzene	130	0	%	70-121%		
1,2-Dichloethane-d4	112	0	%	81-117 %		
Toluene-d8	11/09/94	0	Month/Day/Year			
Date Analyzed:						
Aluminum (Total)	6480000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-019
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0010
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	440	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	76000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9700	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6300	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	68000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/08/94		MM/DD/YY	USEPA 3020	11/08/94	GR

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 113972
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113972*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Toluene Reason: 4
Explanation: However, MS and MSD recoveries are well within range.

Sample No.(s): ---- Parameter: Nitrophenol Reason: 4
Explanation:

Sample No.(s): 2, 4 Parameter: Surrogates Reason: 7
Explanation:

Sample No.(s): 1 Parameter: Endosulfan II, Alpha-BHC Reason: 5
Explanation: Due to matrix interferences.

Sample No.(s): 1 - 4 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 3 Parameter: Manganese, Potassium Reason: 5
Explanation: Due to overwhelming analyte concentrations.

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	260	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	80	0	%	31-115 %		
2-Fluorophenol	91	0	%	25-131 %		
Nitrobenzene-d5	72	0	%	23-120 %		
Phenol-d6	71	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	82	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/24/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	86	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	74	0	%	60-150%		
Date Analyzed:	11/24/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	4100000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3700	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	22000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	300	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	76000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	6400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	8900	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	9900000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	600000	10000	ug/kg	USEPA 6010	11/13/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	46000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	11000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	31000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR
% Solids	90	0.1	%		11/08/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	5200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	132	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	370	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	130	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	71000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8800	1600	ug/kg	USEPA 6010	11/13/94	GR
ɔbalt (Total)	19000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7100	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	240000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	55000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-STH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/10/94	PWS

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	810	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	6400000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-STH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4600	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	150	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	81000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8600	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	910000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	49000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/10/94	PWB

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	700	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	14	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	67	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	62	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	124	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	4000000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	9200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	22000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	80000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	6600	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	9000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	9900000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	5800	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 7471	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/13/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	790000	10000	ug/kg	USEPA 7740	11/15/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/13/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	54000	10000	ug/kg	USEPA 7841	11/13/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 6010	11/13/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 3005	11/11/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	90	0.1	%		11/10/94	PWS

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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113987
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/07/94

Thomas J. Geyer, CIH
Signature

12/7/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
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Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113987*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 6 Parameter: 1,2-Dichloroethane-d4 Reason: 7
Explanation:

Sample No.(s): 5, 8 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: Surrogate data is unavailable due to dilution that was required.

Sample No.(s): ---- Parameter: BNA (Water) Reason: 10
Explanation: Insufficient sample to run MS/MSD.

Sample No.(s): 1 - 10 Parameter: Aluminum, Antimony, Cadmium, Potassium, Selenium Reason: 3, 5
Explanation:

Sample No.(s): MB Parameter: Bis (2-ethylhexyl) phthalate Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Tetrachloroethene, Toluene Reason: 4
Explanation:

Sample No.(s): MB, LS, LSD Parameter: 4-Nitrophenol, Phenol-d6, Pyrene, Terphenyl, 2-Fluorobiphenyl Reason: 4, 7
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/14/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	3.4	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	50	0	%	43-116 %		
2-Fluorophenol	34	0	%	21-100 %		
Nitrobenzene-d5	34	0	%	35-114 %		
Phenol-d6	22	0	%	10-94 %		
Terphenyl-d14	134	0	%	33-141 %		
2,4,6-Tribromophenol	52	0	%	10-123 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	18	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	69	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/13/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/13/94	KLZ
BNAs in Water Extraction Date:	11/09/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/09/94	PWB
Aluminum (Total)	1860	200	ug/l	USEPA 6010/200.7	11/16/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/14/94	GR
Barium (Total)	31	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Calcium (Total)	89000	500	ug/l	USEPA 6010/200.7	11/14/94	GR
Iron (Total)	4580	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Manganese (Total)	240	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Potassium (Total)	880	500	ug/l	USEPA 6010/200.7	11/14/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/13/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/14/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 7201	11/14/94	GR
Arsenic (Total)	3.6	1.0	ug/l	USEPA 7060	11/14/94	GR
Cadmium (Total)	0.5	0.2	ug/l	USEPA 7131	11/11/94	GR
Lead (Total)	4.1	1.0	ug/l	USEPA 7421	11/13/94	GR
Magnesium (Total)	25000	500	ug/l	USEPA 6010/200.7	11/14/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/10/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/14/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/14/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/14/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/13/94	GR
Copper (Total)	13	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Zinc, (Total)	20	20	ug/l	USEPA 6010	11/15/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	112	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	<330	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	<330	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	<330	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	<330	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	<330	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	88	0	%	25-131 %		
Nitrobenzene-d5	64	0	%	23-120 %		
Phenol-d6	65	0	%	24-113 %		
Terphenyl-d14	100	0	%	18-137 %		
2,4,6-Tribromophenol	79	0	%	19-122 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	40	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	66	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	4200000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	260	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	350	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	77000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	7200	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	13000	600	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	12000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	700000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	200000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	62000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	93	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	32	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	6600000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	31000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	80000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	11000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	21000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8300	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	24000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	95000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	56000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	86	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	2600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	128	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	140	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	74000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8300	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	21000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7600	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	260000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	70000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	86	0.01	%		11/17/94	PWS

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	440	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	112	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	Recovery	0	%	Control Limits		
SURROGATES	78	0	%	31-115 %		
2-Fluorobiphenyl	100	0	%	25-131 %		
2-Fluorophenol	68	0	%	23-120 %		
Nitrobenzene-d5	71	0	%	24-113 %		
Phenol-d6	114	0	%	18-137 %		
Terphenyl-d14	90	0	%	19-122 %		
2,4,6-Tribromophenol	11/13/94	0	Month/Day/Year			
Date Analyzed:						
		*1		USEPA 608/8080	11/29/94	GR
Pesticides & PCBs in Soil						
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	63	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	60	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	8200000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	37000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	530	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	300	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	66000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	11000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	22000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	15000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	9200	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	15000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	290000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	210000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	20000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	89	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	500	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	35	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	130	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	5700000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	30000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	140	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	65000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	18000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	940000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	87	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-8TH-029
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113987-0007
DATE RECEIVED.....: 11/08/94
TIME RECEIVED.....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	3600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5500000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-029
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0007
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6600	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	31000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	450	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	420	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	66000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	23000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	250000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	960000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	77000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	46000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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CLIENT I.D.....: S-5570-110894-BTH-029
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LABORATORY I.D...: 113987-0007
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWS

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CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	990	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	360	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	550	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	360	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	1700	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	330	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	510	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene						

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	430	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	430	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	86	0	%	31-115 %		
2-Fluorophenol	115	0	%	25-131 %		
Nitrobenzene-d5	48	0	%	23-120 %		
Phenol-d6	110	0	%	24-113 %		
Terphenyl-d14	118	0	%	18-137 %		
2,4,6-Tribromophenol	51	0	%	19-122 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<36	36	ug/kg			
alpha-BHC	<36	36	ug/kg			
beta-BHC	<36	36	ug/kg			
delta-BHC	<36	36	ug/kg			
gamma-BHC (Lindane)	<36	36	ug/kg			
4,4'-DDD	<36	36	ug/kg			
4,4'-DDE	<36	36	ug/kg			
4,4'-DDT	<36	36	ug/kg			
Dieldrin	<36	36	ug/kg			
Endosulfan I	<36	36	ug/kg			
Endosulfan II	<36	36	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0008
DATE RECEIVED.....: 11/08/94
TIME RECEIVED.....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<36	36	ug/kg			
Endrin	<36	36	ug/kg			
Endrin aldehyde	<36	36	ug/kg			
Heptachlor	<36	36	ug/kg			
Heptachlor epoxide	<36	36	ug/kg			
Toxaphene	<420	420	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<36	36	ug/kg			
alpha-Chlordane	<36	36	ug/kg			
gamma-Chlordane	<36	36	ug/kg			
PCB Aroclor 1016	<420	420	ug/kg			
PCB Aroclor 1221	<420	420	ug/kg			
PCB Aroclor 1232	<420	420	ug/kg			
PCB Aroclor 1242	<420	420	ug/kg			
PCB Aroclor 1248	<420	420	ug/kg			
PCB Aroclor 1254	1700	420	ug/kg			
PCB Aroclor 1260	<420	420	ug/kg			
Decachlorobiphenyl	ND	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	ND	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	3900000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	830	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	5900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	75000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	370	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	970	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	54000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	16000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	44000	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	130000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	14000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	310000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	440000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	130000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	100000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	93	0.01	%		11/10/94	PWB

12649 Richfield Court
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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-031
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	<10	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	120	0	%	74-121 %		
Bromofluorobenzene	120	0	%	70-121%		
1,2-Dichloethane-d4	108	0	%	81-117 %		
Toluene-d8	11/15/94	0	Month/Day/Year			
Date Analyzed:						
Aluminum (Total)	6000000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-031
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6800	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	26000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	290	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	18000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	10000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	87000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	48000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-STH-031
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED.....: 11/08/94
TIME RECEIVED.....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	87	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0010
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	460	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5700000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113987-0010
DATE RECEIVED.....: 11/08/94
TIME RECEIVED.....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	29000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	440	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	260	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	85000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	22000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 7471	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/13/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1100000	10000	ug/kg	USEPA 7740	11/15/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/13/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 7841	11/13/94	GR
Thallium (Total)	370	250	ug/kg	USEPA 6010	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	48000	1000	ug/kg	USEPA 3050	11/11/94	MAS
Graphite Furnance Metals	11/11/94		MM/DD/YY			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0010
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWS

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114006
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *114006*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Pesticide/PCB (Soil) Reason: 10
Explanation: No MS/MSD data due to matrix problems.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3
Explanation:

Sample No.(s): 1 - 3 Parameter: Antimony, Potassium, Selenium Reason: 3, 5
Explanation:

Sample No.(s): MB Parameter: Carbon Tetrachloride Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Toluene Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	850	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	140	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	ND	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	<10	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	ND	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	114	0	%	74-121 %		
Bromofluorobenzene	110	0	%	70-121%		
1,2-Dichloethane-d4	106	0	%	81-117 %		
Toluene-d8	11/15/94	0	Month/Day/Year			
Date Analyzed:						
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	<330	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	60	0	%	25-131 %		
Nitrobenzene-d5	52	0	%	23-120 %		
Phenol-d6	51	0	%	24-113 %		
Terphenyl-d14	104	0	%	18-137 %		
2,4,6-Tribromophenol	89	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<1.8	1.8	ug/kg			
alpha-BHC	<1.8	1.8	ug/kg			
beta-BHC	<1.8	1.8	ug/kg			
delta-BHC	<1.8	1.8	ug/kg			
gamma-BHC (Lindane)	<1.8	1.8	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	4.5	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.8	1.8	ug/kg			
Heptachlor epoxide	<1.8	1.8	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	900	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	93	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	83	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
...st/PCB in Soil Extraction Date:	11/14/94		Month/Day/Year	EPA 3550	11/14/94	RSP
...As in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/15/94	PWB
...uminum (Total)	6600000	4000	ug/kg	USEPA 6010	11/14/94	GR
...timony (Total)	300	250	ug/kg	USEPA 7041	11/16/94	GR
...senic (Total)	3700	100	ug/kg	USEPA 7060	11/15/94	GR
...ium (Total)	43000	400	ug/kg	USEPA 6010	11/14/94	GR
...eryllium (Total)	370	200	ug/kg	USEPA 6010	11/14/94	GR
...dmium (Total)	700	50	ug/kg	USEPA 6010	11/14/94	GR
...lcium (Total)	19000000	10000	ug/kg	USEPA 6010	11/14/94	GR
...romium (Total)	15000	1600	ug/kg	USEPA 6010	11/13/94	GR
...balt (Total)	9600	200	ug/kg	USEPA 6010	11/14/94	GR
...pper (Total)	60000	600	ug/kg	USEPA 6010	11/14/94	GR

12649 Richfield Court
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(313) 462-3900

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	5400000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	320000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	470000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	130000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	55000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH
% Solids	87	0.01	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	230	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	22	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	7700000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	510	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	320	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	84000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	15000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	17000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	10000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	25800000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	330000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	20000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1800000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	390	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	360	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	18000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	58000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1100	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5200000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	86000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	7400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	11000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	6800	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	260000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1100000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	320	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	59000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	300	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.01	%		11/17/94	PWB

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114019
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP,Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: Conestoga-Rovers & Associates, Inc.
JOB NUMBER: 114019

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Pesticide/PCB (Soil) Reason: 10
Explanation: No MS/MSD data due to matrix problems.

Sample No.(s): 2 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: No surrogate due to dilution that was required.

Sample No.(s): 2 - 5 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 1 Parameter: Antimony, Cadmium, Lead Reason: 5
Explanation:

Sample No.(s): 1 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): --- Parameter: Toluene (S) Tetrachlorothene (W) Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol (Soil) Reason: 4
Explanation:

Sample No.(s): MB Parameter: Bis (2-ethylhexyl) phthalate Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Pyrene (Water) Reason: 4
Explanation:

Sample No.(s): ---- Parameter: BNA (Water) Reason: 10
Explanation: Insufficient sample to run MS/MSD.

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/15/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	3.0	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	96	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/14/94	RDC

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	7.1	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	<5.0	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project IO: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	43-116 %		
2-Fluorophenol	40	0	%	21-100 %		
Nitrobenzene-d5	44	0	%	35-114 %		
Phenol-d6	14	0	%	10-94 %		
Terphenyl-d14	120	0	%	33-141 %		
2,4,6-Tribromophenol	45	0	%	10-123 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	35	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	92	0	%	60-150%		
Date Analyzed:	11/30/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/14/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/14/94	RSP
BNAs in Water Extraction Date:	11/11/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/11/94	
Aluminum (Total)	850	200	ug/l	USEPA 6010/200.7	11/16/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/16/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Calcium (Total)	24000	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Iron (Total)	2460	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Manganese (Total)	77	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Potassium (Total)	<500	500	ug/l			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/13/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/16/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010	11/16/94	GR
Arsenic (Total)	2.0	1.0	ug/l	USEPA 7060	11/16/94	GR
Cadmium (Total)	<0.2	0.2	ug/l	USEPA 7131	11/11/94	GR
Lead (Total)	1.5	1.0	ug/l	USEPA 7421	11/13/94	GR
Magnesium (Total)	5500	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/14/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/18/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/16/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010	11/15/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	14000	100	ug/kg			
Benzene	<10	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	2200	330	ug/kg			
Acenaphthylene	<330	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	3100	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	7200	6600	ug/kg			
Benzo(a)pyrene	5000	330	ug/kg			
Benzo(b)fluoranthene	8900	6600	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	5600	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	8700	6600	ug/kg			
Dibenzo(a,h)Anthracene	1300	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	17000	6600	ug/kg			
Fluorene	1700	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	4700	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	910	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	400	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	14000	6600	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	12000	6600	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	90	0	%	31-115 %		
2-Fluorophenol	77	0	%	25-131 %		
Nitrobenzene-d5	62	0	%	23-120 %		
Phenol-d6	71	0	%	24-113 %		
Terphenyl-d14	104	0	%	18-137 %		
2,4,6-Tribromophenol	75	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<18	18	ug/kg			
alpha-BHC	<18	18	ug/kg			
beta-BHC	<18	18	ug/kg			
delta-BHC	<18	18	ug/kg			
gamma-BHC (Lindane)	<18	18	ug/kg			
4,4'-DDD	<18	18	ug/kg			
4,4'-DDE	<18	18	ug/kg			
4,4'-DDT	<18	18	ug/kg			
Dieldrin	<18	18	ug/kg			
Endosulfan I	<18	18	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<18	18	ug/kg			
Endrin	<18	18	ug/kg			
Endrin aldehyde	<18	18	ug/kg			
Heptachlor	<18	18	ug/kg			
Heptachlor epoxide	<18	18	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<18	18	ug/kg			
alpha-Chlordane	<18	18	ug/kg			
gamma-Chlordane	<18	18	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	800	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/14/94		Month/Day/Year	EPA 3550	11/14/94	RSP
TAL in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/15/94	PWB
Aluminum (Total)	3600000	4000	ug/kg	USEPA 6010	11/14/94	GR
Antimony (Total)	29000	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	12000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	2300000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	2000	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	19000	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	42000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	93000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	136000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	211000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	120000000	2000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
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LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	740000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	8300000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	980000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	180	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	59000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	580000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	800	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	960	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	440000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	1800000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH
Solids	88	0.01	%		11/15/94	PWB

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	5000	100	ug/kg			
Benzene	17	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	230	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	13	10	ug/kg			
Ethylbenzene	ND	100	ug/kg			
2-Hexanone	<10	10	ug/kg			
Methylene chloride	ND	100	ug/kg			
4-Methyl-2-pentanone	ND	10	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	21	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	<30	30	ug/kg			
Xylenes (o,m & p)	ND	10	ug/kg			
cis-1,2-Dichloroethene	<100	100	ug/kg			
Vinyl acetate	Recovery	0	%	Control Limits		
SURROGATES	128	0	%	74-121 %		
Bromofluorobenzene	118	0	%	70-121%		
1,2-Dichloethane-d4	114	0	%	81-117 %		
Toluene-d8	11/15/94	0	Month/Day/Year			
Date Analyzed:						
Aluminum (Total)	9000000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	8500	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	11000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	700000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	820	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	17000	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	52000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	120000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	57000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	1000000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	60000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	880000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	15000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	590000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	140000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	1300	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	2300	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	430000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	1500000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Solids	75	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	820	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	7200000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	51000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	630	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	60000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	13000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	26000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	17000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	450000	200	ug/kg	USEPA 7471	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/14/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	950000	10000	ug/kg	USEPA 7740	11/15/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/14/94	GR
Silver (Total)	340	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	190000	10000	ug/kg	USEPA 7841	11/16/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 6010	11/14/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	76000	1000	ug/kg	USEPA 3020	11/14/94	LAH
Graphite Furnance Metals	11/14/94		MM/DD/YY			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH.
% Solids	89	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-040
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0005
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1500	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	19	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	130	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	4400000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-040
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
PROJECT DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0005
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
timony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
senic (Total)	3300	100	ug/kg	USEPA 7060	11/15/94	GR
rium (Total)	20000	400	ug/kg	USEPA 6010	11/14/94	GR
yllium (Total)	280	200	ug/kg	USEPA 6010	11/14/94	GR
mium (Total)	<50	50	ug/kg	USEPA 6010	11/14/94	GR
cium (Total)	82000000	10000	ug/kg	USEPA 6010	11/14/94	GR
omium (Total)	6600	1600	ug/kg	USEPA 6010	11/13/94	GR
balt (Total)	9400	200	ug/kg	USEPA 6010	11/14/94	GR
per (Total)	9600	600	ug/kg	USEPA 6010	11/14/94	GR
n (Total)	9500000	2000	ug/kg	USEPA 6010	11/14/94	GR
d (Total)	5800	1000	ug/kg	USEPA 6010	11/14/94	GR
gnesium (Total)	23000000	10000	ug/kg	USEPA 6010	11/14/94	GR
nganese (Total)	240000	200	ug/kg	USEPA 6010	11/14/94	GR
cury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
kel (Total)	10000	200	ug/kg	USEPA 6010	11/14/94	GR
ssium (Total)	1000000	10000	ug/kg	USEPA 6010	11/14/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
ver (Total)	310	200	ug/kg	USEPA 6010	11/14/94	GR
ium (Total)	61000	10000	ug/kg	USEPA 6010	11/14/94	GR
allium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
nadium (Total)	12000	2000	ug/kg	USEPA 6010	11/14/94	GR
nc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
aphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH

12649 Richfield Court
Livonia, MI 48150
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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114038
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/13/94

Thomas J Geyer, CIH
Signature

12/13/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

12649 Richfield Court, Livonia, MI 48150, 313/462-3900 Fax 462-3911

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114038*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3
Explanation: Surrogates were diluted out.

Sample No.(s): 1, 6 Parameter: Pesticide/PCB Reason: 10
Explanation: No MS/MSD data available due to matrix problems.

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): 1 Parameter: Volatile Reason: 7
Explanation:

Sample No.(s): 1 - 8 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 1 Parameter: Metals Reason: 5
Explanation: Due to high dilutions necessary to analyze most metals.

Sample No.(s): ---- Parameter: 4,4'-DDT Reason: 4
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	2800	200	ug/kg			
Benzene	200	200	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	4200	200	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	25000	5000	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	45000	5000	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	2400	200	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	50000	5000	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	134	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	134	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	<330	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	360	330	ug/kg			
Benzo(a)pyrene	<330	330	ug/kg			
Benzo(b)fluoranthene	460	330	ug/kg			
Benzo(k)Fluoranthene	<330	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	520	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	1000	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	480	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	800	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	<330	330	ug/kg			
Fluoranthene	600	330	ug/kg			
Fluorene	<330	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-STH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	380	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	1700	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	430	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	740	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	940	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	92	0	%	31-115 %		
2-Fluorophenol	78	0	%	25-131 %		
Nitrobenzene-d5	76	0	%	23-120 %		
Phenol-d6	35	0	%	24-113 %		
Terphenyl-d14	110	0	%	18-137 %		
2,4,6-Tribromophenol	84	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<20	20	ug/kg			
alpha-BHC	<20	20	ug/kg			
beta-BHC	<20	20	ug/kg			
delta-BHC	<20	20	ug/kg			
gamma-BHC (Lindane)	<20	20	ug/kg			
4,4'-DDD	<20	20	ug/kg			
4,4'-DDE	<20	20	ug/kg			
4,4'-DDT	<20	20	ug/kg			
Dieldrin	<20	20	ug/kg			
Endosulfan I	<20	20	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER:. Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<20	20	ug/kg			
Endrin	<20	20	ug/kg			
Endrin aldehyde	<20	20	ug/kg			
Heptachlor	<20	20	ug/kg			
Heptachlor epoxide	<20	20	ug/kg			
Toxaphene	<410	410	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<20	20	ug/kg			
alpha-Chlordane	<20	20	ug/kg			
gamma-Chlordane	<20	20	ug/kg			
PCB Aroclor 1016	<410	410	ug/kg			
PCB Aroclor 1221	<410	410	ug/kg			
PCB Aroclor 1232	<410	410	ug/kg			
PCB Aroclor 1242	<410	410	ug/kg			
PCB Aroclor 1248	<410	410	ug/kg			
PCB Aroclor 1254	2100	410	ug/kg			
PCB Aroclor 1260	<410	410	ug/kg			
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/15/94		Month/Day/Year	EPA 3540 Soxhlet	11/15/94	KLZ
BNAs in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/14/94	PWB
Aluminum (Total)	11300000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	20000	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	10000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	2220000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	980	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	42000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	47200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	641000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	95000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	1020000	600	ug/kg	USEPA 6010	11/19/94	GR
Iron (Total)	56300000	2000	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	4740000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	10900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	844000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	450	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	94000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	2300	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	2900	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	911000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	26000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	4390000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR
Solids	89	0.1	%		11/15/94	PWB

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LABORATORY TESTS RESULTS

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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3700	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	140	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	18	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	320	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	7950000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	1900	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	19000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	541000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	1900	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	17000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	7620000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	225000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	161000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	189000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	95600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	945000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	2670000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	688000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	170	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	31000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	893000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	620	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	583000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	47000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	1020000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	82	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS

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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	1200	1000	ug/kg			
Benzene	<10	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	260	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	490	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	5670000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	600	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	56000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	280000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	1800	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	15000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	4780000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	124000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	159000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	547000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	94600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	754000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	1940000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	439000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	32000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	610000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	470	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	357000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	42000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	413000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	83	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	770	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	15	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	35	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	6310000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5700	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	470	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	200	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	62400000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9300	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	8200	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	21100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	264000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1580000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	159000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3500	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	14	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	17	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	7220000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
ntimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
rsenic (Total)	7600	100	ug/kg	USEPA 7060	11/18/94	GR
rium (Total)	32000	400	ug/kg	USEPA 6010	11/19/94	GR
ryllium (Total)	540	200	ug/kg	USEPA 6010	11/17/94	GR
dmium (Total)	410	50	ug/kg	USEPA 6010	11/17/94	GR
lcium (Total)	63100000	10000	ug/kg	USEPA 6010	11/19/94	GR
romium (Total)	11000	1600	ug/kg	USEPA 6010	11/17/94	GR
balt (Total)	23000	200	ug/kg	USEPA 6010	11/17/94	GR
pper (Total)	18000	600	ug/kg	USEPA 6010	11/17/9	GR
on (Total)	16600000	2000	ug/kg	USEPA 6010	11/19/94	GR
ad (Total)	10000	1000	ug/kg	USEPA 6010	11/17/94	GR
gnesium (Total)	20600000	10000	ug/kg	USEPA 6010	11/19/94	GR
nganese (Total)	284000	200	ug/kg	USEPA 6010	11/17/94	GR
rcury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
ckel (Total)	20000	200	ug/kg	USEPA 6010	11/17/94	GR
tassium (Total)	1660000	10000	ug/kg	USEPA 6010	11/17/94	GR
lenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
lver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
dium (Total)	161000	10000	ug/kg	USEPA 6010	11/17/94	GR
allium (Total)	520	250	ug/kg	USEPA 7841	11/16/94	GR
nadium (Total)	21000	2000	ug/kg	USEPA 6010	11/17/94	GR
nc (Total)	48000	1000	ug/kg	USEPA 6010	11/17/94	GR
raphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	89	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3000	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	62	0	%	31-115 %		
2-Fluorophenol	58	0	%	25-131 %		
Nitrobenzene-d5	52	0	%	23-120 %		
Phenol-d6	50	0	%	24-113 %		
Terphenyl-d14	132	0	%	18-137 %		
2,4,6-Tribromophenol	61	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	75	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	68	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/16/94		Month/Day/Year	EPA 3540 Soxhlet	11/16/94	KLZ
PAS in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/14/94	PWB
Aluminum (Total)	10200000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	42000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	570	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	420	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	52500000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/17/94	GR

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LABORATORY TESTS RESULTS
12/13/94

LAB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	17600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	9300	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	12200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	421000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1310000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	64000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	22000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	43000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3050	11/15/94	GR
Solids	91	0.1	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	740	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Aluminum (Total)	4770000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	2600	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	14000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	330	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	66900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	6800	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	14000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9400	600	ug/kg	USEPA 6010	11/17/9	GR
Iron (Total)	9650000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	5900	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	22200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	237000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	10000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1030000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	128000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	35000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-047
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	1700	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	14	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-C47
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	430	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5400	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	21000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	91	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	62100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	8100	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	7500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	20400000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	265000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1060000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-047
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
% Solids	92	0.1	%		11/22/94	GR

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114059
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/22/94

Thomas J Geyer CIH
Signature

12/22/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *CONESTOGA-ROVERS & ASSOCIATES*

JOB NUMBER: *114059*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 0001 Parameter: Decachlorobiphenyl Reason: 7
Explanation: Due to matrix interference

Sample No.(s): 3,4 Parameter: 1,2-Dichloroethane-d4 Reason 7
Explanation: Due to matrix interference

Sample No.(s): --- Parameter: Acetone, 2-Butone, Vinyl Acetate Xylenes,, 4-Nitrophenol, Pyrene Reason: 4
Explanation:

Sample No.(s): MB Parameter: Bis(-2ethyl hexyl) phthalate Reason: 8
Explanation:

Sample No.(s): --- Parameter: Semi-Volatile (water) Reason: 10
Explanation: Insufficient sample to analyze for MS/MSD, on these samples

Sample No.(s): 2-4 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/20/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	98	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/22/94	RDC

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	44	0	%	43-116 %		
2-Fluorophenol	28	0	%	21-100 %		
Nitrobenzene-d5	46	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	104	0	%	33-141 %		
2,4,6-Tribromophenol	51	0	%	10-123 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/24/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.20	0.20	ug/l			
PCB Aroclor 1221	<0.20	0.20	ug/l			
PCB Aroclor 1232	<0.40	0.40	ug/l			
PCB Aroclor 1242	<0.20	0.20	ug/l			
PCB Aroclor 1248	<0.20	0.20	ug/l			
PCB Aroclor 1254	<0.20	0.20	ug/l			
PCB Aroclor 1260	<0.20	0.20	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	52	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/24/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/17/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/17/94	RSP
BNAs in Water Extraction Date:	11/16/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/17/94	PWB
Aluminum (Total)	100	20	ug/l	USEPA 6010/200.7	11/18/94	GR
Antimony (Total)	2.1	2.0	ug/l	USEPA 7041	11/21/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Calcium (Total)	4500	500	ug/l	USEPA 6010/200.7	11/18/94	GR
Iron (Total)	1170	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Manganese (Total)	17	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/18/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/17/94	DWJ
Vanadium (Total)	<100	100	ug/l	USEPA 6010/200.7	11/18/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010	11/18/94	JTW
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	11/22/94	DLV
Cadmium (Total)	0.3	0.2	ug/l	USEPA 7131	11/21/94	DLV
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	11/20/94	GR
Magnesium (Total)	1100	500	ug/l	USEPA 6010/200.7	11/18/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/22/94	JTW
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/18/94	JTW
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/18/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/18/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/21/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010	11/20/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	3100	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	35	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/18/94	RDC

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JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	58	0	%	31-115 %		
2-Fluorophenol	65	0	%	25-131 %		
Nitrobenzene-d5	46	0	%	23-120 %		
Phenol-d6	51	0	%	24-113 %		
Terphenyl-d14	76	0	%	18-137 %		
2,4,6-Tribromophenol	52	0	%	19-122 %		
Date Analyzed:	11/18/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	75	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	80	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/17/94		Month/Day/Year	EPA 3550	11/17/94	RSP
BNAs in Soil Extraction Date:	11/16/94		Month/Day/Year	USEPA 3550	11/17/94	PWB
Aluminum (Total)	6580000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	38000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	350	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	33100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9100	600	ug/kg	USEPA 6010	11/17/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11500000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	9600	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	8250000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	334000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	9600	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	536000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/9	GR
Sodium (Total)	42000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	30000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS
% Solids	88	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	6400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	128	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	6330000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3300	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	430	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	67	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	66900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9200	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/17/9	GR
Iron (Total)	12700000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	8500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	22900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	283000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1260000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	34000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	89	0.01	%		11/22/94	GR

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LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-051
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0004
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	15	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	95	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	126	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	3720000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-051
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0004
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	17000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	300	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	200	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	4700	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9500	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	10100000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	5500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	18200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	255000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	831000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	50000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114077
Prepared For:

Conestoga-Rovers & Associates
Lou Almeida
651 Colby Dr
Waterloo Ontario, OT N2VIC2

Date: 12/22/94

Thomas J Geyer, CIH
Signature

12/22/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114077*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1-3 Parameter: Antimony Reason: 3
Explanation: Due to matrix interferences.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 5
Explanation: Due to matrix interferences.

Sample No.(s): ---- Parameter: Nitrophenol, Acetone, 2-Butone, Vinyl Acetate Xylenes Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	1400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	380	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/19/94	RDC

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	31-115 %		
2-Fluorophenol	55	0	%	25-131 %		
Nitrobenzene-d5	44	0	%	23-120 %		
Phenol-d6	43	0	%	24-113 %		
Terphenyl-d14	66	0	%	18-137 %		
2,4,6-Tribromophenol	52	0	%	19-122 %		
Date Analyzed:	11/19/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	12/01/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	89	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	89	0	%	60-150%		
Date Analyzed:	12/01/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/22/94		Month/Day/Year	EPA 3550	11/22/94	RSP
BNAs in Soil Extraction Date:	11/18/94		Month/Day/Year	USEPA 3550	11/21/94	
Aluminum (Total)	6770000	4000	ug/kg	USEPA 6010	11/23/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	2900	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	34000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	240	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	24500000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/21/94	GR
Cobalt (Total)	12000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	14000	600	ug/kg	USEPA 6010	11/21/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	13600000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	15000	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	5590000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	262000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	467000	10000	ug/kg	USEPA 6010	11/21/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	<10000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT
% Solids	85	0.1	%		11/22/94	GR

12649 Richfield Court
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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	2000	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	17500000	4000	ug/kg	USEPA 6010	11/23/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	62000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	600	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	76	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	104000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	19000	1600	ug/kg	USEPA 6010	11/21/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	16000	600	ug/kg	USEPA 6010	11/21/94	GR
Iron (Total)	30700000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	14000	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	35600000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	336000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	21000	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	2490000	10000	ug/kg	USEPA 6010	11/21/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	103000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	29000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	46000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	82	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	320	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	4080000	4000	ug/kg	USEPA 6010	11/23/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	4000	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	15000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	240	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	112000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	5300	1600	ug/kg	USEPA 6010	11/21/94	GR
Cobalt (Total)	13000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	7300	600	ug/kg	USEPA 6010	11/21/94	GR
Iron (Total)	10800000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	7100	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	27000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	227000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	110	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	8600	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	892000	10000	ug/kg	USEPA 6010	11/21/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	45000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	27000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Trip Blank
DATE SAMPLED.....: 10/26/94
TIME SAMPLED.....: 12:54
WORK DESCRIPTION...: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114077-0004
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 12:54
REMARKS.....: water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/20/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	1.6	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	96	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/24/94	0	Month/Day/Year			

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114110
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/14/94

Thomas J Geyer, CIH
Signature

12/14/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analaytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

12649 Richfield Court, Livonia, MI 48150, 313/462-3900 Fax 462-39

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114110*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: A dilution was required - the surrogates were diluted out.

Sample No.(s): 4 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): ---- Parameter: Beta-BHC Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): 1 Parameter: Metals Reason: 5
Explanation: Due to high levels of dilution necessary for most parameters.

Sample No.(s): ---- Parameter: Magnesium, Manganese, Nickel Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	610	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/23/94	RDC

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	<330	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	980	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	<330	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	<330	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	<330	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	660	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
JOB DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	<330	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	<330	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	420	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	500	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	58	0	%	25-131 %		
Nitrobenzene-d5	60	0	%	23-120 %		
Phenol-d6	58	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	88	0	%	19-122 %		
Date Analyzed:	11/30/94	0	Month/Day/Year			
ticides & PCBs in Soil		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<20	20	ug/kg			
alpha-BHC	<20	20	ug/kg			
beta-BHC	<20	20	ug/kg			
delta-BHC	<20	20	ug/kg			
gamma-BHC (Lindane)	<20	20	ug/kg			
4,4'-DDD	<20	20	ug/kg			
4,4'-DDE	<20	20	ug/kg			
4,4'-DDT	<20	20	ug/kg			
Dieldrin	<20	20	ug/kg			
Endosulfan I	<20	20	ug/kg			
Endosulfan II	<20	20	ug/kg			

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<20	20	ug/kg			
Endrin	<20	20	ug/kg			
Endrin aldehyde	<20	20	ug/kg			
Heptachlor	<20	20	ug/kg			
Heptachlor epoxide	<20	20	ug/kg			
Toxaphene	<400	400	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<20	20	ug/kg			
alpha-Chlordane	<20	20	ug/kg			
gamma-Chlordane	<20	20	ug/kg			
PCB Aroclor 1016	<400	400	ug/kg			
PCB Aroclor 1221	<400	400	ug/kg			
PCB Aroclor 1232	<400	400	ug/kg			
PCB Aroclor 1242	<400	400	ug/kg			
PCB Aroclor 1248	<400	400	ug/kg			
PCB Aroclor 1254	1500	400	ug/kg			
PCB Aroclor 1260	<400	400	ug/kg			
Date Analyzed:	11/30/94	0	Month/Day/Year			
st/PCB in Soil Extraction Date:	11/22/94		Month/Day/Year	EPA 3550	11/22/94	RSP
As in Soil Extraction Date:	11/21/94		Month/Day/Year	USEPA 3550	11/21/94	
uminum (Total)	14000000	500	ug/kg	USEPA 6010	11/28/94	TN
timony (Total)	ND	500	ug/kg	USEPA 7041	11/28/94	TN
senic (Total)	13000	100	ug/kg	USEPA 7060	11/30/94	TN
ium (Total)	67000	1000	ug/kg	USEPA 6010	11/28/94	TN
yllium (Total)	ND	1000	ug/kg	USEPA 6010	11/28/94	TN
dmium (Total)	2200	50	ug/kg	USEPA 7131	11/28/94	TN
lcium (Total)	12000000	800	ug/kg	USEPA 6010	11/28/94	TN
romium (Total)	19000	2500	ug/kg	USEPA 6010	11/28/94	TN
balt (Total)	9700	800	ug/kg	USEPA 6010	11/28/94	TN
pper (Total)	30000	1000	ug/kg	USEPA 6010	11/28/94	TN
on (Total)	41000000	2000	ug/kg	USEPA 6010	11/28/94	TN

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	77000	1000	ug/kg	USEPA 7421	11/28/94	TN
Magnesium (Total)	4800000	3800	ug/kg	USEPA 6010	11/28/94	TN
Manganese (Total)	670000	2000	ug/kg	USEPA 6010	11/28/94	TN
Mercury (Total)	230	100	ug/kg	USEPA 7471	11/27/94	TN
Nickel (Total)	25000	1000	ug/kg	USEPA 6010	11/28/94	TN
Potassium (Total)	2700000	5000	ug/kg	USEPA 7610	11/30/94	TN
Selenium (Total)	ND	500	ug/kg	USEPA 7740	11/23/94	TN
Silver (Total)	ND	500	ug/kg	USEPA 7761	11/28/94	TN
Sodium (Total)	260000	1000	ug/kg	USEPA 7770	11/30/94	TN
Thallium (Total)	ND	500	ug/kg	USEPA 7841	11/28/94	TN
Vanadium (Total)	20000	1000	ug/kg	USEPA 6010	11/28/94	TN
Zinc (Total)	97000	1000	ug/kg	USEPA 6010	11/28/94	TN
% Solids	8%	0.01	%		11/22/94	GR

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-056
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0002
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	450	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Aluminum (Total)	8900000	500	ug/kg	USEPA 6010	11/28/94	TN

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(313) 462-3900

LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-056
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0002
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	630	500	ug/kg	USEPA 7041	11/28/94	TN
Arsenic (Total)	9500	100	ug/kg	USEPA 7060	11/30/94	TN
Barium (Total)	92000	1000	ug/kg	USEPA 6010	11/28/94	TN
Beryllium (Total)	ND	1000	ug/kg	USEPA 6010	11/28/94	TN
Cadmium (Total)	4100	50	ug/kg	USEPA 7131	11/28/94	TN
Calcium (Total)	11000000	800	ug/kg	USEPA 6010	11/28/94	TN
Chromium (Total)	40000	2500	ug/kg	USEPA 6010	11/28/94	TN
Cobalt (Total)	6900	800	ug/kg	USEPA 6010	11/28/94	TN
Copper (Total)	230000	1000	ug/kg	USEPA 6010	11/28/94	TN
Iron (Total)	29000000	2000	ug/kg	USEPA 6010	11/28/94	TN
Lead (Total)	910000	1000	ug/kg	USEPA 7421	11/28/94	TN
Magnesium (Total)	4700000	3800	ug/kg	USEPA 6010	11/28/94	TN
Manganese (Total)	280000	2000	ug/kg	USEPA 6010	11/28/94	TN
Mercury (Total)	ND	100	ug/kg	USEPA 7471	11/27/94	TN
Nickel (Total)	25000	1000	ug/kg	USEPA 6010	11/28/94	TN
Potassium (Total)	1700000	5000	ug/kg	USEPA 7610	11/30/94	TN
Selenium (Total)	ND	500	ug/kg	USEPA 7740	11/23/94	TN
Silver (Total)	ND	500	ug/kg	USEPA 7761	11/28/94	TN
Sodium (Total)	220000	1000	ug/kg	USEPA 7770	11/30/94	TN
Thallium (Total)	ND	500	ug/kg	USEPA 7841	11/28/94	TN
Vanadium (Total)	15000	1000	ug/kg	USEPA 6010	11/28/94	TN
Zinc (Total)	260000	1000	ug/kg	USEPA 6010	11/28/94	TN
% Solids	90	0.01	%		11/22/94	GR

12649 Richfield Court
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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-057
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0003
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	590	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	15	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Aluminum (Total)	7200000	500	ug/kg	USEPA 6010	11/28/94	TN

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

APPENDIX E

CHAIN OF CUSTODY RECORDS

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Labora Name): W+W

114255
Conestoga-Rovers & Associates, Inc
Waterloo, Ontario, CN N2V 1C2
ATTN: Lou Almeida

REFERENCE NUMBER: 5770

PROJECT NAME: GM-Pontiac J-LOT

SAMPLER'S SIGNATURE: B. Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	VOC TCL	SVOC TCL	PCB/PEST TCL	Metals TAL	REMARKS
1	12/7		GW-5770-120794-BTH-001	Water	8	✓	✓	✓	✓	
2			-002		8	✓	✓	✓	✓	
3			-003		8	✓	✓	✓	✓	
4			-004		8	✓	✓	✓	✓	
5			-005		8	✓	✓	✓	✓	
6			-006		8	✓	✓	✓	✓	
7			TRIP BLANK	Water	2	✓				
			7 Day Turn Around Time							

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: 1. B. Holbrook	DATE: 12/7/94 TIME: 1730	RECEIVED BY: 1. Danny L Chrisman	DATE: 12/7/94 TIME: 17:30
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Hand Deliver

AIR BILL No. —

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook, Frank Ring

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

No 1181

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earth Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-Lot

SAMPLER'S SIGNATURE: B Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	TCL VOC	TAL Metals	TCL SVOC	TCL PCB/Pest	REMARKS
001	11/3/94		S-5770-110393-BTH-001	Soil	3	X	X	X	X	
002			-002		2	X	X			
003			-003		2	X	X			
004			-004		3	X	X	X	X	
005			-005		2	X	X			
006			-006		2	X	X			
007			-007		3	X	X	X	X	
008			-008		2	X	X			
009			-009		2	X	X			
TOTAL NUMBER OF CONTAINERS					21					

RELINQUISHED BY: 1. B Holbrook	DATE: 11/3/94 TIME: 1640	RECEIVED BY: 1.	DATE: 11/3/94 TIME: 16:40
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in Person AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:

DATE: 11/3/94 TIME: 16:40

No 0949

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earl Tec

REFERENCE NUMBER: 5770

PROJECT NAME: I-M Pontiac J-LOT

SAMPLER'S SIGNATURE: Brian Holbrad PRINTED NAME: Brian Holbrad

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL PCB/Pest	REMARKS
001	11/4/94		W-5770-110494-BTH-010	water	8	X	X	X	X	
002			S-5770-110494-BTH-011	soil	3	X	X	X	X	
003			S-5770-110494-BTH-012	soil	2	X	X			
004			S-5770-110494-BTH-013	soil	2	X	X			
005			S-5770-110494-BTH-014	soil	3	X	X	X	X	
006			S-5770-110494-BTH-015	soil	2	X	X			
007			S-5770-110494-BTH-016	soil	2	X	X			
008			S-5770-110494-BTH-017	soil	3	X	X	X	X	
009			S-5770-110494-BTH-018	soil	2	X	X			
010			S-5770-110494-BTH-019	soil	2	X	X			
			TOTAL NUMBER OF CONTAINERS		29					

RELINQUISHED BY: 1. Brian Holbrad	DATE: 11/4/94 TIME: 1400	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Delivered in Person AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

0940

SAMPLE TEAM: Brian Holbrad

RECEIVED FOR LABORATORY BY:

DATE: TIME:

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earth Tec

11397
Conestoga-Rovers & Associates, Inc
Waterloo, Ontario, CN N2V 1C2
ATTN: Lou Almeida

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-LOT

SAMPLER'S SIGNATURE: Brian Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL PCB/Pest	REMARKS
001	11/7/94		S-5770-110794-BTH-020	Soil	3	X	X	X	X	
002	↓		S-5770-110794-BTH-021	↓	2	X	X			
003			S-5770-110794-BTH-021 MS/MSD		2	X	X			
004			S-5770-110794-BTH-022		2	X	X			

TOTAL NUMBER OF CONTAINERS: 9

RELINQUISHED BY: 1. Brian Holbrook	DATE: 11/7/94 TIME: 17:37	RECEIVED BY: 1.	DATE: 11/7/94 TIME: 17:37
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in person AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

№ 0941

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laborat Name): Earth Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-LOT

SAMPLER'S SIGNATURE: B Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL Pest/PCB	REMARKS
001	11/8/94		W-5770-110894-BTH-023	water	8	X	X	X	X	
002			S-5770-110894-BTH-024	soil	3	X	X	X	X	
003			S-5770-110894-BTH-025	soil	2	X	X			
004			S-5770-110894-BTH-026	soil	2	X	X			
005			S-5770-110894-BTH-027	soil	3	X	X	X	X	
006			S-5770-110894-BTH-028	soil	2	X	X			
007			S-5770-110894-BTH-029	soil	2	X	X			
008			S-5770-110894-BTH-030	soil	3	X	X	X	X	
009			S-5770-110894-BTH-031-30' BH	soil	2	X	X			
010			S-5770-110894-BTH-032	soil	2	X	X			

TOTAL NUMBER OF CONTAINERS: 29

RELINQUISHED BY: 1. B Holbrook	DATE: 11/8/94 TIME:	RECEIVED BY: 1.	DATE: 11/8/94 TIME: 17:23
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in Person

AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:

DATE: 11/8/94 TIME: 17:23

Nº 0942

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earth Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-LOT

SAMPLER'S SIGNATURE: Brian Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL Pest/PCB	REMARKS
001	11/9/94		S-5770-110994-BTH-033	Soil	3	X	X	X	X	X	
002	↓		↓ 034	↓	2	X	X				
003	↓		↓ 035	↓	2	X	X				

114019
Conestoga-Rovers & Associates, Inc.
Waterloo, Ontario, CN N2V 1C2
ATTN: Lou Almeida
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name): Earth Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-Lot

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: Brian Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL METALS	TCL SVOC	TCL PEST/PCB	REMARKS
001	11/10/94		S-5770-111094-BTH-036	water	8	X	X	X	X	
002	"		S-5770-111094-BTH-037	soil	3	X	X	X	X	
003	"		S-5770-111094-BTH-038	soil	2	X	X			
004	"		S-5770-111094-BTH-039	soil	2	X	X			
005			S-5770-111094-BTH-040	soil	2	X	X			
			TOTAL NUMBER OF CONTAINERS		17					

RELINQUISHED BY: 1. Brian Holbrook	DATE: 11/10/94 TIME: 17:54	RECEIVED BY: 1.	DATE: 11/10/94 TIME: 17:54
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in person AIR BILL No.

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:
DATE: 11/10/94 TIME: 17:54

No 0944

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

11038
Conestoga-Rovers & Associates, Inc
Waterloo, Ontario, CN N2V 1C2
ATTN: Lou Almeida

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earth Tec

REFERENCE NUMBER: 5720

PROJECT NAME: GM Pontiac J-LOT

SAMPLER'S SIGNATURE: Brian Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL PCB/Pest	REMARKS
001	11/11/94		S-5770-111194-BTH-041	soil	3	X	X	X	X	
002			-042		2	X	X			
003			-042 MS/MSD		2	X	X			
004			-043		2	X	X			
005			-044		2	X	X			
006			-045		3	X	X	X	X	
007			-046		2	X	X			
008	↓		-047	↓	2	X	X			
			TOTAL NUMBER OF CONTAINERS		18					

RELINQUISHED BY: 1. Brian Holbrook	DATE: 11/11/94 TIME:	RECEIVED BY: 1. [illegible]	DATE: 11/11/94 TIME: 14:45
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Deliver in person AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:

DATE: TIME:

№ 0948

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

CRA

CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name): Eaton Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-LOT

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: B. Hollbrook PRINTED NAME: Brian Hollbrook

SEQ No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: T+L VOC	T+AL Metals	T+L SVOC	T+L PCB's	REMARKS
001	11/5/94		W-5770-111594-BTH-048	water	8	X	X	X	X	
002	↓		S-5770-111594-BTH-049	soil	3	X	X	X	X	
003			S-5770-111594-BTH-050	soil	2	X	X			
004			S-5770-111594-BTH-051	soil	2	X	X			
			TOTAL NUMBER OF CONTAINERS		15					

RELINQUISHED BY: 1. B. Hollbrook	DATE: 11-5-94 TIME:	RECEIVED BY: 1.	DATE: TIME:
RELINQUISHED BY: 2.	DATE: TIME:	RECEIVED BY: 2.	DATE: TIME:
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: Delivered Person AIR BILL No.

White - Fully Executed Copy; Yellow - Receiving Laboratory Copy; Pink - Shipper Copy; Goldenrod - Sampler Copy

SAMPLE TEAM: Brian Hollbrook

RECEIVED FOR LABORATORY BY:

DATE: 11/6/94 TIME: 0950

1091 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

114077
Conestoga-Rovers & Associates
Waterloo Ontario, CP N2V1C2
ATTN: Lou Almeida

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

CHAIN OF CUSTODY RECORD

SHIPPED TO (Laboratory Name): Earth Tec

REFERENCE NUMBER: 5770

PROJECT NAME: GM Pontiac J-LOT

SAMPLER'S SIGNATURE: Brian Holbrook PRINTED NAME: Brian Holbrook

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL Pest/PCB	REMARKS
001	11/16/94		S-5770-111694-BTH-052	soil	3	X	X	X	X	
002	↓		S-5770-111694-BTH-053	soil	2	X	X			
003	↓		S-5770-111694-BTH-054	soil	2	X	X			

CRA
CONESTOGA-ROVERS & ASSOCIATES, INC.
11100 Metro Airport Center Drive - Suite 160
Romulus, MI 48174 (313) 942-0909

SHIPPED TO (Laboratory Name): Earth Tec — Brighton, Ontario, Canada — Lou Almeida

REFERENCE NUMBER: 5770 / 6318

PROJECT NAME: GM Pontiac

CHAIN OF CUSTODY RECORD

SAMPLER'S SIGNATURE: B Holbrook — PRINTED NAME: Brian Holbrook

SEQ. No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: TCL VOC	TAL Metals	TCL SVOC	TCL PCB/Pest	REMARKS
001	11/18/94		S-5770-111894-BTH-055	Soil	3	X	X	X	X	
002	↓		S-5770-111894-BTH-056	↓	2	X	X			
003			S-5770-111894-BTH-057		2	X	X			
004			S-6318-111894-BTH-031		3	X	X	X	X	
005			S-6318-111894-BTH-032		3	X	X	X	X	
			TOTAL NUMBER OF CONTAINERS		13					

RELINQUISHED BY: 1. B Holbrook — DATE: 11/18/94 TIME:
RELINQUISHED BY: 2. — DATE: TIME:
RELINQUISHED BY: 3. — DATE: TIME:

RECEIVED BY: 1. Donna L Christie — DATE: 11/18/94 TIME: 1737
RECEIVED BY: 2. — DATE: TIME:
RECEIVED BY: 1. — DATE: TIME:

METHOD OF SHIPMENT: Deliver in Person — AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: Brian Holbrook

RECEIVED FOR LABORATORY BY:
DATE: TIME:

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

APPENDIX F

WELL DEVELOPMENT LOGS

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-LOT
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-1
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 930.28
STATIC WATER DEPTH: 17.54
BOTTOM DEPTH: 21.00
WATER COLUMN LENGTH: 3.46+
SCREENED INTERVAL: 21'-17'
WELL VOLUME: 0.55 gal

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	10	12	14			
FIELD pH	7.15	7.06	7.03			
FIELD TEMPERATURE °C	10.1	9.8	9.8			
FIELD CONDUCTIVITY mS	1.21	1.19	1.20			
CLARITY/TURBIDITY VALUES (NTU)	10	62	10			
COLOUR	BROWN	BROWN	BROWN			
ODOR	NONE	NONE	NONE			
COMMENTS	SILTY	SILTY	SILTY			

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-LOT
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-2
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 919.89
STATIC WATER DEPTH: 32.65
BOTTOM DEPTH: 37.00
WATER COLUMN LENGTH: 10.35
SCREENED INTERVAL: 5'
WELL VOLUME: 1.6 GAL

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	10	12	14			
FIELD pH	7.11	7.17	7.11			
FIELD TEMPERATURE °C	8.8	8.6	8.4			
FIELD CONDUCTIVITY mS	1.31	1.32	1.30			
CLARITY/TURBIDITY VALUES (NTU)	999	999	999			
COLOUR	BROWN	BROWN	BROWN			
ODOR	NONE	NONE	NONE			
COMMENTS	SILTY	SILTY	SILTY			

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-10T
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-3
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 922.77
STATIC WATER DEPTH: 36.90
BOTTOM DEPTH: 41.50
WATER COLUMN LENGTH: 4.60+
SCREENED INTERVAL: 5'
WELL VOLUME: 1.1 GAL

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	6.5	8.0	9.5			
FIELD pH	7.14	7.19	7.22			
FIELD TEMPERATURE °C	8.5	8.6	8.9			
FIELD CONDUCTIVITY mS	0.636	0.627	0.636			
CLARITY/TURBIDITY VALUES (NTU)	999	43	10			
COLOUR	GREY	GREY	GREY			
ODOR	NONE	NONE	NONE			
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-LOT
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-4
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 925.29
STATIC WATER DEPTH: —
BOTTOM DEPTH: —
WATER COLUMN LENGTH: —
SCREENED INTERVAL: —
WELL VOLUME: DRY

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL						
FIELD pH						
FIELD TEMPERATURE °C						
FIELD CONDUCTIVITY mS						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR						
ODOR						
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-LOT — PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-5
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 927.44 — ELEVATION
STATIC WATER DEPTH: — — ELEVATION
BOTTOM DEPTH: —
WATER COLUMN LENGTH: —
SCREENED INTERVAL: —
WELL VOLUME: DRY

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL						
FIELD pH						
FIELD TEMPERATURE °C						
FIELD CONDUCTIVITY mS						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR						
ODOR						
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: PONTIAC GM J-LOT
PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 11/30/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-
WELL TYPE (diameter/material): 2" STAINLESS STEEL
MEASURING POINT ELEVATION: 918.35
STATIC WATER DEPTH: 28.24
BOTTOM DEPTH: 39.00
WATER COLUMN LENGTH: 13.76+ ~ 3' WELL CASING
SCREENED INTERVAL: 5'
WELL VOLUME: 2.2 GAL

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	10	12.5	15			
FIELD pH	7.05	7.09	7.15			
FIELD TEMPERATURE °C	9.2	8.2	8.8			
FIELD CONDUCTIVITY mS	1.47	1.47	1.49			
CLARITY/TURBIDITY VALUES (NTU)	10	10	10			
COLOUR	BROWN	BROWN	BROWN			
ODOR	NONE	NONE	NONE			
COMMENTS	SILTY	SILTY	SILTY			

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: J-10T — PROJECT NO. 5770
DATE OF WELL DEVELOPMENT: 12/7/94
DEVELOPMENT CREW MEMBERS: FRANK RING / BRIAN HOLBROOK
SUPERVISOR: —
PURGING METHOD: STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER: MW-J-1
WELL TYPE (diameter/material): 2" ID STAINLESS STEEL
MEASURING POINT ELEVATION: 930.28 — ELEVATION
STATIC WATER DEPTH: 17.34 — ELEVATION
BOTTOM DEPTH: 21.0
WATER COLUMN LENGTH: 6'
SCREENED INTERVAL: 21' - 17'
WELL VOLUME: 1 GAL

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	1	2	3			
FIELD pH	6.67	6.64	6.67			
FIELD TEMPERATURE °C	8.7	9.2	9.2			
FIELD CONDUCTIVITY mS/cm	1.35	1.31	1.31			
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	SILTY BROWN	SILTY BROWN	SILTY BROWN			
ODOR	NO ODOR	NO ODOR	NO ODOR			
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME J-10T PROJECT NO. 57?~

DATE OF WELL DEVELOPMENT 12/7/94

DEVELOPMENT CREW MEMBERS FRANK RING / BRIAN HOLBROOK

SUPERVISOR —

PURGING METHOD STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER	MW-J-2	
WELL TYPE (diameter/material)	2" ID STAINLESS STEEL	
MEASURING POINT ELEVATION	919.89	
STATIC WATER DEPTH	32.62	ELEVATION
BOTTOM DEPTH	37.0'	ELEVATION
WATER COLUMN LENGTH	8'	
SCREENED INTERVAL	37'-32'	
WELL VOLUME	1.6	

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	1.75	3.5	5.25			
FIELD pH	6.36	6.50	6.57			
FIELD TEMPERATURE °C	8.0	8.3	8.0			
FIELD CONDUCTIVITY mS/cm	1.34	1.4	1.36			
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	BROWN	BROWN	BROWN			
ODOR	NO ODOR	NO ODOR	NO ODOR			
COMMENTS	LITTLE SILTY TRANSAMENT	→	→			

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME J-10T PROJECT NO. 5770
DATE OF WELL DEVELOPMENT 12/7/94
DEVELOPMENT CREW MEMBERS FRANK RING / BRIAN HOLBROOK
SUPERVISOR —
PURGING METHOD STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER MW-J-3
WELL TYPE (diameter/material) 2" ID STAINLESS STEEL
MEASURING POINT ELEVATION 922.77 ELEVATION
STATIC WATER DEPTH 36.88 ELEVATION
BOTTOM DEPTH 41.5
WATER COLUMN LENGTH 7'
SCREENED INTERVAL 41.5 - 37'
WELL VOLUME 1.1 gal

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) gal	1.3	2.6	3.9			
FIELD pH	7.69	7.11	6.9			
FIELD TEMPERATURE °C	8.5	8.4	8.4			
FIELD CONDUCTIVITY mS/cm	.571	.574	.587			
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	SILTY GREY	SILTY GREY	SILTY GREY			
ODOR	NO ODOR	NO ODOR	NO ODOR			
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME J-10T PROJECT NO. 5770

DATE OF WELL DEVELOPMENT 12/7/94

DEVELOPMENT CREW MEMBERS FRANK RING / BRIAN HOLBROOK

SUPERVISOR —

PURGING METHOD STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER MW-5-4

WELL TYPE (diameter/material) 2" ID STAINLESS STEEL

MEASURING POINT ELEVATION 925.29

STATIC WATER DEPTH — ELEVATION

BOTTOM DEPTH — ELEVATION

WATER COLUMN LENGTH —

SCREENED INTERVAL —

WELL VOLUME DRY

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/tot. volume)						
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR						
ODOR						
COMMENTS						

COPIES TO: _____

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME J-10T PROJECT NO. 5770
DATE OF WELL DEVELOPMENT 12/7/94
DEVELOPMENT CREW MEMBERS FRANK RING / BRIAN HOLBROOK
SUPERVISOR —
PURGING METHOD STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER MW-J-5
WELL TYPE (diameter/material) 2" ID STAINLESS STEEL
MEASURING POINT ELEVATION 927.44
STATIC WATER DEPTH — ELEVATION
BOTTOM DEPTH — ELEVATION
WATER COLUMN LENGTH —
SCREENED INTERVAL —
WELL VOLUME DRY

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (# bails/tot. volume)						
FIELD pH						
FIELD TEMPERATURE						
FIELD CONDUCTIVITY						
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR						
ODOR						
COMMENTS						

COPIES TO:

CRA

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME J-10T
PROJECT NO. 57.-
DATE OF WELL DEVELOPMENT 12/7/94
DEVELOPMENT CREW MEMBERS FRANK RING / BRIAN HOLBROOK
SUPERVISOR —
PURGING METHOD STAINLESS STEEL BAILER

WELL INFORMATION

WELL NUMBER MW-J-6
WELL TYPE (diameter/material) 2" ID STAINLESS STEEL
MEASURING POINT ELEVATION 918.35
STATIC WATER DEPTH 28.35
BOTTOM DEPTH 39'
WATER COLUMN LENGTH 11'
SCREENED INTERVAL 39'-34'
WELL VOLUME 1.8 GAL

ELEVATION
ELEVATION

Note: For 2" dia well, 1 foot = 0.14 gallons (imp) or 0.16 gallons (us).
1 meter = 2 liters

	1	2	3	4	5	TOT/AVG
VOLUME PURGED (~~# bails~~/tot. volume) GAL	4 GAL	6 GAL	8 GAL			
FIELD pH	11.98	11.35	11.62			
FIELD TEMPERATURE °C	10.6	9.6	10.0			
FIELD CONDUCTIVITY mS/cm	8.45	5.51	4.13			
CLARITY/TURBIDITY VALUES (NTU)						
COLOUR	SILTY GREY	SILTY GREY	SILTY GREY			
ODOR	NO ODOR	NO ODOR	NO ODOR			
COMMENTS						

COPIES TO:

CRA

APPENDIX G

LABORATORY ANALYTICAL RESULTS - GROUNDWATER

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114255
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 01/11/95

Thomas J Geyer, CIH
Signature

1/11/95
Date

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *CONESTOGA-ROVERS & ASSOCIATES*

JOB NUMBER: *114255*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 0001 Parameter: Cadmium, Zinc Reason: 5
Explanation:

Sample No.(s): 0004 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): 0006 Parameter: 2-Fluorophenol Reason: 7
Explanation:

Sample No.(s): --- Parameter: Acetone Reason: 4
Explanation:

Sample No.(s): 0001 Parameter: 4-Chloro-3-Methylphenol Reason: 5
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-001
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WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	43-116 %		
2-Fluorophenol	24	0	%	21-100 %		
Nitrobenzene-d5	52	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	84	0	%	33-141 %		
2,4,6-Tribromophenol	68	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	ug/l	Control Limits		
Decachlorobiphenyl	60	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	70	0	%	60-150%		
Date Analyzed:	12/13/94	0	month/day/year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	190	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	2.8	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	240	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	277000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	520	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	9000	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	1.9	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	118000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	290	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	43-116 %		
2-Fluorophenol	27	0	%	21-100 %		
Nitrobenzene-d5	48	0	%	35-114 %		
Phenol-d6	19	0	%	10-94 %		
Terphenyl-d14	76	0	%	33-141 %		
2,4,6-Tribromophenol	70	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	74	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	61	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	270	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	3.1	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	230	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	255000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	160	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	8300	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	1.2	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	
Sodium (Total)	111000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-003
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-003
DATE SAMPLED.....: 12/07/94
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LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	9.1	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY I.D...: 114255-0003
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
)-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	43-116 %		
2-Fluorophenol	18	0	%	21-100 %		
Nitrobenzene-d5	46	0	%	35-114 %		
Phenol-d6	27	0	%	10-94 %		
Terphenyl-d14	74	0	%	33-141 %		
2,4,6-Tribromophenol	63	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-003
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	51	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	84	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	45	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	4.1	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	160	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	80000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	210	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	2500	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-003
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	15	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	19000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	19000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	100	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
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CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	62	0	%	43-116 %		
2-Fluorophenol	28	0	%	21-100 %		
Nitrobenzene-d5	60	0	%	35-114 %		
Phenol-d6	22	0	%	10-94 %		
Terphenyl-d14	74	0	%	33-141 %		
2,4,6-Tribromophenol	61	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	45	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	68	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	84	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	340	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	181000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	3810	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	130	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	1700	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	40000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	
Sodium (Total)	28000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	36	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
),1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	1.3	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	<3.0	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	98	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	19	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

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DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	43-116 %		
2-Fluorophenol	22	0	%	21-100 %		
Nitrobenzene-d5	54	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	72	0	%	33-141 %		
2,4,6-Tribromophenol	58	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	51	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	65	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	59	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	110	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	122000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	43	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	280	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	1700	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	36000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	73000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	220	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	2.5	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	42	0	%	43-116 %		
2-Fluorophenol	19	0	%	21-100 %		
Nitrobenzene-d5	40	0	%	35-114 %		
Phenol-d6	12	0	%	10-94 %		
Terphenyl-d14	78	0	%	33-141 %		
2,4,6-Tribromophenol	50	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	90	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	77	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS

01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: Trip Blank
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0007
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	1.5	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/13/94	0	Month/Day/Year			

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Livonia, MI 48150
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APPENDIX H

DATA VALIDATION REPORTS

MEMO

TO: Frank Ring REFERENCE NO: 5770

FROM: Lou Almeida/dm/4 DATE: January 13, 1995

C.C.: Brian Holbrook

RE: Analytical Data and Quality Assurance Review
J-Lot Extent of Contamination Study
Pontiac, Michigan

1.0 OVERVIEW

Fifty-three soil samples and four water samples were collected between November 3, 1994 and November 18, 1994 at the J-Lot Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of target compound list (TCL), volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); TCL Pesticides/polychlorinated biphenyls (Pest/PCBs); and target analyte list (TAL) metals.

This memo presents an analytical assessment and validation of results obtained in eleven analytical reports from Earth Tech Analytical Services (Earth Tech) located in Lavonia, Michigan, resulting from the analysis of the soil and water samples collected from the Site.

Analytical results were received in reports provided by Earth Tech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Earth Tech's quality control criteria. Earth Tech completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (February 1994), and "National Functional Guidelines for Inorganic Data

Review", (February 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries and field blank results.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by Earth Tech. Analytical methods and holding time criteria are presented in Table 1.

All samples submitted for analysis were analyzed prior to expiration of the prescribed holding time. Therefore, no qualifications were necessary on this basis.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for TCL VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene and 1,2-dichloroethane-d_4. Samples submitted for TCL SVOCs analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5, terphenyl-d_{14}, 2-fluorophenol, phenol-d_6 and 2,4,6-tribromophenol surrogates. Samples submitted for TCL Pesticides/PCB analysis were spiked with dechlorobiphenyl

and 2,4,5,6-tetrachloro-m-xylene surrogates. Surrogate recovery limits, as established by the laboratory, are summarized in Table 2.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with some exceptions. Sample results with unacceptable surrogate recoveries are presented in Table 3. Qualifications, based on unacceptable surrogate recoveries, are presented on Table 4.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants with only limited exceptions. In cases where analytes were detected in the method blank, qualifications were not necessary as the analyte was either not detected in the associated sample or the sample result greatly exceeded (greater than 10 times) the blank result.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. Earth Tech prepared and analyzed check samples with the investigative samples, for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology. No action is normally taken on

MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits for organic analyses, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision for organic analyses.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE (MS) INORGANIC ANALYSES

MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

MS recoveries fell within review limits (75-125%) with some exceptions. Samples whose MS recoveries fell outside review limits have been appropriately qualified and are summarized in Table 4. A summary of unacceptable inorganic MS recoveries is present in Table 5.

3.0 FIELD QA/QC

3.1 FIELD BLANKS

In order to assess sample equipment decontamination occurring in the field, four field rinsate blanks were collected and submitted for all analyses.

Field rinsate blanks were found to be free of target analytes with some exceptions. In all cases were a target analyte was detected in a rinsate blank the associated sample result greatly exceeded (greater than 10 times) the blank result. Qualifications were not deemed necessary on this basis.

4.0 CONCLUSION

The data provided by Earth Tech is acceptable for use noting the qualifications resulting from unacceptable surrogate spike and inorganic MS recoveries, as summarized in Table 4.

TABLE 2

SUMMARY OF SURROGATE CONTROL LIMITS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits*	
		Water Matrix	*Solid Matrix*
TCL VOCs	Bromofluorobenzene	74-121	74-121
	1,2-Dichloroethane-d_4	70-121	70-121
	Toluene-d_8	81-117	81-117
TCL SVOCs	2-Fluorobiphenyl	43-116	43-116
	Nitrobenzene-d_5	35-117	35-114
	Terphenyl-d_{14}	33-141	33-141
	2-Fluorophenol	21-100	21-100
	Phenol-d_6	18-137	33-146
	2,4,6-Tribromophenol	39-120	31-115
Pest/PCBs	Decachlorobiphenyl	60-150	60-150
	2,4,5,6-Tetrachloro-m-xylene	60-150	60-150

Notes:

TCL - Target Compound List
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychorinated Biphenyls

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
S-5770-110394-BTH-002	VOCs	Bromofluorobenzene	140	74-121
		1,2-Dichloroethane-d_4	124	70-121
S-5770-110394-BTH-003	VOCs	Bromofluorobenzene	122	74-121
		1,2-Dichloroethane-d_4	124	70-121
S-5770-110394-BTH-004	VOCs	1,2-Dichloroethane-d_4	56	70-121
S-5770-110394-BTH-006	VOCs	Bromofluorobenzene	128	74-121
S-5770-110394-BTH-008	VOCs	Bromofluorobenzene	124	74-121
		1,2-Dichloroethane-d_4	126	70-121
S-5770-110394-BTH-009	VOCs	1,2-Dichloroethane-d_4	126	70-121
S-5770-110494-BTH-012	VOCs	1,2-Dichloroethane-d_4	132	70-121
S-5770-110494-BTH-014	Pest/PCBs	Decachlorobiphenyl	212	60-150
S-5770-110494-BTH-019	Pest/PCBs	1,2-Dichloroethane-d_4	130	70-121
S-5770-110794-BTH-021	Pest/PCBs	1,2-Dichloroethane-d_4	132	70-121
S-5770-110794-BTH-022	Pest/PCBs	Bromofluorobenzene	124	74-121
S-5770-110894-BTH-024	Pest/PCBs	Decachlorobiphenyl	40	60-150
S-5770-110894-BTH-025	VOCs	1,2-Dichloroethane-d_4	124	70-121
S-5770-110894-BTH-026	VOCs	1,2-Dichloroethane-d_4	128	70-121
S-5770-110894-BTH-028	VOCS	1,2-Dichloroethane-d_4	130	70-121
S-5770-110894-BTH-030	Pest/PCBs	Decachlorobiphenyl	ND	60-150
		2,4,5,6-Tetrachloro-m-xylene	ND	60-150
S-5770-111094-BTH-038	VOCs	Bromofluorobenzene	128	74-121
S-5770-111094-BTH-039	VOCs	1,2-Dichloroethane-d_4	124	70-121

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
S-5770-111094-BTH-040	VOCs	Bromofluorobenzene	130	74-121
S-5770-111114-BTH-041	VOCs	Bromofluorobenzene	134	74-121
		Toluene-d_8	134	81-117
S-5770-111594-BTH-050	VOCs	1,2-Dichloroethane-d_4	128	70-121
S-5770-111594-BTH-051	VOCs	1,2-Dichloroethane-d_4	126	70-121

Notes:

VOCs - Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
ND - Not Detected/No Recovery

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110394-BTH-002	VOCs	Acetone	2200	2200J	2.2
		Toluene	14	14J	2.2
S-5770-110394-BTH-003	VOCs	Acetone	3200	3200J	2.2
		Toluene	19	19J	2.2
S-5770-110394-BTH-003	VOCs	Acetone	410	410J	2.2
		Benzene	ND(10)	10UJ	2.2
		Bromodichloromethane	ND(10)	10UJ	2.2
		Bromoform	ND(10)	10UJ	2.2
		Bromoethane	ND(10)	10UJ	2.2
		2-Butanone	ND(100)	100UJ	2.2
		Carbon disulfide	ND(100)	100UJ	2.2
		Carbon Tetrachloride	ND(10)	10UJ	2.2
		Chlorobenzene	ND(10)	10UJ	2.2
		Chloroethane	ND(10)	10UJ	2.2
		Chloroform	ND(10)	10UJ	2.2
		Chloromethane	ND(10)	10UJ	2.2
		Dibromochloromethane	ND(10)	10UJ	2.2
		1,1-Dichloroethane	ND(10)	10UJ	2.2
		1,2-Dichloroethane	ND(10)	10UJ	2.2
		1,1-Dichloroethene	ND(10)	10UJ	2.2
		trans-1,2-Dichloroethene	ND(10)	10UJ	2.2
		1,2-Dichloropropane	ND(10)	10UJ	2.2
		cis-1,3-Dichloropropene	ND(10)	10UJ	2.2
		Ethylbenzene	ND(10)	10UJ	2.2
		2-Hexanone	ND(100)	100UJ	2.2
		Methylene chloride	ND(10)	10UJ	2.2
		4-Methyl-2-pentanone	ND(100)	100UJ	2.2
		Styrene	ND(10)	10UJ	2.2
		1,1,2,2-Tetrachloroethane	ND(10)	10UJ	2.2
		Tetrachloroethene	ND(10)	10UJ	2.2
		Toluene	ND(10)	10UJ	2.2
		1,1,1-Trichloroethane	ND(10)	10UJ	2.2
		1,1,2-Trichloroethane	ND(10)	10UJ	2.2
		Trichloroethene	ND(10)	10UJ	2.2
		Vinyl chloride	ND(10)	10UJ	2.2
		Xylenes (o,m&p)	ND(30)	30UJ	2.2
		cis-1,2-Dichloroethene	ND(10)	10UJ	2.2
		Vinyl acetate	ND(10)	10UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110394-BTH-006	VOCs	Acetone	790	790J	2.2
		Methylene Chloride	18	18J	2.2
		Toluene	21	21J	2.2
S-5770-110394-BTH-008	VOCs	Acetone	170	170J	2.2
		Methylene Chloride	17	17J	2.2
		Toluene	23	23J	2.2
S-5770-110394-BTH-009	VOCs	Acetone	1000	1000J	2.2
		Methylene Chloride	18	18J	2.2
		Toluene	10	10J	2.2
S-5770-110494-BTH-012	VOCs	Acetone	5400	5400J	2.2
		Methylene Chloride	20	20J	2.2
		Toluene	28	28J	2.2
S-5770-110494-BTH-014	Pest/PCBs	Aroclor 1254	730	730J	2.2
S-5770-110494-BTH-019	VOCs	Acetone	4800	4800J	2.2
		Methylene Chloride	10	10J	2.2
		Toluene	23	23J	2.2
S-5770-110794-BTH-021	VOCs	Acetone	5200	5200J	2.2
	Metals	Arsenic	4600	4600J	2.6
		Manganese	270000	270000J	2.6
		Potassium	910000	910000J	2.6
S-5770-110794-BTH-022	VOCs	Acetone	700	700J	2.2
		Ethylbenzene	14	14J	2.2
		Toluene	67	67J	2.2
		Xylenes (o,m&p)	62	62J	2.2
S-5770-110894-BTH-024	Pest/PCBs	Aldrin	<1.7	1.7UJ	2.2
		alpha-BHC	<1.7	1.7UJ	2.2
		beta-BHC	<1.7	1.7UJ	2.2
		delta-BHC	<1.7	1.7UJ	2.2
		gamma-BHC (Lindane)	<1.7	1.7UJ	2.2
		4,4'-DDD	<3.3	3.3UJ	2.2
		4,4'-DDE	<3.3	3.3UJ	2.2
		4,4'-DDT	<3.3	3.3UJ	2.2
		Dieldrin	<3.3	3.3UJ	2.2
		Endosulfan I	<3.3	3.3UJ	2.2
		Endosulfan II	<3.3	3.3UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110894-BTH-024	Pest/PCBs	Endosulfan sulfate	<3.3	3.3UJ	2.2
		Endrin	<3.3	3.3UJ	2.2
		Endrin aldehyde	<3.3	3.3UJ	2.2
		Heptachlor	<1.7	1.7UJ	2.2
		Heptachlor epoxide	<1.7	1.7UJ	2.2
		Toxaphene	<170	170UJ	2.2
		Methoxychlor	<50	50UJ	2.2
		Endrin ketone	<1.7	1.7UJ	2.2
		alpha-Chlordane	<3.3	3.3UJ	2.2
		gamma-Chlordane	<3.3	3.3UJ	2.2
		PCB Aroclor 1016	<330	330UJ	2.2
		PCB Aroclor 1221	<330	330UJ	2.2
		PCB Aroclor 1232	<330	330UJ	2.2
		PCB Aroclor 1242	<330	330UJ	2.2
		PCB Aroclor 1248	<330	330UJ	2.2
		PCB Aroclor 1254	<330	330UJ	2.2
		PCB Aroclor 1260	<330	330UJ	2.2
	Metals	Thallium	<250	250UJ	2.6
S-5770-110894-BTH-025	VOCs	Acetone	1400	1400J	2.2
		Toluene	32	32J	2.2
S-5770-110894-BTH-026	VOCs	Acetone	2600	2600J	2.2
		Toluene	12	12J	2.2
S-5770-110894-BTH-028	VOCs	Acetone	500	500J	2.2
		Toluene	35	35J	2.2
S-5770-110994-BTH-033	Metals	Manganese	320000	320000J	2.6
		Potassium	470000	470000J	2.6
S-5770-111094-BTH-038	VOCs	Acetone	5000	5000J	2.2
		Benzene	17	17J	2.2
		2-Butanone	230	230J	2.2
		Ethylbenzene	13	13J	2.2
		Toluene	21	21J	2.2
S-5770-111094-BTH-039	VOCs	Acetone	820	820J	2.2
		Toluene	14	14J	2.2
S-5770-111094-BTH-040	VOCs	Acetone	1500	1500J	2.2
		Toluene	19	19J	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-111094-BTH-041	VOCs	Acetone	2800	2800J	2.2
		Benzene	200	200J	2.2
		2-Butanone	4200	4200J	2.2
		Ethylbenzene	25000	25000J	2.2
		Methylene Chloride	13	13J	2.2
		4,-Methyl-2-pentanone	45000	45000J	2.2
		Toluene	2400	2400J	2.2
		Xylenes (o,m&p)	50000	50000J	2.2
	Metals	Arsenic	10000	10000J	2.6
S-5770-111594-BTH-050	VOCs	Acetone	6400	6400J	2.2
S-5770-111594-BTH-051	VOCs	Acetone	1900	1900J	2.2
		Ethylbenzene	15	15J	2.2
		Toluene	14	14J	2.2
		Xylenes (o,m&p)	95	95J	2.2
S-5770-111894-BTH-055	Metals	Arsenic	13000	13000J	2.6
		Barium	67000	67000J	2.6
		Chromium	19000	19000J	2.6
		Copper	30000	30000J	2.6
		Iron	41000000	41000000J	2.6
		Lead	77000	77000J	2.6
		Selenium	ND(500)	500UJ	2.6
		Silver	ND(500)	R	2.6
		Thallium	ND(500)	500UJ	2.6

Notes:

VOCs - Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
UJ - The parameter was undetected. The sample reporting limit is an estimated limit.
J - The reported result is estimated.
R - The reported data is unuseable.

TABLE 5

SUMMARY OF UNACCEPTABLE INORGANIC MATRIX SPIKE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Metal*	*MS Recoveries (%)*	*Control Limits (%)*
S-5770-110794-BTH-021	Arsenic	64, 64	75-125
	Manganese	17, 20	75-125
	Potassium	178, 167	75-125
S-5770-110894-BTH-024	Thallium	69, 64	75-125
S-5770-110994-BTH-033	Manganese	61, 63	75-125
	Potassium	137, 173	75-125
S-5770-111094-BTH-041	Arsenic	132, 144	75-125
S-5770-111894-BTH-055	Arsenic	0, 0	75-125
	Barium	138, 183	75-125
	Chromium	152, 200	75-125
	Copper	1000, 975	75-125
	Iron	0, 535	75-125
	Lead	982, 535	75-125
	Selenium	30, 17	75-125
	Silver	0, 0	75-125
	Thallium	70, 72	75-125

MEMO

TO: Frank Ring

REFERENCE NO: 5770

FROM: Lou Almeida/dm/5

DATE: January 16, 1995

C.C.: Brian Holbrook

RE: Analytical Data and Quality Assurance Review
J-Lot Groundwater Sampling
Pontiac, Michigan

1.0 OVERVIEW

Six water samples were collected on December 7, 1994 at the J-Lot Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of target compound list (TCL), volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); TCL Pesticides/polychlorinated biphenyls (Pest/PCBs); and target analyte list (TAL) metals.

This memo presents an analytical assessment and validation of results obtained in an analytical report from Earth Tech Analytical Services (Earth Tech) located in Lavonia, Michigan, resulting from the analysis of the water samples collected from the Site.

Analytical results were received in a report provided by Earth Tech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Earth Tech's quality control criteria. Earth Tech completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (February 1994), and "National Functional Guidelines for Inorganic Data Review", (February 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries and trip blank results.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by Earth Tech. Analytical methods and holding time criteria are presented in Table 1.

All samples submitted for analysis were analyzed prior to expiration of the prescribed holding time. Therefore, no qualifications were necessary on this basis.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for TCL VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene and 1,2-dichloroethane-d_4. Samples submitted for TCL SVOCs analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5, terphenyl-d_{14}, 2-fluorophenol, phenol-d_6 and 2,4,6-tribromophenol surrogates. Samples submitted for TCL Pesticides/PCB analysis were spiked with dechlorobiphenyl and 2,4,5,6-tetrachloro-m-xylene surrogates. Surrogate recovery limits, as established by the laboratory, are summarized in Table 2.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with some exceptions. Sample results with unacceptable surrogate recoveries are presented in Table 3. Qualifications, based on unacceptable surrogate recoveries, are presented on Table 4.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants. Qualifications were not required on this basis.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. Earth Tech prepared and analyzed check samples with the investigative samples, for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology. No action is normally taken on MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits for organic analyses, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision for organic analyses.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE (MS) INORGANIC ANALYSES

MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

MS recoveries fell within review limits (75-125%) with two exceptions. The mercury MS recoveries for sample GW-5770-120794-BTH-003 exceeded acceptable limits, however, as mercury was not detected, a data qualification was not required. The cadmium MS recoveries for sample GW-5770-120794-BTH-001 were below acceptable limits. The data qualification for this sample result is presented in Table 4.

2.7 TRIP BLANK

In order to assess the existence and magnitude of VOC contamination attributable to sample transport, the environment and/or shipping, one trip blank was collected and submitted for analyses.

The trip blank was found to be free of target analytes. Qualifications were not deemed necessary on this basis.

3.0 CONCLUSION

The data provided by Earth Tech is acceptable for use noting the qualifications resulting from unacceptable surrogate spike and inorganic MS recoveries, as summarized in Table 4.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIMES
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Analysis	*Method*	*Holding time Criteria Water Matrix (days)*
TCL VOCs	SW-846 8240	14
TCL SVOCs	SW-846 8270	7/40
TCL Pest/PCBs	SW-846 8080	7/40
TAL Metals	SW-846 6010/7000 Series	6 months
Mercury	SW-846 7470	28

Notes:

TCL	-	Target Compound List
VOCs	-	Volatile Organic Compounds
SVOCs	-	Semi-Volatile Organic Compunds
Pest/PCBs	-	Pesticides/Polychlorinated Biphenyls
TAL	-	Target Analyte List
SW-846	-	USEPA's document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, September 1986.
7/40	-	7 days from the sample collection date to the sample extraction date, 40 days from the sample extraction date to the sample analysis date
14	-	14 days from the sample collection date to the sample analysis date

TABLE 2

SUMMARY OF SURROGATE CONTROL LIMITS
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits Water Matrix*
TCL VOCs	Bromofluorobenzene	74-121
	1,2-Dichloroethane-d_4	70-121
	Toluene-d_8	81-117
TCL SVOCs	2-Fluorobiphenyl	40-106
	Nitrobenzene-d_5	36-102
	Terphenyl-d_{14}	39-120
	2-Fluorophenol	17-72
	Phenol-d_6	10-98
	2,4,6-Tribromophenol	34-116
Pest/PCBs	Decachlorobiphenyl	60-150
	2,4,5,6-Tetrachloro-m-xylene	60-150

Notes:

TCL - Target Compound List
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychorinated Biphenyls

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
GW-5770-120794-BTH-003	Pest/PCBs	Decachlorobiphenyl	51	60-150
GW-5770-120794-BTH-004	Pest/PCBs	Decachlorobiphenyl	45	60-150
GW-5770-120794-BTH-005	Pest/PCBs	Decachlorobiphenyl	51	60-150

Note:

Pest/PCBs - Pesticides/Polychlorinated Biphenyls

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-001	Metals	Cadium	<0.2	0.2UJ	2.6
GW-5770-120794-BTH-003	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2
		Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2
		PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2
GW-5770-120794-BTH-004	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-004	Pest/PCBs	Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2
		PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2
GW-5770-120794-BTH-005	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2
		Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-005	Pest/PCBs	PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2

Notes:

Pest/PCBs - Pesticides/Polychlorinated Biphenyls
UJ - The parameter was undetected. The sample reporting limit is an estimated limit.

APPENDIX I

REGIONAL WELL LOGS

(1) GEOLOGICAL SURVEY NO #1

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PERMIT NUMBER

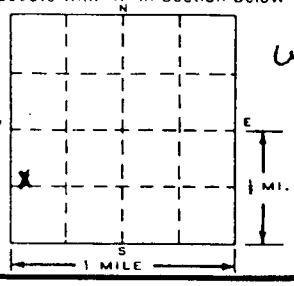
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	SW¼ NW¼ SW¼	3	2 N/S*	10 E/W*

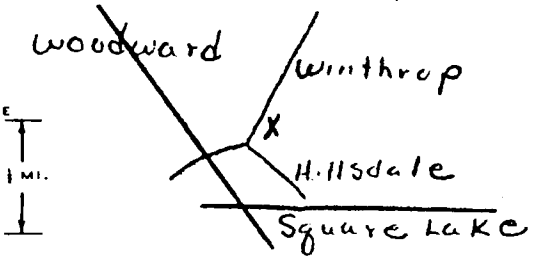
Distance And Direction From Road Intersection
1616 Winthrop

19-03-301-004-040 BLHL
Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map:



3 OWNER OF WELL
Mr. Fred Silverman
Address 1616 Winthrop
Bloomfield Hills 48302
Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH: 245 FT. | Date Completed MO 9 DAY 18 YEAR 91 | [ ] New Well [X] Replacement Well

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ]

6 USE [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ]

7 CASING Diameter [X] Steel [X] Threaded [ ] Plastic [ ] Welded
4 in. to 242 ft. depth
___ in. to ___ ft. depth
Grouted Drill Hole Diameter
___ in. to ___ ft. depth
___ in. to ___ ft. depth
Height Above/~~Below~~ Surface 2'2" ft.
Weight 11 lbs./ft
Drive Shoe [X] Yes [ ] No

8 SCREEN Johnson [ ] Not Installed
Type stainless steel Diameter 4"
Slot/~~Gauze~~ 30 Length 5'
Set between 239'10" ft. and 245' ft.
FITTINGS [ ] K-Packer [ ] Lead Packer [ ] Bremer Check
[X] Blank above screen 20" ft. Other

9 STATIC WATER LEVEL
90 ft. below land surface [ ] Flow

10 PUMPING LEVEL below land surface
97 ft. after 1 3/4 hrs. pumping at 20 G.P.M.
___ ft. after ___ hrs. pumping at ___ G.P.M.

11 WELL HEAD COMPLETION [X] Pitless adapter [ ] 12" above grade [ ] Basement offset [ ] Approved pit

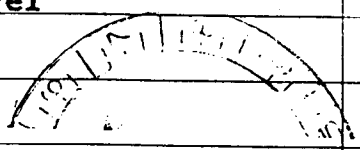
12 WELL GROUTED? [ ] No [X] Yes From ___ to ___ ft.
[ ] Neat cement [ ] Bentonite [X] Other casing seal
No. of bags of cement ___ Additives ___

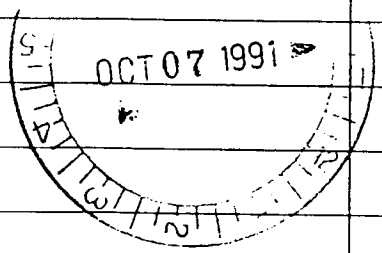
13 Nearest source of possible contamination
Type septic Distance 70 ft. Direction SW
Well disinfected upon completion? [X] Yes [ ] No
Was old well plugged? [ ] Yes [X] No

14 PUMP [ ] Not Installed [ ] Pump Installation Only
Manufacturer's name Red Jacket
Model number 150CN1-CN10G HP 1½ Volts 230
Length of Drop Pipe 126 ft. capacity 25 G.P.M.
TYPE [X] Submersible [ ] Jet
PRESSURE TANK
Manufacturer's name Wellrite
Model number WR-260 Capacity ___ Gallons

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gravel clay	17'	17'
Yellow gravel	23'	40'
Gravel hardpan	55'	95'
Boulder		95'
Gravel hardpan	55'	150'
Gravel clay & *hardpan	30'	180'
Gravel w/clay	20'	200'
Clay w/gravel	30'	230'
Gravel	15'	245'





USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc.
Old well kept as backup

16 WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

O.O. Corsaut, Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO
Address 15101 W. 11 Mile Oak Park, MI 48237
Signed [signature] Date 10/2/91
AUTHORIZED REPRESENTATIVE

17 Rig Operator's Name
Wayne Hambell

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a

D67d 2/89

LOCAL HEALTH DEPT.

GEOLOGICAL SURVEY SAMPLE No. #2

(2)

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

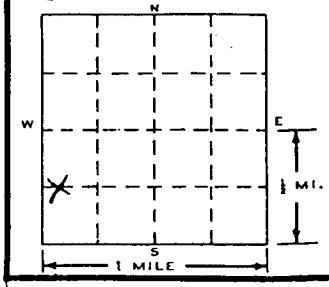
County	Township Name	Fraction	Section Number	Town Number	Range Number
OAKLAND	BLOOMFIELD	¼ ¼ ¼	3	N/S.	E/

Distance And Direction from Road Intersections

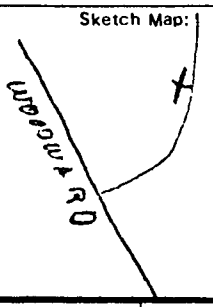
1628 WINTHROP

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:



3 OWNER OF WELL: RICHARD SANDERS

Address

4 WELL DEPTH: (completed) 169 ft. Date of Completion NOV 84

5 ☐ Cable tool ☑ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☑ Jetted ☐ Bored ☐ ____

6 USE: ☑ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☐ Welded ☑ Diam. 4 in. to ____ ft. Depth; ____ in. to ____ ft. Depth. Height: Above/Below Surface ____ ft. Weight ____ lbs./ft. Drive Shoe? Yes ☑ No ☐

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
RED CLAY		25
GRAVEL		32
BLUE CLAY ROCKS		135
GRAVEL SOME CLAY		159
WATER SAND	?	169

USE A 2ND SHEET IF NEEDED

8 SCREEN: Type: S. S. Dia.: 4 Slot/Gauze 15 Length 8 Set between ____ ft. and ____ ft. Fittings: K

9 STATIC WATER LEVEL 87 ft. below land surface

10 PUMPING LEVEL below land surface 100 ft. after ____ hrs. pumping 20 g.p.m. ____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million: Iron (Fe) ____ Chlorides (Cl) ____ Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☑ Pitless Adapter ☐ 12" Above Grade

13 Well Grouted? ☑ Yes ☐ No ☐ Neat Cement ☑ Bentonite ☐ ____ Depth: From 0 ft. to 144 ft.

14 Nearest Source of possible contamination ____ feet ____ Direction ____ Type. Well disinfected upon completion ☑ Yes ☐ No

15 PUMP: ☐ Not installed. Manufacturer's Name WIEBIMOL. Model Number ____ HP ½ Volts 230. Length of Drop Pipe ____ ft. capacity ____ G.P.M. Type: ☑ Submersible ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION: This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

REGISTERED BUSINESS NAME ____ REGISTRATION NO. 0613

Address 10730 CLARK

Signed ____ AUTHORIZED REPRESENTATIVE Date 84

D67d 100M (Rev. 12-68)

LOCAL HEALTH DEPT COPY

(3) GEOLOGICAL SURVEY NO. #3

WATER WELL AND PUMP RECORD

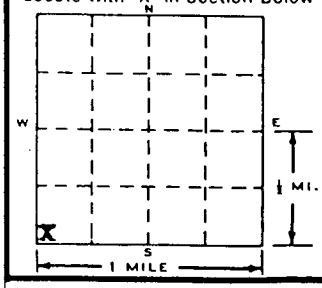
PERMIT NUMBER

1 LOCATION OF WELL

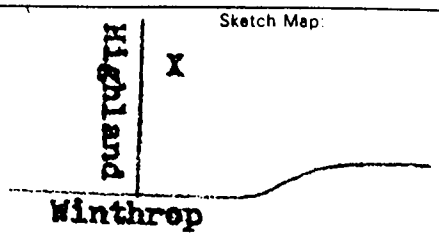
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	SW ¼ SW ¼ SW ¼	3	2 N/S	10 E/W

Distance And Direction From Road Intersection
500' N of Winthrop
210 E. Highland Ave.
Bloomfield Hills, MI
Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map:



3 OWNER OF WELL:
Ivan Kebosh
Address 210 E. Highland Ave.
Bloomfield Hills, MI 48013
Address Same As Well Location? [X] Yes [ ] No

4 WELL DEPTH: 107 FT. | Date Completed MO. DAY YEAR: 7 29 86 | [ ] New Well [X] Replacement Well

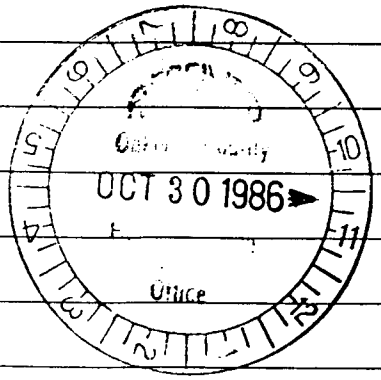
5 [ ] Cable tool [X] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Auger [ ] Jetted [ ] ____

6 USE: [X] Domestic [ ] Type I Public [ ] Type III Public [ ] Irrigation [ ] Type IIa Public [ ] Heat pump [ ] Test Well [ ] Type IIb Public [ ] ____

7 CASING: Diameter [ ] Steel [ ] Threaded [X] Plastic [ ] Welded
5 in. to 103 ft. depth
____ in. to ____ ft. depth
Grouted Drill Hole Diameter
8 in. to 103 ft. depth
____ in. to ____ ft. depth
Height: Above/Below
Surface ____ ft.
Weight ____ lbs./ft
Drive Shoe [ ] Yes [ ] No

2 FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand and gravel	20	20
Gravel	10	30
Clay and gravel	10	40
Clay	30	70
Clay and gravel	20	90
Waterbearing gravel	17	107

USE A 2ND SHEET IF NEEDED



8 SCREEN: [ ] Not Installed
Type stainless Diameter 3"
Slot XXX 15 Length 4'
Set between 103 ft. and 107 ft.
FITTINGS: [X] K-Packer [ ] Lead Packer [ ] Bremer Check
[ ] Blank above screen ____ ft. Other ____

9 STATIC WATER LEVEL:
50 ft. below land surface [ ] Flow

10 PUMPING LEVEL: below land surface
60 ft. after 2 hrs. pumping at 25 G.P.M.
____ ft. after ____ hrs. pumping at ____ G.P.M.

11 WELL HEAD COMPLETION: [X] Pitless adapter [ ] 12" above grade [ ] Basement offset [ ] Approved pit

12 WELL GROUTED? [ ] No [X] Yes From 0 to 103 ft.
[ ] Neat cement [X] Bentonite [ ] Other ____
No. of bags of cement ____ Additives ____

13 Nearest source of possible contamination
Type none Distance ____ ft. Direction ____
Well disinfected upon completion? [X] Yes [ ] No
Was old well plugged? [X] Yes [ ] No

14 PUMP: [ ] Not Installed [ ] Pump Installation Only
Manufacturer's name Red Jacket
Model number 75GNWi HP 3/4 Volts 230
Length of Drop Pipe 90 ft. capacity 15 G.P.M.
TYPE [X] Submersible [ ] Jet ____
PRESSURE TANK
Manufacturer's name Well-X-Trol
Model number 203 Capacity 9 Gallons

15 Remarks, elevation, source of data, etc.
Subcontract - Glenn Eagan 25-1876

16. WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief
Bellinger Well Drilling 44-1757
REGISTERED BUSINESS NAME REGISTRATION NO.
Address 4020 S. Lapeer Rd. Metamora, MI 48455
Signed ____ AUTHORIZED REPRESENTATIVE Date 8/12/86

17 Rig Operator's Name:
Dave Jory

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation of any provision is a

D67d 12/85

(4) #4

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

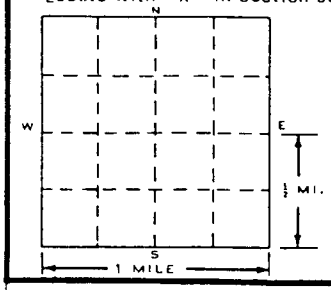
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Pontiac City	¼ ¼ ¼	27-33	3N N/S.	10E E/W

Distance And Direction from Road Intersections

40' East of old well #4 - in Southwest corner of property approx. 1400' south of Bldg. No. 29

Street address & City of Well Location

Locate with "X" in section below



Sketch Map:

3 OWNER OF WELL:

Address G.M.C. Truck & Coach Div.
660 South Blvd. East
Pontiac, Mich.

4 WELL DEPTH: (completed) 266 ft. Date of Completion 10-20-78

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ____

6 USE: ☐ Domestic ☐ Public Supply ☒ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ ____

7 CASING: Threaded ☒ Welded ☒ Diam. ____ in. to ____ ft. Depth ____ in. to ____ ft. Depth

Height: Above/Below Surface 1 ft. Weight ____ lbs./ft. Drive Shoe? Yes ☒ No ☐

8 SCREEN:

Type: Stainless Steel Dia.: 18" & 16"
Slot/Gauze ~~150 & 60~~ Length ~~41'~~
Set between ~~266~~ ft. and ~~236~~ ft. &
Fittings: 126 & 116
~~Standard~~

9 STATIC WATER LEVEL

92 ft. below land surface

10 PUMPING LEVEL below land surface

106 ft. after 2 hrs. pumping 1000 g.p.m.
____ ft. after ____ hrs. pumping ____ g.p.m.

11 WATER QUALITY in Parts Per Million:

Iron (Fe) ____ Chlorides (Cl) ____
Hardness ____ Other ____

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☐ Pitless Adapter ☐ 12" Above Grade

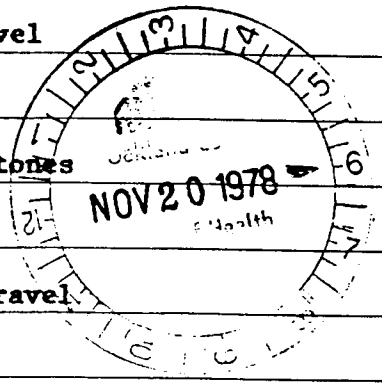
13 Well Grouted? ☐ Yes ☐ No ☐ Neat Cement ☐ Bentonite ☐ ____
Depth: From ____ ft. to ____ ft.

14 Nearest Source of possible contamination
____ feet ____ Direction ____ Type
Well disinfected upon completion ☐ Yes ☐ No

15 PUMP: ☐ Not installed
Manufacturer's Name ____
Model Number ____ HP ____ Volts ____
Length of Drop Pipe ____ ft. capacity ____ G.P.M.
Type: ☐ Submersible ☐ Jet ☐ Reciprocating

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Fill	0	5'
Clay	5'	9'
Sand	9'	11'
Clay	11'	49'
Hardpan	49'	119'
gravel & sand	119'	126'
Hardpan	126'	154'
Fine gravel	154'	175'
Hard pan	175'	205'
Clay & stones	205'	219'
Sand	219'	226'
Sand & Gravel	226'	266'

USE A 2ND SHEET IF NEEDED



16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

~~Dunbar Drilling Inc.~~ NAME OF COMPANY 0163 REGISTRATION NO.

Address 307 Broadway, Swanton, Ohio 43558

Signed ____ AUTHORIZED REPRESENTATIVE Date 10-31-78

Dale R. Dunbar, President

D67d 100M (Rev. 12-68)

LOCAL HEALTH DEPT. COPY

(5) GEOLOGICAL SURVEY NO. #5

WATER WELL AND PUMP RECORD

PERMIT NUMBER

1 LOCATION OF WELL

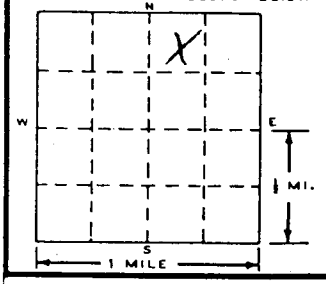
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	NW. NW NE¼	3	2 N/S	10 E/W

Distance And Direction From Road Intersection

Street Address & City of Well Location: Plant #6 Trucks Bros.

Locate with "X" in Section Below

Sketch Map:



3 OWNER OF WELL

Utley Jones Inc.

Address: 400 Opdyke Rd. Pontiac 48056

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH: (completed) 80 ft — **Date of Completion** 1/85

5 ☐ Cable tool ☒ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Auger ☐ Jetted ☐ ____

6 USE ☐ Domestic ☐ Type I Public ☐ Type III Public ☐ Irrigation ☐ Type IIa Public ☐ Heat pump ☐ Test Well ☐ Type IIb Public ☒ Construction Observation

7 CASING Diameter ☐ Steel ☐ Threaded ☒ Plastic ☒ Welded

5" in. to 75 ft. depth

____ in. to ____ ft. depth

Grouted Drill Hole Diameter 7 7/8 in. to 75 ft. depth

____ in. to ____ ft. depth

Height: Above/Below Surface 1 ft

Weight 50 lbs/ft

Drive Shoe ☐ Yes ☒ No

8 SCREEN ☐ Not Installed

Type Plastic Diameter 4"

Slot/Gauze #15 Length 5'

Set between 75 ft. and 80 ft

FITTINGS: ☒ K-Packer ☐ Lead Packer ☐ Bremer Check

☒ Blank above screen 1 ft. Other ____

9 STATIC WATER LEVEL 46' ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

Bottom ft. after ½ hrs. pumping at 25 G.P.M

____ ft. after ____ hrs. pumping at ____ G.P.M

11 WELL HEAD COMPLETION ☐ Pitless adapter ☒ 12" above grade ☐ Basement offset ☐ Approved pit

12 WELL GROUTED? ☐ No ☒ Yes From 75 to Top ft.

☐ Neat cement ☐ Bentonite ☒ Other Portland

No. of bags of cement ____ Additives Flush

13 Nearest source of possible contamination

Type Septic Distance ____ ft. Direction E

Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP ☐ Not Installed ☐ Pump Installation Only

Manufacturer's name Flint & Walling

Model number 4F10B10 HP 1 Volts 230

Length of Drop Pipe 60 ft. capacity 10 G.P.M

TYPE ☒ Submersible ☐ Jet ____

PRESSURE TANK

Manufacturer's name Well X Trol

Model number WX 203 Capacity 80 Gallons

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Brown Sand, Gravel.		
(Overburden)		4'
Blue Clay (Some Sands & Gravel)	9'	13'
Blue Clay	21'	34'
Blue Clay, Sand & Gravel.	15'	49'
Black Sand & Gravel.		
(Some Blue Clay)	13'	62'
Black Water Sand.		80'

USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc.

16. WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

D. Ward Son Inc. 0058

REGISTERED BUSINESS NAME REGISTRATION NO.

Address 6253 Clarkston, Clarkston

Signed R Ward Jus. Date 1/85

AUTHORIZED REPRESENTATIVE

D67d 2/84

Authority: Act 368 PA 1978
Completion: Required
Penalty: Conviction of a violation

LOCAL HEALTH DEPT. COPY

(6) #6

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Bloomfield	¼ ¼ ¼	2	N/S.	E/W.

Distance And Direction from Road Intersections

S.E. corner of Updyke & South blv'd.

Street address & City of Well Location

OWNER No.

3 OWNER OF WELL: Mobil Oil Co.

Address

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Sand, gravel, clay	11	11
Muddy sand	2	13
Gravel & clay	19	32
Gravel & sand, hardpan	46	78
Coarse sand & clay	11	89
Clay & sand	69	158
Muddy sand & clay	5	163
Clay & coarse sand	40	203
Layer of gravel	1	204
Muddy water sand	3	207
Coarse clean water sand	6	213
Fine clean water ~~sand~~ CANVEL	6	219

4 WELL DEPTH: (completed) 219 ft. Date of Completion 9-24-69

5 [X] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ___

6 USE: [ ] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [X] Commercial [ ] Test Well [ ] ___

7 CASING: Diam. Threaded [X] Welded [ ]
4 in. to 219 ft. Depth
___ in. to ___ ft. Depth
Height: Above/Below surface ___ ft.
Weight 11 lbs/ft.
Drive Shoe? Yes [X] No [ ]

8 SCREEN:
Type: Stainless Dia.: 4"
Slot Gauze 25 Length 4'
Set between 114 ft. and 119 ft.
Fittings: Std. W/burlap packer

9 STATIC WATER LEVEL
65 ft. below land surface

10 PUMPING LEVEL below land surface
70 ft. after 3 hrs. pumping 30 g.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) ___ Chlorides (Cl) ___
Hardness ___

12 WELL HEAD COMPLETION: [ ] In Approved Pit [X] Pitless Adapter [X] 12" Above Grade

13 GROUTING:
Well Grouted? [ ] Yes [X] No
Material: [ ] Neat Cement [ ] ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination
100 feet S Direction Holding TANK Type
Well disinfected upon completion [X] Yes [ ] No

15 PUMP:
Manufacturer's Name Red Jacket
Model Number 11 MAB HP 1
Length of Drop Pipe 105 ft. capacity 12 G.P.M.
Type: [X] Submersible [ ] ___ [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

John Cameron & Son — REGISTERED BUSINESS NAME
0414 — REGISTRATION NO.

Address 1800 Butterfield Rd., Troy

Signed ___ — AUTHORIZED REPRESENTATIVE
Date 9-30-69

D67D 100M 6-66

LOCAL HEALTH DEPT. COPY

(7) LOGICAL SURVEY NO #7

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P A 1978

W866316 9 — PERMIT NUMBER

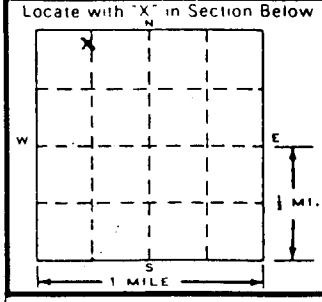
1 LOCATION OF WELL

County	Township Name	Fraction	Section Number	Town Number	Range Number
OAKLAND	~~PONTIAC~~	NE¼ NW¼ NW¼	35	3 N/S	10 E/W

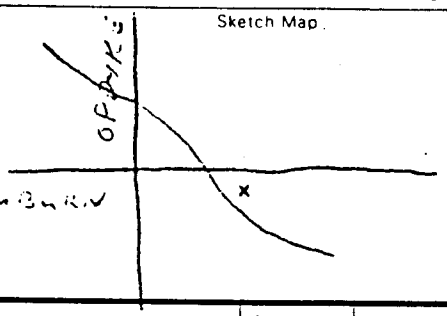
Distance And Direction From Road Intersection
700 FT SOUTH OF AUBURN RD
1/4 MI EAST OF OPDYKE

Street Address & City of Well Location 3710 AUBURN RD

Locate with "X" in Section Below



Sketch Map



3 OWNER OF WELL

ART CO CONTRACTING INC
Address 6966 CROOKS RD
TROY MICH
Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed)

60 ft

Date of Completion MAY 13 - 86

5

☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐ _____

6 USE

☐ Domestic ☐ Type I Public ☐ Type III Public
☐ Irrigation ☒ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☐ _____

7 CASING

Diameter ☒ Steel ☒ Threaded ☐ Plastic ☐ Welded
4 in. to 46 ft. depth
_____ in. to _____ ft. depth
Grouted Drill Hole Diameter
_____ in. to _____ ft. depth
_____ in. to _____ ft. depth

Height Above/Below Surface 1 ft
Weight 11 lbs /ft
Drive Shoe ☒ Yes ☐ No

8 SCREEN

☐ Not Installed
Type S.S. Diameter 4"
Slot/Gauze 25 Length 4'
Set between 48 ft. and 52 ft
FITTINGS ☒ K-Packer ☐ Lead Packer ☐ Bremer Check
☒ Blank above screen 2 ft. Other _____

9 STATIC WATER LEVEL

8 ft. below land surface ☐ Flow

10 PUMPING LEVEL below land surface

23 ft. after _____ hrs. pumping at 50 G P M
_____ ft. after _____ hrs. pumping at _____ G P M

11 WELL HEAD COMPLETION

☒ Pitless adapter ☒ 12" above grade
☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☒ No ☐ Yes From _____ to _____ ft
☐ Neat cement ☐ Bentonite ☐ Other _____
No. of bags of cement _____ Additives _____

13 Nearest source of possible contamination

Type _____ Distance _____ ft. Direction _____
Well disinfected upon completion? ☐ Yes ☐ No

14 PUMP

☐ Not Installed ☐ Pump Installation Only
Manufacturer's name RED JACKET
Model number 2 WIRE HP 1 Volts 230
Length of Drop Pipe 37 ft. capacity 18 G P M
TYPE ☒ Submersible ☐ Jet _____
PRESSURE TANK
Manufacturer's name WELL X TROL
Model number WX 252 Capacity 86 Gallons

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
FILL	5	5
SAND	18	23
CLAY	16	39
SAND	13	52
FINE SAND & SILT	8	60

USE A 2ND SHEET IF NEEDED

15 Remarks, elevation, source of data, etc.

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

AIRCO PUMP & WELL SERVICE 1584
REGISTERED BUSINESS NAME REGISTRATION NO
Address 5635 COOLEY LK RD
Signed Donald Aird Date May 19 - 86
AUTHORIZED REPRESENTATIVE

D67d (Rev 10-80)

LOCAL HEALTH DEPT. COPY

(8) #8

WATER WELL RECORD

ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Pontiac Auburn Mills	¼ ¼ ¼	35	3 N☒.	10 E☒.

Distance And Direction from Road Intersections

Auburn Road
(SW Corner of Auburn E. of I-75)

Street address & City of Well Location

OWNER No.

3 OWNER OF WELL:
Clawson Concrete
Address 15231 No Michols
Detroit, Michigan 48235

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gray Sandy Clay	17'	17'
Soft Clay	20'	37'
Sandy Clay	11'	48'
Gravely Hardpan	15'	63'
Clay	6½'	69½'
Med. Sand	4½'	74'
Sandy Clay	6'	80'
Hardpan	11'	91'
Hard Clay (Gray)	12'	103'
Brown Clay	22'	125'
Gray Clay	6'	131'
Sandy Hardpan	29'	160'
Hard Clay	32'	192'
Sandy Rock	1'	193'
Coarse Gravel	4'	197'

4 WELL DEPTH: (completed) 197 ft. Date of Completion 2-9-70

5 ☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug ☐ Hollow rod ☐ Jetted ☐ Bored ☐ ___

6 USE: ☐ Domestic ☐ Public Supply ☐ Industry ☐ Irrigation ☐ Air Conditioning ☐ Commercial ☐ Test Well ☐ Transit Mix

7 CASING: Diam. Threaded ☒ Welded ☐
6 in. to 195'-3" ft. Depth
___ in. to ___ ft. Depth
Height: Above ~~Below~~ surface 3½ ft.
Weight 19.45 lbs/ft.
Drive Shoe? Yes ☒ No ☐

8 SCREEN: Johnson Stainless
Type: Steel Dia.: 6"
Slot/~~Gauge~~ 80 Length 5'
Set between 192 ft. and 197 ft.
Fittings: 5" x 18" Nipple

9 STATIC WATER LEVEL
9 ft. below land surface

10 PUMPING LEVEL below land surface
177 ft. after 8 hrs. pumping 37½ g.p.m
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) 0.5 Chlorides (Cl) 102
Hardness ~~132~~ 204

12 WELL HEAD COMPLETION: ☐ In Approved Pit ☒ Pitless Adapter ☐ 12" Above Grade

13 GROUTING:
Well Grouted? ☐ Yes ☒ No
Material: ☐ Neat Cement ☐ ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination UNKNOWN
___ feet ___ Direction ___ Type
Well disinfected upon completion ☒ Yes ☐ No

15 PUMP:
Manufacturer's Name ___
Model Number ___ HP ___
Length of Drop Pipe ___ ft. capacity ___ G.P.M.
Type: ☐ Submersible ☐ ___ ☐ Jet ☐ Reciprocating

16 Remarks, elevation, source of data, etc.

#1 No Pump to go in this well

17 WATER WELL CONTRACTOR'S CERTIFICATION:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

O. O. Corsaut Inc. (REGISTERED BUSINESS NAME) 0025 (REGISTRATION NO.)

Address 15101 W. 11 Mile Road, Oak Park 4 8237

Signed ___ (AUTHORIZED REPRESENTATIVE) Date June 5, 1970

D67D 100M 6-66

LOCAL HEALTH DEPT. COPY

(9) #9.

WATER WELL RECORD
ACT 294 PA 1965

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

1 LOCATION OF WELL

County	Twp.	Fraction	Section No.	Town	Range
Oakland	Pontiac Auburn Hills	¼ ¼ ¼	35	3 N/S	10 E/W

Distance And Direction from Road Intersections: S.W. Corner of I 75 and Auburn Road

Street address & City of Well Location

OWNER No.

3 OWNER OF WELL:
Address: Clawson Concrete Co.
15331 W. Mc Nichols Road
Detroit, Michigan 48235

2 FORMATION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Gray Clay	10'	10'
Fill (Wood, Rocks, Etc.)	8'	18'
~~xx~~ Sandy Clay	16'	34'
Clay	5'	39'
Water Sand (Muddy)	3'	42'
Hard Clay	3'	45'
Medium Coarse Sand	6'	51'

4 WELL DEPTH: (completed) 51 ft. **Date of Completion** 3-18-70

5 [x] Cable tool [ ] Rotary [ ] Driven [ ] Dug [ ] Hollow rod [ ] Jetted [ ] Bored [ ] ___

6 USE: [ ] Domestic [ ] Public Supply [ ] Industry [ ] Irrigation [ ] Air Conditioning [ ] Commercial [ ] Test Well [ ] Transit mix

7 CASING: Diam. 6 in. 48'-9" ft. Depth; Threaded [x] Welded [ ]; ___ in. to ___ ft. Depth
Height: Above ~~xxx~~ surface 3 ft.
Weight 19.45 lbs/ft.
Drive Shoe? Yes [x] No [ ]

8 SCREEN: Johnson Stainless
Type: Steel Dia.: 6"
Slot/~~Gauge~~ 35 Length 5'
Set between 46 ft. and 51 ft.
Fittings: 5" x 18" Nipple

9 STATIC WATER LEVEL
9 ft. below land surface

10 PUMPING LEVEL below land surface
37 ft. after 4 hrs. pumping 250 g.p.m.
___ ft. after ___ hrs. pumping ___ g.p.m.

11 WATER QUALITY in Parts Per Million:
Iron (Fe) 1.3 Chlorides (Cl) 34
Hardness 289

12 WELL HEAD COMPLETION: [ ] In Approved Pit [x] Pitless Adapter [ ] 12" Above Grade

13 GROUTING:
Well Grouted? [ ] Yes [x] No
Material: [ ] Neat Cement [ ] ___
Depth: From ___ ft. to ___ ft.

14 SANITARY:
Nearest Source of possible contamination: Unknown
___ feet ___ Direction ___ Type
Well disinfected upon completion [x] Yes [ ] No

15 PUMP:
Manufacturer's Name: Red Jacket
Model Number 1006R5-4HB6 HP 10
Length of Drop Pipe 314 ft. capacity 190 G.P.M.
Type: [x] Submersible [ ] ___ [ ] Jet [ ] Reciprocating

16 Remarks, elevation, source of data, etc.

17 WATER WELL CONTRACTOR'S CERTIFICATION
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

O. O. Corsaut Inc. — REGISTERED BUSINESS NAME
0025 — REGISTRATION NO.

Address 15101 W. 11 Mile Roadk, Oak Park 48237

Signed ___ — AUTHORIZED REPRESENTATIVE
Date June 5, 1970

D67D 100M 6-66

LOCAL HEALTH DEPT. COPY

(18) GEOLOGICAL SURVEY NO #10

MICHIGAN DEPARTMENT OF PUBLIC HEALTH

WATER WELL AND PUMP RECORD

PART 127 ACT 368, P A 1978

PERMIT NUMBER

1 LOCATION OF WELL

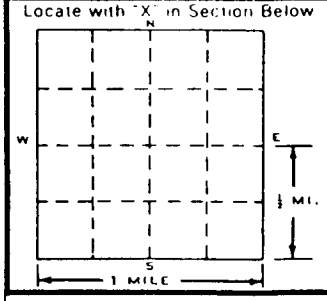
County	Township Name	Fraction	Section Number	Town Number	Range Number
Oakland	Bloomfield	¼ ¼ ¼	2	N/S	10 E/W

Distance And Direction From Road Intersection

The Heathers
Square Lake at I-75

Street Address & City of Well Location

Locate with "X" in Section Below



Sketch Map

3 OWNER OF WELL

Robertson Brothers Co.
3883 Telegraph Rd. Suite 202
Address Blfd Hills, Mi 48013

Address Same As Well Location? ☐ Yes ☒ No

4 WELL DEPTH (completed)

253 ft

Date of Completion 6/16/88

5

☒ Cable tool ☐ Rotary ☐ Driven ☐ Dug
☐ Hollow rod ☐ Auger ☐ Jetted ☐

6 USE

☐ Domestic ☐ Type I Public ☐ Type III Public
☒ Irrigation ☐ Type IIa Public ☐ Heat pump
☐ Test Well ☐ Type IIb Public ☐

7 CASING

Diameter ☐ Steel ☒ Threaded
☐ Plastic ☐ Welded

6 in to 223 ft depth
___ in to ___ ft depth

Grouted Drill Hole Diameter
___ in to ___ ft depth
___ in to ___ ft depth

Height Above/~~Below~~ Surface 2 ft
Weight 1945 lbs /ft

Drive Shoe ☒ Yes ☐ No

2 FORMATION DESCRIPTION

FORMATION DESCRIPTION	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM
Stony sand & gravel (dry)	10'	10'
Stony sand & gravel	2'	12'
Stony gravely clay	12'	24'
8 slot yellow sand (wet)	6'	30'
10 slot grey clay (wet)	21'	51'
Gravely clay	19'	70'
Hardpan	15'	85'
Dry hardpan & gravel (very firm)	18'	103'
Gravely hardpan (very firm)	17'	120'
Hardpan & seams of gravel (wet) set screen (n.g.)	14'	134'
hard clay	54'	188'
Brown clay	24'	212'
18 slot sand	2'	214'
Sand & hardpan	3'	217'
Very fine sand	24'	241'
Med. sand	7'	248'
Very fine sand	5'	253'
Putty sand		253'

USE A 2ND SHEET IF NEEDED

8 SCREEN

Johnson stainless ☐ Not installed
Type steel Diameter 6"
Slot/Gauge ~~see below~~ Length 30'
Set between 221 ft and 253 ft
FITTINGS ☐ K-Packer ☐ Lead Packer ☐ Bremer Check
☐ Blank above screen 1'4" ft Other

9 STATIC WATER LEVEL

11 ft below land surface ☐ Flo

10 PUMPING LEVEL below land surface

217 ft after 4 hrs pumping at 80 G P M
___ ft after ___ hrs pumping at ___ G P M

11 WELL HEAD COMPLETION

☐ Pitless adapter ☒ 12" above grade
☐ Basement offset ☐ Approved pit

12 WELL GROUTED?

☒ No ☐ Yes From ___ to ___ ft
☐ Neat cement ☐ Bentonite ☐ Other
No of bags of cement ___ Additives

13 Nearest source of possible contamination

unknown
Type ___ Distance ___ ft Direction ___
Well disinfected upon completion? ☒ Yes ☐ No

14 PUMP

☐ Not installed ☐ Pump Installation Only
Manufacturer's name Red Jacket
Model number 766B1-6MB6 HP 7½ Volts 230
Length of Drop Pipe 216 ft capacity 68 G P M
TYPE ☒ Submersible ☐ Jet
PRESSURE TANK
Manufacturer's name
Model number ___ Capacity ___ Gallons

15 Remarks, elevation, source of data, etc

1. top 7'
2. middle 5'
3. middle 7'
4. middle 7'
5. middle 18'
6. bottom 7'

16 WATER WELL CONTRACTOR'S CERTIFICATION

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief

O.O. Corsaut, Inc. 0025
REGISTERED BUSINESS NAME REGISTRATION NO

Address 15101 W. 11 Mile Rd. Oak Park, Mi 48237

Signed [signature] Date 7/18/88
AUTHORIZED REPRESENTATIVE

APPENDIX M.3

J-LOT EECA

DRAFT
ENGINEERING EVALUATION/COST ANALYSIS (EE/CA) REPORT

J-Lot
General Motors Pontiac Central Manufacturing Facility
Pontiac, Michigan

FEBRUARY 1995
REF. NO. 5770 (19)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

Conestoga-Rovers & Associates (CRA) was retained by General Motors Corporation (GM), on behalf of the Pontiac Central Manufacturing Facility (Facility), to prepare an Extent of Contamination (EOC) Study and an Engineering Evaluation and Cost Analysis (EE/CA) Study for the area known as the J-Lot Site (Site). The Site is located at the Central Manufacturing Facility in Pontiac, Michigan. The Facility location is presented on Figure 1.1. The Site location is presented on Figure 1.2. The Site Plan is presented on Figure 1.3.

This document presents the EE/CA Report (Report) prepared for the Site. An EOC Study Report for the Site has been completed and is presented under separate cover.

1.1 STATEMENT OF PURPOSE

The goals of this EE/CA are to identify the objectives of the removal action and analyze the effectiveness, implementability and cost of various removal action alternatives that may satisfy the identified objectives. Generalized goals for an EE/CA are presented in the guidance document entitled "Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA (Removal Action Guidance)" (EPA/540-R-93-057, August 1993).

The purpose of this Report is to present the EE/CA which includes:

- presenting relevant information generated during the EOC Study;
- conducting a Site-specific Streamlined Risk Assessment (SRA);
- considering potentially applicable or relevant and appropriate requirements (ARARs);
- developing removal action scope, goals and objectives;
- assembling removal action alternatives applicable to the J-Lot Site; and
- conducting a detailed evaluation of assembled alternatives.

To effectively meet the stated objective for the EE/CA, an EOC Study was performed consistent with a prepared work plan for the Site (Work Plan). A Quality Assurance Project Plan (QAPP) and a Health and Safety Plan (HASP) were also prepared and implemented as outlined in the Work Plan.

The Work Plan, QAPP, and HASP were developed consistent with United States Environmental Protection Agency (U.S. EPA) and Michigan Department of Natural Resources (MDNR) guidance and are presented under separate cover.

1.2 BASIS

The primary regulation that governs removal actions is the National Contingency Plan (NCP 40 CFR 300). The NCP provides the regulatory framework to address the requirements of CERCLA. The NCP states the following factors shall be considered in determining the appropriateness of removal actions [40 CFR 300.415 (b) (2) (i-vii)]:

(i) actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

(ii) actual or potential contamination of drinking water supplies or sensitive ecosystems;

(iii) hazardous substances or pollutants or contaminants in drums, barrels, tanks or other bulk storage containers, that may pose a threat of release;

(iv) high levels of hazardous substances or pollutants or contaminants in soils largely at or near surface, that may migrate;

(v) weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released;

(vi) threat of fire or explosion;

(vii) the availability of other appropriate federal or state response mechanisms to respond to the release; and

(viii) other situations or factors that may pose threats to public health or welfare of the environment.

In addition, 40 CFR 300.415 (c) states that:

(c) Removal actions shall, to the extent practicable, contribute to the efficient performance of any anticipated long-term remedial action with respect to the release concerned.

This EE/CA utilizes the regulatory requirements and guidance designed to evaluate removal action alternatives. In addition, this EE/CA has been prepared in a manner consistent with the Michigan Environmental Response Act (MERA) 307 requirements.

1.3 REPORT ORGANIZATION

This EE/CA Report is presented in the following sections:

1.0 Introduction
2.0 Site Characterization
3.0 Streamlined Risk Assessment
4.0 Identification of Removal Action Objectives
5.0 Proposed Removal Action Alternatives
6.0 Evaluation of Removal Action Alternatives

Section 2.0 presents a summary of the Site conditions, as developed during the EOC Study, and presented in detail in the EOC Study Report.

Section 3.0 presents a Site-specific Streamlined Risk Assessment (SRA) prepared in support of the EE/CA.

Section 4.0 presents the removal action scope and cleanup levels based upon the results of the EOC Study Report and the Site-specific Streamlined Risk Assessment presented in Section 3.0.

Section 5.0 presents the development of seven possible removal action alternatives.

Section 6.0 presents an evaluation of the removal action alternatives presented in Section 5.0.

2.0 SITE CHARACTERIZATION

The purpose of this section is to present an overview of this current situation at the Site. The overview is based on information developed and presented in the EOC Study Report. This section is organized as follows:

2.1 Site Description
2.2 Site Background
2.3 Land Use
2.4 Site Geology
2.5 Site Hydrogeology
2.6 Site Hydrology
2.7 Site Chemical Distribution Summary
2.8 Demograpy
2.9 Meteorology

2.1 SITE DESCRIPTION

The Site is located in an industrial area of Pontiac Michigan, on the north side of South Boulevard, north of the Facility and west of Opdyke Road. The Site is bordered to the south by South Boulevard, to the north by an abandoned Government warehouse, and to the east and west by vacant properties. The Facility location is presented on Figure 1.1. The Site location is presented on Figure 1.2. A Site Plan is presented on Figure 1.3.

The surface materials at the Site consist of earth fill and gravel. The sub-surface material at the Site consists of earth fill, construction debris, metal scraps, and process sand.

Access to the Site is from an entrance point off South Boulevard. Entry to the Site along the road is restricted to vehicles by a locked security gate. Pedestrian access to the Site is restricted by a 6-foot chain link security fence.

The south third of the Site is flat, gravel covered, and enclosed by a 6-foot security fence with one locked car gate on the east side.

The middle third of the Site is currently being utilized to stockpile clean soil (excavated on the South side of South Boulevard during Facility re-development activities). Approximately 30,000 cubic yards of clean soil are stockpiled in this area.

The north third of the Site is generally flat. The north west corner of the Site supports vegetation, including grass, brush and small trees.

2.2 SITE BACKGROUND

The Site is part of the GM Pontiac Central Manufacturing Facility which was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes. Major manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing. Manufacturing operations at the Facility ceased in August 1990 and the Facility was closed in the summer of 1991 as an obsolete factory.

It was reported by GM personnel that the J-Lot area was formerly a low lying area which was filled to its present grade for use as a parking lot.

2.3 LAND USE

The current local land use consists of industrial, public service, and residential properties. The Site has been utilized for industrial purposes since the 1920's.

Immediately north of the Site is a government warehouse. East of the Site is a vacant lot that extends east to Opdyke Road. South of the Site, across South Boulevard, is the GM Pontiac Central Manufacturing Facility. West of the Site is an access road for the government warehouse. Further west is a thin undeveloped parcel of land owned by GM, of this parcel are residential properties.

The current "Future Land Use Map" indicates that the property will continue to be utilized for industrial purposes (City of Pontiac Planning Commission, December 1991). In addition, the "Future Land Use Map" indicates that the residential area west of the Site will be utilized for industrial purposes in the future. A copy of the "Future Land Use Map" for the City of Pontiac is reproduced as Figure 2.1.

2.4 SITE GEOLOGY

The Site geology presented in this section is based upon the regional geologic information and the stratigraphic information obtained from seventeen boreholes and six monitoring wells installed at the Site as part of the EOC Study investigation.

A glacial clay/till deposit exists immediately below and around the fill material in the area. The clay/till unit is continuous across the Site. Borehole stratigraphic logs indicate this clay layer extends to a depth of at least 44 feet below ground surface (bgs) at the Site. The thickness of this clay/till unit was not determined by on-Site borings but is identified regionally to be approximately 100 to 250 feet thick.

2.5 SITE HYDROGEOLOGY

The Site hydrogeology was characterized through the installation of seventeen boreholes, six monitoring wells, static water level measurements, and laboratory geotechnical tests. In general, no distinct hydrostratigraphic units were identified at the Site. Only perched,

discontinuous water zones were identified to exist within the glacial clay/till during the Site investigation.

During the installation of the boreholes and monitoring wells, perched water zones were identified on Site. The perched water zones exist at the south and north ends of the Site, and off-Site to the west. The perched water zones are not continuous across the Site.

Water level elevations for the six monitoring wells which were installed do not correlate. Water level elevations for monitoring wells MW-J-2, 887.24 feet AMSL, and MW-J-3, 887.87 feet AMSL, do not correlate with the water level elevation in near by monitoring well MW-J-1, 912.74 feet AMSL. This illustrates that the perched water off Site to the west is not hydraulically connected to the perched water at the north end of the Site.

Monitoring wells MW-J-4 and MW-J-5 are located near the middle of the Site, no water was identified during installation, and the wells were later identified to be "dry". This indicates that the perched water encountered at the north end of the Site is not hydraulically connected to the perched water identified at the south end of the Site.

During the installation of the seventeen boreholes, five Shelby Tube samples were collected from the glacial clay/till. The samples were collected from borings BH-J-1, 13, 15, 16, and 17 and analyzed for grain size and hydraulic conductivity. The grainsize analysis indicates that the glacial clay/till is mostly comprised of clay and silt, with some sand. The hydraulic conductivity of the samples ranged from 1.6×10^{-8} to 4.1×10^{-7} cm/S.

The lack of a continuous water bearing zone, and the low hydraulic conductivity of the glacial clay/till, combine to effectively limit the flow of groundwater on or off Site.

2.6 SITE HYDROLOGY

The Site is generally flat, bare soil with the exception of the northwest corner which is covered with vegetation. Precipitation either infiltrates through the surface soil to form perched water zones, evaporates, or leaves the Site as runoff.

2.7 CHEMICAL DISTRIBUTION

The purpose of this section is to provide a summary of the chemical distribution identified at the Site. The summary is presented for both soil and groundwater analytical results.

A summary of the detected constituents which exceed Michigan Type B or C Cleanup Criteria is presented in Tables 2.1 through 2.3, and discussed below. The comparison of detected constituents to Michigan Type B and C Cleanup Criteria are for comparison purposes only. Michigan Type B Cleanup Criteria are from MERA Operational Memorandum #8, Revision 3 (dated February 4, 1994) and addendum dated June 21, 1994. Michigan Type C Cleanup Criteria are from MERA Operational Memorandum #14, dated June 21, 1994.

2.7.1 Soil Summary

Compounds detected in soil above the Michigan Type B 20 x Drinking Water Criteria are presented on Table 2.1.

Detected compounds in soil above the Michigan Type B Direct Contact Criteria are presented on Table 2.3. The compounds listed on Table 2.2 were detected in boreholes BH-J-7, 11, 14, and 16. An estimate of the area of affected material is presented on Figure 2.4. Approximately 50,000 cubic yards of material are estimated to contain concentrations of regulated compounds above the Michigan Type B Direct Contact Criteria.

Detected compounds in soil above the Michigan Type C Direct Contact Criteria are presented on Table 2.3. Arsenic, lead and benzo(a)pyrene were detected above Michigan Type C Direct Contact Criteria in BH-J-7, 14 and 16 at depths of four to eighteen feet bgs. An estimate of the area of affected material is presented on Figure 2.4. Approximately 40,000 cubic yards of material are estimated to contain concentrations of arsenic, lead or benzo(a)pyrene above the Michigan Type C Direct Contact Criteria.

2.7.2 Groundwater Summary

Compounds detected above the Michigan Type B Drinking Water Cleanup Criteria (for comparison purposes only) are presented on Table 2.4.

Arsenic was detected in MW-J-3 at 15 µg/L which is above the Michigan Type C Drinking Water Cleanup Criteria.

2.8 DEMOGRAPHY

The population of the City of Pontiac and Oakland County in 1970, 1980, 1990, 1993 are summarized below:

	Population						
Location	1970	1980	1990	1993	% Change (1970-80)	% Change (1980-90)	% Change (1990-93)
City of Pontiac	85,279	76,715	71,166	71,183	-10%	-7.2%	+.02%
Oakland County	907,871	1,011,793	1,083,592	1,133,993	+11%	+7%	+4.5%

2.9 METEOROLOGY

The meteorological conditions of Oakland County are monitored by the U.S. Weather Bureau Office at the Detroit Metropolitan Airport, which is located approximately 25 miles south of the Site.

The Site is located approximately 50 miles inland southwest of Lake Huron, 135 miles east of Lake Michigan, and 45 miles northwest of Lake Erie. The Great Lakes have a moderate effect on the area in that they cause more cloud cover over the area during the winter, thus moderating temperatures. The average annual precipitation is 32 inches per year and winds are generally from the southwest at an average velocity of 10 mph.

3.0 STREAMLINED RISK ASSESSMENT

3.1 INTRODUCTION

This Streamlined Risk Assessment (SRA) utilizes data developed during the Extent of Contamination Study (EOC) to estimate potential health risks and hazards related to human exposure to residual chemicals identified as related to the activities at the J-Lot Site (Site).

Previous hydrogeologic assessment performed by Camp Dresser and McKee (CDM) indicate that there are three primary sand and sand/gravel aquifers beneath the Site; one occurring at 120 feet, one at 150 feet and 210-feet BGS. The "210-foot aquifer" is a known local source for the municipal water supply. In addition, there are perched groundwater in several areas of the Site, however, the perched groundwater is not considered to be hydraulically connected with the lower water-bearing zones. Therefore, groundwater will not be evaluated further in this SRA.

The SRA, presented herein, evaluates the present and future potential impact on public health due to soil.

Reported chemical concentrations in the environmental media will change over time due to various degradation processes (i.e., dilution, sorption, dispersion, volatilization, biodegradation, chemical degradation and photodegradation). These processes and their resultant decrease in concentrations have not been assessed in the SRA. In addition, various exposure scenarios have been developed in accordance with applicable U.S. EPA guidance. This guidance is admittedly conservative and, as such, may overstate risks.

The scope of the SRA is comprised of the following:

1. Identification of primary chemicals of concern (COC) - the presence, distribution, concentration and toxicity of chemicals detected and identified as Site related were evaluated to identify those chemicals which are most likely to pose the majority of the potential health risks;

2. Exposure Assessment - potential exposure pathways were assessed to determine how and in what media the chemicals of concern could reach potential public receptors and estimation of the exposure point concentrations;

3. Toxicity Assessment - potential hazards associated with the chemicals of concern were identified; and

4. Risk Characterization - estimates of potential carcinogenic and non-carcinogenic risks were calculated for each potential exposure pathway based on the exposure and toxicity assessments.

3.2 IDENTIFICATION OF CHEMICALS OF CONCERN

Information on Site characteristics and data from analysis of soil samples obtained during Site investigations were examined to evaluate the chemicals present, their distributions and concentrations at the Site. All validated data were evaluated in the identification of chemicals of concern (COCs) and are summarized and discussed in Section 3.2.2 of this report.

In the procedure to identify COCs, maximum concentrations reported in non-background samples were evaluated against the criteria described herein.

For the identification of COCs, duplicate samples were considered as one sample.

3.2.1 Identification of Background Sample Locations

3.2.1.1 Soil Background

Soil samples from BH-J-2, BH-J-3, BH-J-5 and BH-J-15 were collected from locations near the northern or northeastern boundary of the Site. These sampling locations are upgradient from contaminant releases and are considered not to be impacted by the Site. Therefore, the samples from these locations were believed to represent natural soil and/or areas not contaminated by Site activities (e.g., background).

The surface and subsurface soil data were combined to represent the background soil for the area around the Site.

3.2.2 Identification of COCs

The identification of COCs may use several objective approaches which evaluate the concentrations, frequency of occurrence and toxicity of the reported chemicals and, by applying selected criteria, identify the primary chemicals in a specific media. This is consistent with U.S. EPA guidance document Risk Assessment Guidance for Superfund (RAGS), Volume I, "Human Health Evaluation Manual (Part A)", Section 5.0.

To be identified as a COC, a chemical had to be reported as present in at least one sample of the media being evaluated at a concentration greater than the mean concentration reported in the Site-related background samples for the same media. The Site-specific mean background concentrations for each media were calculated consistent with MERA Operational Memorandum #15: "Default Type A Cleanup Criteria (September 30, 1993)".

The COCs were established on the basis of their concentration in relation to background and Michigan Type B Cleanup Criteria published in MERA Operational Memorandum #8: Type B Criteria

(updated June 21, 1994). The selection of COCs is an attempt to identify those Site-related compounds which are most likely to be the cause of a potential adverse impact on public health.

The results of the evaluation process are summarized in Tables 3.1, 3.2, 3.3, and 3.4.

3.2.2.1 COCs in Surface Soils

Soil data collected from surface (0-4' BGS) were used to identify COCs in surface soils. The detection frequencies and range of reported concentrations for parameters are summarized in Tables 3.1 and 3.2 for organics and inorganics, respectively. The maximum reported concentration for each detected chemical was compared to Michigan Type B criterion and the Site-specific mean background concentration. If the maximum reported concentration for the chemical exceeded both the MDNR Type B criterion and the Site-specific background concentration, then the chemical is identified as a COC.

Following the COC selection procedure described above, there are no COCs identified in surface soils (see Tables 3.1 and 3.2). As such, exposure to surface soils by potential populations will not be evaluated further in this SRA.

3.2.2.2 COCs in Soils

Soil data collected from 0 feet BGS to 44 feet BGS were used to identify COCs in soils. The detection frequencies and range of reported concentrations for parameters are summarized in Tables 3.3 and 3.4 for organics and inorganics, respectively. The same COC selection procedure described in Section 3.2.2.1 were used to identify COCs in soil. The parameters identified as COCs in soil were:

PAHs

benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
dibenzo(a,h)anthracene
indeno(1,2,3-cd)pyrene

PCB Aroclor-1254

Metals

arsenic
lead

The identified list of chemicals does not include all the chemicals reported in each media but the COCs that are believed to account for the vast majority (>95 percent) of the potential adverse effects on human health and the environment from any probable exposure.

Aluminum and Calcium concentrations are not above the applicable Michigan Type B criterion however, they have been retained as COCs due to their high concentrations compared to Site background levels.

Note that the maximum concentrations for Site-related polycyclic aromatic hydrocarbons (PAHs), namely, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene, exceeded both the Michigan Type B and the Site-specific mean background concentrations. However, the concentrations reported on Site are typical of levels found in urban areas. Typical background PAH levels are summarized in Table 3.5.

3.3 EXPOSURE ASSESSMENT

3.3.1 Characterization of Exposure Setting

3.3.1.1 Physical Setting

The physical setting of the Site is discussed in Section 1.0 and Section 2.0 of this Report.

The primary Site-related facts applied to this evaluation are summarized as follows:

i) the Site is located in an area zoned industrial and is an inactive industrial property which consists of approximately 20 acres;

ii) the Site is part of the GM Pontiac Central Manufacturing Facility which was built in 1927 and was utilized to manufacture trucks, buses, military vehicles and motor homes;

iii) historical manufacturing activities associated with the production of these vehicles included machining, stamping, plating, smelting, fiberglass laminations, heat treating, painting and sealing;

iv) according to GM personnel, the J-Lot area was formerly a low lying area filled to its present grade for use as a parking lot;

v) the Site is bounded to the north by an abandoned Government warehouse, to the south by South Boulevard, and to the east and west by vacant properties;

vi) access to the Site is from an entrance point off South Boulevard;

vii) entry to the Site along the road is restricted to vehicles by a locked security gate and pedestrian access to the Site is restricted by the

presence of a 6-foot chain-linked security fence on three sides of the Site;

viii) the current local land use consists of industrial, public service and residential properties in the area of the Site; and

ix) the current "Future land Use Map" indicates that the property will continue to be utilized for industrial purposes (City of Pontiac Planning Commission, December 1991).

3.3.2 Potentially Exposed Populations

Because the Site is presently an inactive industrial Site and the area is zoned industrial, there is no reason to believe that this land use will change. Therefore, for the purposes of this SRA, the exposure scenarios developed and evaluated for the Site property were limited to worker-type exposure scenarios (construction, industrial, etc.).

Soils

Presently, it is reasonable to assume that industrial workers may be exposed to surface soils (0-4' BGS) via incidental ingestion and dermal contact. However, there are no COCs identified in the surface soils. Therefore, potential exposure by industrial workers to surficial soils under the present Site conditions would not result in any adverse health impact.

The only potential future direct-contact exposure to soils could occur if construction activities require excavation of surface and subsurface soils. During the construction/excavation program, industrial workers and construction workers would be exposed to excavated dirt. In the event that trespassers gain entrance to the fenced Site area during the time of construction/excavation, trespassers would generally have limited exposure to impacted soil. The potential exposures of on-Site workers represents the worst-case exposure scenario.

An industrial worker exposure scenario was developed with the assumption that the excavated dirt is left exposed under the future Site condition. A construction worker exposure scenario was developed with the assumption that the construction worker will work on one construction project at the Site.

The future hypothetical situation whereby the Site is developed into a residential area is evaluated. Although highly unlikely, the residential exposure scenario is evaluated and represents the worst-case exposure.

3.3.3 Identification of Exposure Pathways

The potential exposures under present and future land use are summarized as follows:

Media	*Exposure Pathway*	*Receptor Population(s)*	*Land Use*
General Soil (Surface & Subsurface Soils)	Dermal Contact Incidental Ingestion	Industrial Workers Construction Workers Residential Exposure by Adults and Children	Future

3.3.4 Exposure Point Concentrations

Tables 3.3 and 3.4 present the arithmetic mean of the concentrations in all samples, the maximum detected concentration and the 95th percent upper confidence limit (95% UCL) of the mean for each COC in soil (RAGS, Supplemental Guidance to RAGS: Calculating the Concentration Term, OSWER 9285.7 - 081, May 1992).

For this evaluation, a most likely exposure scenario (e.g., Level 1) and a reasonable maximum exposure (RME) scenario (e.g., Level 2) were evaluated to provide a range of potential impacts. U.S. EPA has defined the mean or average concentration as appropriate for

the exposure concentration for the most likely exposure scenario (Level 1). For this evaluation, the average concentration was calculated by averaging results for all samples using the detected concentrations and counting all non-detects (NDs) as half the detection limit for constituents which were reported as both positive and non-detect in different samples from a single study area. In the event that duplicate samples were analyzed, the higher concentration value was used based upon the direction of U.S. EPA (to maintain a conservative approach).

U.S. EPA has defined the RME concentration as the upper 95th percentile of the mean of concentrations reported in the media/area being evaluated. The RME exposure scenario (Level 2) should be considered as conservative.

3.3.5 Quantification of Exposure

For each exposure scenario, two levels of assumptions are presented. "Level 1" assumptions present the average or mean value for the assumption approximating the average expected exposure conditions. "Level 2" presents assumptions which are more conservative, approximating the reasonable maximum exposure. The Level 2 assumptions are based on the 90th or 95th percentile confidence level for factors such as exposure duration, ingestion rates and total exposed skin surface areas.

To quantify exposures, potential exposure scenarios were developed using exposure assumptions presented in the U.S. EPA documents entitled, "Risk Assessment Guidance for Superfund (RAGS)", Part I: Human Health Evaluation Manual, EPA/540/1-89/002, December 1989; "RAGS Supplemental Guidance Standard Default Exposure Factors", OSWER Directive 9285.6-03, March 25, 1991; "Exposure Factors Handbook", EPA/600/8-89/043, March 1990; "Dermal Exposure Assessment: Principles and Applications", EPA/600/8-91/011B, January 1992; and "Superfund Exposure Assessment Manual", EPA/540/1-88/001, April 1988. In some instances, where the U.S. EPA documents did not present necessary assumptions, and where specific appropriate exposure information were not

available, professional judgment was applied to develop conservative assumptions which are protective of human health.

3.4 TOXICITY ASSESSMENT

3.4.1 Toxicity Summaries

The following subsections provide a brief summary of the occurrence and toxicity of the COCs evaluated at the Site. The COCs included:

1. PCBs
2. PAHS: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene
3. aluminum
4. arsenic
5. calcium
6. lead

3.4.2 Polychlorinated Biphenyls (PCBs)

PCBs are a group of 209 stable, fat-soluble chemicals. In the past, PCBs have been used in capacitors, transformers, carbonless copying paper, paints and hydraulic fluid.

Aroclor is the commercial name for U.S. manufactured PCB product mixtures. Different product mixtures are further identified by codes, such as 1248, 1254, and 1260. These codes designate the percent of chlorination of the product mixture. Since the time necessary for different components of PCB mixtures to break down in the environment varies, PCB mixtures usually found in soils, sediments and biota have different compositions in comparison to the commercial formulations. Most PCBs in the environment are similar, but not identical to, Aroclor 1254.

Environmental Fate

Due to the hydrophobic nature of PCBs, their solubility in water is limited. Therefore, the majority of the PCBs are readily adsorbed to sediment/soil material. Increasing organic carbon content in the soil increases the adsorption tendency and capacity.

As reflected by the k_{OC} values, PCBs are immobile compounds. The k_{OC} reflects the tendency of the specific compound to be adsorbed by soil and sediment. The k_{OC} is directly related to the organic carbon content and the amount of fines in the geologic materials, and is inversely related to the solubility of the specific compound in water. Therefore, when the k_{OC} is large, the compounds migrate slowly. The high k_{OCS} for PCBs indicate that PCBs are readily adsorbed by organic carbon and fines in sediment/soils. Additionally, PCBs are not readily soluble in water. Therefore, PCBs are relatively immobile in the environment.

Toxicity

PCBs are classified as a probable human carcinogen (designated as a B2 carcinogen by U.S. EPA) with sufficient evidence of carcinogenicity in animal studies. Evaluating the health effects of PCBs is difficult since they are mixtures and each mixture behaves differently kinetically, and therefore exerts different health effects quantitatively.

The U.S. EPA Cancer Slope Factor (CSF) for PCBs used to estimate additional lifetime cancer risks is 7.7 $(mg/kg/day)^{-1}$. This CSF value is taken from the Integrated Risk Information System (IRIS) database, (January 1994).

U.S. EPA has not yet developed a final Reference Dose (RfD) which can be used to quantify noncarcinogenic effects for PCBs due to the complexity of the mixtures. U.S. EPA has developed an RfD for Aroclor 1016 of 7.0E-5 mg/kg/day (IRIS, 1994).

3.4.3 Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic Aromatic Hydrocarbons (PAHs) are a group of chemicals formed during the incomplete combustion of virtually all forms of organic materials. The combustion of fuels in cars and in furnaces produces PAHs. Waste incinerators produce PAHs. Natural sources include volcanoes, forest fires, crude oil and shale oil. PAHs can also be found in substances such as crude oil, coal tar pitch, creosote, road and roofing tar. A major source of exposure for humans is cigarette smoking, both active and passive. Therefore, PAHs are ubiquitous in the environment and the increasing levels found in the environment parallel industrial and urban development.

Chemical Identity

Benzo(a)anthracene, benzo(a)pyrene (B(a)P), benzo(b)fluoranthene, dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene are considered as a group in this review of the chemical and physical properties of PAHs.

Table 3.6 summarizes the physical and chemical properties of the above mentioned chemicals.

As pure chemicals, PAHs generally exist as colorless, white or pale yellow-green solids. Most PAHs do not occur alone in the environment, rather they are found as mixtures of two or more PAHs. The Site-related PAHs are not commercially produced in the U.S. nor are there any known uses for them except as research chemical.

Environmental Fate

Some of the transport and partitioning characteristics of the PAHs are roughly correlated to their molecular weights. The Site-related PAHs are considered high molecular weight compounds ranging from 228 g/mol to 278 g/mol.

In air, PAHs are present in the gaseous phase or sorbed to particulates. The atmospheric residence time and transport distance depend on the size of the particles to which PAHs are adsorbed. That is, the larger the particulate size, the shorter the residence time and transport distance. PAHs can undergo photochemical oxidation with the formation of nitrated PAHs, Phenols, and other compounds. Atmospheric half lives are generally less than 30 days.

PAH compounds tend to be removed from the water column by volatilization to the atmosphere, adsorption to particulates or sediments, biodegradation or bioaccumulation into aquatic organisms. The high molecular weight PAHs have Henry's Law Constants in the range of 10^{-5} to 10^{-8} (refer to Table 3.6) which indicates very limited volatilization from water. Half-lives for volatilization of benzo(a)anthracene and bezno(a)pyrene (high molecular weight PAHs) from water have been estimated to be greater than 100 hours.

High molecular weight PAHs have K_{OC} values that range from 10^5 to 10^6 which indicates strong tendencies to adsorb to organic carbon. Due to their low water solubilities, PAHs are primarily found adsorbed to sediments or soils. Adsorption of PAHs is a function of organic carbon content and particle size. The environmental fate of PAHs is described by U.S. EPA in the document "Ambient Water Quality Criteria for Polynuclear Aromatic Hydrocarbons" which states:

> "PAH will adsorb strongly onto suspended particulates and biota and their (PAH) transport will be determined largely by the hydrogeologic condition of the aquatic system. PAH dissolved in the water column will probably undergo direct photolysis at a rapid rate. The ultimate fate of those which accumulate in the sediment is believed to be biodegradation and biotransformation by benthic organisms." (U.S. EPA, 1979).

This is restated in the U.S. EPA document "Health Effects Assessment for Polycyclic Aromatic Hydrocarbons (PAHs)" which states:

> "The predominant mechanism that is likely to dictate the fate of most PAHs in aquatic media is sorption to particulate matter and subsequent sedimentation and microbial degradation".

Since PAHs are most likely to stay in the sediment or soil, microbial degradation is the most likely ultimate environmental fate in contrast to photolysis and volatilization. Compounds with four cyclic rings or less are most amenable to microbial degradation. Benzo(a)pyrene (five cyclic rings) has a half life in soil inoculated with bacteria of less than 8 days. The half-life reported for benzo(a)pyrene in soil reported in Superfund Public Health Evaluation Manual (SPHEM, 1986) in 420 to 480 days but there is no reference to the microbial content in the soil.

Toxicity

Investigative studies reviewing PAHs carcinogenicity have conclusively demonstrated that PAHs may induce tumors on the skin, lung, kidney, stomach, etc. of test animals.

PAHs occur in mixtures. Different mixtures of PAHs are released into the environment and different mixtures of PAHs can demonstrate varying health effects. Evaluating which specific PAH causes the observed toxic health effects from a specific human exposure to a mixture of PAHs is difficult if not impossible. There are several questions that one must consider in estimating the carcinogenic risk of complex mixtures of PAHs. Is the effect observed due to one particular carcinogenic PAH or is it due to the combined effect of the mixture of PAHs.

B(a)P, a known human carcinogen, has consistently been demonstrated to be one of the most potent carcinogenic PAHs to which humans might be expected to be exposed environmentally. B(a)P has been studied extensively and is the basis for the toxicity studies of other PAHs. To estimate carcinogenic risk of complex mixtures of PAHs, one approach

assumes that all carcinogenic PAHs are equivalent in potency to B(a)P. This has little scientific support and results in an overestimation of carcinogenic potency of most mixtures of PAHs. Thus, a relative potency approach for estimation of cancer risk of complex mixtures of PAHs was developed as an alternative to using a B(a)P one-to-one equivalency approach. This alternate approach takes into account differing potencies of carcinogenic PAHS and results in a more realistic estimate for risk from mixtures.

Summary of Relative Potency Estimates Derived for PAHs

Benzo(a)pyrene	1
Benzo(a)anthracene	0.1
Benzo(b)fluoranthene	0.1
Dibenzo(a,h)anthracene	1.0
Indeno(1,2,3-cd)pyrene	0.1

To calculate the Cancer Slope Factor (CSF) for the aforementioned carcinogenic PAHs, the relative potency estimates for the individual PAH is multiplied times the CSF for B(a)P (7.3 mg/kg-day). The resultant value is used to calculate the lifetime upper bound excess cancer risk associated with the exposure to the individual PAH.

3.4.4 Arsenic

Arsenic may be released to the air by volcanic eruptions and forest fires. Natural weathering processes release arsenic to water (ATSDR, 1992).

Emissions from coal combustion facilities and pesticide spraying are sources of arsenic in the air. Sources of arsenic in water include discharge from industrial facilities, leaching from landfills or soil, and urban runoff. Application of pesticides and disposal of solid wastes from fossil fuel combustion and industrial processes are the major sources of arsenic in the soil. Land application of sewage sludge is another source of arsenic in soil (ATSDR, 1992).

Currently, the principal use of arsenic (as arsenic trioxide) is in products used for wood preservation. Most of the other arsenical compounds are used in the production of agricultural chemicals such as insecticides, herbicides, algicides, and growth stimulants for plants and animals. Some arsenic formulations which were used in the past as pesticides (e.g., rat or ant poisons) have been prohibited because of concerns about human health risks during production and application, or accidental poisoning at the point of use. Smaller amounts of arsenic are also used in the production of glass and nonferrous alloys, and in the electronics industry (ATSDR, 1992).

Arsenic compounds have a long history of use in medicine where they have been used in the treatment of syphilis, yaws, amoebic dysentry, and trypanosomiasis. The use of organic arsenic compounds to treat venereal disease ceased upon the discovery of antibiotics, but several arsenic compounds are still being used to treat certain severe parasitic diseases (ATSDR, 1992).

Environmental Fate

Many arsenic compounds tend to adsorb to soils or sediments, and leaching usually results in transportation over only short distances in soil. Arsenic in soil exists primarily as As^{+5} in aerobic soils, As^{+3} in slightly reduced soils (e.g., temporarily flooded), and arsine, methylated arsenic, and elemental arsenic in very reduced conditions (e.g., swamps and bogs) (ATSDR, 1992).

Transport and partitioning of arsenic in water depends upon the chemical form of the arsenic and on the interactions with other materials present. Fate processes are most strongly influenced by Eh (oxidation-reduction potential), pH, metal sulphide and sulphide ion concentration, iron concentration, temperature, salinity, and distribution and composition of the biota. Soluble forms move with the water and may be carried long distances through rivers. However, arsenic may be adsorbed from water onto sediments or soils, especially clays, iron oxides, aluminum hydroxides, manganese compounds, and organic material. Sediment-bound

arsenic may be released back into the water by chemical or biological interconversions of arsenic species (ATSDR, 1992).

Arsenic in the atmosphere exists as particulate matter, mostly as particles less than 2 m in diameter. These particles are transported by wind and air currents until they are returned to earth by wet or dry deposition. The residence time of particulate-bound arsenic depends on particle size and meteorological conditions, but a typical value is about 9 days. Photolysis is not considered an important fate process for arsenic compounds (ATSDR, 1992).

Chemical Identity

Table 3.6 summarizes the physical and chemical properties of arsenic.

Toxicity

Inhalation of inorganic arsenic dusts (usually containing mainly arsenic trioxide) is irritating to the nose, throat, and lungs, and can lead to hoarseness, bronchitis, and rhinitis. Chronic functional impairment of respiration is not usually observed, even in workers exposed to high levels of arsenic trioxide in air. The effects of organic arsenicals on the respiratory tract have not been well studied. There are no data by any route from human studies, but acute respiratory distress and lung injury have been reported in mice that inhaled very high levels (2170 mg As/m^3) of DMA (ATSDR, 1992).

High oral doses of inorganic arsenic can lead to marked cardiac arrhythmias and altered cardiograms in humans. Chronic oral exposure to lower levels of inorganic arsenic can also result in serious damage to the vascular system. The most extreme manifestation of this is "Blackfoot disease", a progressive loss of circulation in the fingers and toes that ultimately leads to gangrene. Blackfoot disease may not be likely to occur in other areas besides Taiwan, but less severe signs of vascular injury (Raynaud's disease, cyanosis of fingers and toes) have been noted in several other populations exposed to inorganic arsenic, both by inhalation (at a

concentration above 0.05 to 0.5 mg/m^3) and by the oral route (at doses of 0.02 to 0.06 mg As/kg/day, depending on age) (ATSDR, 1992).

Nausea, vomiting and diarrhea are very common symptoms in humans following oral exposure to inorganic arsenicals, both after acute high dose exposure and after repeated exposure to lower doses. Inhalation exposure of rats to high doses (above 2000 mg As/m^3) of DMA can cause diarrhea and oral exposure of rabbits to MMA can cause intestinal irritation and weakening of the intestinal wall (ATSDR, 1992).

Arsenic is recognized as a known human carcinogen and the U.S. EPA has published an oral CSF of 1.75 $(mg/kg/day)^{-1}$, and an oral RfD of 0.0003 mg/kg/day (IRIS, 1994).

3.4.5 Lead

Lead is a naturally occurring element that has been found in the earth's crust and in all compartments of the biosphere. Natural emissions of lead to the atmosphere are from volcanoes and windblown dust (ATSDR, 1992).

Lead is dispersed through the environment primarily as a result of anthropogenic activities. Although combustion of leaded gasoline used to be the primary source of anthropogenic atmospheric releases of lead, industrial releases to soil from nonferrous smelters, battery plants, and chemical plants are now major contributors to total lead releases. Of the known aquatic releases of lead, the largest ones are from the steel and iron industries and lead production and processing operations. Lead-containing solid wastes are produced primarily as a result of domestic ore production and ammunition use. Other sources include solder, weights and ballasts, bearing metals, and iron and steel production. These sources are concentrated primarily in landfills (ATSDR, 1992).

Lead may be consumed in the form of metal, either pure or alloyed with other metals, or as a chemical compound, primarily oxides.

The commercial importance of lead is based on its ease of casting, high density, low melting point, low strength, ease of fabrication, acid resistance, electrochemical reaction with sulphuric acid and chemical stability in air, water, and soil (ATSDR, 1992).

Lead has many different uses. Its most important use is in the production of some types of batteries. Other uses include the production of ammunition and some kinds of metal products (such as sheet lead, solder, and pipes). Some chemicals containing lead, such as tetraethyl and tetramethyl lead, are used as gasoline additives. However, the use of these lead-containing chemicals is much less than it used to be because these additives are being phased out. Other chemicals containing lead are used in paint. The amount of lead added to paints and ceramic products, roofing, caulking, ammunition, gasoline additives, and solder has been reduced in recent years because of lead's harmful effects in humans and animals (ATSDR, 1992).

Chemical Identity

Table 3.6 summarizes the physical and chemical properties of lead.

Environmental Fate

Lead is strongly sorbed to organic matter in soil, and although not subject to leaching, it may enter surface waters as a result of erosion of lead-containing soil particulates. Lead may be converted to lead sulphate at the soil surface which is relatively soluble compared with lead carbonate or phosphate. Lead may also be immobilized by ion exchange with hydrous oxides or clays or by chelation with humic or fulvic acids in the soil. Many plants commonly take up lead from soil and lead will eventually be returned to soil when these plants decay unless they are harvested or removed (ATSDR, 1992).

The amount of lead that remains in solution in surface waters depends upon the pH of the water and the dissolved salt content. Lead

has a tendency to form compounds of low solubility with the major anions found in natural waters. In the environment, the divalent form (Pb^{2+}) is the stable ionic species of lead. Hydroxide, carbonate, sulphide, and more rarely, sulphate, may act as solubility controls in precipitating lead from water. In water, tetraalkyd lead compounds are subject to photolysis and volatilization with the more volatile compounds being lost by evaporation (ATSDR, 1992).

In the atmosphere, lead primarily exists in particulate form. Upon release to the atmosphere, lead particles are dispersed and ultimately removed from the atmosphere by wet or dry deposition. Large particles, particularly those with aerodynamic diameters of >2 μm, settle out of the atmosphere fairly rapidly and are deposited relatively close to emission sources, whereas smaller particles may be transported thousands of kilometers. Wet deposition is more important than dry deposition for removing lead from the atmosphere (ATSDR, 1992).

Toxicity

Humans living in areas surrounding hazardous waste sites may be exposed to lead via ingestion of affected water or soils or by inhalation of affected particulates in the air. For the general population (i.e., those not living in the vicinity of hazardous waste sites), the major route of exposure is ingestion of lead-affected drinking water, food, soil, lead-based paint chips, or dusts. The predominant route of occupational exposure is the inhalation of lead-affected particulates (ATSDR, 1992).

Lead has been shown to affect virtually every organ and/or system in the body in both humans and animals. The most sensitive target organs appear to be the nervous system, the hematopoietic system, and the cardiovascular system (ATSDR, 1992).

There are no conclusive data available to indicate that lead adversely affects the respiratory system in humans. However, one inhalation study in laboratory mice indicated that continuous prolonged exposure to lead-affected particulates (1.6 mg lead/m^3 as lead nitrate for 28 days) may be irritating to the lungs, as evidenced by the pulmonary edema

and hemorrhage seen in the lungs of the lead-exposed mice at necropsy. These effects were not observed in laboratory mice continually exposed for 14 days. The results of this study suggested that the observed respiratory effects were dependent on exposure duration and are cumulative (ATSDR, 1992).

The evidence from occupational, clinical, and general population studies suggest that lead affects the cardiovascular system in humans, producing cardiac lesions and electrocardiographic abnormalities at high levels of exposure (600 $\mu g/m^3$ to 4000 $\mu g/m^3$) and increases in blood pressure, particularly in middle-aged men, at very low levels of exposure with no evident threshold through the lowest blood levels, 7 $\mu g/dL$ (ATSDR, 1992).

Exposure to lead that resulted in blood levels of approximately 40 $\mu g/dL$ to > 100 g/dL has been associated with nephropathy in lead-exposed workers. Characteristics of chronic lead nephropathy include progressive interstitial fibrosis, dilation of tubules and atrophy or hyperplasia of the tubular epithelial cells. The chronic form is reported mainly in lead workers, whose primary exposure is via inhalation (ATSDR, 1992).

Evidence from occupationally exposed workers suggests that lead may adversely affect thyroid function. Lead appears to interfere with the conversion of vitamin D to its hormonal form, 1,25-dihydroxyvitamin D. In lead-exposed children with blood lead levels of 33 to 55 $\mu g/dL$, 1,25-dihydroxyvitamin D levels were reduced to levels comparable to those observed in children with severe renal insufficiency. Children with blood lead levels of 33 to 120 g/dL had depressed levels of 1,25-dihydroxyvitamin D ($\leq$ 20 pg/mL), comparable to those found in vitamin D-dependent rickets, type I (ATSDR, 1992).

U.S. EPA has concluded that the animal data are sufficient to demonstrate that lead and (inorganic lead) compounds, particularly soluble lead salts, are carcinogenic (ATSDR, 1992). To date, U.S. EPA has not established any toxicity values for lead. The previous RfD (0.0014 mg/kg/day)

is included in this report so that lead is included in a comparable evaluation with the other chemicals evaluated at the Site.

3.5 RISK CHARACTERIZATION

The results of the quantitative risk assessments are summarized in Tables 3.7. The detailed calculations are presented in Appendix D, Tables 1 through 8, inclusive.

The quantitative health risk assessment was performed for the most likely exposure scenario (Level 1) based on mean exposure point concentrations and average exposure conditions as well as the reasonable maximum exposure (RME) scenario (Level 2) based on the 95% UCL concentration and reasonable maximum conditions.

The risk assessment provides a theoretical relative evaluation of the additional risk of contracting cancer due to estimated exposure to specific contaminants. The procedure yielded a negative exponential number that represents the estimated additional cancer risk; for instance, 1E-06 (or 1×10^{-6}) implies one additional case of cancer will result for every 1,000,000 individuals exposed to the specific exposure scenario. As the negative exponent increases, the associated risk decreases. U.S. EPA has identified that a screening level of 10^{-6} should be utilized for this EE/CA.

The estimated additional lifetime carcinogenic risks (R) were calculated according to the following general equation:

$$R = CDI * CSF$$

where:

R = Upper Bound Additional Lifetime Cancer Risks
CDI = Chronic Daily Intake (mg/kg-day)
CSF = Cancer Slope Factor [1/(mg/kg-day)].

The cancer slope factor represents the carcinogenic potency of a chemical (see Table 3.6). The dose, or intake, represents the

amount of contaminant to which a receptor is exposed. When evaluating carcinogenic risks, the dose in all exposure scenarios is the estimated daily intake of each chemical, received during the specified period of exposure, and averaged over a 70-year lifetime.

Incremental cancer risk was calculated for each chemical of concern having a designated slope factor and all applicable exposure pathways (ingestion and dermal contact with soil). Risk values for all contaminants assessed were summed by exposure pathway to provide total pathway-specific risks.

U.S. EPA has not identified a single value that represents a significant incremental cancer risk. However, the NCP acceptable risk range for Superfund sites has been set at 1×10^{-6} to 1×10^{-4} per environmental medium (NCP, 1990). In other words, the goal of the NCP is to reduce the cancer risk associated with site contaminants in a given medium to within or below a range of 1 in 10,000 to 1 in 1,000,000.

Potential non-carcinogen effects were evaluated based on a comparison of chemical-specific chronic exposure doses (depending on the scenario-specific exposure duration) with corresponding reference doses derived from health criteria (see Table 3.6). The result of this comparison is expressed as the Hazard Quotient (HQ):

$$HQ = \frac{\text{Exposure Dose}}{\text{Protective Dose}} = \frac{CDI}{RfD}$$

where :

HQ = Hazard Quotient
CDI = Chronic Daily Intake (mg/kg-day)
RfD = Reference Dose (mg/kg-day).

A Hazard Quotient (HQ) that exceeds unity (1.0) suggests a greater likelihood of developing an adverse chronic effect. However, the uncertainty factors built into the reference doses result in conservative protective dose values. Therefore, the reference dose is likely well below that for which adverse effects will be seen.

Hazard Quotients were calculated for each contaminant for which health criteria are currently available. The HQs for each contaminant were summed to produce a rough estimate of the exposure pathway-specific risk, the Hazard Index (HI). In estimating total non-carcinogen risk, potential responses were conservatively assumed to be additive. However, all chemicals of concern do not have the same or similar toxic endpoints and responses may not be additive. Therefore, in those cases where the HI exceeded one, further analyses were undertaken to evaluate which specific chemicals might exhibit toxic effects and whether the potential health effects estimated for each chemical were potentially additive.

Estimated risk numbers calculated as part of the risk assessment are compared to U.S. EPA value ranges (U.S. EPA range and hazard index).

3.5.1 General Soils (Surface and Subsurface Soils)

3.5.1.1 Industrial Worker Exposure

An industrial worker exposure scenario was developed with the assumption that the excavated dirt is left exposed under the future Site condition. The following conservative and health-protective assumptions were used to calculate exposures:

- Subsurface soils and surficial soils on the Site are disturbed/excavated.

- Exposure point concentrations are the mean concentration of soils for the Mean or average most likely exposure scenario and the 95% UCL concentration for the RME exposure scenario.
  Note: Soil data taken from 0 to 44 feet BGS were used in the evaluation based on the assumption that excavation activities on the Site will result in the mixing of soils at depth with the subsoils being exposed at surface.

- Inadvertent soil ingestion rate for adult workers is assumed to be 50 mg of soil per day for the Mean and the RME.
  Note: U.S. EPA guidance document entitled "RAGS Supplemental Guidance, Standard Default Exposure Factors" (U.S. EPA, 1991) states that *"50 mg of soil per day was chosen as the standard default value for adult soil ingestion in the workplace"*.

- The surface area of the body contacted by soil during construction activities includes the head and hands (2,000 $cm^{2)}$ for the Mean and the RME.
  Note: U.S. EPA guidance states that *"clothing is expected to limit the extent of the exposed surface area in cases of soil contact (U.S. EPA, 1992)"*. Workers are required to wear hard hats, safety glasses, gloves and steel-toe boots, thus, the exposed skin surface is limited.

- Soil-to-skin adherence factor is 0.2 mg/cm^2 for the Mean and 1.0 mg/cm^2 for the RME (U.S. EPA, 1992).

- When chemical-specific information is not available, the absorption efficiency applicable to ingestion is assumed to be 100 percent for volatile organic compounds and 50 percent for other organic chemicals, PCBs, pesticides, or inorganics (MDNR, 1991).

- When chemical-specific information is not available, the absorption efficiency applicable to dermal contact is assumed to be 10 percent for volatile organic compounds and 1 percent for other organic chemicals, PCBs, pesticides, or inorganics (MDNR, 1991).

- Exposure frequency equals 250 days per year for the Mean and the RME. Reasonably, maximum surficial soil exposure will only occur during the summer months since factors such as precipitation, snow cover and vegetation will limit activity patterns and exposure.

- Exposure duration:
  10 years (Mean) and 25 years (RME) for carcinogens and non-carcinogens.

- The percent time factor is 1.0 for both the Mean and the RME.

- Adult body weight is assumed to be 70 kg.

- Averaging time is 25,550 days or 70 years (the Mean and the RME) for the carcinogen assessment and ED*365 days (the Mean and the RME) for the non-carcinogen assessment.

The estimated cancer risks and hazards are summarized in Table 3.7 while the scenario details, assumptions and calculation tables are presented in Appendix D , Tables 1 through 4, inclusive. The estimated additional risks of cancer exceeded the U.S. EPA screening level of 10^{-6} for this EE/CA, while the non-carcinogenic hazard was below. The additional lifetime upper limit of cancer risks were estimated to be 9.3E-07 and 5.9E-06 for the Mean and the RME, respectively. The hazard indices for the Mean and the RME were two to one order of magnitude below 1.0, the level of concern.

3.5.1.2 Construction Worker Exposure

A construction worker exposure scenario was developed with the assumption that the construction worker will work on one construction project at the Site. The following conservative and health-protective assumptions were used to calculate exposures:

- Subsurface soils and surficial soils on the Site are disturbed/excavated.

- Exposure point concentrations for the Mean and the RME are the mean and 95% UCL concentration of surface and subsurface soil data collected from the Site.

  Note: Soil data taken from 0 to 44 feet BGS were used in the evaluation based on the assumption that excavation activities on the Site will result in the mixing of soils at depth with the subsoils being exposed at surface.

- The construction worker inadvertently ingests 50 mg of soil per event for both the Mean and the RME.

  Note: U.S. EPA guidance document entitled: "RAGS Supplemental Guidance, Standard Default Exposure Factors (U.S. EPA, 1991)" states that *"50 mg of soil per day was chosen as the standard default value for adult soil ingestion in the workplace."*

- Surface area of the body contacted by soil during outdoor activities includes the head and hands (5,300 cm^2) for the Mean and the RME.

- Soil-to-skin adherence factor is 0.2 mg/cm^2 and 1.0 mg/cm^2 (U.S. EPA, 1992) for the Mean and the RME, respectively.

- When chemical-specific information is not available, the absorption efficiency applicable to ingestion is assumed to be 100 percent for volatile organic compounds and 50 percent for other organic chemicals, PCBs, pesticide, or an inorganic parameter (MDNR, 1991).

- When chemical-specific information is not available, the absorption efficiency applicable to dermal contact is assumed to be 10 percent for volatile organic chemical and 1 percent for other organic chemicals, PCBs, a pesticide, or an inorganic parameter (MDNR, 1991)".

- The exposure time for Levels 1 and 2 is 8 hours/day which represents an average work day.

- The exposure frequency is 250 days/year for the Mean and the RME.

- The exposure duration for a given construction program including excavation is one year for the Mean and the RME.

- Adult body weight is assumed to be 70 kg.

- Averaging time is 25,550 days or 70 years (the Mean and the RME) for the carcinogen assessment and ED*365 days (the Mean and the RME) for the non-carcinogen assessment.

- Percentage time factor (PTF) is 1.0 for the Mean and the RME, respectively.

The estimated cancer risks and hazards are summarized in Table 3.7 while the scenario details, assumptions and calculation tables are presented in Appendix D, Tables 5 through 8, inclusive. The estimated additional risks of cancer and non-carcinogenic hazard are below the U.S. EPA screening levels. The additional lifetime upper limit of cancer risks were estimated to be 1.1E-07 and 4.1E-07 for the Mean and the RME, respectively. The hazard indices for the Mean and the RME were two to one order of magnitude below 1.0, the level of concern.

3.5.1.3 Residential Exposure

- Subsurface and surface soils on the Site are disturbed/excavated.

- Exposure point concentrations are the mean concentrations in soils for the Mean or average most likely exposure scenario and the 95% UCL concentration for the RME exposure scenario.
  Note: Soil data taken from 0 to 44 feet BGS were used in the evaluation based on the assumption that excavation activities on the Site will result in the mixing of soils at depth with the subsoils being exposed at surface.

- Incidental ingestion rates for the Mean and the RME:
  child (1 to 6 years) = 200 mg/day, adult and older child = 100 mg/day.

- The adult skin surface area contacted by soil is 5300 cm^2 for the Mean and the RME.
  Note: USEPA guidance states that "clothing is expected to limit the extent of the exposed surface area in cases of soil contact (USEPA, 1992)." If the individual wears a short sleeve shirt, shorts, and shoes, the exposed skin surface is limited to the head, hands, forearms and lower legs (5300 cm^2).

- The child skin surface area contacted by soil is 1983 cm^2 and 2295 cm^2 for the Mean and the RME, respectively.

  Note: USEPA guidance states that clothing scenarios discussed "suggest that roughly 10% to 25% of the skin is exposed to soil...The defaults for children can be derived from multiplying the 50th and 95th percentiles by 0.25 for the ages of interest (pg.8-10, USEPA, 1992)." Following this procedure, the skin surface areas presented above were derived.

- Soil-to-skin adherence factor is 0.2 mg/cm^2 and 1.0 mg/cm^2 (USEPA, 1992) for the Mean and the RME, respectively.

- When chemical-specific information is not available, the absorption efficiency applicable to ingestion is assumed to be 100 percent for volatile organic compounds and 50 percent for other organic chemicals, PCBs, pesticide, or an inorganic parameter (MDNR, 1991).

- When chemical-specific information is not available, the absorption efficiency applicable to dermal contact is assumed to be 10 percent for volatile organic compounds and 1 percent for other organic chemicals, PCBs, pesticide, or an inorganic parameter (MDNR, 1991).

- The exposure frequency is 350 days/year for the Mean and the RME.

- The individual is assumed to reside in the area for 10 years (Mean) and 30 years (RME), of which 5 years are as a younger child.

- Averaging time is 25,550 days or 70 years (Mean and RME) for the carcinogen assessment and ED * 365 (Mean and RME) for the non-carcinogen assessment.

- The body weight is assumed to be 15 kilograms (kg) for a young child (Mean and RME) and 70 kg for an adult and older child (Mean and RME).

The exposure scenario details and the risk calculations are presented in Appendix D, Tables 9 through 16, inclusive. The estimated

cancer risks and hazards are summarized in Table 3.7. The estimated additional risks of cancer and the non-carcinogenic hazard exceeded the U.S. EPA screening levels for this EE/CA. The additional lifetime upper limit of cancer risks associated with the exposure of an individual assumed to reside in the area for 10 years and 25 years of his lifetime (5 years of which is as a younger child) range from 1.2E-05 to 4.0E-05 for the Mean and the RME, respectively. The hazard indices associated with the exposure of an individual assumed to reside in the area for 10 years and 25 years of his lifetime (5 years of which is as a younger child) range from 1.4 to 3.4 for the Mean and the RME, respectively.

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4.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

The purpose of establishing removal action objectives (RAOs) is to provide a benchmark against which to evaluate the selection of removal action alternatives.

The development of RAO's requires the following Site-specific information:

1. media of potential concern;
2. chemicals of potential concern; and
3. probable future land use.

Each of these subjects is further discussed below.

a) Media of Potential Concern

> *"As a guide to determining the media and chemicals of potential concern, the OSWER directive "Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions "(EPA 1991) indicates that action is generally warranted at a site when the cumulative carcinogenic risk is greater than 10^{-4} or the cumulative noncarcinogenic HI exceeds 1 based on RME assumptions. "*

As summarized in Section 3.0 of this EE/CA, unacceptable carcinogenic and/or non-carcinogenic risks were identified for residential (Type B) future land use scenarios evaluated in the SRA for the subsurface soil. Consistent with the guidance identified above, remedial action would be warranted for the subsurface soil if a residential land use is desired. It should be noted that the human or environmental risks identified in other areas do not warrant remediation based upon U.S. EPA policy and guidance.

> *"When the cumulative current or future baseline cancer risk for a medium is within the range of 10^{-6} to 10^{-4}, a decision about whether or not to take action is a site-specific determination. "* (RAGS, VI, Part B).

The RME cancer risks for all current and potential future land uses summarized in Table 3.7, indicate that the cancer risks fall within the 10^{-6} range or lower, and non-cancer risks have an HI below 1, with the exception of the following scenarios:

- residential exposure to subsurface soils
  - 3.97×10^{-5} cancer risk, RME
  - 3.37 non-cancer risk, RME

The cancer and non-cancer risks for subsurface soil in the industrial/commercial (Type C) scenarios were determined to be lower than 10^{-6} and an HI of 1 for all current and potential future land uses, with the exception of the industrial worker scenario, under which the cancer risk was estimated at 5.85×10^{-6} (slightly above the 10^{-6} point of departure).

b) Chemicals of Concern

> *"Following the baseline risk assessment, any chemical that has an associated cancer risk (current or future) within a medium of greater than 10^{-6} or an HI of greater than 1 should remain on the list of chemicals of potential concern for that medium. Likewise, chemicals that present cancer risks of less than 10^{-6} generally should not be retained on the list unless there are significant concerns about multiple contaminants and pathways."* (RAGS, VI, Part B).

Based upon the guidance identified above, the following are the potential chemicals of concern for each of the media identified to require remediation. Potential chemicals of concern within each media requiring remediation are defined by having a cumulative carcinogenic risk greater than 10^{-6} or cumulative HI greater than 1. The potential chemicals of concern on a media and exposure specific basis are as follows:

I. CARCINOGENS (>1 x 10^{-6} risks)

Subsurface Soil

Arsenic
Aroclor-1254
Benzo(a)pyrene

The SRA indicates that arsenic, aroclor-1254 and benzo(a)pyrene equally account for the cancer risks associated with the subsurface soils.

II. NON-CARCINOGENS (HI>1.0)

Subsurface Soil

Arsenic
Lead

The results of the SRA indicates that lead and arsenic account for the non-cancer risks associated with the subsurface soil. The vast majority of risk (>90 percent) is associated with lead.

c) Probable Future Land Use

The J-Lot Site is currently zoned and utilized for industrial purposes. In addition, the City of Pontiac's future land use plan calls for the continued industrial classification of the property. The property surrounding the Site consists of industrial and mixed residential land uses. This current residential land is intended for future industrial use as indicated on the City of Pontiac's future land use plan (see Section 2.0).

The residential scenario (i.e. unrestricted land use) is considered in order to evaluate more stringent removal action alternatives than are required according to current and future land uses.

4.1 REMOVAL ACTION OBJECTIVES

This section presents general and Site-specific removal objectives for the J-Lot Site removal action. General removal objectives are defined by the NCP, CERCLA (as amended by SARA)/MERA. These objectives relate to the statutory requirements for development of any removal action. Site-specific objectives relate to specific contaminated media, such as subsurface soil and potential exposure routes. Site-specific objectives also identify target remediation areas and concentrations. Site-specific objectives require an understanding of the contaminants in their respective media. The Site-specific objectives are developed based on the risk to the public health and the environment.

4.1.1 General Removal Objectives

The NCP states *"The national goal of the remedy selection process is to select remedies that are protective of human health and the environment, that maintain protection over time, and that minimize untreated waste" (40 CFR 300.430).*

This section of the NCP pertains to remedial actions, and not removal actions, but is considered in this EE/CA report to ensure a long-term solution (consistent with CERCLA/MERA).

In addition to the NCP, Michigan Act 307 regulates the levels of contaminants allowed in soil for both industrial/commercial areas (Type C) and residential areas (Type B).

The following general removal objectives have been developed for the J-Lot Site:

- minimize the potential for direct contact with the subsurface soil;
- reduce the toxicity, mobility or volume through treatment and/or containment of contaminated source materials; and

- reduce long-term Site management and maintenance requirements.

4.1.2 Site Specific Removal Action Objectives

The following Site-specific removal action objectives (RAO) have been developed for the J-Lot Site based on the general removal objectives, specific media, potential exposure routes, and future land use scenarios. In addition, these Site-specific RAOs were developed based on the risk to the public health and the environment, and ARARs (including Michigan Act 307).

4.1.2.1 Industrial/Commercial Scenario

No substantial risk was identified in the SRA for the industrial/commercial scenario. Therefore, no removal action is warranted based on risk to human health for the industrial/commercial scenario. However, Michigan Act 307 outlines generic cleanup criteria for industrial sites which are exceeded at the J-Lot Site. The Michigan Type C Generic Industrial Direct Contact Cleanup Criteria for soil for the COCs identified in Section 4.1 are as follows (MERA Operational Memorandum #14, dated June 21, 1994):

Constituent	Soil Cleanup Value (mg/kg)		
	Industrial	Commercial III	Commercial IV
Aroclor - 1254	7.5	10	25
Arsenic	8.6	12	29
Benzo(a)pyrene	2.1	2.9	6.9
Lead	400	400	400

These cleanup levels have been established as the Site-specific RAOs for the J-Lot Site under an industrial/commercial scenario.

4.1.2.2 Residential Scenario

Risks were identified in the SRA for the residential scenario. In addition, Michigan Act 307 outlines cleanup criteria for residential land use. The Michigan residential Type B Direct Contact Cleanup Criteria for soil for the COCs identified in Section 4.1 are as follows (MERA Operational Memorandum #8 dated June 21, 1994):

Analyte	Soil Cleanup Value (mg/kg)
Aroclor - 1254	1.0
Arsenic	0.72
Benzo(a)pyrene	0.33
Lead	400

These cleanup levels have been established as the Site-specific RAOs for the J-Lot Site under a residential scenario.

4.2 IDENTIFICATION OF POTENTIAL ARARS

Removal actions under the NCP are not required to comply with applicable or relevant and appropriate requirements (ARARs). ARARs are considered in this report to ensure the selection of a long-term solution for the Site.

Guidance for the determination of ARARs is presented in the U.S. EPA guidance document entitled "Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements", August 27, 1987 (OSWER Directive Number: 9234.0-05). The NCP provides the framework for addressing the requirements of CERCLA.

ARARs are used to develop removal action objectives and to scope and formulate removal action alternatives. ARARs are cleanup standards, control standards or other substantive environmental limitations promulgated under federal or state law.

4.2.2 Michigan Public Act 307

The Michigan Environmental Response Act (MERA) (Michigan Public Act 307 (P.A. 307, 1982, as amended) is the State of Michigan equivalent to the federal CERCLA statute. As such, it provides the rules necessary to develop remedial programs and cleanup standards for environmental contamination sites located within the State of Michigan.

The Michigan Act 307 Rules provide for three types of cleanup standards (Type A, Type B and Type C). The selection of a cleanup standard for a particular site is based on site-specific characteristics, the nature of the contamination which exists and the anticipated future land uses of the property. Under Rule 299.5705(2)(3), the cleanup approach may be Type A, B, C, or a combination of types for individual chemicals within each media of concern.

A Type A cleanup is achieved when the concentration of a hazardous substance in any environmental media does not exceed background or the relevant method detection limit.

Type B cleanup criteria are health-based, employing conservative, standardized exposure assumptions that assume there will be unrestricted direct contact with contaminated media in a residential setting.

A Type C cleanup is a health-based approach which allows site-specific characteristics to be factored into a risk assessment. It must be demonstrated that the assumptions used in the risk assessment are appropriate to the site and consistent with reasonably foreseeable current and future land uses. Less conservative exposure assumptions (than Type B) may be made by assuming less direct contact with the waste materials or restricting current and future use of the site through the application of institutional controls and deed restrictions. Cleanup levels will vary according to the exposure assumptions used in a site-specific risk assessment.

A generic approach to developing Type C Remedial Action Plans for industrial sites was recently identified by MDNR in MERA Operational Memorandum #14. The Type C approach was determined to be generally appropriate for industrial sites with the following characteristics:

- the primary activity at the site is industrial; and
- the current zoning of the site is industrial.

5.0 IDENTIFICATION AND DESCRIPTION OF REMOVAL ACTION ALTERNATIVES

This Section identifies and describes potential removal action alternatives, which could be implemented to fulfill the removal action objectives at the Site. Table 5.1 presents an array of removal action alternative considered potentially applicable to the Site.

The removal action alternatives considered in this EE/CA were derived for the subsurface soil, which was identified in Section 4.0 as the only media of potential concern. The following sections provide a description and technical feasibility evaluation of the removal action alternatives considered potentially applicable.

5.1 NO ACTION

The "No Action" alternative allows the Site to exist as it is without the implementation of any removal action. The no action alternative would incorporate long-term environmental monitoring at the Site to confirm that future conditions do not deteriorate significantly from present existing conditions. The long-term monitoring program at the Site would involve the monitoring of the surface and subsurface soils to ensure the Site-specific contamination is not impacting areas adjacent to the Site.

Contaminated soil with contaminant concentrations in excess of clean-up goals would remain at the Site under the no action response and no measure would be invoked to remove or physically contain contaminant source areas.

5.2 LIMITED ACTION

The limited action response involves the implementation of institutional controls and property access restrictions to reduce potential human exposure to Site-related constituents.

5.2.1 Institutional Controls

This action would involve the placement of a restriction within the deed (or other institutional controls such as zoning or building code changes) to the property obligating the property owner to not conduct specific activities (e.g., excavation, residential use) and warn prospective future purchasers of the past history and condition of the property. Deed restrictions can be made enforceable and permanent through various legal mechanisms (e.g., Consent Decree). The use of a deed restriction does not imply that other removal actions technologies are unnecessary. To ensure that the Site does not pose a threat to the environment or to public health may require the implementation of other removal actions technologies in addition to a deed restriction.

5.2.2 Access Restriction

Access to the Site may be further restricted by upgrading the existing security fence, constructing additional security fencing, or instituting other controls to minimize entry to the Site by wildlife or unauthorized personnel.

Although the soil with contaminant concentrations exceeding potential cleanup goals are not addressed by this option, the implementation of institutional controls and access restrictions would reduce potential future human contact with Site-related constituents. As a result, limited action (including access restrictions) is considered applicable and is recommended for inclusion in all Type C removal action alternatives.

5.3 PHYSICAL CONTAINMENT OPTIONS

The physical containment option involves the use of physical barriers to restrict human contact with Site constituents associated with the soil. This would be done through the construction of a suitable

cover. The purpose of the cover is to prevent direct contact with the soil, and reduce infiltration of precipitation through the soil. In addition, the cover would provide long-term protection against erosion and subsequent transport of constituents, provided it is properly maintained.

In general, a cover technology provides very good isolation of the contaminated soil but may extend the length of time that other possible remedy components, such as monitoring, are required.

Materials which may be used in the construction of low permeability covers may include:

1) Soil Cover;
2) Asphalt Cover; and
3) Clay Cover.

A brief description of each capping technology is presented below.

Soil Cover

In general, this technology would involve installation of the following layers:

- topsoil; and
- grading layer.

The topsoil layer would be seeded to promote vegetative growth. The grading layer would be designed to promote runoff and reduce ponding. The vegetation and grading will reduce infiltration to the subsurface soils, however, infiltration to the subsurface would occur during large precipitation or snow melt events. The most significant benefit of the soil cover will be to reduce risk from direct contact with the contaminated soil and transport of contaminants due to erosion.

Asphalt Cover

This technology would involve the construction of an asphalt concrete surface over a compacted granular base. The granular base would overlie the foundation layer. The required thicknesses of the asphalt concrete cap and granular drainage base are functions of the degree of anticipated settlement and local climatic conditions.

Asphalt concrete mixes designed to reduce infiltration are similar to highway paving asphalt concretes except that the percentages of mineral filler and asphalt cement are increased. These increased percentages serve to increase water repellency and decrease the photo sensitive weathering characteristics as compared to normal asphalt pavements.

Asphalt concrete is designed to retain enough flexibility to mold to slight deformations of the subgrade, and is more resistant to surface cracking than normal Portland concrete.

The increased precipitation runoff resulting from the reduced infiltration capacity of the asphalt concrete pavement may cause stormwater management concerns. However, due to the relatively small surface area of the cover, and location of the Site, minimal stormwater runoff management would be expected.

Clay Cover

This technology would require; the pre-grading of a foundation layer to provide two to four percent minimum slopes; placement of compacted low permeability clay; placement, compaction, and grading of a sand drainage layer, and placement, compaction, and grading of compacted fill. The clay soil must be placed and compacted to achieve a hydraulic conductivity of less than 10^{-7} cm/S. The finished surface would be covered with topsoil and would be seeded to provide a vegetative cover.

The implementation of this cap option would provide protection of human health and the environment by preventing direct contact with, or incidental ingestion of, Site-related constituents.

The drainage layer provides protection against surface water infiltration. Infiltrated water would drain along the surface of the clay layer and would be discharged into stormwater ditches located adjacent to the cap. Frost protection of the clay layer by the cover materials prevents degradation of the clay liner due to freeze-thaw cycles. The vegetative cover, topsoil, and low hydraulic conductivity clay will help to reduce infiltration into the contaminated soil.

5.4 REMOVAL AND OFF-SITE DISPOSAL

Removal and off-Site disposal involves excavating, transporting, and disposing of the contaminated soil to an off-Site landfill.

Excavated soils would be characterized for disposal and disposed at a Michigan Type II landfill, a Resource Conservation and Recovery Act (RCRA) hazardous waste landfill or a Toxic Substance Control Act (TSCA) permitted chemical waste landfill, as necessary.

The contaminated soil would be excavated to Michigan Type C or Type B cleanup criteria, dependent upon the type of removal action selected.

5.5 SUMMARY OF REMOVAL ACTION ALTERNATIVES

The following removal action alternatives were identified for potential implementation at the Site:

No Action

- No Action.

Limited Action

- Institutional controls and property access restrictions.

Physical Containment

- Covers:
  - soil cover;
  - asphalt cover; and
  - clay cover.

Removal and off-Site Disposal

- Removal to Michigan Type C cleanup criteria and off-Site disposal; and
- Removal to Michigan Type B cleanup criteria and off-Site disposal.

6.0 PROPOSED REMOVAL ACTION ALTERNATIVES

6.1 INTRODUCTION

This section presents an evaluation of each removal action alternative against seven criteria. The evaluation presented follows the outline presented in the U.S. EPA "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA", (May 1989) and the requirements outlined in Michigan Act 307 for conducting remedial actions.

The seven evaluation criteria used in this evaluation of removal action alternatives are summarized as follows:

1. overall protection of human health and the environment;
2. consideration of applicable or appropriate and relevant requirements (ARARs);
3. short-term impacts and effectiveness;
4. long-term effectiveness and permanence;
5. reduction of toxicity, mobility and volume;
6. implementability; and
7. cost.

Seven removal action alternatives were developed in Section 5.0 for evaluation. Each removal action alternative was developed incorporating appropriate removal action technologies for the contaminated soil encountered at the Site. The seven alternatives developed for evaluation are summarized as follows:

Alternative 1:	No Action;
Alternative 2:	Limited Action;
Alternative 3A:	Soil Cover;
Alternative 3B:	Asphalt Cover;
Alternative 3C:	Clay Cover;
Alternative 4A:	Removal to Michigan Type C criteria and off-Site disposal;

Alternative 4B: Removal to Michigan Type B criteria and off-Site disposal.

6.2 COMPARATIVE EVALUATION

Consistent with U.S. EPA guidance, and R299.5513 of Michigan Act 307, this section presents a comparative analysis of the removal actions outlined in Section 6.1.

Consistent with the requirements of Michigan Act 307 R299.5717(3)(l), alternatives for both Michigan Type B and Type C cleanups have been evaluated. In addition, the no action alternative was evaluated in accordance with R299.5513.

A comparative analysis of the removal action alternative is presented in Table 6.1. Preliminary cost estimates for each alternative are presented in Tables 6.2 to 6.8.

The removal action alternative to be implemented at the Site will be selected according to the intended future land use for the Site (i.e., residential (Type B) or industrial/commercial (Type C).

Based upon the comparative analysis presented in Table 6.1, removal action alternatives 3A or 3B (dependent on desired end use) were selected for an industrial/commercial (Type C) future land use scenario, and removal action alternative 4B was selected for a residential (Type B) future land use scenario. These removal action alternatives were selected because of their overall protection of human health and the environment while being both technically feasible and cost effective.

Alternative 1, the No Action Alternative, was determined to be unprotective of human health and the environment and was therefore eliminated from further evaluation. Alternative 2 was determined to be protective, technically feasible and cost effective, but does not eliminate the

potential for off-Site impacts and therefore was eliminated based upon its lack of long term effectiveness and reduction immobility, toxicity and volume.

Alternatives 3A, 3B and 3C were found to be equally protective of human health and the environment. However, Alternatives 3A and 3B provide desirable end uses (vegetative cover on asphalt cover for parking) and are more cost effective than Alternative 3C.

Alternative 4A was found to be the industrial/commercial Type C removal alternative that was most protective of human health and the environment. However, short-term risks associated with the excavation and trucking activities raise concerns regarding short-term effectiveness. Alternative 4A was also found to be not as cost effective as Alternatives 3A and 3B.

Alternative 4B was the only residential Type B removal action alternative evaluated. Alternative 4B was found to be the most effective removal alternative for the protection of human health and the environment (while meeting Type B requirements).

6.3 IMPLEMENTATION OF SELECTED TYPE C REMOVAL ALTERNATIVE

The components of Alternatives 3A and/or 3B include the following:

- implementation of deed restrictions and zoning changes, as necessary, including:
  - insuring that the City of Pontiac's zoning and future land use plans do not change; and
  - maintaining land ownership, as required.

- construction of a Site security fence;
  - 8-foot chain link security fence with three strand barb wire.

- placement of warning signs including:
  1. NO TRESPASSING.

  - signs will be posted inside the perimeter of the fence at eye level approximately every 200 feet; and
  - maintain present lighting.

- construction of a cover (with stormwater diversions and management) including:

  Alternative 3A - Soil Cover

  - prairie grass;
  - 6-inch top soil; and
  - 12-inch common fill grading layer.

  Alternative 3B - Asphalt Cover

  - 4-6 inch asphalt concrete cover;
  - 12 inch compacted granular grading layer.

- operation and maintenance including;
  - monitoring program;
  - cover repair as necessary;
  - fence inspections;
  - warning sign replacement; and
  - liaison with MDNR.

6.4 IMPLEMENTATION OF SELECTED TYPE B REMOVAL ALTERNATIVE

Components of Alternative 4B include the following:

- excavate and disposal of contaminated soil including:
  - stockpiling of excavated soil;
  - characterizing stockpiled soil for disposal;

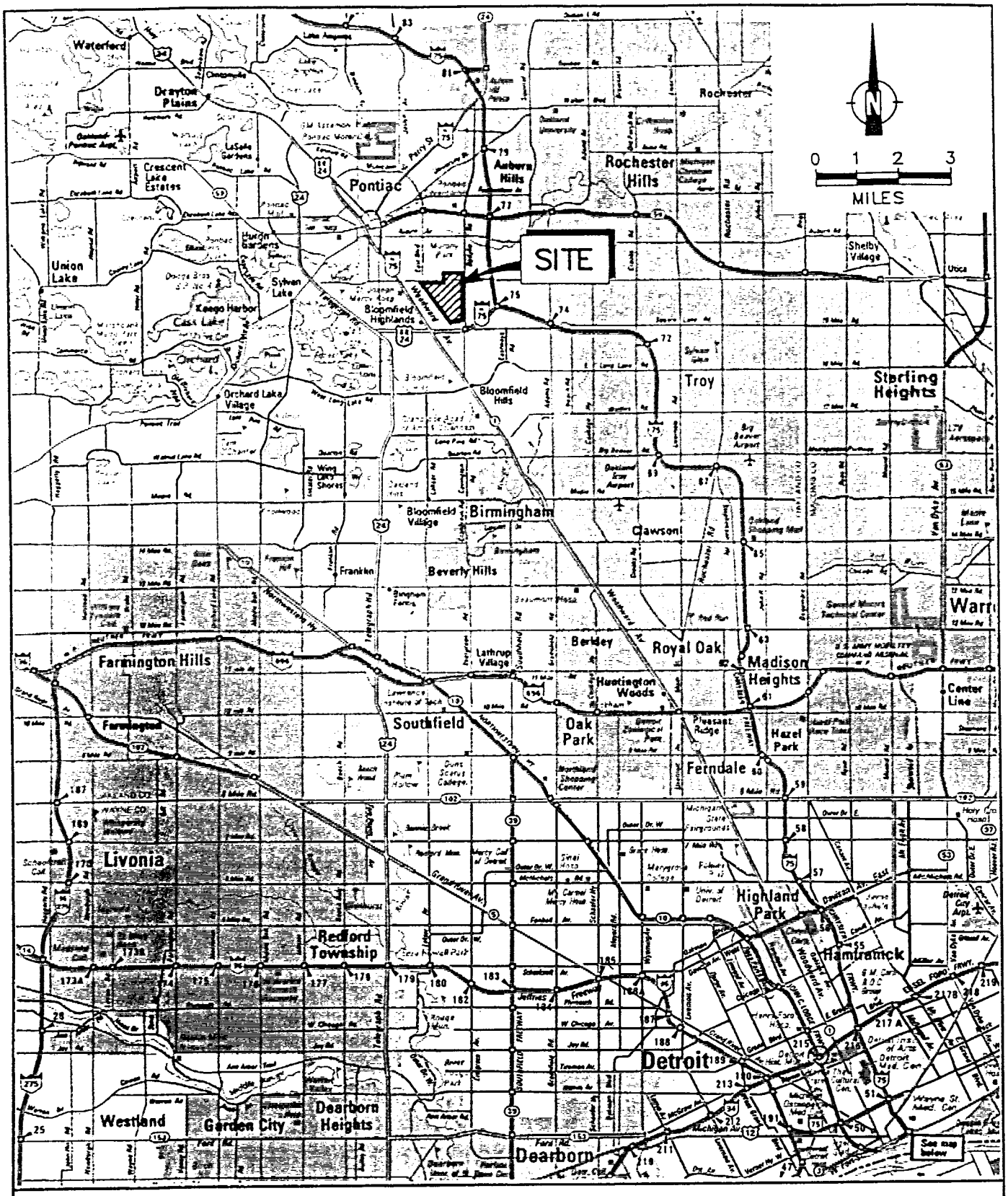
- transportation of characterized soil to the appropriate disposal facility;
- verification of removal of contaminated soil.

- backfilling and restoration of Site.
- reporting of activities to U.S. EPA and/or MDNR, as necessary.

6.5 REMOVAL ACTION SCHEDULE

The removal action schedule will be determined after a removal action alternative has been selected. The removal action schedule will be determined by General Motors Corporation. The estimated time frame to implement each of the removal action alternatives after one is selected is summarized as follows:

	Alternative	
1:	No action (immediate)	3-6 months
2:	Institutional Controls (1 year)	6-12 months
3:	Cover (1 construction season)	6-12 months
4:	Soil Removal and Off-Site disposal (1 construction season)	12 months



SOURCE: RAND McNALLY ROAD ATLAS

figure 1.1

FACILITY LOCATION
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

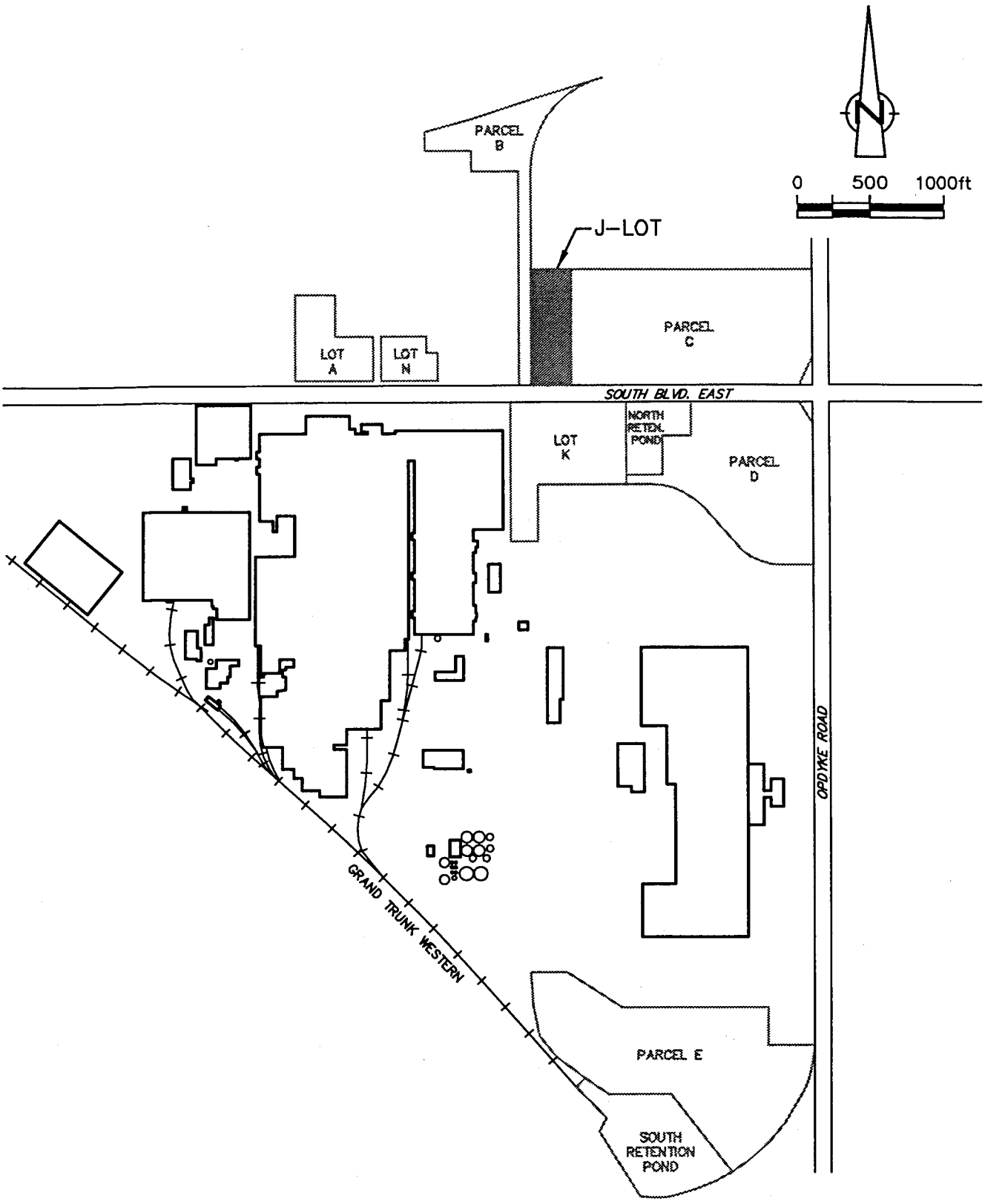


figure 1.2
SITE LOCATION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

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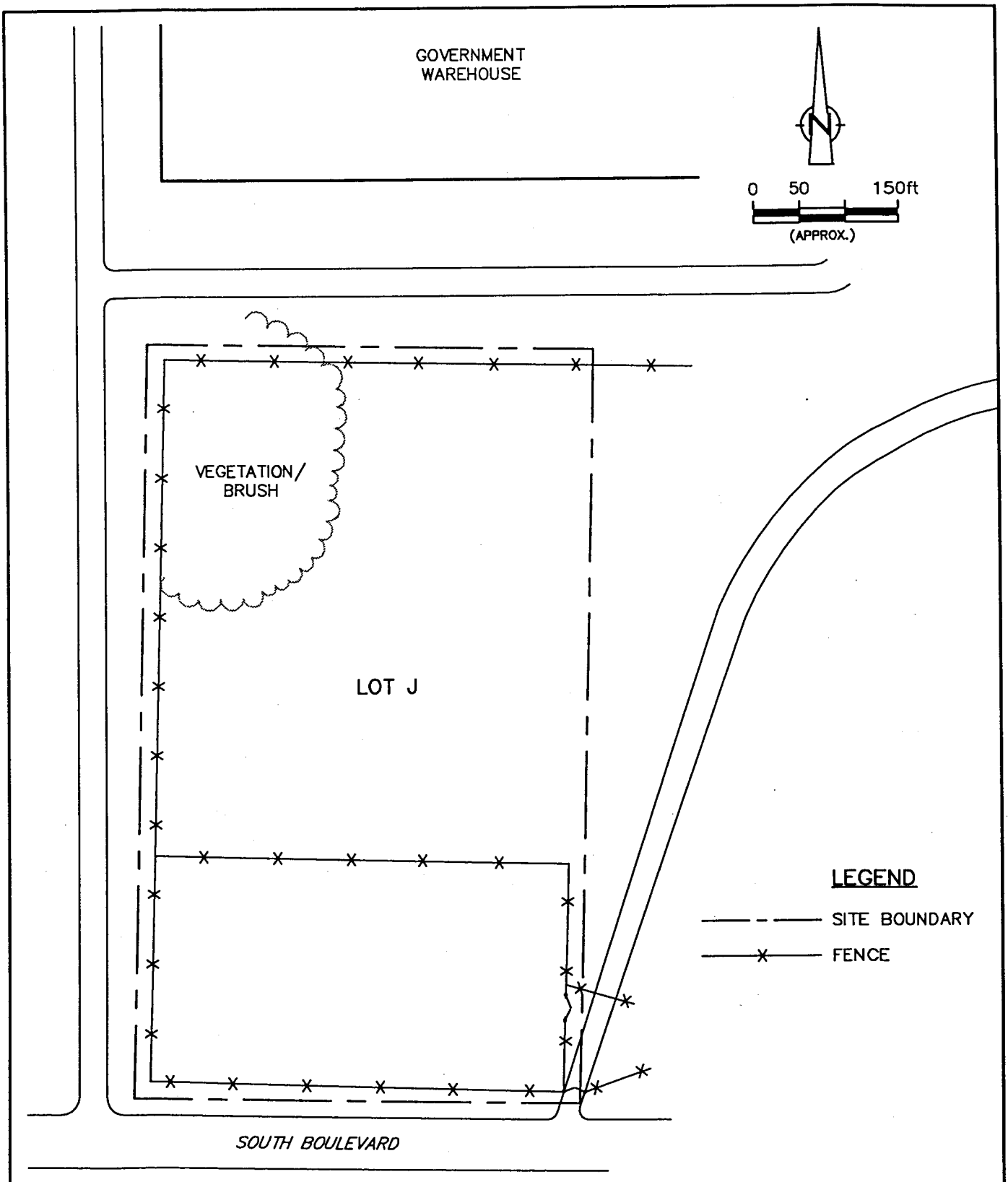
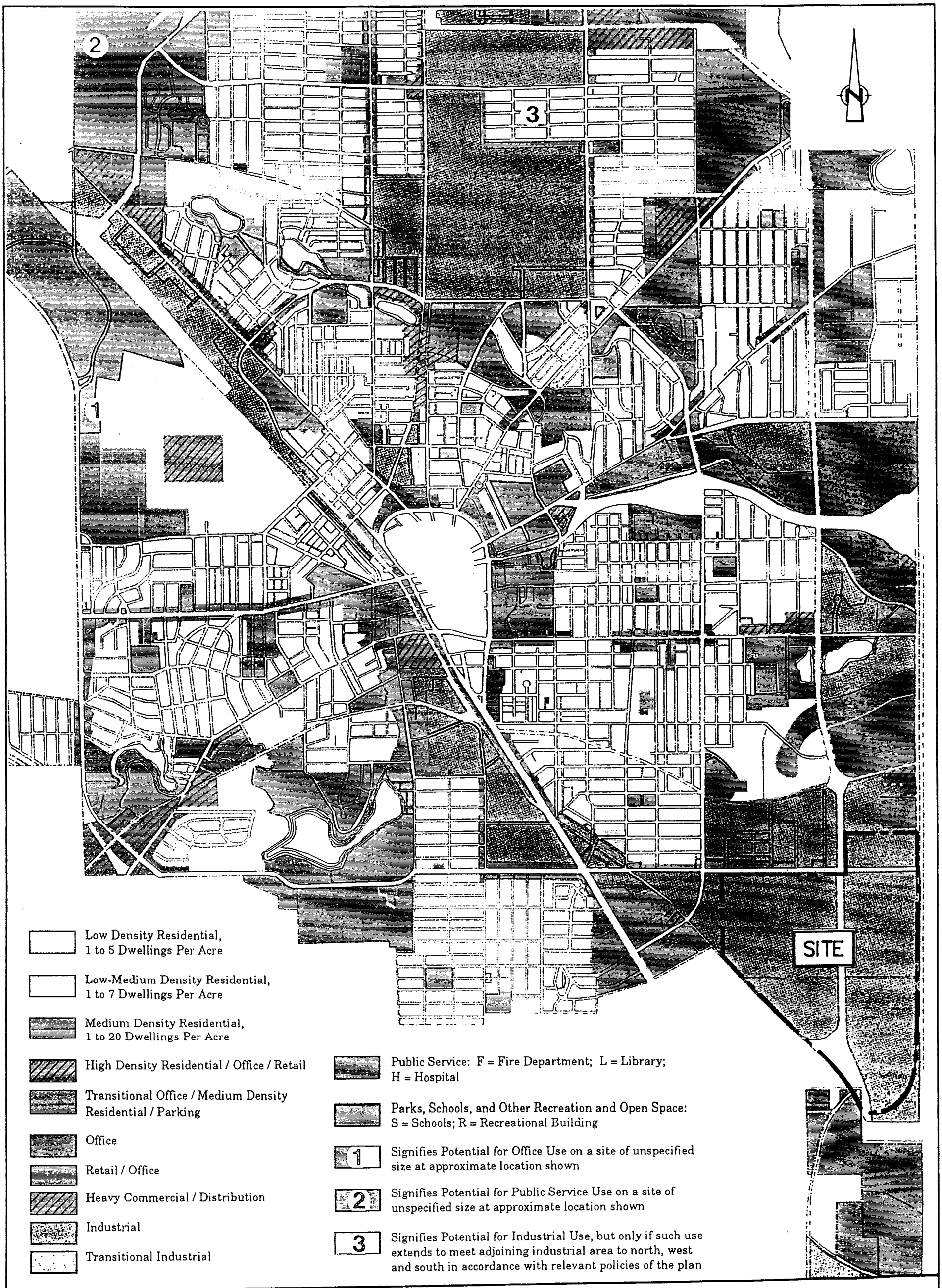


figure 1.3
SITE PLAN
J–LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (19) SEPT 07/95(W) REV.0 (P–73)



Low Density Residential,
1 to 5 Dwellings Per Acre

Low-Medium Density Residential,
1 to 7 Dwellings Per Acre

Medium Density Residential,
1 to 20 Dwellings Per Acre

High Density Residential / Office / Retail

Transitional Office / Medium Density Residential / Parking

Office

Retail / Office

Heavy Commercial / Distribution

Industrial

Transitional Industrial

Public Service: F = Fire Department; L = Library; H = Hospital

Parks, Schools, and Other Recreation and Open Space: S = Schools; R = Recreational Building

1 Signifies Potential for Office Use on a site of unspecified size at approximate location shown

2 Signifies Potential for Public Service Use on a site of unspecified size at approximate location shown

3 Signifies Potential for Industrial Use, but only if such use extends to meet adjoining industrial area to north, west and south in accordance with relevant policies of the plan

figure 2.1

FUTURE LAND USE MAP
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

SOURCE: CITY OF PONTIAC PLANNING COMMISSION

CRA

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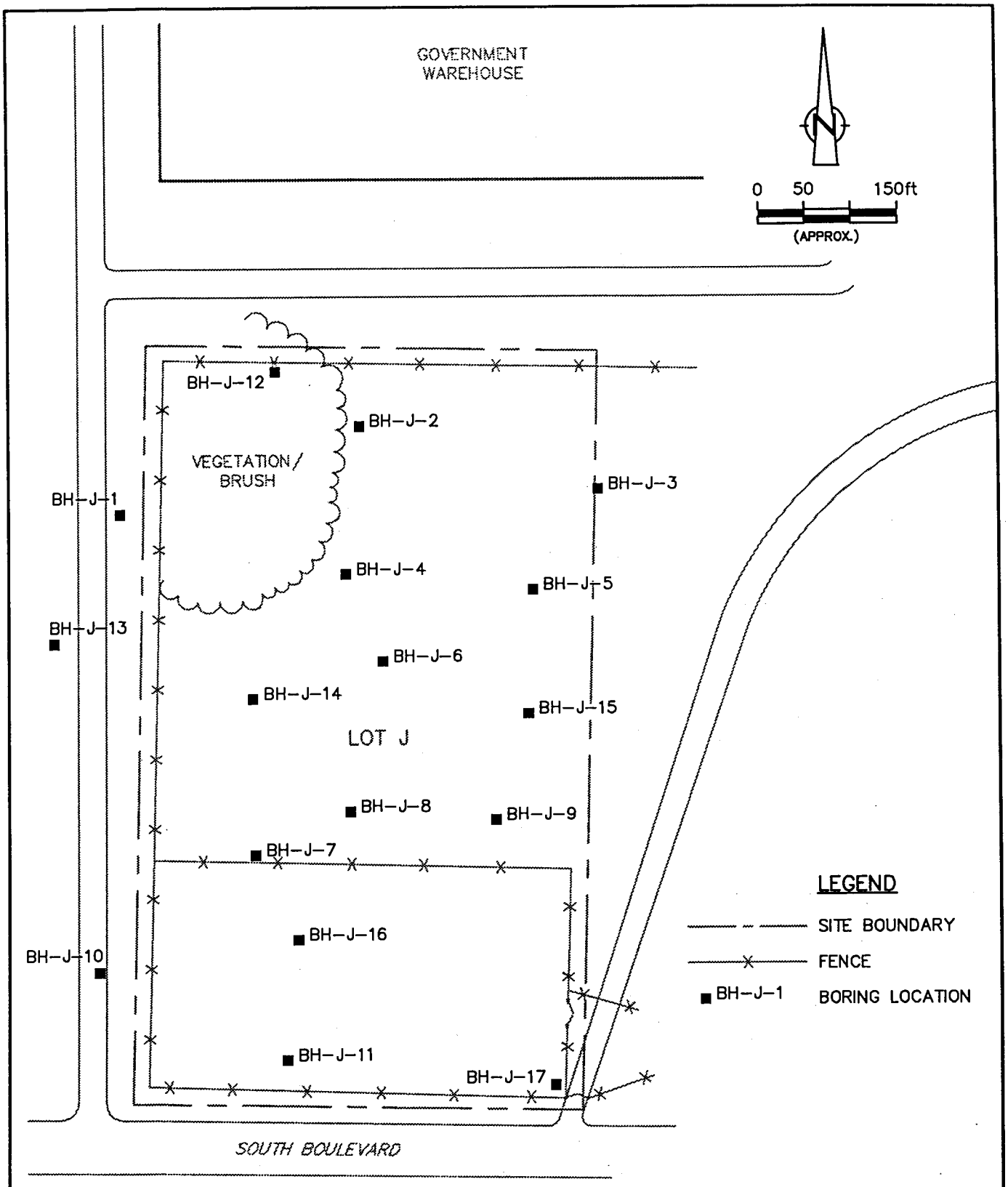


figure 2.2

BORING LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

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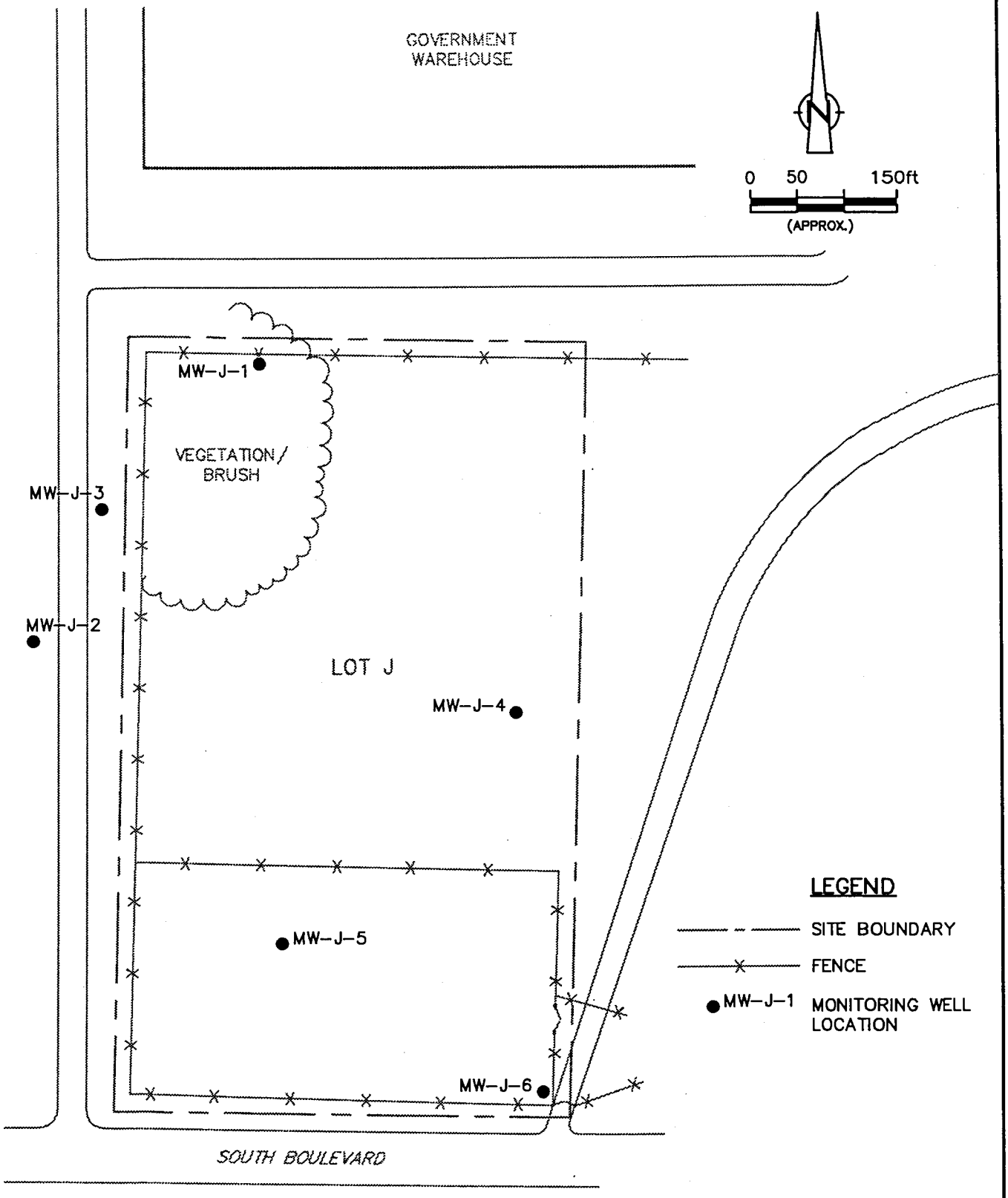


figure 2.3

MONITORING WELL LOCATIONS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

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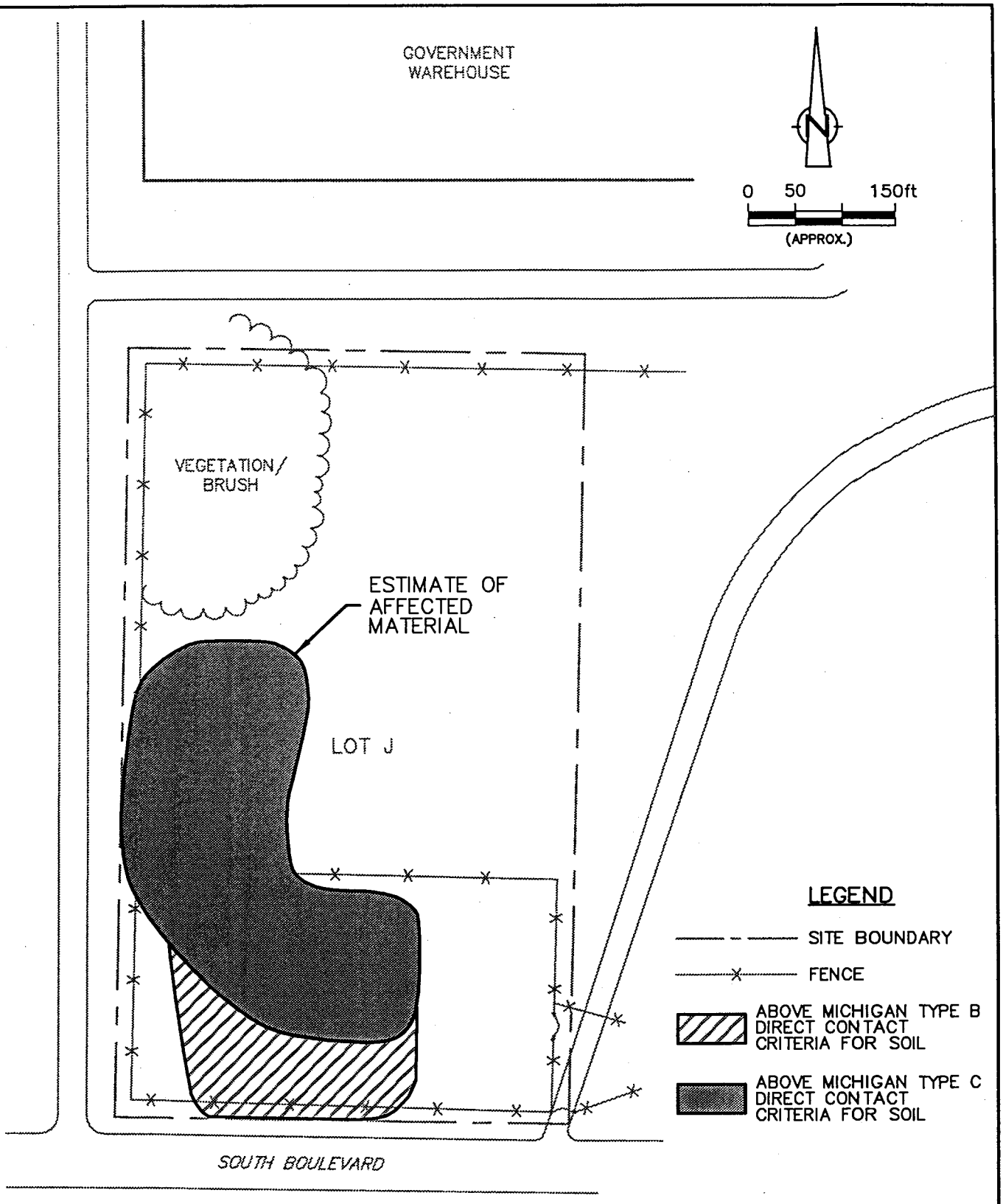


figure 2.4

ESTIMATED AREA OF AFFECTED MATERIAL
PONTIAC CENTRAL MANUFACTURING FACILITY
Pontiac, Michigan

CRA

5770 (19) SEPT 07/95(W) REV.0 (P-75)

TABLE : 1

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : INDUSTRIAL WORKER
SITE : J-LOT SITE
SECTOR : SOIL
LOCATION : ON-SITE

$$\text{EQUATION : INTAKE (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} + \frac{CS \times IR \times ABS \times CF \times EF \times ED}{BW \times AT} \times PTF$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg soil/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (10E-06 kg/mg)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged -- days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor (unitless)
PTF = Percent of Time Factor: Percent of time in contaminated area. (%/100)

VARIABLE ASSUMPTIONS	MEAN	RME	REFERENCES
3 (mg/kg)	MEAN	95th %	RAGS (1)
IR - ADULT (mg/exposure)	50	50	RAGS (1,2)
SA - ADULT) (cm2)	2000	2000	DEAP (3)
CF (kg/mg)	0.000001	0.000001	RAGS (1,2)
EF (days/year)	250	250	RAGS (1) & PROFESSIONAL JUDGEMENT
ED - (CARCINOGEN) (yrs)	10	25	RAGS (1,2)
ED - (NON-CARC.) (yr)	10	25	RAGS (1,2)
BW (ADULT) (kg)	70	70	RAGS (1,2)
AT (CARCINOGEN) (yrs x days/yr)	25550	25550	RAGS (1,2)
AT (NON-CARCINOGEN) (yrs x days/yr)	3650	9125	RAGS (1,2)
AF (mg/cm2)	0.5	1	DEAP (3)
ABS ORAL (CHEMICAL SPECIFIC)			
DERMAL (CHEMICAL SPECIFIC)			
PTF	1	1	PROFESSIONAL JUDGEMENT

NOTE:
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991
(3) EPA DERMAL EXPOSURE ASSESSMENT: PRINCIPLES AND APPLICATIONS, EPA/600/8-89/011B, JANUARY 1992.

TABLE : 2

MEDIA CONCENTRATIONS AND CHEMICAL CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	MEDIA CONCENTRATION				ORAL BIOAVAIL. FACTOR		DERMAL BIOAVAIL. FACTOR	
	MEAN	RME	ORAL CSF	ORAL RfD	MEAN	RME	MEAN	RME
PARAMETER	mg/kg	mg/kg	1/(mg/kg/d)	mg/kg/d	%/100	%/100	%/100	%/100
PAHs								
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.50	0.01	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.50	0.01	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
PCBs								
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.50	0.01	0.01
METALS								
ALUMINUM	6.77E+03	7.61E+03	NA	NA	0.50	0.50	0.01	0.01
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.50	0.01	0.01
CALCIUM	6.03E+04	6.90E+04	NA	NA	0.50	0.50	0.01	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.50	0.01	0.01

NA = NOT AVAILABLE

TABLE : 3

EXPOSURE, RISK AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	95th %	MEAN	95th %	MEAN	95th %
PAHs								
BENZO(A)ANTHRACENE	3.60E-08	3.00E-07	2.63E-08	2.19E-07	2.52E-07	8.41E-07	0.00E+00	0.00E+00
BENZO(A)PYRENE	2.63E-08	2.12E-07	1.92E-07	1.55E-06	1.84E-07	5.93E-07	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	4.35E-08	3.69E-07	3.18E-08	2.69E-07	3.04E-07	1.03E-06	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	1.23E-08	6.96E-08	9.00E-08	5.08E-07	8.63E-08	1.95E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	2.70E-08	2.05E-07	1.97E-08	1.50E-07	1.89E-07	5.75E-07	0.00E+00	0.00E+00
PCBs								
AROCLOR-1254	3.23E-08	1.71E-07	2.49E-07	1.32E-06	2.26E-07	4.79E-07	3.23E-03	6.84E-03
METALS								
ALUMINUM	3.31E-04	1.20E-03	0.00E+00	0.00E+00	2.32E-03	3.35E-03	0.00E+00	0.00E+00
ARSENIC	2.94E-07	1.05E-06	5.14E-07	1.84E-06	2.05E-06	2.95E-06	6.85E-03	9.83E-03
CALCIUM	2.95E-03	1.09E-02	0.00E+00	0.00E+00	2.06E-02	3.04E-02	0.00E+00	0.00E+00
LEAD	1.05E-05	7.19E-05	0.00E+00	0.00E+00	7.36E-05	2.01E-04	5.26E-02	1.44E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.12E-06	5.85E-06	**HAZARD INDEX:**		6.27E-02	1.60E-01

TABLE : 4

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	MEDIA CONCENTRATION		LIFETIME UPPER BOUND EXCESS CANCER RISK		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN mg/kg	RME mg/kg	MEAN	95th %	MEAN	95th %
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	2.63E-08	2.19E-07	0.00E+00	0.00E+00
BENZO(A)PYRENE	5.37E-01	1.35E+00	1.92E-07	1.55E-06	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.18E-08	2.69E-07	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	9.00E-08	5.08E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	1.97E-08	1.50E-07	0.00E+00	0.00E+00
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	2.49E-07	1.32E-06	3.23E-03	6.84E-03
METALS						
ALUMINUM	6.77E+03	7.61E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC	6.00E+00	6.70E+00	5.14E-07	1.84E-06	6.85E-03	9.83E-03
CALCIUM	6.03E+04	6.90E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD	2.15E+02	4.57E+02	0.00E+00	0.00E+00	5.26E-02	1.44E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.12E-06	5.85E-06		
			HAZARD INDEX:		6.27E-02	1.60E-01

TABLE : 5

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : CONSTRUCTION WORKER
SITE : J-LOT SITE
SECTOR : SOIL
LOCATION : ON-SITE

$$\text{EQUATION : INTAKE (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} + \frac{CS \times IR \times ABS \times CF \times EF \times ED}{BW \times AT} \times PTF$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg soil/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (10E-06 kg/mg)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged -- days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor (unitless)
PTF = Percent of Time Factor: Percent of time in contaminated area. (%/100)

VARIABLE ASSUMPTIONS	MEAN	RME	REFERENCES
5 (mg/kg)	MEAN	95th %	RAGS (1)
IR - ADULT (mg/exposure)	50	50	RAGS (1,2)
SA - ADULT) (cm2)	5300	5300	DEAP (3)
CF (kg/mg)	0.000001	0.000001	RAGS (1,2)
EF (days/year)	250	250	RAGS (1) & PROFESSIONAL JUDGEMENT
ED - (CARCINOGEN) (yrs)	1	1	RAGS (1,2)
ED - (NON-CARC.) (yr)	1	1	RAGS (1,2)
BW (ADULT) (kg)	70	70	RAGS (1,2)
AT (CARCINOGEN) (yrs x days/yr)	25550	25550	RAGS (1,2)
AT (NON-CARCINOGEN) (yrs x days/yr)	365	365	RAGS (1,2)
AF (mg/cm2)	0.5	1	DEAP (3)
ABS ORAL (CHEMICAL SPECIFIC)			
DERMAL (CHEMICAL SPECIFIC)			
PTF	1	1	PROFESSIONAL JUDGEMENT

NOTE:
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991
(3) EPA DERMAL EXPOSURE ASSESSMENT: PRINCIPLES AND APPLICATIONS, EPA/600/8-89/011B, JANUARY 1992.

TABLE : 6

MEDIA CONCENTRATIONS AND CHEMICAL CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	MEDIA CONCENTRATION				ORAL BIOAVAIL. FACTOR		DERMAL BIOAVAIL. FACTOR	
PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	MEAN %/100	RME %/100	MEAN %/100	RME %/100
PAHs								
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.50	0.01	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.50	0.01	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
PCBs								
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.50	0.01	0.01
METALS								
ALUMINUM	6.77E+03	7.61E+03	NA	NA	0.50	0.50	0.01	0.01
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.50	0.01	0.01
CALCIUM	6.03E+04	6.90E+04	NA	NA	0.50	0.50	0.01	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.50	0.01	0.01

NA = NOT AVAILABLE

TABLE : 7

EXPOSURE, RISK AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	95th %	MEAN	95th %	MEAN	95th %
PAHs								
BENZO(A)ANTHRACENE	5.30E-09	2.08E-08	3.87E-09	1.52E-08	3.71E-07	1.46E-06	0.00E+00	0.00E+00
BENZO(A)PYRENE	3.87E-09	1.47E-08	2.82E-08	1.07E-07	2.71E-07	1.03E-06	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	6.40E-09	2.56E-08	4.67E-09	1.87E-08	4.48E-07	1.79E-06	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	1.81E-09	4.83E-09	1.32E-08	3.52E-08	1.27E-07	3.38E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	3.97E-09	1.42E-08	2.90E-09	1.04E-08	2.78E-07	9.97E-07	0.00E+00	0.00E+00
PCBs								
ROCLOR-1254	4.75E-09	1.19E-08	3.66E-08	9.13E-08	3.33E-07	8.30E-07	4.75E-03	1.19E-02
METALS								
ALUMINUM	4.87E-05	8.30E-05	0.00E+00	0.00E+00	3.41E-03	5.81E-03	0.00E+00	0.00E+00
ARSENIC	4.32E-08	7.31E-08	7.56E-08	1.28E-07	3.02E-06	5.11E-06	1.01E-02	1.70E-02
CALCIUM	4.34E-04	7.53E-04	0.00E+00	0.00E+00	3.04E-02	5.27E-02	0.00E+00	0.00E+00
LEAD	1.55E-06	4.98E-06	0.00E+00	0.00E+00	1.08E-04	3.49E-04	7.74E-02	2.49E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.65E-07	4.06E-07	**HAZARD INDEX:**		9.22E-02	2.78E-01

TABLE : 8

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	MEDIA CONCENTRATION		LIFETIME UPPER BOUND EXCESS CANCER RISK		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN mg/kg	RME mg/kg	MEAN	95th %	MEAN	95th %
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	3.87E-09	1.52E-08	0.00E+00	0.00E+00
BENZO(A)PYRENE	5.37E-01	1.35E+00	2.82E-08	1.07E-07	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	4.67E-09	1.87E-08	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	1.32E-08	3.52E-08	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	2.90E-09	1.04E-08	0.00E+00	0.00E+00
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	3.66E-08	9.13E-08	4.75E-03	1.19E-02
METALS						
ALUMINUM	6.77E+03	7.61E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ARSENIC	6.00E+00	6.70E+00	7.56E-08	1.28E-07	1.01E-02	1.70E-02
CALCIUM	6.03E+04	6.90E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
LEAD	2.15E+02	4.57E+02	0.00E+00	0.00E+00	7.74E-02	2.49E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.65E-07	4.06E-07		
			HAZARD INDEX:		9.22E-02	2.78E-01

TABLE : 9

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : RESIDENTIAL - CHILD
SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE

EQUATION : $$\text{INTAKE (mg/kg-day)} = \frac{(CS \times CF \times SA \times AF \times ABS \times EF \times ED)}{(BW \times AT)} + \frac{(CS \times IR \times ABS \times CF \times EF \times ED)}{(BW \times AT)}$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (kg/mg)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time - period over which exposure is averaged (days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor

VARIABLE	MEAN	RME	REFERENCES:
CS (mg/kg)	Mean	95% UCL	
IR CHILD (mg/day)	200	200	RAGS (1,2)
SA CHILD (cm2)	1983	2295	DEAP (3)
CF (mg/kg)	0.000001	0.000001	EFH (4)
EF (days/yr)	350	350	RAGS (1,2)
ED - carc. (yr)	5	5	RAGS (1,2)
ED - non-carc. (yr)	5	5	RAGS (1,2)
BW CHILD (kg)	15	15	RAGS (1,2)
AT - carcinogen (years x days)	25550	25550	RAGS (1,2)
AT - non-carcinogen (years x days)	1825	1825	RAGS (1,2)
AF (mg/cm2)	0.2	1	RAGS (1)
ABS ORAL (chemical specific)	CHEMICAL-SPECIFIC		
ABS DERMAL (chemical specific)	CHEMICAL-SPECIFIC		

NOTES :
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND" MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991.
(3) "DERMAL EXPOSURE ASSESSMENT : PRINCIPLES AND APPLICATIONS", EPA/600/8-91/011B, JANUARY 1992.
(4) EXPOSURE FACTORS HANDBOOK, EPA/600/8-89/043, MARCH 1990.

TABLE : 10

MEDIA CONCENTRATIONS/CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	ORAL ABSORPTION FACTOR (%/100)	DERMAL ABSORPTION FACTOR (%/100)
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.01
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.01
METALS						
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.01

NA= Not Available

TABLE : 11

EXPOSURE, RISKS AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	RME	MEAN	RME	MEAN	RME
PAHs								
BENZO(A)ANTHRACENE	3.49E-07	1.07E-06	2.55E-07	7.83E-07	4.89E-06	1.50E-05	NV	NV
BENZO(A)PYRENE	2.55E-07	7.56E-07	1.86E-06	5.52E-06	3.57E-06	1.06E-05	NV	NV
BENZO(B)FLUORANTHENE	4.22E-07	1.32E-06	3.08E-07	9.61E-07	5.91E-06	1.84E-05	NV	NV
DIBENZO(a,h)ANTHRACENE	1.20E-07	2.48E-07	8.73E-07	1.81E-06	1.67E-06	3.48E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	2.62E-07	7.33E-07	1.91E-07	5.35E-07	3.66E-06	1.03E-05	NV	NV
PCBs								
AROCLOR-1254	3.13E-07	6.11E-07	2.41E-06	4.70E-06	4.39E-06	8.55E-06	6.27E-02	1.22E-01
METALS								
ARSENIC	2.85E-06	3.76E-06	4.98E-06	6.58E-06	3.99E-05	5.27E-05	1.33E-01	1.76E-01
LEAD	1.02E-04	2.57E-04	NV	NV	1.43E-03	3.59E-03	1.02E+00	2.57E+00
NV = No Value	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:		1.09E-05	2.09E-05			HAZARD INDEX: 1.22E+00	2.86E+00

TABLE : 12

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

PARAMETER	MEAN mg/kg	RME mg/kg	LIFETIME UPPER BOUND EXCESS CANCER RISK MEAN	LIFETIME UPPER BOUND EXCESS CANCER RISK RME	HAZARD QUOTIENT CDI/RfD MEAN	HAZARD QUOTIENT CDI/RfD RME
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	2.55E-07	7.83E-07	NV	NV
BENZO(A)PYRENE	5.37E-01	1.35E+00	1.86E-06	5.52E-06	NV	NV
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.08E-07	9.61E-07	NV	NV
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	8.73E-07	1.81E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	1.91E-07	5.35E-07	NV	NV
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	2.41E-06	4.70E-06	6.27E-02	1.22E-01
METALS						
ARSENIC	6.00E+00	6.70E+00	4.98E-06	6.58E-06	1.33E-01	1.76E-01
LEAD	2.15E+02	4.57E+02	NV	NV	1.02E+00	2.57E+00
NV = No Value	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:				HAZARD INDEX:	
ND = Not Detected			1.09E-05	2.09E-05	1.22E+00	2.86E+00

TABLE : 13

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : RESIDENTIAL - ADULT
SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE

EQUATION : $$\text{INTAKE (mg/kg-day)} = \frac{(CS \times CF \times SA \times AF \times ABS \times EF \times ED)}{(BW \times AT)} + \frac{(CS \times IR \times ABS \times CF \times EF \times ED)}{(BW \times AT)}$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (kg/mg)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time - period over which exposure is averaged (days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor

VARIABLE	MEAN	RME	REFERENCES:
CS (mg/kg)	Mean	95% UCL	
IR ADULT (mg/day)	100	100	RAGS (1,2)
SA ADULT (cm2)	5300	5300	DEAP (3)
CF (mg/kg)	0.000001	0.000001	EFH (4)
EF (days/yr)	350	350	RAGS (1,2)
ED - carc. (yr)	5	25	RAGS (1,2)
ED - non-carc. (yr)	5	25	RAGS (1,2)
BW ADULT (kg)	70	70	RAGS (1,2)
AT - carcinogen (years x days)	25550	25550	RAGS (1,2)
AT - non-carcinogen (years x days)	1825	9125	RAGS (1,2)
AF (mg/cm2)	0.2	1	RAGS (1)
ABS ORAL (chemical specific)	CHEMICAL-SPECIFIC		
ABS DERMAL (chemical specific)	CHEMICAL-SPECIFIC		

NOTES :
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND" MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991.
(3) "DERMAL EXPOSURE ASSESSMENT : PRINCIPLES AND APPLICATIONS", EPA/600/8-91/011B, JANUARY 1992.
(4) EXPOSURE FACTORS HANDBOOK, EPA/600/8-89/043, MARCH 1990.

TABLE : 14

MEDIA CONCENTRATIONS/CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	ORAL ABSORPTION FACTOR (%/100)	DERMAL ABSORPTION FACTOR (%/100)
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.01
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.01
METALS						
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.01

NA= Not Available

TABLE : 15

EXPOSURE, RISKS AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : NA
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	RME	MEAN	RME	MEAN	RME
PAHs								
BENZO(A)ANTHRACENE	4.36E-08	9.62E-07	3.19E-08	7.03E-07	6.11E-07	2.69E-06	NV	NV
BENZO(A)PYRENE	3.18E-08	6.79E-07	2.32E-07	4.96E-06	4.46E-07	1.90E-06	NV	NV
BENZO(B)FLUORANTHENE	5.27E-08	1.18E-06	3.85E-08	8.63E-07	7.38E-07	3.31E-06	NV	NV
DIBENZO(a,h)ANTHRACENE	1.49E-08	2.23E-07	1.09E-07	1.63E-06	2.09E-07	6.24E-07	NV	NV
INDENO(1,2,3-cd)PYRENE	3.27E-08	6.58E-07	2.39E-08	4.80E-07	4.57E-07	1.84E-06	NV	NV
PCBs								
AROCLOR-1254	3.91E-08	5.48E-07	3.01E-07	4.22E-06	5.48E-07	1.53E-06	7.83E-03	2.19E-02
METALS								
ARSENIC	3.56E-07	3.38E-06	6.23E-07	5.91E-06	4.98E-06	9.45E-06	1.66E-02	3.15E-02
LEAD	1.27E-05	2.30E-04	NV	NV	1.78E-04	6.45E-04	1.27E-01	4.61E-01
	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:						HAZARD INDEX:	
			1.36E-06	1.88E-05			1.52E-01	5.14E-01

NV = No Value

TABLE : 16

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

PARAMETER	MEAN mg/kg	RME mg/kg	LIFETIME UPPER BOUND EXCESS CANCER RISK MEAN	LIFETIME UPPER BOUND EXCESS CANCER RISK RME	HAZARD QUOTIENT CDI/RfD MEAN	HAZARD QUOTIENT CDI/RfD RME
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	3.19E-08	7.03E-07	NV	NV
BENZO(A)PYRENE	5.37E-01	1.35E+00	2.32E-07	4.96E-06	NV	NV
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.85E-08	8.63E-07	NV	NV
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	1.09E-07	1.63E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	2.39E-08	4.80E-07	NV	NV
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	3.01E-07	4.22E-06	7.83E-03	2.19E-02
METALS						
ARSENIC	6.00E+00	6.70E+00	6.23E-07	5.91E-06	1.66E-02	3.15E-02
LEAD	2.15E+02	4.57E+02	NV	NV	1.27E-01	4.61E-01
	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:		1.36E-06	1.88E-05	HAZARD INDEX: 1.52E-01	5.14E-01

NV = No Value
ND = Not Detected

TABLE 2.1

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x DRINKING WATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-005	BTH-012	BTH-014	BTH-030	BTH-033	BTH-034
SAMPLE LOCATION		BH-J-12	BH-J-6	BH-J-9	BH-J-11	BH-J-17	BH-J-17
SAMPLE INTERVAL (feet bgs)		(12-14)'	(10-12)'	(4-6)'	(4-6)'	(2-4)'	(12-14)'
DATE SAMPLED		11/3/94	11/4/94	11/4/94	11/8/94	11/9/94	11/9/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Aluminum	9653 (c)	8730 (4)	6970 (4)	5550 (4)	3900 (4)	6600 (4)	7700 (4)
Antimony	0.50	< 0.25 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	0.83 (0.25)	0.3 (0.25)	<0.25 (0.25)
Arsenic	12.5 (c)	3.7 (0.1)	5.4 (0.1)	3.3 (0.1)	5.9 (0.1)	3.7 (0.1)	4.1 (0.1)
Barium	75 (a)	26 (0.4)	34 (0.4)	27 (0.4)	**75 (0.4)**	43 (0.4)	27 (0.4)
Cadmium	1.2 (a)	0.3 (0.05)	0.21 (0.05)	0.28 (0.05)	0.97 (0.05)	0.7 (0.05)	0.32 (0.05)
Chromium	18 (a)	14 (1.6)	10 (1.6)	9.1 (1.6)	16 (1.6)	15 (1.6)	13 (1.6)
Copper	32 (a)	15 (0.6)	12 (0.6)	7.5 (0.6)	**44 (0.6)**	**60 (0.6)**	17 (0.6)
Iron	17738 (c)	17000 (2)	**18000 (2)**	8440 (2)	11000 (2)	14000 (2)	16000 (2)
Lead	21 (a)	9.1 (1)	8.2 (1)	**25 (1)**	**130 (1)**	**41 (1)**	10 (1)
Manganese	440 (a)	269 (0.2)	230 (0.2)	142 (0.2)	310 (0.2)	320 (0.2)	330 (0.2)
Mercury	0.13 (a)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)	< 0.1 (0.1)
Nickel	20 (a)	23 (0.2)	18 (0.2)	7.6 (0.2)	18 (0.2)	19 (0.2)	**20 (0.2)**
Selenium	0.70	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)	< 0.5 (0.5)
Silver	1.0 (a)	< 0.2 (0.2)	0.21 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	< 0.2 (0.2)	0.39 (0.2)
Thallium	0.5(b)	< 0.25 0.25)	0.36 (0.25)	< 0.25 (0.25)	0.26 (0.25)	< 0.25 (0.25)	0.36 (0.25)
Vanadium	21.3 (c)	21(2)	18 (2)	13 (2)	**12 (2)**	15 (2)	18 (2)
Zinc	50.8 (c)	**51 (1)**	44 (1)	30 (1)	**100 (1)**	**55 (1)**	**58 (1)**
Volatile Compounds (ug/kg)							
Acetone	14000	340 (100)	5400 (100)	2200 (100)	990 (100)	850 (100)	230 (100)
Benzene	24	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	1500	ND(10)	ND(10)	ND(10)	< 10 (10)	ND(10)	< 10 (10)
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	5600	< 30 (30)	< 30 (30)	ND(30)	< 30 (30)	ND(30)	< 30 (30)
Semi-volatile Compounds (ug/kg)							
Benzo(a)anthracene	1800	NA	NA	ND(330)	360 (330)	ND(330)	NA
Benzo(a)pyrene	330 (b)	NA	NA	ND(330)	ND(330)	ND(330)	NA
Benzo(b)fluoranthene	1800	NA	NA	ND(330)	550 (330)	< 330 (330)	NA
Dibenzo(a,h)anthracene	330 (b)	NA	NA	ND(330)	ND(330)	ND(330)	NA
Fluoranthene	17000	NA	NA	ND(330)	510 (330)	ND(330)	NA
Indeno(1,2,3-c,d)pyrene	1,800	NA	NA	ND(330)	430 (330)	ND(330)	NA
Phenanthrene	500	NA	NA	ND(330)	430 (330)	ND(330)	NA
Pyrene	10000	NA	NA	ND(330)	ND(330)	ND(330)	NA
PCBs/Pesticides (ug/kg)							
PCB Aroclor 1254	1000	NA	NA	730 (330)	**1700 (420)**	900 (330)	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 2.1

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x DRINKING WATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-037	BTH-038	BTH-039	BTH-041	BTH-042	BTH-044
SAMPLE LOCATION		BH-J-16	BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-7
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(16-18)'	(8-10)'	(12-14)'	(22-24)'
DATE SAMPLED		11/10/94	11/10/94	11/10/94	11/11/94	11/11/94	11/11/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Aluminum	9653 (c)	3600 (4)	9000 (4)	7200 (4)	**11300 (4)**	7950 (4)	7220 (4)
Antimony	0.50	**29 (0.25)**	**8.5 (0.25)**	< 0.25 (0.25)	**20 (0.25)**	**1.9 (0.25)**	< 0.25 (0.25)
Arsenic	12.5 (c)	12 (0.1)	11 (0.1)	3.9 (0.1)	10 (0.1)	**19 (0.1)**	7.6 (0.1)
Barium	75 (a)	**2300 (0.4)**	**700 (0.4)**	51 (0.4)	**2220 (0.4)**	**541 (0.4)**	32 (0.4)
Cadmium	1.2 (a)	**19 (0.05)**	**17 (0.05)**	0.63 (0.05)	**42 (0.05)**	**17 (0.05)**	0.41 (0.05)
Chromium	18 (a)	**93 (1.6)**	**120 (1.6)**	13 (1.6)	**641 (1.6)**	**225(1.6)**	11 (1.6)
Copper	32 (a)	**211 (0.6)**	**1000 (0.6)**	26 (0.6)	**1020 (0.6)**	**189 (0.6)**	18 (0.6)
Iron	17738 (c)	**120000 (2)**	**60000 (2)**	17000 (2)	**56300 (2)**	**95600 (2)**	16600 (2)
Lead	21 (a)	**740 (1)**	**880 (1)**	**40 (1)**	**4740 (1)**	**945 (1)**	10 (1)
Manganese	440 (a)	**980 (0.2)**	**590 (0.2)**	**450 (0.2)**	**844 (0.2)**	**688 (0.2)**	284 (0.2)
Mercury	0.13 (a)	**0.18 (0.1)**	< 0.1 (0.1)	< 0.1 (0.1)	**0.45 (0.1)**	**0.17 (0.1)**	< 0.1 (0.1)
Nickel	20 (a)	**59 (0.2)**	**140 (0.2)**	19 (0.2)	**94 (0.2)**	**31 (0.2)**	**20 (0.2)**
Selenium	0.70	**0.8 (0.5)**	**1.3(0.5)**	< 0.5 (0.5)	**2.3 (0.5)**	< 0.5 (0.5)	< 0.5 (0.5)
Silver	1.0 (a)	0.96 (0.2)	**2.3(0.2)**	0.34 (0.2)	**2.9 (0.2)**	0.62 (0.2)	< 0.2 (0.2)
Thallium	0.5(b)	< 0.25 (0.25)	< 0.25 (0.25)	0.33 (0.25)	< 0.25 (0.25)	< 0.25 (0.25)	**0.52 (0.25)**
Vanadium	21.3 (c)	19 (2)	19 (2)	16 (2)	**26 (2)**	**47 (2)**	21 (2)
Zinc	50.8 (c)	**1800 (1)**	**1500 (1)**	**76 (1)**	**4390 (1)**	**1020 (1)**	48 (1)
Volatile Compounds (ug/kg)							
Acetone	14000	**14000 (100)**	5000 J (100)	820 J (100)	2800 (200)	3700 (10)	3500 (10)
Benzene	24	< 10 (10)	17 J (10)	ND(10)	**200 (200)**	ND(10)	ND(10)
Ethylbenzene	1500	< 10 (10)	13 J (10)	<10 UJ (10)	**25000 (5000)**	**140 (10)**	**14 (10)**
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	**45000 (5000)**	ND(100)	ND(100)
Total Xylenes	5600	< 30 (30)	<30 UJ(30)	<30 UJ(30)	**50000 (5000)**	**320 (30)**	< 30 (30)
Semi-volatile Compounds (ug/kg)							
Benzo(a)anthracene	1800	**7200 (6,600)**	NA	NA	360 (330)	NA	NA
Benzo(a)pyrene	330 (b)	**5000 (330)**	NA	NA	< 330 (330)	NA	NA
Benzo(b)fluoranthene	1800	**8900 (6,600)**	NA	NA	460 (330)	NA	NA
Dibenzo(a,h)anthracene	330 (b)	**1300 (330)**	NA	NA	ND(330)	NA	NA
Fluoranthene	17000	**17000 (6,600)**	NA	NA	600 (330)	NA	NA
Indeno(1,2,3-c,d)pyrene	1,800	**4700 (330)**	NA	NA	380 (330)	NA	NA
Phenanthrene	500	**14000 (6,600)**	NA	NA	**740 (330)**	NA	NA
Pyrene	10000	**12000 (6,600)**	NA	NA	940 (330)	NA	NA
PCBs/Pesticides (ug/kg)							
PCB Aroclor 1254	1000	800 (330)	NA	NA	**2100 (410)**	NA	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 2.1

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B 20x DRINKING WATER CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-045	BTH-053	BTH-055	BTH-056	BTH-057
SAMPLE LOCATION		BH-J-10	BH-J-13	BH-J-14	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(6-8)'	(16-18)'	(20-22)'
DATE SAMPLED		11/11/94	11/16/94	11/18/94	11/18/94	11/18/94
Parameter	Michigan Type B 20X Groundwater Cleanup Criteria					
Inorganic Analytes (mg/kg)						
Aluminum	9653 (c)	**10200 (4)**	**17500 (4)**	**14000 (0.5)**	8900 (0.5)	7200 (0.5)
Antimony	0.50	< 0.25 (0.25)	< 0.25 (0.25)	ND(0.5)	**0.63 (0.5)**	ND(0.5)
Arsenic	12.5 (c)	5.1 (0.1)	4.3 (0.1)	**13 (0.1)**	9.5 (0.1)	9.2 (0.1)
Barium	75 (a)	42 (0.4)	62 (0.4)	67 (1)	**92 (1)**	34 (1)
Cadmium	1.2 (a)	0.42 (0.05)	0.076 (0.05)	**2.2 (0.05)**	**4.1 (0.05)**	1.1 (0.05)
Chromium	18 (a)	13 (1.6)	**19 (1.6)**	**19 (2.5)**	**40 (2.5)**	11 (2.5)
Copper	32 (a)	15 (0.6)	16 (0.6)	30 (1)	**230 (1)**	16 (1)
Iron	17738 (c)	17600 (2)	**30700 (2)**	**41000 (2)**	**29000 (2)**	**19000 (2)**
Lead	21 (a)	9.3 (1)	14 (1)	**77 (1)**	**910 (1)**	11 (1)
Manganese	440 (a)	421 (0.2)	336 (0.2)	**670 (2)**	280 (2)	300 (2)
Mercury	0.13 (a)	< 0.1 (0.1)	< 0.1 (0.1)	**0.23 (0.1)**	ND(0.1)	ND(0.1)
Nickel	20 (a)	16 (0.2)	**21 (0.2)**	**25 (1)**	**25 (1)**	15 (1)
Selenium	0.70	< 0.5 (0.5)	< 0.5 (0.5)	ND(0.5)	ND(0.5)	ND(0.5)
Silver	1.0 (a)	< 0.2 (0.2)	< 0.2 (0.2)	ND(0.5)	ND(0.5)	ND(0.5)
Thallium	0.5(b)	< 0.25 (0.25)	< 0.25 (0.25)	ND(0.5)	ND(0.5)	ND(0.5)
Vanadium	21.3 (c)	**22 (2)**	**29 (2)**	20 (1)	15 (1)	13 (1)
Zinc	50.8 (c)	43 (1)	46 (1)	**97 (1)**	**260 (1)**	45 (1)
Volatile Compounds (ug/kg)						
Acetone	14000	3000 (10)	2000 (100)	610 (100)	450 (100)	590 (100)
Benzene	24	ND(10)	ND(10)	ND(10)	ND(10)	ND(10)
Ethylbenzene	1500	ND(10)	ND(10)	ND(10)	ND(10)	< 10 (10)
4-Methly-2-pentanone	7000	ND(100)	ND(100)	ND(100)	ND(100)	ND(100)
Total Xylenes	5600	ND(30)	< 30 (30)	< 30 (30)	< 30 (30)	< 30 (30)
Semi-volatile Compounds (ug/kg)						
Benzo(a)anthracene	1800	ND(330)	NA	< 330 (330)	NA	NA
Benzo(a)pyrene	330 (b)	ND(330)	NA	ND(330)	NA	NA
Benzo(b)fluoranthene	1800	ND(330)	NA	ND(330)	NA	NA
Dibenzo(a,h)anthracene	330 (b)	ND(330)	NA	ND(330)	NA	NA
Fluoranthene	17000	ND(330)	NA	660 (330)	NA	NA
Indeno(1,2,3-c,d)pyrene	1,800	ND(330)	NA	ND(330)	NA	NA
Phenanthrene	500	ND(330)	NA	420 (330)	NA	NA
Pyrene	10000	ND(330)	NA	500 (330)	NA	NA
PCBs/Pesticides (ug/kg)						
PCB Aroclor 1254	1000	<330 (330)	NA	**1500 (400)**	NA	NA

Notes:

(a) The Michigan Default Type A Cleanup Criteria has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria.

(b) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

(c) Site specific background levels have been substituted for the Michigan Type B 20X Groundwater Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 2.2

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE B DIRECT CONTACT CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-014	BTH-030	BTH-033	BTH-037	BTH-038	BTH-041	BTH-042	BTH-055	BTH-056
SAMPLE LOCATION		BH-J-9	BH-J-11	BH-J-17	BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(4-6)'	(2-4)'	(4-6)'	(8-10)'	(8-10)'	(12-14)'	(6-8)'	(16-18)'
DATE SAMPLED		11/4/94	11/8/94	11/9/94	11/10/94	11/10/94	11/11/94	11/11/94	11/18/94	11/18/94
Parameter	Michigan Type B Direct Contact Cleanup Criteria									
Inorganic Analytes (mg/kg)										
Arsenic	12.5 (b)	3.3 (0.1)	5.9 (0.1)	3.7 (0.1)	12 (0.1)	11 (0.1)	10 (0.1)	**19 (0.1)**	**13 (0.1)**	9.5 (0.1)
Barium	1800	27 (0.4)	75 (0.4)	43 (0.4)	**2300 (0.4)**	700 (0.4)	**2220 (0.4)**	541 (0.4)	67 (1)	92 (1)
Lead	400	25 (1)	130 (1)	41 (1)	**740 (1)**	**880 (1)**	**4740 (1)**	**945 (1)**	77 (1)	**910 (1)**
Semi-volatile Compounds (ug/kg)										
Benzo(a)anthracene	1800	ND(330)	360 (330)	ND(330)	**7200 (6,600)**	NA	360 (330)	NA	< 330 (330)	NA
Benzo(a)pyrene	330 (a)	ND(330)	ND(330)	ND(330)	**5000 (330)**	NA	< 330 (330)	NA	ND(330)	NA
Benzo(b)fluoranthene	1800	ND(330)	550 (330)	< 330 (330)	**8900 (6,600)**	NA	460 (330)	NA	ND(330)	NA
Dibenzo(a,h)anthracene	330 (a)	ND(330)	ND(330)	ND(330)	**1300 (330)**	NA	ND(330)	NA	ND(330)	NA
Indeno(1,2,3-c,d)pyrene	1,800	ND(330)	430 (330)	ND(330)	**4700 (330)**	NA	380 (330)	NA	ND(330)	NA
PCBs/Pesticides (ug/kg)										
PCB Aroclor 1254	1000	730 (330)	**1700 (420)**	900 (330)	800 (330)	NA	**2100 (410)**	NA	**1500 (400)**	NA

Notes:

(a) The Michigan Target Method Detection Limit has been substituted for the Michigan Type B Direct Contact Cleanup Criteria

(b) Site specific background levels have been substituted for the Michigan Type B Direct Contact Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit.
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 2.3

DETECTED COMPOUNDS IN SOIL COMPARED TO MICHIGAN TYPE C DIRECT CONTACT CLEANUP CRITERIA J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-037	BTH-038	BTH-041	BTH-042	BTH-055	BTH-056
SAMPLE LOCATION		BH-J-16	BH-J-16	BH-J-7	BH-J-7	BH-J-14	BH-J-14
SAMPLE INTERVAL (feet bgs)		(4-6)'	(8-10)'	(8-10)'	(12-14)'	(6-8)'	(16-18)'
DATE SAMPLED		11/10/94	11/10/94	11/11/94	11/11/94	11/18/94	11/18/94
Parameter	Michigan Type C Direct Contact Cleanup Criteria						
Inorganic Analytes (mg/kg)							
Arsenic	12.5 (a)	12 (0.1)	11 (0.1)	10 (0.1)	**19 (0.1)**	**13 (0.1)**	9.5 (0.1)
Lead	400	**740 (1)**	**880 (1)**	**4740 (1)**	**945 (1)**	**77 (1)**	**910 (1)**
Semi-volatile Compounds (ug/kg)							
Benzo(a)pyrene	2,100	**5000 (330)**	NA	< 330 (330)	NA	ND(330)	NA

Notes:

(a) Site specific background levels have been substituted for the Michigan Type C Direct Contact Cleanup Criteria

- Number in parenthesis indicates the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit.
- bgs = below ground surface.
- ND = Not Detected.
- NA = Not Analyzed.

TABLE 2.4

DETECTED INORGANIC ANALYTES IN PERCHED WATER COMPARED TO MICHIGAN TYPE B DRINKING WATER CLEANUP CRITERIA
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

SAMPLE NUMBER		BTH-001	BTH-002	BTH-003	BTH-004	BTH-005	BTH-006
SAMPLE LOCATION		MW-J-6	MW-J-6	MW-J-3	MW-J-2	MW-J-1	RINSATE
DATE SAMPLED		12/7/94	12/7/94	12/7/94	12/7/94	12/7/94	12/7/94
UNITS		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Parameter	Michigan Type B Drinking Water Cleanup Criteria (ug/L)						
Antimony	2.4	**2.8(2.0)**	**3.1(2.0)**	**4.1(2.0)**	<2.0(2.0)	<2.0(2.0)	<2.0(2.0)
Arsenic	1	**1.9(1.0)**	**1.2(1.0)**	**15(1.0)**	<1.0(1.0)	<1.0(1.0)	<1.0(1.0)
Manganese	170	<10(10.0)	<10(10.0)	**210(10.0)**	130(10.0)	**280(10.0)**	<10.0(10.0)

Notes:

- Antimony, arsenic, and manganese are the only parameters detected in groundwater sample with concentrations above the Michigan Type B Drinking Water Cleanup Criteria.
- Number in parenthesis are the method detection limit.
- < = an unquantifiable concentration was detected below the method detection limit

TABLE 3.1

SUMMARY OF DETECTION FREQUENCIES, EXPOSURE POINT CONCENTRATIONS, MICHIGAN TYPE B CRITERIA AND CHEMICALS OF CONCERN FOR ORGANICS IN SURFACE SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*CAS Number*	*Total No. of Samples (n) (1)*	*No. of Detections*	*Student t-value*	*Standard Deviation*	*Concentrations (ug/kg)* Mean	Maximum	95% UCL	*Site-Specific Background (ug/kg)*	*Type B Direct Contact Value (ug/kg)*	*COC (2)*
Volatile Compounds											
Acetone	67-64-1	2	2	12.7	388.9	1125	1400	4619.2	7.45E+03	7.80E+06	
Benzene	71-43-2	2	0	ND	ND	ND	ND	ND	ND	1.30E+04	
2-Butanone	78-93-3	2	2	12.7	169.7	260	380	1784.7	ND	3.60E+06	
Carbon Disulfide	75-15-0	2	0	ND	ND	ND	ND	ND	ND	8.60E+06	
Chloroform	67-66-3	2	0	ND	ND	ND	ND	ND	ND	6.20E+04	
Ethylbenzene	100-41-4	2	0	ND	ND	ND	ND	ND	1.35E+01	7.50E+06	
Methylene chloride	75-09-2	2	0	ND	ND	ND	ND	ND	9.75E+00	5.10E+04	
4-Methyl-2-pentanone	108-10-1	2	0	ND	ND	ND	ND	ND	ND	3.90E+06	
Toluene	108-88-3	2	0	ND	ND	ND	ND	ND	7.24E+01	1.70E+07	
Vinyl Acetate	108-05-4	2	0	ND	ND	ND	ND	ND	ND	–	
Total Xylenes	1330-20-7	2	0	ND	ND	ND	ND	ND	1.50E+01	1.40E+08	
Semi-volatile Compounds											
2-Methylnaphthalene	91-57-6	2	0	ND	ND	ND	ND	ND	ND	4.10E+05	
Acenapthene	83-32-9	2	0	ND	ND	ND	ND	ND	ND	4.50E+07	
Acenapthylene	208-96-8	2	0	ND	ND	ND	ND	ND	ND	9.30E+05	
Anthracene	120-12-7	2	0	ND	ND	ND	ND	ND	ND	2.60E+08	
Benzo(a)anthracene	56-55-3	2	0	ND	ND	ND	ND	ND	ND	1.80E+03	
Benzo(a)pyrene	50-32-8	2	0	ND	ND	ND	ND	ND	ND	1.80E+02	
Benzo(b)fluoranthene	205-99-2	2	0	ND	ND	ND	ND	ND	ND	1.80E+03	
Benzo(k)fluoranthene	207-08-9	2	0	ND	ND	ND	ND	ND	ND	1.80E+04	
Benzo(g,h,i)perylene	191-24-2	2	0	ND	ND	ND	ND	ND	ND	–	
Bis(2-Ethylhexyl)phthalate	117-81-7	2	0	ND	ND	ND	ND	ND	ND	9.20E+04	
Butlybenzylphthalate	85-68-7	2	0	ND	ND	ND	ND	ND	ND	4.10E+07	
Di-n-butylphthalate	84-74-2	2	0	ND	ND	ND	ND	ND	ND	3.10E+07	
Chrysene	218-01-9	2	0	ND	ND	ND	ND	ND	ND	1.80E+05	
Dibenzo(a,h)anthracene	53-70-3	2	0	ND	ND	ND	ND	ND	ND	1.80E+02	
Di-n-octylphthalate	117-84-0	2	0	ND	ND	ND	ND	ND	ND	4.70E+06	
Fluoranthene	206-44-0	2	0	ND	ND	ND	ND	ND	ND	3.10E+07	
Fluorene	86-73-7	2	0	ND	ND	ND	ND	ND	ND	3.10E+07	
Indeno(1,2,3-c,d)pyrene	193-39-5	2	0	ND	ND	ND	ND	ND	ND	1.80E+03	
Naphthalene	91-20-3	2	0	ND	ND	ND	ND	ND	ND	9.30E+06	
N-Nitrosodimethylamine	62-75-9	2	0	ND	ND	ND	ND	ND	ND	7.80E+04	
Phenanthrene	85-01-8	2	0	ND	ND	ND	ND	ND	ND	9.30E+05	
Pyrene	129-00-0	2	0	ND	ND	ND	ND	ND	ND	1.90E+07	
PCBs/Pesticides											
Aldrin	309-00-2	2	0	ND	ND	ND	ND	ND	ND	7.60E+01	
alpha-BHC	319-84-6	2	0	ND	ND	ND	ND	ND	ND	2.10E+02	
beta-BHC	319-85-7	2	0	ND	ND	ND	ND	ND	ND	7.20E+02	
delta-BHC	319-86-8	2	0	ND	ND	ND	ND	ND	ND	–	
gamma-BHC (Lindane)	58-89-9	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
4,4'-DDD	72-54-8	2	0	ND	ND	ND	ND	ND	ND	5.40E+03	
4,4'-DDE	72-55-9	2	0	ND	ND	ND	ND	ND	ND	3.80E+03	
4,4'-DDT	50-29-3	2	0	ND	ND	ND	ND	ND	ND	3.80E+03	
Dieldrin	60-57-1	2	1	12.7	2.0	3	5	21.2	ND	8.00E+01	
Endosulfan I	959-98-8	2	0	ND	ND	ND	ND	ND	ND	6.00E+04	
Endosulfan II	33213-65-9	2	0	ND	ND	ND	ND	ND	ND	6.00E+04	
Endosulfan Sulfate	1031-07-08	2	0	ND	ND	ND	ND	ND	ND	–	
Endrin	72-20-8	2	0	ND	ND	ND	ND	ND	ND	4.40E+04	
Endrin Aldehyde	7421-93-4	2	0	ND	ND	ND	ND	ND	ND	–	
Heptachlor	76-44-8	2	0	ND	ND	ND	ND	ND	ND	2.80E+02	
Heptachlor Epoxide	1024-57-3	2	0	ND	ND	ND	ND	ND	ND	1.40E+02	
Toxaphene	8001-35-2	2	0	ND	ND	ND	ND	ND	ND	3.50E+02	
Methoxychlor	72-43-5	2	0	ND	ND	ND	ND	ND	ND	1.30E+06	
Endrin Ketone	53494-70-4	2	0	ND	ND	ND	ND	ND	ND	–	
alpha-Chlordane	5103-71-9	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
gamma-Chlordane	5103-74-2	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1016	12674-11-2	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1221	11104-28-2	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1232	11141-16-5	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1242	53469-21-9	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1248	12672-29-6	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1254	11097-69-1	2	1	12.7	519.7	533	900	5202.0	ND	1.00E+03	
PCB Aroclor 1260	11096-82-5	2	0	ND	ND	ND	ND	ND	ND	1.00E+03	

NOTES:
ND = Not Detected
(1) Based on sampling locations: BH-J-13 and 17.
(2) Chemicals of Potential Concern.

TABLE 3.2

SUMMARY OF DETECTION FREQUENCIES, EXPOSURE POINT CONCENTRATIONS,
SITE-SPECIFIC BACKGROUND LEVELS, MICHIGAN TYPE B CRITERIA AND COCs FOR INORGANICS IN SURFACE SOILS
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Total No. of Samples (n)(1)	*No. of Detections*	*Student t-value*	*Standard Deviation*	*Concentrations (mg/kg)*			*Site Specific Background (mg/kg)*	*Type B Direct Contact Value (mg/kg)*	*COCs (2)*
					Mean	*Maximum*	*95%UCL*			
Inorganic Analytes										
Aluminum	2	2	12.706	120.2	6685	6770	7765.0	9,653	ID	
Antimony	2	1	12.706	0.1	0.21	0.30	1.32	0.25	91	
Arsenic	2	2	12.706	0.6	3.30	3.70	8.38	12.5	0.72	
Barium	2	2	12.706	6.4	38.50	43.00	95.68	75	18,000	
Beryllium	2	2	12.706	0.04	0.35	0.37	0.66	0.57	--	
Cadmium	2	2	12.706	0.3	0.47	0.70	3.39	1.2	130	
Calcium	2	2	12.706	3889.1	21750.00	24500.00	56691.50	114,020	--	
Chromium	2	2	12.706	4.0	12.20	15.00	47.78	18	1,200	
Cobalt	2	2	12.706	1.7	10.80	12.00	26.05	--	--	
Copper	2	2	12.706	32.5	37.00	60.00	329.24	--	9,800	
Iron	2	2	12.706	282.8	13800.00	14000.00	16341.20	17,738	ID	
Lead	2	2	12.706	18.4	28.00	41.00	193.18	21	400	
Magnesium	2	2	12.706	134.4	5495.00	5590.00	6702.07	30,726	--	
Manganese	2	2	12.706	41.0	291.00	320.00	659.47	384	1,200	
Mercury	2	0	ND	ND	ND	ND	ND	6.10	78	
Nickel	2	2	12.706	5.7	15.00	19.00	65.82	20	20,000	
Potassium	2	2	12.706	2.1	468.50	470.00	487.56	1,719	--	
Selenium	2	0	ND	ND	ND	ND	ND	0.5	1,300	
Silver	2	0	ND	ND	ND	ND	ND	1	1,200	
Sodium	2	1	12.706	88.4	67.50	130.00	861.63	210	1,000,000	
Thallium	2	0	ND	ND	ND	ND	ND	0.31	22	
Vanadium	2	2	12.706	0.00	15.00	15.00	15.00	21.26	2,200	
Zinc	2	2	12.706	11.3	47.00	55.00	148.65	50.8	86,000	

NOTES:
ND = Not Detected
ID = Insufficient data to determine criteria (MDNR)
(1) Based on sampling locations: BH-J-13 and 17.
(2) Chemicals of Potential Concern.

TABLE 3.3

SUMMARY OF DETECTION FREQUENCIES, EXPOSURE POINT CONCENTRATIONS, MICHIGAN TYPE B CRITERIA AND CHEMICALS OF CONCERN FOR ORGANICS IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	CAS Number	Total No. of Samples (n)(1)	No. of Detections	Student t-value	Standard Deviation	Concentrations (ug/kg) Mean	Maximum	95%UCL	Site-Specific Background (ug/kg)	Type B Direct Contact Value (ug/kg)	COC (2)
Volatile Compounds											
Acetone	67-64-1	41	40	2.021	2438.2	1961	14000	2731.0	7.45E+03	7.80E+06	
Benzene	71-43-2	41	2	2.021	30.5	10	200	19.7	ND	1.30E+04	
2-Butanone	78-93-3	41	5	2.021	648.3	167	4200	371.7	ND	3.60E+06	
Carbon Disulfide	75-15-0	41	0	ND	ND	ND	ND	ND	ND	8.60E+06	
Chloroform	67-66-3	41	0	ND	ND	ND	ND	ND	ND	6.20E+04	
Ethylbenzene	100-41-4	41	5	2.021	3903.0	619	25000	1850.5	1.35E+01	7.50E+06	
Methylene chloride	75-09-2	41	11	2.021	4.9	8	20	9.4	9.75E+00	5.10E+04	
4-Methyl-2-pentanone	108-10-1	41	1	2.021	7020.2	1145	45000	3361.0	ND	3.90E+06	
Toluene	108-88-3	41	20	2.021	373.2	69	2400	187.1	7.24E+01	1.70E+07	
Vinyl Acetate	108-05-4	41	0	ND	ND	ND	ND	ND	ND	–	
Total Xylenes	1330-20-7	41	5	2.021	7804.8	1245	50000	3707.9	1.50E+01	1.40E+08	
Semi-volatile Compounds											
2-Methylnaphthalene	91-57-6	13	2	2.18	94.1	203	430	260.3	ND	4.10E+05	
Acenapthene	83-32-9	13	1	2.18	564.4	322	2200	662.6	ND	4.50E+07	
Acenapthylene	208-96-8	13	0	ND	ND	ND	ND	ND	ND	9.30E+05	
Anthracene	120-12-7	13	1	2.18	814.0	391	3100	882.7	ND	2.60E+08	
Benzo(a)anthracene	56-55-3	13	3	2.18	1943.5	736	7200	1910.7	ND	1.80E+03	X
Benzo(a)pyrene	50-32-8	13	1	2.18	1341.0	537	5000	1347.3	ND	1.80E+02	X
Benzo(b)fluoranthene	205-99-2	13	3	2.18	2410.3	889	8900	2345.9	ND	1.80E+03	X
Benzo(k)fluoranthene	207-08-9	13	0	ND	ND	ND	ND	ND	ND	1.80E+04	
Benzo(g,h,i)perylene	191-24-2	13	2	2.18	1502.4	610	5600	1518.4	ND	–	
Bis(2-Ethylhexyl)phthalate	117-81-7	13	2	2.18	309.8	292	1000	479.2	ND	9.20E+04	
Butlybenzylphthalate	85-68-7	13	0	ND	ND	ND	ND	ND	ND	4.10E+07	
Di-n-butylphthalate	84-74-2	13	1	2.18	176.1	214	800	320.3	ND	3.10E+07	
Chrysene	218-01-9	13	3	2.18	2357.4	861	8700	2285.5	ND	1.80E+05	
Dibenzo(a,h)anthracene	53-70-3	13	1	2.18	314.8	252	1300	442.6	ND	1.80E+02	X
Di-n-octylphthalate	117-84-0	13	0	ND	ND	ND	ND	ND	ND	4.70E+06	
Fluoranthene	206-44-0	13	4	2.18	4643.5	1558	17000	4364.3	ND	3.10E+07	
Fluorene	86-73-7	13	1	2.18	425.7	283	1700	540.4	ND	3.10E+07	
Indeno(1,2,3-c,d)pyrene	193-39-5	13	3	2.18	1249.9	551	4700	1306.2	ND	1.80E+03	X
Naphthalene	91-20-3	13	2	2.18	457.5	340	1700	616.9	ND	9.30E+06	
N-Nitrosodimethylamine	62-75-9	13	0	ND	ND	ND	ND	ND	ND	7.80E+04	
Phenanthrene	85-01-8	13	4	2.18	3815.8	1313	14000	3619.5	ND	9.30E+05	
Pyrene	129-00-0	13	3	2.18	3264.6	1161	12000	3133.7	ND	1.90E+07	
PCBs/Pesticides											
Aldrin	309-00-2	13	0	ND	ND	ND	ND	ND	ND	7.60E+01	
alpha-BHC	319-84-6	13	0	ND	ND	ND	ND	ND	ND	2.10E+02	
beta-BHC	319-85-7	13	0	ND	ND	ND	ND	ND	ND	7.20E+02	
delta-BHC	319-86-8	13	0	ND	ND	ND	ND	ND	ND	–	
gamma-BHC (Lindane)	58-89-9	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
4,4'-DDD	72-54-8	13	0	ND	ND	ND	ND	ND	ND	5.40E+03	
4,4'-DDE	72-55-9	13	0	ND	ND	ND	ND	ND	ND	3.80E+03	
4,4'-DDT	50-29-3	13	0	ND	ND	ND	ND	ND	ND	3.80E+03	
Dieldrin	60-57-1	13	1	2.18	5.3	4.88	4.50	8.1	ND	8.00E+01	
Endosulfan I	959-98-8	13	0	ND	ND	ND	ND	ND	ND	6.00E+04	
Endosulfan II	33213-65-9	13	0	ND	ND	ND	ND	ND	ND	6.00E+04	
Endosulfan Sulfate	1031-07-08	13	0	ND	ND	ND	ND	ND	ND	–	
Endrin	72-20-8	13	0	ND	ND	ND	ND	ND	ND	4.40E+04	
Endrin Aldehyde	7421-93-4	13	0	ND	ND	ND	ND	ND	ND	–	
Heptachlor	76-44-8	13	0	ND	ND	ND	ND	ND	ND	2.80E+02	
Heptachlor Epoxide	1024-57-3	13	0	ND	ND	ND	ND	ND	ND	1.40E+02	
Toxaphene	8001-35-2	13	0	ND	ND	ND	ND	ND	ND	3.50E+02	
Methoxychlor	72-43-5	13	0	ND	ND	ND	ND	ND	ND	1.30E+06	
Endrin Ketone	53494-70-4	13	0	ND	ND	ND	ND	ND	ND	–	
alpha-Chlordane	5103-71-9	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
gamma-Chlordane	5103-74-2	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1016	12674-11-2	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1221	11104-28-2	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1232	11141-16-5	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1242	53469-21-9	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1248	12672-29-6	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	
PCB Aroclor 1254	11097-69-1	13	8	2.18	707.7	660	2100	1087.5	ND	1.00E+03	X
PCB Aroclor 1260	11096-82-5	13	0	ND	ND	ND	ND	ND	ND	1.00E+03	

NOTES:
ND = Not Detected
(1) Based on sampling locations: BH-J-1,4,6,7,8,9,10,11,12,13,14,16 and 17.
(2) Chemicals of Potential Concern.

TABLE 3.4
SUMMARY OF DETECTION FREQUENCIES, EXPOSURE POINT CONCENTRATIONS, SITE-SPECIFIC BACKGROUND LEVELS, MICHIGAN TYPE B CRITERIA AND CHEMICALS OF CONCERN FOR INORGANIC ANALYTES IN SOIL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Total No. of Samples (n)(1)*	*No. of Detections*	*Student t-value*	*Standard Deviation*	*Concentrations (mg/kg)*			*Site Specific Background (mg/kg)*	*Type B Direct Contact Value (mg/kg)*	*COC (2)*
					Mean	*Maximum*	*95%UCL*			
Inorganic Analytes										
Aluminum	41	41	2.021	2683.8	6765	17500	7612.2	9,653	ID	
Antimony	41	9	2.021	5.5	2	29	3.3	0.25	91	
Arsenic	41	41	2.021	3.4	6	19	6.7	12.5	0.72	X
Barium	41	41	2.021	496.5	170	2300	327.1	75	18,000	
Beryllium	41	38	2.021	0.4	0.49	2	0.6	0.57	--	
Cadmium	41	31	2.021	7.8	3	42	5.1	1.2	130	
Calcium	41	41	2.021	27876.8	60250	120009	69048.4	114,020	--	
Chromium	41	41	2.021	104.4	36	641	69.3	18	1,200	
Cobalt	41	41	2.021	31.7	26	161	36.0	--	--	
Copper	41	41	2.021	219.9	78	1020	147.7	--	9,800	
Iron	41	41	2.021	22878.2	21565	120000	28786.1	17,738	ID	
Lead	41	41	2.021	769.0	215	4740	457.2	21	400	X
Magnesium	41	41	2.021	7797.0	17362	35600	19823.1	30,726	--	
Manganese	41	41	2.021	171.8	338	980	392.5	384	1,200	
Mercury	41	5	2.021	0.1	0.07	0.45	0.1	6.10	78	
Nickel	41	41	2.021	23.8	22	140	29.5	20	20,000	
Potassium	41	41	2.021	493.2	1156	2700	1311.4	1,719	--	
Selenium	41	3	2.021	0.4	0.34	2	0.5	0.5	1,300	
Silver	41	12	2.021	0.6	0.30	3	0.5	1	1,200	
Sodium	41	40	2.021	170.2	143	911	197.2	210	1,000,000	
Thallium	41	16	2.021	0.1	0.22	0.52	0.3	0.31	22	
Vanadium	41	41	2.021	6.0	17	47	19.1	21.26	2,200	
Zinc	41	41	2.021	761.7	259	4390	499.3	50.8	86,000	

NOTES:
ND = Not Detected
(1) Based on sampling locations: BH-J-1,4,6,7,8,9,10,11,12,13,14,16 and 17.
(2) Chemicals of Potential Concern.

TABLE 3.5

BACKGROUND SOIL CONCENTRATIONS OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) J-LOT PONTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

Compound	*Concentration (µg/kg)* *Urban Soil*
Acenaphthene	NA
Acenaphthylene	NA
Anthracene	NA
Benz(a)anthracene	169-59,000
Benzo(a)pyrene	165-220
Benzo(b)fluoranthene	15,000-62,000
Benzo(e)pyrene	60-14,000
Benzo(g,h,i)perylene	900-47,000
Benzo(k)fluoranthene	300-26,000
Chrysene	251-640
Fluoranthene	200-166,000
Fluorene	NA
Indeno(1,2,3-c,d)pyrene	8,000-61,000
Phenanthrene	NA
Pyrene	145-147,000

a Derived from
IARC (1973)
White and Vanderslice (1980)
Windsor and Hites (1979)
Edwards (1983)
Butler et al. (1984)
Vogt et al. (1987)
Jones et al. (1987)

NA - Not available

TABLE 3.6

SUMMARY OF PHYSICOCHEMICAL PROPERTIES AND TOXICITY DATA
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Parameter	*Molecular Wt. (g/mol)*	*Water Solubility (mg/L)*	*Vapor Pressure (mm Hg)*	*Henry's Law Constant (atm-m3/mol)*	*Koc (mL/g)*	*Log Kow (L/kg)*	*RfD (mg/kg-d)*	*CSF (1/(mg/kg-d))*
PCBs								
Aroclor-1254	3.30E+02	5.70E-02	7.71E-05	2.70E-03	5.30E+05	6.47E+00	7.00E-05	7.70E+00
BNA								
Benzo(a)anthracene	2.28E+02	1.40E-02	1.10E-07	6.60E-07	1.38E+06	5.61E+00	NA	7.30E-01
Benzo(a)pyrene	2.52E+02	3.80E-03	5.49E-09	2.40E-06	3.98E+05	5.99E+00	NA	7.30E+00
Benzo(b)fluoranthene	2.52E+02	1.20E-03	5.00E-07	1.20E-05	5.50E+05	6.57E+00	NA	7.30E-01
Dibenzo(a,h)anthracene	2.78E+02	5.00E-04	NA	7.33E-09	1.66E+06	6.36E+00	NA	7.30E+00
Indeno(1,2,3-cd)pyrene	2.67E+02	6.20E-02	10.0E-10	2.96E-20	3.09E+07	7.70E+00	NA	7.30E-01
Metals								
Arsenic	7.49E+01	insoluble	1 mm @ 372°C	NA	NA	NA	3.00E-04	1.75E+00
Lead	2.07E+02	insoluble	1.77 mm @ 1000°C	NA	NA	NA	1.40E-03	NA

Notes:
NA - Not Available

References: U.S. Department of Health and Human Services. Public Health Service. Agency for Toxic Substances and Disease Registry.
Groundwater Chemicals Desk Reference, John H. Montgomery, Linda M. Welkom, Lewis Publishers, Inc. 1990.
USEPA Integrated Risk Infromation System Database (IRIS), January 1995.
USEPA Superfund Public Health Evaluation Manual (SPHEM), EPA/540/1-86/060, October, 1986.

TABLE 3.7

SUMMARY OF LIFETIME CANCER RISKS AND HAZARD INDICES - FUTURE SITE CONDITION SOIL EXPOSURE J-LOT POINTIAC CENTRAL MANUFACTURING FACILITY PONTIAC, MICHIGAN

SCENARIOS:	LIFETIME UPPERBOUND EXCESS CANCER RISK	
	MEAN	**RME**
Industrial Worker Exposure	9.30E-07	5.85E-06
Construction Worker Exposure	1.14E-07	4.06E-07
Residential Exposure (Hypothetical)		
Child	1.09E-05	2.09E-05
Adult	1.36E-06	1.88E-05
	1.22E-05	3.97E-05

SCENARIOS:	HAZARD INDICIES	
	MEAN	**RME**
Industrial Worker Exposure	5.19E-02	1.60E-01
Construction Worker Exposure	6.37E-02	2.78E-01
Residential Exposure (Hypothetical)		
Child	1.22E+00	2.86E+00
Adult	1.52E-01	5.14E-01
	1.37E+00	3.37E+00

TABLE 5.1

REMOVAL ACTION ALTERNATIVES ARRAY
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

General Response Actions	*Removal Technology*	*Comments*
1. No Action	No Action	- required by the NCP - will not change existing conditions - soil with concentrations exceeding potential cleanup goals will remain at the Site.
2. Limited Action	Institutional Controls and Restricted Access	- will minimize potential future contact with chemicals in soil - soil with concentrations exceeding potential cleanup goals will remain at the Site.
3. Physical Containment Action	Capping	- will minimize potential contact with chemicals in surface soil (dermal contact and air pathways) - reduce infiltration - soil with concentrations exceeding potential cleanup goals will remain at the Site.
	A) Soil/Seeded Cover	- surface cap - exposed to forces of nature - infiltration prevention impaired by weathering - may be conformant with desired land use (i.e.vegative cover preferred)

TABLE 5.1

REMOVAL ACTION ALTERNATIVES ARRAY
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

General Response Actions	*Removal Technology*	*Comments*
3. Physical Containment Action (Cont'd)	B) Asphaltic Cover	- surface cap - exposed to forces of nature - infiltration prevention impaired by weathering - may be conformant with desired land use (i.e. parking area preferred)
	C) Clay Cover	- surface cap - protection against infiltration provided - infiltration layer protected against weathering - conformant with desired land use (i.e. vegative cover)
4. Removal and Disposal	Removal of contaminated soil and Off-Site Disposal in Michigan Type II Landfill	- remove soil from the Site - secures waste and minimizes future migration of contaminants - necessary to characterize soil for disposal; may be subject to TSCA and RCRA land ban regulations
	A) Removal of Soil above Michigan Type C criteria	- less soil volume to remove than for Michigan Type B criteria - long term monitoring of Site necessary - institutional controls necessary
	B) Removal of Soil above Michigan Type B criteria	- more soil volume to remove than for Michigan Type C criteria - no long term monitoring of Site - no institutional controls necessary

TABLE 5.2

REMOVAL ACTION ALTERNATIVES ARRAY
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

General Response	*ActionsRemedial Technology/Process Option*	*Comments*
1. No Action	a) No Action	- required by the NCP - will not change existing conditions - soil with concentrations exceeding potential cleanup goals will remain at the Site.
2. Limited Action	a) Restricted Access and Institutional Controls	- will minimize potential future contact with chemicals in soil - soil with concentrations exceeding potential cleanup goals will remain at the Site.
3. Physical Containment Action	a) Capping	- will minimize potential contact with chemicals in surface soil (dermal contact and air pathways) - reduce infiltration and hence chemical loading to the groundwater - soil with concentrations exceeding potential cleanup goals will remain at the Site.
	- Asphaltic Concrete Cover	- surface cap - exposed to forces of nature - not conformant with desired land use (i.e. vegetative cover preferred)
3. Physical Containment Action (Cont'd)	- Clay Cover (Act 64 Cap)	- protection against infiltration provided - infiltration layer protected against weathering - conformant with desired land use

TABLE 5.2

REMOVAL ACTION ALTERNATIVES ARRAY
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	General Response Actions	*Remedial Technology/Process Option*	*Comments*
			(i.e. vegetative cover)
		- Top Soil/ Seeded Cover	- surface cap - exposed to forces of nature - infiltration prevention impaired by weathering - not conformant with desired land use (i.e. vegetative cover preferred)
7.	Disposal Action	Disposal in RCRA/TSCA Landfill (on Site or off Site)	- will remove soil from the Site (off-Site disposal only) - secures waste and minimizes future migration of contaminants - subject to TSCA and RCRA land ban regulations

TABLE 6.1

COMPARATIVE ANALYSIS OF REMOVAL ALTERNATIVES
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

Alternative Identification	*Remedy Components*	*Remedy Type*	*Short-Term Effectiveness [R299.5603(1)(e)(i)]*	*Long-Term Effectiveness [R299.5603(1)(b)(d)(e)(g)(h)]*	*Reduction In Mobility, Toxicity, and Volume [R299.5603(1)(d)(2)]*	*Technical Feasibility*	*Administrative Feasibility*	*Cost [R299.5603(1)(f)]*	*Overall Protection of Human Health and the Environment*	*Overall Rank*
Alternate 1 No Action	- monitoring program	C	yes	no	no - least reduction in MTV - natural attenuation only	yes - easy to implement	no - not acceptable alone	$90,099 - lowest cost - Table 6.2	- unprotective	7
Alternate 2 Limited Action	- monitoring program - institutional controls • fence, warning signs • deed restrictions	C	yes	no	no - least reduction in MTV - natural attenuation only	yes - easy to implement	yes	$297,786 - Table 6.3	- protective	6
Alternative 3A Soil Cover	- monitoring program - institutional controls - cover - stormwater management	C	yes	yes	yes - reduction in mobility only	yes	yes	$1,169,886 - Table 6.4	- protective	3
Alternative 3B Asphalt Cover	- monitoring program - institutional controls - cover - stormwater management	C	yes	yes	yes - reduction in mobility only	yes	yes	$1,140,786 - Table 6.5	- protective	3
Alternative 3C Clay Cover	- monitoring program - institutional controls - cover - stormwater management	C	yes	yes	yes - reduction in mobility only	yes	yes	$2,091,486 - Table 6.6	- protective	3
Alternative 4A Soil Removal to Michigan Type C Criteria and Off-Site Disposal	- monitoring program - institutional controls - soil excavation - off-Site disposal - Site restoration	C	no - risks associated with soil excavation - risks associated with increased truck traffic	yes	yes - reduction in mobility only	yes - easy to implement utilizing standard environmental excavation and safety technologies	yes	$3,738,358 - Table 6.7	- protective	2
Alternative 4B Soil Removal to Michigan Type B Criteria and Off-Site Disposal	- monitoring program - institutional controls - soil excavation - off-Site disposal - Site restoration	B	no - risks associated with soil excavation - risks associated with increased truck traffic	yes	yes - reduction in mobility only	yes - easy to implement utilizing standard environmental excavation and safety technologies	yes	$4,290,000 - Table 6.8	- protective	1

TABLE 6.2

PRELIMINARY COST ESTIMATE
ALTERNATIVE 1 - NO ACTION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*		*Unit Cost*		*Cost*
CAPITAL COSTS							
There are no capital costs associated with this Alternative.						$	0
ANNUAL OPERATION AND MAINTENANCE COSTS							
1.)	Site Inspection	2	rounds	$	500.00	$	1,000
2.)	Annual Report	–	L.S.	$	–	$	2,000
3.)	Site Evaluation ($30,000 every 5 years)	–	L.S.	$	–	$	4,900
	Subtotal					$	7,900
	Contingency (20%)					$	1,580
	Total O & M Costs					$	9,480
	Total Present Worth (30 years at 10%)					$	90,099
	TOTAL PRESENT WORTH ALTERNATIVE 1					**$**	**90,099**

TABLE 6.3

PRELIMINARY COST ESTIMATE
ALTERNATIVE 2 - LIMITED ACTION
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*	*Unit Cost*	*Cost*
CAPITAL COSTS					
1.)	Security Fence	2,600	L. ft.	$ 8.00	$ 20,800
2.)	Deed Restrictions	–	L.S.	$ –	$ 100,000
	Subtotal				$ 120,800
	Contingency (20%)				$ 24,160
	Total Capital Costs				$ 144,960
ANNUAL OPERATION AND MAINTENANCE COSTS					
1.)	Institutional Controls	–	L.S.	$ –	$ 5,500
2.)	Elements of Alternative 1	–	L.S.	$ –	$ 7,900
	Subtotal				$ 13,400
	Contingency (20%)				$ 2,680
	Total O & M Costs				$ 16,080
	Total Present Worth (30 years at 10%)				$ 152,826
	TOTAL PRESENT WORTH - ALTERNATIVE 2				**$ 297,786**

TABLE 6.4

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3A - SOIL COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*		*Unit Cost*		*Cost*
	CAPITAL COSTS						
1.)	Institutional Controls	–	L.S.	$	–	$	100,000
2.)	Soil Cover						
	a) materials						
	grading layer	30,000	C.Y.	$	5.00	$	150,000
	top soil	7,500	C.Y.	$	10.00	$	75,000
	b) construction						
	grading layer	30,000	C.Y.	$	2.50	$	75,000
	top soil	7,500	C.Y.	$	2.50	$	18,750
	c) drainage ditches	2,600	L.ft.	$	10.00	$	26,000
	d) grass	20	Acres	$	3,000.00	$	60,000
4.)	Security Fence	2,600	L.ft.	$	8.00	$	20,800
	Subtotal					$	512,550
	Contingency (20%)					$	102,510
	Total Capital Costs					$	615,060

TABLE 6.4

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3A - SOIL COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*	*Unit Cost*	*Cost*
	ANNUAL OPERATION AND MAINTENANCE COSTS				
1.)	Institutional Controls	–	L.S.	$ –	$ 5,500
2.)	Elements of Alternative 1	–	L.S.	$ –	$ 7,900
	Subtotal				$ 13,400
	Contingency (20%)				$ 2,680
	Total O & M Costs				$ 16,080
	Total Present Worth (30 years at 10%)				$ 152,826
	ENGINEERING				
1.)	Pre-Design	–	L.S.	$ –	$ 80,000
2.)	Design	–	L.S.	$ –	$ 75,000
3.)	Contractor Procurement	–	L.S.	$ –	$ 30,000
4.)	Removal Action Supervision	–	L.S.	$ –	$ 150,000
	Subtotal				$ 335,000
	Contingency (20%)				$ 67,000
	Total Capital Costs				$ 402,000
	TOTAL PRESENT WORTH ALTERNATIVE 3A				**$ 1,169,886**

TABLE 6.5

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3B - ASPHALT COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*	*Unit Cost*	*Cost*
	CAPITAL COSTS				
1.)	Institutional Controls	–	L.S.	$ –	$ 100,000
2.)	Asphalt Cover				
	a) materials				
	grading layer	30,000	C.Y.	$ 5.00	$ 150,000
	asphalt	7,500	C.Y.	$ 10.00	$ 75,000
	b) construction				
	grading layer	30,000	C.Y.	$ 2.50	$ 75,000
	asphalt	7,500	C.Y.	$ 5.00	$ 37,500
3.)	Stormwater Collection System	–	L.S.	$ –	$ 30,000
4.)	Security Fence	2,600	L.ft.	$ 8.00	$ 20,800
	Subtotal				$ 488,300
	Contingency (20%)				$ 97,660
	Total Capital Costs				$ 585,960

TABLE 6.5

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3B - ASPHALT COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*	*Unit Cost*		*Cost*
	ANNUAL OPERATION AND MAINTENANCE COSTS					
1.)	Institutional Controls	–	L.S.	$ –	$	5,500
2.)	Elements of Alternative 1	–	L.S.	$ –	$	7,900
	Subtotal				$	13,400
	Contingency (20%)				$	2,680
	Total O & M Costs				$	16,080
	Total Present Worth (30 years at 10%)				$	152,826
	ENGINEERING					
1.)	Pre-Design	–	L.S.	$ –	$	80,000
2.)	Design	–	L.S.	$ –	$	75,000
3.)	Contractor Procurement	–	L.S.	$ –	$	30,000
4.)	Removal Action Supervision	–	L.S.	$ –	$	150,000
	Subtotal				$	335,000
	Contingency (20%)				$	67,000
	Total Capital Costs				$	402,000
	TOTAL PRESENT WORTH ALTERNATIVE 3B				**$**	**1,140,786**

TABLE 6.6

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3C - CLAY COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*		*Unit Cost*		*Cost*
	CAPITAL COSTS						
1.)	Institutional Controls	–	L.S.	$	–	$	100,000
2.)	Clay Cover						
	a) materials						
	grading layer	30,000	C.Y.	$	5.00	$	150,000
	clay	30,000	C.Y.	$	4.00	$	120,000
	sand	15,000	C.Y.	$	5.00	$	75,000
	common fill	15,000	C.Y.	$	5.00	$	75,000
	top soil	7,500	C.Y.	$	10.00	$	75,000
	b) construction						
	grading layer	30,000	C.Y.	$	2.50	$	75,000
	clay	30,000	C.Y.	$	2.50	$	75,000
	sand	15,000	C.Y.	$	2.50	$	37,500
	common fill	15,000	C.Y.	$	2.50	$	37,500
	top soil	7,500	C.Y.	$	2.50	$	18,750
	c) drainage ditches	2,600	L.ft.	$	10.00	$	26,000
	d) grass	20	Acres	$	3,000.00	$	60,000
3.)	Security Fence	2,600	L.ft.	$	8.00	$	20,800
	Subtotal					$	945,550
	Contingency (20%)					$	189,110
	Total Capital Costs					$	1,134,660

TABLE 6.6

PRELIMINARY COST ESTIMATE
ALTERNATIVE 3C - CLAY COVER
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*	*Unit Cost*		*Cost*
	ANNUAL OPERATION AND MAINTENANCE COSTS					
1.)	Institutional Controls	–	L.S.	$ –	$	5,500
2.)	Elements of Alternative 1	–	L.S.	$ –	$	7,900
	Subtotal				$	13,400
	Contingency (20%)				$	2,680
	Total O & M Costs				$	16,080
	Total Present Worth (30 years at 10%)				$	152,826
	ENGINEERING					
1.)	Pre-Design	–	L.S.	$ –	$	160,000
2.)	Design	–	L.S.	$ –	$	150,000
3.)	Contractor Procurement	–	L.S.	$ –	$	60,000
4.)	Removal Action Supervision	–	L.S.	$ –	$	300,000
	Subtotal				$	670,000
	Contingency (20%)				$	134,000
	Total Capital Costs				$	804,000
	TOTAL PRESENT WORTH ALTERNATIVE 3C				**$**	**2,091,486**

TABLE 6.7

PRELIMINARY COST ESTIMATE
ALTERNATIVE 4A - REMOVAL TO TYPE C CRITERIA AND OFF-SITE DISPOSAL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*		*Unit Cost*		*Cost*
	CAPITAL COSTS						
1.)	Excavate, process and load soil for off-Site Disposal	40,000	cy	$	2.00	$	80,000
2.)	Transport to off-Site Facility	40,000	cy	$	2.00	$	80,000
3.)	Disposal (1)	40,000	cy	$	66.50	$	2,657,143
4.)	Security Fence	2,600	L. ft.	$	8.00	$	20,800
5.)	Deed Restrictions	–	L.S.	$	–	$	100,000
	Subtotal					$	2,937,943
	Contingency (20%)					$	587,589
	Total Capital Costs					$	3,525,532
	ANNUAL OPERATION AND MAINTENANCE COSTS						
1.)	Institutional Controls	–	L.S.	$	–	$	5,500
2.)	Elements of Alternative 1	–	L.S.	$	–	$	7,900
	Subtotal					$	13,400
	Contingency (20%)					$	2,680
	Total O & M Costs					$	16,080
	Total Present Worth (30 years at 10%)					$	152,826

ENGINEERING

1.)	Design	–	L.S.	$	–	$	15,000
2.)	Contractor Procurement	–	L.S.	$	–	$	5,000
3.)	Removal Action Supervision	–	L.S.	$	–	$	30,000
	Subtotal					$	50,000
	Contingency (20%)					$	10,000
	Total Capital Costs					$	60,000
	TOTAL PRESENT WORTH - ALTERNATIVE 4A					**$**	**3,738,358**

Note:

(1) - based on USPCI/Laidlaw price structure as of 2/22/95. New unit pricing is under negotiation.
- current USPCI/Laidlaw cost for disposal of non-hazardous soil as of 2/22/95 is $93.00/ton - a conversion factor of 1.4 cy per ton was used to calculate the disposal unit cost of $66.50/cy.
- disposal and transportation unit costs assume soil can be disposed at USPCI as a NON-HAZARDOUS soil.
- unit costs for disposal of non-hazardous soil at a local Michigan Type II landfill is estimated at $20.00/cy for a total disposal cost of $800,000 resulting in a Total Present Worth of $1,500,426.

TABLE 6.8

PRELIMINARY COST ESTIMATE
ALTERNATIVE 4B - REMOVAL TO TYPE B CRITERIA AND OFF-SITE DISPOSAL
J-LOT
PONTIAC CENTRAL MANUFACTURING FACILITY
PONTIAC, MICHIGAN

	Item	*Quantity*	*Unit*		*Unit Cost*		*Cost*
	CAPITAL COSTS						
1.)	Excavate, process and load soil for off-Site Disposal	50,000	cy	$	2.00	$	100,000
2.)	Transport to off-Site Facility	50,000	cy	$	2.00	$	100,000
3.)	Disposal (1)	50,000	cy	$	66.50	$	3,325,000
	Subtotal					$	3,525,000
	Contingency (20%)					$	705,000
	Total Capital Costs					$	4,230,000
	ENGINEERING						
1.)	Design	–	L.S.	$	–	$	15,000
2.)	Contractor Procurement	–	L.S.	$	–	$	5,000
3.)	Removal Action Supervision	–	L.S.	$	–	$	30,000
	Subtotal					$	50,000
	Contingency (20%)					$	10,000
	Total Capital Costs					$	60,000
	TOTAL PRESENT WORTH ALTERNATIVE 4B					**$**	**4,290,000**

Note:

(1) - based on USPCI/Laidlaw price structure as of 2/22/95. New unit pricing is under negotiation.
- current USPCI/Laidlaw cost for disposal of non-hazardous soil as of 2/22/95 is $93.00/ton - a conversion factor of 1.4 cy per ton was used to calculate the disposal unit cost of $66.50/cy.

Note cont'd:

(1) - disposal and transportation unit costs assume soil can be disposed at USPCI as a NON-HAZARDOUS soil.
- unit costs for disposal of non-hazardous soil at a local Michigan Type II landfill is estimated at $20.00/cy for a total disposal cost of $1,000,000 resulting in a Total Present Worth of $1,500,000.

APPENDIX A

LABORATORY ANALYTICAL RESULTS - SOIL

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113945
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/06/94

Thomas J Geyer, CIH
Signature

12/6/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113945*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 - 9 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 2-4, 6, 8 Parameter: Bromofluorobenzene, 1,2-Dichloroethane-d4 Reason: 7
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	270	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	110	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	64	0	%	31-115 %		
2-Fluorophenol	55	0	%	25-131 %		
Nitrobenzene-d5	50	0	%	23-120 %		
Phenol-d6	37	0	%	24-113 %		
Terphenyl-d14	98	0	%	18-137 %		
2,4,6-Tribromophenol	40	0	%	19-122 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/08/94	SS
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfan II	ND	1.9	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D....: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.6	ug/kg			
PCB Aroclor 1221	ND	9.6	ug/kg			
PCB Aroclor 1232	ND	9.6	ug/kg			
PCB Aroclor 1242	ND	9.6	ug/kg			
PCB Aroclor 1248	ND	9.6	ug/kg			
PCB Aroclor 1254	ND	9.6	ug/kg			
PCB Aroclor 1260	ND	9.6	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	100	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
Aluminum (Total)	6070000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	11000	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	20000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	110	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	51700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9800	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-001
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0001
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8300	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	17200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	296000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	707000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	89000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	87	0.01	%		11/07/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-002
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0002
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	2200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	140	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Aluminum (Total)	5320000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-002
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0002
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3800	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	20000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ng/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	74600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8700	1600	ug/kg	USEPA 6010	11/10/94	GR
balt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	12300000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7800	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	21400000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	265000	200	ug/kg	USEPA 7470	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 6010	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1070000	10000	ug/kg	USEPA 7740	11/11/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 6010	11/10/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	72000	10000	ug/kg	USEPA 7841	11/08/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 6010	11/10/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg		11/10/94	PWB
% Solids	93	0.01	%			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-003
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0003
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	3200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	19	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	122	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Aluminum (Total)	4990000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-003
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0003
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	24000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	81500000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8100	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	22200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	287000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1060000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	93	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	410	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	56	0	%	70-121%		
Toluene-d8	114	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	31-115 %		
2-Fluorophenol	54	0	%	25-131 %		
Nitrobenzene-d5	42	0	%	23-120 %		
Phenol-d6	50	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	31	0	%	19-122 %		
Date Analyzed:	11/07/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/08/94	SB
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfan II	ND	1.9	ug/kg			

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.6	ug/kg			
PCB Aroclor 1221	ND	9.6	ug/kg			
PCB Aroclor 1232	ND	9.6	ug/kg			
PCB Aroclor 1242	ND	9.6	ug/kg			
PCB Aroclor 1248	ND	9.6	ug/kg			
PCB Aroclor 1254	ND	9.6	ug/kg			
PCB Aroclor 1260	ND	9.6	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	94	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
Aluminum (Total)	5840000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3400	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	23000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	380	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	67800000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8500	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-004
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0004
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11800000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7200	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	259000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	831000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	36000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	87	0.01	%		11/07/94	PWS

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12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-005
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0005
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	340	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	8730000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-005
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0005
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3700	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	26000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	550	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	300	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	75400000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	14000	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	17000000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	9100	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19300000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	269000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	23000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1580000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	21000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	51000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	88	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS

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JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-006
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0006
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	790	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	18	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	21	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	128	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	4760000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-006
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0006
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	15000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	98	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	63700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	7800	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	9580000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8700	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	12600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	263000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	12000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	595000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	37000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	38000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	81	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	<100	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/07/94	RDC

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	31-115 %		
2-Fluorophenol	60	0	%	25-131 %		
Nitrobenzene-d5	50	0	%	23-120 %		
Phenol-d6	40	0	%	24-113 %		
Terphenyl-d14	98	0	%	18-137 %		
2,4,6-Tribromophenol	33	0	%	19-122 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/08/94	SB
Aldrin	ND	1.9	ug/kg			
alpha-BHC	ND	1.9	ug/kg			
beta-BHC	ND	1.9	ug/kg			
delta-BHC	ND	1.9	ug/kg			
gamma-BHC (Lindane)	ND	1.9	ug/kg			
4,4'-DDD	ND	1.9	ug/kg			
4,4'-DDE	ND	1.9	ug/kg			
4,4'-DDT	ND	1.9	ug/kg			
Dieldrin	ND	1.9	ug/kg			
Endosulfan I	ND	1.9	ug/kg			
Endosulfan II	ND	1.9	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	ND	1.9	ug/kg			
Endrin	ND	1.9	ug/kg			
Endrin aldehyde	ND	1.9	ug/kg			
Heptachlor	ND	1.9	ug/kg			
Heptachlor epoxide	ND	1.9	ug/kg			
Toxaphene	ND	19	ug/kg			
Methoxychlor	ND	1.9	ug/kg			
Endrin ketone	ND	1.9	ug/kg			
alpha-Chlordane	ND	1.9	ug/kg			
gamma-Chlordane	ND	1.9	ug/kg			
PCB Aroclor 1016	ND	9.3	ug/kg			
PCB Aroclor 1221	ND	9.3	ug/kg			
PCB Aroclor 1232	ND	9.3	ug/kg			
PCB Aroclor 1242	ND	9.3	ug/kg			
PCB Aroclor 1248	ND	9.3	ug/kg			
PCB Aroclor 1254	17	9.3	ug/kg			
PCB Aroclor 1260	ND	9.3	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	98	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	74	0	%	60-150%		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
BNAs in Soil Extraction Date:	11/04/94		Month/Day/Year	USEPA 3550	11/07/94	PWB
Aluminum (Total)	5060000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	19000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	8400	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	9700	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-007
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0007
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11400000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	20500000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	12000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	772000	10000	ug/kg	USEPA 6010	11/10/94	GR
lenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	88000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	33000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	90	0.01	%		11/07/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-008
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0008
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	170	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	17	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	23	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	124	0	%	74-121 %		
1,2-Dichloethane-d4	126	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	6260000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-008
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0008
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	73700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	10000	1600	ug/kg	USEPA 6010	11/10/94	GR
alt (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	13400000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	7800	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	20100000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	225000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1070000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	64000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/10/94	PWB

12649 Richfield Court
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(313) 462-3900

LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-009
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0009
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/07/94	RDC
Acetone	1000	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	18	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	126	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	5860000	4000	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113945 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110394-BTH-009
DATE SAMPLED.....: 11/03/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770

LABORATORY I.D...: 113945-0009
DATE RECEIVED....: 11/03/94
TIME RECEIVED....: 16:40
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3500	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	430	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	91600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9700	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/10/94	GR
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	21700000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	263000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1180000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	42000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/10/94	PWS

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Livonia, MI 48150
(313) 462-3900

DEC 14 1994

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113961
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/06/94

Thomas J Geyer, CIH
Signature

12/6/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113961*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s):	1	Parameter:	Terphenyl-d14	Reason:	7
Explanation:					
Sample No.(s):	3, 10	Parameter:	1,2-Dichloroethane-d4	Reason:	7
Explanation:					
Sample No.(s):	5, MB	Parameter:	Decachlorobiphenyl	Reason:	7
Explanation:					
Sample No.(s):	----	Parameter:	Tetrachloroethene	Reason:	4
Explanation:					
Sample No.(s):	----	Parameter:	4-Nitrophenol	Reason:	4
Explanation:					
Sample No.(s):	MB	Parameter:	Bis(2-Ethylhexyl)phthalate	Reason:	8
Explanation:					
Sample No.(s):	MB, LS, LSD	Parameter:	Phenol-d6, Terphenyl-d14	Reason:	7
Explanation:					
Sample No.(s):	LS, LSD	Parameter:	Pyrene, 2-Fluorobiphenyl	Reason:	4, 7
Explanation:					
Sample No.(s):	5, 8	Parameter:	Pesticide/PCB	Reason:	3
Explanation:					
Sample No.(s):	----	Parameter:	Pesticide/PCB (Soil)	Reason:	10
Explanation:	No matrix spike and spike duplicate due to matrix problems.				
Sample No.(s):	---	Parameter:	BNA (Water)	Reason:	10
Explanation:	Insufficient sample to run analyses for MS/MSD.				
Sample No.(s):	1, 2, 10	Parameter:	Antimony, Calcium, Manganese, Mercury, Potassium	Reason:	5
Explanation:					
Sample No.(s):	2 - 10	Parameter:	Antimony	Reason:	3
Explanation:					

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/08/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	<50	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	5.3	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	43-116 %		
2-Fluorophenol	34	0	%	21-100 %		
Nitrobenzene-d5	56	0	%	35-114 %		
Phenol-d6	24	0	%	10-94 %		
Terphenyl-d14	144	0	%	33-141 %		
2,4,6-Tribromophenol	62	0	%	10-123 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	74	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	95	0	%	60-150%		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/08/94	GR
BNAs in Water Extraction Date:	11/09/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/09/94	PWB
Aluminum (Total)	220	200	ug/l	USEPA 6010/200.7	11/09/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/10/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Calcium (Total)	3900	500	ug/l	USEPA 6010/200.7	11/09/94	GR
Iron (Total)	370	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Manganese (Total)	16	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/09/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-110494-BTH-010
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0001
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/08/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/09/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	11/08/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	11/08/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	11/07/94	GR
Magnesium (Total)	1000	500	ug/l	USEPA 6010/200.7	11/09/94	GR
cury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/08/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/10/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/09/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/09/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/08/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/09/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	11/08/94	GR

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Livonia, MI 48150
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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	590	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	12	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	84	0	%	31-115 %		
2-Fluorophenol	81	0	%	25-131 %		
Nitrobenzene-d5	76	0	%	23-120 %		
Phenol-d6	64	0	%	24-113 %		
Terphenyl-d14	102	0	%	18-137 %		
2,4,6-Tribromophenol	70	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	146	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	95	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	6170000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	63	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9000	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-011
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0002
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	12500000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	6900	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	19900000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	289000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	1150000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	76000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	35000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/08/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-012
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK OESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0003
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	5400	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	<100	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	20	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	28	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	132	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/08/94	0	Month/Day/Year			
Aluminum (Total)	6970000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-012
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0003
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	5400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	34000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	550	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	210	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	10000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	18000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8200	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1500000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	210	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	56000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	360	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	18000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	90	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-013
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0004
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	240	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	6300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-013
DATE SAMPLED.....: 11/04/94
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LABORATORY I.D...: 113961-0004
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	32000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	90	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9900	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	72000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	410	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	42000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	89	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.O...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	2200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/10/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	74	0	%	31-115 %		
2-Fluorophenol	77	0	%	25-131 %		
Nitrobenzene-d5	64	0	%	23-120 %		
Phenol-d6	58	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	65	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.8	1.8	ug/kg			
alpha-BHC	<1.8	1.8	ug/kg			
beta-BHC	<1.8	1.8	ug/kg			
delta-BHC	<1.8	1.8	ug/kg			
gamma-BHC (Lindane)	<1.8	1.8	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II						

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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.8	1.8	ug/kg			
Heptachlor epoxide	<1.8	1.8	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.8	1.8	ug/kg			
alpha-Chlordane	<1.8	1.8	ug/kg			
gamma-Chlordane	<1.8	1.8	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	730	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	212	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	83	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	5550000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	3300	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	260	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	280	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	23600000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	11000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	7500	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-014
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0005
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	8440000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	25000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	4240000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	142000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	7600	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	577000	10000	ug/kg	USEPA 6010	11/10/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	58000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	30000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	90	0.01	%		11/08/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-015
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0006
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	1600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	110	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	6630000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-015
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0006
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	40000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	84000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	12000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	32000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	250000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	220	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	29000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	86	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-016
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0007
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	2900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	<100	100	ug/kg			
SURROGATES	Recovery	0		Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/09/94	0				
Aluminum (Total)	5710000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-016
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0007
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	450	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	73000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9300	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	17000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	9100	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	280000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	220	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	66000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	410	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	91	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS

12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D....: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	80	0	%	31-115 %		
2-Fluorophenol	93	0	%	25-131 %		
Nitrobenzene-d5	70	0	%	23-120 %		
Phenol-d6	68	0	%	24-113 %		
Terphenyl-d14	92	0	%	18-137 %		
2,4,6-Tribromophenol	90	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/17/94	GR
Aldrin	<1.9	1.9	ug/kg			
alpha-BHC	<1.9	1.9	ug/kg			
beta-BHC	<1.9	1.9	ug/kg			
delta-BHC	<1.9	1.9	ug/kg			
gamma-BHC (Lindane)	<1.9	1.9	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II						

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JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.9	1.9	ug/kg			
Heptachlor epoxide	<1.9	1.9	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.9	1.9	ug/kg			
alpha-Chlordane	<1.9	1.9	ug/kg			
gamma-Chlordane	<1.9	1.9	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	800	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	140	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	65	0	%	60-150%		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/08/94		Month/Day/Year	USEPA 3050	11/08/94	GR
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	6350000	4000	ug/kg	USEPA 6010	11/10/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/11/94	GR
Arsenic (Total)	4700	100	ug/kg	USEPA 7060	11/13/94	GR
Barium (Total)	43000	400	ug/kg	USEPA 6010	11/10/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/10/94	GR
Cadmium (Total)	330	50	ug/kg	USEPA 6010	11/10/94	GR
Calcium (Total)	27000000	10000	ug/kg	USEPA 6010	11/10/94	GR
Chromium (Total)	9900	1600	ug/kg	USEPA 6010	11/10/94	GR
Cobalt (Total)	15000	200	ug/kg	USEPA 6010	11/10/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/10/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-017
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0008
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11500000	2000	ug/kg	USEPA 6010	11/10/94	GR
Lead (Total)	17000	1000	ug/kg	USEPA 6010	11/10/94	GR
Magnesium (Total)	7790000	10000	ug/kg	USEPA 6010	11/10/94	GR
Manganese (Total)	362000	200	ug/kg	USEPA 6010	11/10/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7470	11/10/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/10/94	GR
Potassium (Total)	571000	10000	ug/kg	USEPA 6010	11/10/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/11/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/10/94	GR
Sodium (Total)	89000	10000	ug/kg	USEPA 6010	11/10/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/08/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/10/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/10/94	GR
% Solids	89	0.01	%		11/08/94	PWS

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-018
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0009
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	470	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	5510000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-018
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0009
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	78000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8500	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6500	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	57000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	300	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	34000	1000	ug/kg	USEPA 6010	11/14/94	GR
% Solids	89	0.01	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-019
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0010
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/08/94	RDC
Acetone	4800	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	23	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	130	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Aluminum (Total)	6480000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/06/94

JOB NUMBER: 113961 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110494-BTH-019
DATE SAMPLED.....: 11/04/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113961-0010
DATE RECEIVED....: 11/04/94
TIME RECEIVED....: 11:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	28000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	440	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	76000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9700	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6300	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	68000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/08/94		MM/DD/YY	USEPA 3020	11/08/94	GR

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DEC 14 1994

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113972
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113972*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Toluene Reason: 4
Explanation: However, MS and MSD recoveries are well within range.

Sample No.(s): ---- Parameter: Nitrophenol Reason: 4
Explanation:

Sample No.(s): 2, 4 Parameter: Surrogates Reason: 7
Explanation:

Sample No.(s): 1 Parameter: Endosulfan II, Alpha-BHC Reason: 5
Explanation: Due to matrix interferences.

Sample No.(s): 1 - 4 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 3 Parameter: Manganese, Potassium Reason: 5
Explanation: Due to overwhelming analyte concentrations.

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	260	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	80	0	%	31-115 %		
2-Fluorophenol	91	0	%	25-131 %		
Nitrobenzene-d5	72	0	%	23-120 %		
Phenol-d6	71	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	82	0	%	19-122 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/24/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	86	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	74	0	%	60-150%		
Date Analyzed:	11/24/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/7/94		Month/Day/Year	USEPA 3550	11/07/94	
Aluminum (Total)	4100000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3700	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	22000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	300	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	76000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	6400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	8900	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-020
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0001
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	9900000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	6000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	600000	10000	ug/kg	USEPA 6010	11/13/94	GR
lenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	46000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	11000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	31000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR
% Solids	90	0.1	%		11/08/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	5200	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	132	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	370	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	130	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	71000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8800	1600	ug/kg	USEPA 6010	11/13/94	GR
balt (Total)	19000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7100	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	240000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	55000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR

12649 Richfield Court
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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0002
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	810	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	6400000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4600	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	390	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	150	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	81000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8600	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	910000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	49000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-8TH-021 MS/MSD
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0003
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/10/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	700	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	14	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	67	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	62	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	124	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	4000000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	9200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	22000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	80000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	6600	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	9000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	9900000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	5800	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	220000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	790000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	54000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3005	11/11/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 113972 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110794-BTH-022
DATE SAMPLED.....: 11/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113972-0004
DATE RECEIVED....: 11/07/94
TIME RECEIVED....: 17:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	90	0.1	%		11/10/94	PWB

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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 113987
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/07/94

Thomas J. Geyer, CIH
Signature

12/7/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *113987*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 6 Parameter: 1,2-Dichloroethane-d4 Reason: 7
Explanation:

Sample No.(s): 5, 8 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: Surrogate data is unavailable due to dilution that was required.

Sample No.(s): ---- Parameter: BNA (Water) Reason: 10
Explanation: Insufficient sample to run MS/MSD.

Sample No.(s): 1 - 10 Parameter: Aluminum, Antimony, Cadmium, Potassium, Selenium Reason: 3, 5
Explanation:

Sample No.(s): MB Parameter: Bis (2-ethylhexyl) phthalate Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Tetrachloroethene, Toluene Reason: 4
Explanation:

Sample No.(s): MB, LS, LSD Parameter: 4-Nitrophenol, Phenol-d6, Pyrene, Terphenyl, 2-Fluorobiphenyl Reason: 4, 7
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/14/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	3.4	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/09/94	RDC

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	50	0	%	43-116 %		
2-Fluorophenol	34	0	%	21-100 %		
Nitrobenzene-d5	34	0	%	35-114 %		
Phenol-d6	22	0	%	10-94 %		
Terphenyl-d14	134	0	%	33-141 %		
2,4,6-Tribromophenol	52	0	%	10-123 %		
Date Analyzed:	11/09/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	18	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	69	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/13/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/13/94	KLZ
BNAs in Water Extraction Date:	11/09/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/09/94	PWB
Aluminum (Total)	1860	200	ug/l	USEPA 6010/200.7	11/16/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/14/94	GR
Barium (Total)	31	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Calcium (Total)	89000	500	ug/l	USEPA 6010/200.7	11/14/94	GR
Iron (Total)	4580	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Manganese (Total)	240	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Potassium (Total)	880	500	ug/l	USEPA 6010/200.7	11/14/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5570-110894-BTH-023
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0001
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/13/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/14/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 7201	11/14/94	GR
Arsenic (Total)	3.6	1.0	ug/l	USEPA 7060	11/14/94	GR
Cadmium (Total)	0.5	0.2	ug/l	USEPA 7131	11/11/94	GR
Lead (Total)	4.1	1.0	ug/l	USEPA 7421	11/13/94	GR
Magnesium (Total)	25000	500	ug/l	USEPA 6010/200.7	11/14/94	GR
tury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/10/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/14/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/14/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/14/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/13/94	GR
Copper (Total)	13	10	ug/l	USEPA 6010/200.7	11/14/94	GR
Zinc, (Total)	20	20	ug/l	USEPA 6010	11/15/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	112	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	<330	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	<330	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	<330	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	<330	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	<330	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	88	0	%	25-131 %		
Nitrobenzene-d5	64	0	%	23-120 %		
Phenol-d6	65	0	%	24-113 %		
Terphenyl-d14	100	0	%	18-137 %		
2,4,6-Tribromophenol	79	0	%	19-122 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	40	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	66	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	4200000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	260	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	350	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	77000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	7200	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/13/94	GR

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12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-024
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0002
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	12000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	20000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	270000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	700000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	200000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	13000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	62000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	93	0.01	%		11/10/94	PWS

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	32	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	6600000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	31000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	80000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	11000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	21000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8300	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	24000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	95000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	56000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

12649 Richfield Court
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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-025
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0003
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	86	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	2600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	128	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	140	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	74000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	8300	1600	ug/kg	USEPA 6010	11/13/94	GR
alt (Total)	21000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7600	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	260000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	980000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	70000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-026
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0004
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	86	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	440	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	112	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

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LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

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DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	78	0	%	31-115 %		
2-Fluorophenol	100	0	%	25-131 %		
Nitrobenzene-d5	68	0	%	23-120 %		
Phenol-d6	71	0	%	24-113 %		
Terphenyl-d14	114	0	%	18-137 %		
2,4,6-Tribromophenol	90	0	%	19-122 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	63	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	60	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	8200000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	2300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	37000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	530	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	300	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	66000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	11000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	22000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-027
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0005
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	15000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	9200	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	15000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	290000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/13/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	210000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	20000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	89	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	500	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	35	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	130	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Aluminum (Total)	5700000	4000	ug/kg	USEPA 6010	11/13/94	GR

12649 Richfield Court
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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	3200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	30000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	140	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	65000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/13/94	GR
lt (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	12000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	18000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	230000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	940000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-028
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0006
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	87	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-029
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0007
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	990	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/13/94	RDC

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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-029
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0007
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	3600	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5500000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-029
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0007
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6600	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	31000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	450	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	420	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	66000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	23000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	7700	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	250000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	17000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	960000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	77000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	250	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	46000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	360	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	550	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	360	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	510	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
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LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	430	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	430	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	86	0	%	31-115 %		
2-Fluorophenol	115	0	%	25-131 %		
Nitrobenzene-d5	48	0	%	23-120 %		
Phenol-d6	110	0	%	24-113 %		
Terphenyl-d14	118	0	%	18-137 %		
2,4,6-Tribromophenol	51	0	%	19-122 %		
Date Analyzed:	11/13/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<36	36	ug/kg			
alpha-BHC	<36	36	ug/kg			
beta-BHC	<36	36	ug/kg			
delta-BHC	<36	36	ug/kg			
gamma-BHC (Lindane)	<36	36	ug/kg			
4,4'-DDD	<36	36	ug/kg			
4,4'-DDE	<36	36	ug/kg			
4,4'-DDT	<36	36	ug/kg			
Dieldrin	<36	36	ug/kg			
Endosulfan I	<36	36	ug/kg			
Endosulfan II	<36	36	ug/kg			

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<36	36	ug/kg			
Endrin	<36	36	ug/kg			
Endrin aldehyde	<36	36	ug/kg			
Heptachlor	<36	36	ug/kg			
Heptachlor epoxide	<36	36	ug/kg			
Toxaphene	<420	420	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<36	36	ug/kg			
alpha-Chlordane	<36	36	ug/kg			
gamma-Chlordane	<36	36	ug/kg			
PCB Aroclor 1016	<420	420	ug/kg			
PCB Aroclor 1221	<420	420	ug/kg			
PCB Aroclor 1232	<420	420	ug/kg			
PCB Aroclor 1242	<420	420	ug/kg			
PCB Aroclor 1248	<420	420	ug/kg			
PCB Aroclor 1254	1700	420	ug/kg			
PCB Aroclor 1260	<420	420	ug/kg			
Decachlorobiphenyl	ND	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	ND	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/11/94		Month/Day/Year	EPA 3550	11/11/94	SSH
BNAs in Soil Extraction Date:	11/9/94		Month/Day/Year	USEPA 3550	11/09/94	
Aluminum (Total)	3900000	4000	ug/kg	USEPA 6010	11/13/94	GR
Antimony (Total)	830	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	5900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	75000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	370	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	970	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	54000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	16000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	44000	600	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-030
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0008
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	130000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	14000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	310000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	18000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	440000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	130000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	100000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS
% Solids	93	0.01	%		11/10/94	PWS

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-031
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	6000000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS

12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-031
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	6800	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	26000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	460	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	290	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	70000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	18000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	10000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	21000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	20000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	87000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	48000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-031
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0009
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	87	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0010
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	460	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	12	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5700000	4000	ug/kg	USEPA 6010	11/13/94	GR

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0010
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/14/94	GR
Arsenic (Total)	4200	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	29000	400	ug/kg	USEPA 6010	11/13/94	GR
Beryllium (Total)	440	200	ug/kg	USEPA 6010	11/13/94	GR
Cadmium (Total)	260	50	ug/kg	USEPA 6010	11/13/94	GR
Calcium (Total)	85000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Chromium (Total)	9100	1600	ug/kg	USEPA 6010	11/13/94	GR
lt (Total)	22000	200	ug/kg	USEPA 6010	11/13/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/13/94	GR
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/13/94	GR
Lead (Total)	8000	1000	ug/kg	USEPA 6010	11/13/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/13/94	GR
Manganese (Total)	300000	200	ug/kg	USEPA 6010	11/13/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/13/94	GR
Potassium (Total)	1100000	10000	ug/kg	USEPA 6010	11/13/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/13/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 6010	11/13/94	GR
Thallium (Total)	370	250	ug/kg	USEPA 7841	11/13/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/13/94	GR
Zinc (Total)	48000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/11/94		MM/DD/YY	USEPA 3050	11/11/94	MAS

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LABORATORY TESTS RESULTS
12/07/94

JOB NUMBER: 113987 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-110894-BTH-032
DATE SAMPLED.....: 11/08/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 113987-0010
DATE RECEIVED....: 11/08/94
TIME RECEIVED....: 17:23
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWB

12649 Richfield Court
Livonia, MI 48150
(313) 462-3900

WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114006
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates*

JOB NUMBER: *114006*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Pesticide/PCB (Soil) Reason: 10
Explanation: No MS/MSD data due to matrix problems.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3
Explanation:

Sample No.(s): 1 - 3 Parameter: Antimony, Potassium, Selenium Reason: 3, 5
Explanation:

Sample No.(s): MB Parameter: Carbon Tetrachloride Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Toluene Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	850	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	140	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	110	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	<330	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	60	0	%	25-131 %		
Nitrobenzene-d5	52	0	%	23-120 %		
Phenol-d6	51	0	%	24-113 %		
Terphenyl-d14	104	0	%	18-137 %		
2,4,6-Tribromophenol	89	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<1.8	1.8	ug/kg			
alpha-BHC	<1.8	1.8	ug/kg			
beta-BHC	<1.8	1.8	ug/kg			
delta-BHC	<1.8	1.8	ug/kg			
gamma-BHC (Lindane)	<1.8	1.8	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	4.5	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.8	1.8	ug/kg			
Heptachlor epoxide	<1.8	1.8	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<3.3	3.3	ug/kg			
gamma-Chlordane	<3.3	3.3	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	900	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Decachlorobiphenyl	93	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	83	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/14/94		Month/Day/Year	EPA 3550	11/14/94	RSP
BNAs in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/15/94	PWB
Aluminum (Total)	6600000	4000	ug/kg	USEPA 6010	11/14/94	GR
Antimony (Total)	300	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3700	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	43000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	370	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	700	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	19000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	15000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	9600	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	60000	600	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-033
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0001
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	14000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	41000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	5400000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	320000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	470000	10000	ug/kg	USEPA 6010	11/14/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	130000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	55000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH
% Solids	87	0.01	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	230	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	22	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	7700000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4100	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	510	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	320	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	84000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	15000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	17000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	16000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	10000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	25800000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	330000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	20000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1800000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	390	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	110000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	360	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	18000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	58000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-8TH-034
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0002
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	88	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1100	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	5200000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-BTH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	25000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	340	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	86000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	7400	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	11000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	11000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	6800	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	22000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	260000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	13000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1100000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	320	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	59000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	300	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	14000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114006 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-110994-8TH-035
DATE SAMPLED.....: 11/09/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114006-0003
DATE RECEIVED....: 11/09/94
TIME RECEIVED....: 16:47
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.01	%		11/17/94	PWB

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114019
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/09/94

Thomas J Geyer, CIH
Signature

12/9/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP,Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: Conestoga-Rovers & Associates, Inc.
JOB NUMBER: 114019

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): ---- Parameter: Pesticide/PCB (Soil) Reason: 10
Explanation: No MS/MSD data due to matrix problems.

Sample No.(s): 2 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: No surrogate due to dilution that was required.

Sample No.(s): 2 - 5 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 1 Parameter: Antimony, Cadmium, Lead Reason: 5
Explanation:

Sample No.(s): 1 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): --- Parameter: Toluene (S) Tetrachlorothene (W) Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol (Soil) Reason: 4
Explanation:

Sample No.(s): MB Parameter: Bis (2-ethylhexyl) phthalate Reason: 8
Explanation:

Sample No.(s): ---- Parameter: Pyrene (Water) Reason: 4
Explanation:

Sample No.(s): ---- Parameter: BNA (Water) Reason: 10
Explanation: Insufficient sample to run MS/MSD.

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/15/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	3.0	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	96	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/14/94	RDC

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111094-BTH-036
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0001
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	7.1	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	<5.0	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

12649 Richfield Court
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitrosd-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	60	0	%	43-116 %		
2-Fluorophenol	40	0	%	21-100 %		
Nitrobenzene-d5	44	0	%	35-114 %		
Phenol-d6	14	0	%	10-94 %		
Terphenyl-d14	120	0	%	33-141 %		
2,4,6-Tribromophenol	45	0	%	10-123 %		
Date Analyzed:	11/14/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	35	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	92	0	%	60-150%		
Date Analyzed:	11/30/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/14/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/14/94	RSP
BNAs in Water Extraction Date:	11/11/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/11/94	
Aluminum (Total)	850	200	ug/l	USEPA 6010/200.7	11/16/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	11/16/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Calcium (Total)	24000	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Iron (Total)	2460	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Manganese (Total)	77	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/16/94	GR

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/13/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	11/16/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010	11/16/94	GR
Arsenic (Total)	2.0	1.0	ug/l	USEPA 7060	11/16/94	GR
Cadmium (Total)	<0.2	0.2	ug/l	USEPA 7131	11/11/94	GR
Lead (Total)	1.5	1.0	ug/l	USEPA 7421	11/13/94	GR
Magnesium (Total)	5500	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/14/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/18/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/16/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/16/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/16/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010	11/15/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3005	11/14/94	LAH

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CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	14000	100	ug/kg			
Benzene	<10	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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12/09/94

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CLIENT I.D.....: S-5770-111094-BTH-037
DATE SAMPLED.....: 11/10/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	2200	330	ug/kg			
Acenaphthylene	<330	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	3100	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	7200	6600	ug/kg			
Benzo(a)pyrene	5000	330	ug/kg			
Benzo(b)fluoranthene	8900	6600	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	5600	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	8700	6600	ug/kg			
Dibenzo(a,h)Anthracene	1300	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	17000	6600	ug/kg			
Fluorene	1700	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	4700	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	910	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	400	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	14000	6600	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	12000	6600	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	90	0	%	31-115 %		
2-Fluorophenol	77	0	%	25-131 %		
Nitrobenzene-d5	62	0	%	23-120 %		
Phenol-d6	71	0	%	24-113 %		
Terphenyl-d14	104	0	%	18-137 %		
2,4,6-Tribromophenol	75	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 603/8080	11/28/94	GR
Aldrin	<18	18	ug/kg			
alpha-BHC	<18	18	ug/kg			
beta-BHC	<18	18	ug/kg			
delta-BHC	<18	18	ug/kg			
gamma-BHC (Lindane)	<18	18	ug/kg			
4,4'-DDD	<18	18	ug/kg			
4,4'-DDE	<18	18	ug/kg			
4,4'-DDT	<18	18	ug/kg			
Dieldrin	<18	18	ug/kg			
Endosulfan I	<18	18	ug/kg			
Endosulfan II	<18	18	ug/kg			

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REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<18	18	ug/kg			
Endrin	<18	18	ug/kg			
Endrin aldehyde	<18	18	ug/kg			
Heptachlor	<18	18	ug/kg			
Heptachlor epoxide	<18	18	ug/kg			
Toxaphene	<190	190	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<18	18	ug/kg			
alpha-Chlordane	<18	18	ug/kg			
gamma-Chlordane	<18	18	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	800	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/14/94		Month/Day/Year	EPA 3550	11/14/94	RSP
BNAs in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/15/94	PWB
Aluminum (Total)	3600000	4000	ug/kg	USEPA 6010	11/14/94	GR
Antimony (Total)	29000	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	12000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	2300000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	2000	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	19000	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	42000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	93000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	136000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	211000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	120000000	2000	ug/kg	USEPA 6010	11/14/94	GR

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12/09/94

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TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0002
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	740000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	8300000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	980000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	180	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	59000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	580000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	800	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	960	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	440000	10000	ug/kg	USEPA 6010	11/14/94	R
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	1800000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH
% Solids	88	0.01	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	5000	100	ug/kg			
Benzene	17	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	230	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	13	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	21	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	<100	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	128	0	%	74-121 %		
1,2-Dichloethane-d4	118	0	%	70-121%		
Toluene-d8	114	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	9000000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS

12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	8500	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	11000	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	700000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	820	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	17000	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	52000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	120000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	57000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	1000000	600	ug/kg	USEPA 6010	11/14/94	
Iron (Total)	60000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	880000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	15000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	590000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	140000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1300000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	1300	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	2300	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	430000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	1500000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-038
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0003
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	75	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	820	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	124	0	%	70-121%		
Toluene-d8	110	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	7200000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	51000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	630	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	60000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	13000	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	26000	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	17000000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	40000	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	19000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	450000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	19000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	950000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	340	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	190000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	76000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-039
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0004
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	89	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-040
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0005
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/15/94	RDC
Acetone	1500	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	19	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	130	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	112	0	%	81-117 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Aluminum (Total)	4400000	4000	ug/kg	USEPA 6010	11/14/94	GR

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LABORATORY TESTS RESULTS
12/09/94

JOB NUMBER: 114019 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111094-BTH-040
DATE SAMPLED.....: 11/10/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114019-0005
DATE RECEIVED....: 11/10/94
TIME RECEIVED....: 17:54
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3300	100	ug/kg	USEPA 7060	11/15/94	GR
Barium (Total)	20000	400	ug/kg	USEPA 6010	11/14/94	GR
Beryllium (Total)	280	200	ug/kg	USEPA 6010	11/14/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/14/94	GR
Calcium (Total)	82000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Chromium (Total)	6600	1600	ug/kg	USEPA 6010	11/13/94	GR
Cobalt (Total)	9400	200	ug/kg	USEPA 6010	11/14/94	GR
Copper (Total)	9600	600	ug/kg	USEPA 6010	11/14/94	GR
Iron (Total)	9500000	2000	ug/kg	USEPA 6010	11/14/94	GR
Lead (Total)	5800	1000	ug/kg	USEPA 6010	11/14/94	GR
Magnesium (Total)	23000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Manganese (Total)	240000	200	ug/kg	USEPA 6010	11/14/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/14/94	GR
Nickel (Total)	10000	200	ug/kg	USEPA 6010	11/14/94	GR
Potassium (Total)	1000000	10000	ug/kg	USEPA 6010	11/14/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/15/94	GR
Silver (Total)	310	200	ug/kg	USEPA 6010	11/14/94	GR
Sodium (Total)	61000	10000	ug/kg	USEPA 6010	11/14/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/14/94	GR
Zinc (Total)	36000	1000	ug/kg	USEPA 6010	11/14/94	GR
Graphite Furnance Metals	11/14/94		MM/DD/YY	USEPA 3020	11/14/94	LAH

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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114038
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/13/94

Thomas J Geyer, CIH
Signature

12/13/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

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STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114038*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3
Explanation: Surrogates were diluted out.

Sample No.(s): 1, 6 Parameter: Pesticide/PCB Reason: 10
Explanation: No MS/MSD data available due to matrix problems.

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): 1 Parameter: Volatile Reason: 7
Explanation:

Sample No.(s): 1 - 8 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): 1 Parameter: Metals Reason: 5
Explanation: Due to high dilutions necessary to analyze most metals.

Sample No.(s): ---- Parameter: 4,4'-DDT Reason: 4
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	2800	200	ug/kg			
Benzene	200	200	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	4200	200	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	25000	5000	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	45000	5000	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	2400	200	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	50000	5000	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	134	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	134	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	<330	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	360	330	ug/kg			
Benzo(a)pyrene	<330	330	ug/kg			
Benzo(b)fluoranthene	460	330	ug/kg			
Benzo(k)Fluoranthene	<330	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	520	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	1000	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	480	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	800	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	<330	330	ug/kg			
Fluoranthene	600	330	ug/kg			
Fluorene	<330	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	380	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	1700	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	430	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	740	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	940	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	92	0	%	31-115 %		
2-Fluorophenol	78	0	%	25-131 %		
Nitrobenzene-d5	76	0	%	23-120 %		
Phenol-d6	35	0	%	24-113 %		
Terphenyl-d14	110	0	%	18-137 %		
2,4,6-Tribromophenol	84	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<20	20	ug/kg			
alpha-BHC	<20	20	ug/kg			
beta-BHC	<20	20	ug/kg			
delta-BHC	<20	20	ug/kg			
gamma-BHC (Lindane)	<20	20	ug/kg			
4,4'-DDD	<20	20	ug/kg			
4,4'-DDE	<20	20	ug/kg			
4,4'-DDT	<20	20	ug/kg			
Dieldrin	<20	20	ug/kg			
Endosulfan I	<20	20	ug/kg			
Endosulfan II	<20	20	ug/kg			

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12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<20	20	ug/kg			
Endrin	<20	20	ug/kg			
Endrin aldehyde	<20	20	ug/kg			
Heptachlor	<20	20	ug/kg			
Heptachlor epoxide	<20	20	ug/kg			
Toxaphene	<410	410	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<20	20	ug/kg			
alpha-Chlordane	<20	20	ug/kg			
gamma-Chlordane	<20	20	ug/kg			
PCB Aroclor 1016	<410	410	ug/kg			
PCB Aroclor 1221	<410	410	ug/kg			
PCB Aroclor 1232	<410	410	ug/kg			
PCB Aroclor 1242	<410	410	ug/kg			
PCB Aroclor 1248	<410	410	ug/kg			
PCB Aroclor 1254	2100	410	ug/kg			
PCB Aroclor 1260	<410	410	ug/kg			
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/15/94		Month/Day/Year	EPA 3540 Soxhlet	11/15/94	KLZ
BNAs in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/14/94	PWB
Aluminum (Total)	11300000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	20000	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	10000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	2220000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	980	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	42000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	47200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	641000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	95000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	1020000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	56300000	2000	ug/kg	USEPA 6010	11/19/94	GR

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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-041
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0001
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	4740000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	10900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	844000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	450	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	94000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1400000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	2300	500	ug/kg	USEPA 7740	11/18/94	GR
ver (Total)	2900	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	911000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	26000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	4390000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR
% Solids	89	0.1	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3700	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	140	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	18	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	320	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	7950000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	1900	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	19000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	541000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	1900	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	17000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	7620000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	225000	1600	ug/kg	USEPA 6010	11/17/94	GR
alt (Total)	161000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	189000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	95600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	945000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	2670000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	688000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	170	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	31000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	893000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	620	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	583000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	47000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	1020000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0002
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	82	0.1	%		11/22/94	GR

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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	1200	1000	ug/kg			
Benzene	<10	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	260	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	13	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	490	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	5670000	4000	ug/kg	USEPA 6010	11/19/94	GR

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JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	600	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	56000	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	280000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	1800	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	15000	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	4780000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	124000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	159000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	547000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	94600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	754000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	1940000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	439000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	32000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	610000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	470	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	357000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	42000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	413000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-042 MS/MSD
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0003
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	83	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	770	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	15	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	35	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	6310000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5700	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	470	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	200	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	62400000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9300	1600	ug/kg	USEPA 6010	11/17/94	GR
alt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	13000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	13700000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	8200	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	21100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	264000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1580000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	159000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	330	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	19000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-043
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0004
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	91	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3500	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	14	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	17	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	116	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/16/94	0	Month/Day/Year			
Aluminum (Total)	7220000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	7600	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	32000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	540	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	410	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	63100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	11000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	23000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	18000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	16600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	10000	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	20600000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	284000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	20000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1660000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	161000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	520	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	21000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	48000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-044
DATE SAMPLED.....: 11/11/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0005
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	89	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	3000	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/15/94	RDC

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LABORATORY TESTS RESULTS

12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	62	0	%	31-115 %		
2-Fluorophenol	58	0	%	25-131 %		
Nitrobenzene-d5	52	0	%	23-120 %		
Phenol-d6	50	0	%	24-113 %		
Terphenyl-d14	132	0	%	18-137 %		
2,4,6-Tribromophenol	61	0	%	19-122 %		
Date Analyzed:	11/15/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/28/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	75	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	68	0	%	60-150%		
Date Analyzed:	11/28/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/16/94		Month/Day/Year	EPA 3540 Soxhlet	11/16/94	KLZ
BNAs in Soil Extraction Date:	11/14/94		Month/Day/Year	USEPA 3550	11/14/94	PWB
Aluminum (Total)	10200000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5100	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	42000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	570	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	420	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	52500000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	13000	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	24000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	15000	600	ug/kg	USEPA 6010	11/17/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-045
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0006
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	17600000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	9300	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	12200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	421000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1310000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	64000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	22000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	43000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3050	11/15/94	GR
% Solids	91	0.1	%		11/15/94	PWB

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	740	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	120	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Aluminum (Total)	4770000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	2600	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	14000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	330	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	66900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	6800	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	14000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9400	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	9650000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	5900	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	22200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	237000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	10000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1030000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	128000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	35000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-046
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0007
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-047
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/17/94	RDC
Acetone	1700	10	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	14	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	112	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/17/94	0	Month/Day/Year			
Aluminum (Total)	5300000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-C47
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	430	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	5400	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	21000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	420	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	91	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	62100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	8100	1600	ug/kg	USEPA 6010	11/17/94	GR
lt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	11000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	13000000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	7500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	20400000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	265000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	14000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1060000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	41000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/15/94		MM/DD/YY	USEPA 3050	11/15/94	GR

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LABORATORY TESTS RESULTS
12/13/94

JOB NUMBER: 114038 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111194-BTH-047
DATE SAMPLED.....: 11/11/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5570

LABORATORY I.D...: 114038-0008
DATE RECEIVED....: 11/11/94
TIME RECEIVED....: 14:45
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.1	%		11/22/94	GR

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114059
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/22/94

Thomas J Geyer CIH
Signature

12/22/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: CONESTOGA-ROVERS & ASSOCIATES

JOB NUMBER: 114059

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 0001 Parameter: Decachlorobiphenyl Reason: 7
Explanation: Due to matrix interference

Sample No.(s): 3,4 Parameter: 1,2-Dichloroethane-d4 Reason 7
Explanation: Due to matrix interference

Sample No.(s): --- Parameter: Acetone, 2-Butone, Vinyl Acetate Xylenes,, 4-Nitrophenol, Pyrene Reason: 4
Explanation:

Sample No.(s): MB Parameter: Bis(-2ethyl hexyl) phthalate Reason: 8
Explanation:

Sample No.(s): --- Parameter: Semi-Volatile (water) Reason: 10
Explanation: Insufficient sample to analyze for MS/MSD, on these samples

Sample No.(s): 2-4 Parameter: Antimony Reason: 3
Explanation:

Sample No.(s): Parameter: Reason:
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/20/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	98	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	11/22/94	RDC

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	44	0	%	43-116 %		
2-Fluorophenol	28	0	%	21-100 %		
Nitrobenzene-d5	46	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	104	0	%	33-141 %		
2,4,6-Tribromophenol	51	0	%	10-123 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	11/24/94	GR
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.50	0.50	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.20	0.20	ug/l			
PCB Aroclor 1221	<0.20	0.20	ug/l			
PCB Aroclor 1232	<0.40	0.40	ug/l			
PCB Aroclor 1242	<0.20	0.20	ug/l			
PCB Aroclor 1248	<0.20	0.20	ug/l			
PCB Aroclor 1254	<0.20	0.20	ug/l			
PCB Aroclor 1260	<0.20	0.20	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	52	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	76	0	%	60-150%		
Date Analyzed:	11/24/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	11/17/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/17/94	RSP
BNAs in Water Extraction Date:	11/16/94		Month/Day/Year	EPA 3510 M Liq/Liq	11/17/94	PWB
Aluminum (Total)	100	20	ug/l	USEPA 6010/200.7	11/18/94	GR
Antimony (Total)	2.1	2.0	ug/l	USEPA 7041	11/21/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Calcium (Total)	4500	500	ug/l	USEPA 6010/200.7	11/18/94	GR
Iron (Total)	1170	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Manganese (Total)	17	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/18/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: W-5770-111594-BTH-048
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0001
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	11/17/94	DWJ
Vanadium (Total)	<100	100	ug/l	USEPA 6010/200.7	11/18/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010	11/18/94	JTW
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	11/22/94	DLV
Cadmium (Total)	0.3	0.2	ug/l	USEPA 7131	11/21/94	DLV
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	11/20/94	GR
Magnesium (Total)	1100	500	ug/l	USEPA 6010/200.7	11/18/94	GR
·cury (Total)	<0.2	0.2	ug/l	USEPA 7470	11/22/94	JTW
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	11/18/94	JTW
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	11/18/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	11/18/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	11/21/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	11/18/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010	11/20/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	3100	1000	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	35	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	110	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/18/94	RDC

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	58	0	%	31-115 %		
2-Fluorophenol	65	0	%	25-131 %		
Nitrobenzene-d5	46	0	%	23-120 %		
Phenol-d6	51	0	%	24-113 %		
Terphenyl-d14	76	0	%	18-137 %		
2,4,6-Tribromophenol	52	0	%	19-122 %		
Date Analyzed:	11/18/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/29/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II						

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	75	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	80	0	%	60-150%		
Date Analyzed:	11/29/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/17/94		Month/Day/Year	EPA 3550	11/17/94	RSP
BNAs in Soil Extraction Date:	11/16/94		Month/Day/Year	USEPA 3550	11/17/94	PWB
Aluminum (Total)	6580000	4000	ug/kg	USEPA 6010	11/19/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	4400	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	38000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	400	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	350	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	33100000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9100	600	ug/kg	USEPA 6010	11/17/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-049
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0002
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	11500000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	9600	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	8250000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	334000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	9600	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	536000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	42000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	17000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	30000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS
% Solids	88	0.01	%		11/17/94	PWB

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	6400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	128	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	6330000	4000	ug/kg	USEPA 6010	11/19/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3300	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	27000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	430	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	67	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	66900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	9200	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	19000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	12000	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	12700000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	8500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	22900000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	283000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	15000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	1260000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	65000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	16000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	34000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

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LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-050
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0003
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	89	0.01	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-051
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0004
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	1900	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	15	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	14	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	95	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	118	0	%	74-121 %		
1,2-Dichloethane-d4	126	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	3720000	4000	ug/kg	USEPA 6010	11/19/94	GR

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L A B O R A T O R Y T E S T S R E S U L T S

12/22/94

JOB NUMBER: 114059 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111594-BTH-051
DATE SAMPLED.....: 11/15/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114059-0004
DATE RECEIVED....: 11/15/94
TIME RECEIVED....: 17:50
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/16/94	GR
Arsenic (Total)	3900	100	ug/kg	USEPA 7060	11/18/94	GR
Barium (Total)	17000	400	ug/kg	USEPA 6010	11/19/94	GR
Beryllium (Total)	300	200	ug/kg	USEPA 6010	11/17/94	GR
Cadmium (Total)	200	50	ug/kg	USEPA 6010	11/17/94	GR
Calcium (Total)	72200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Chromium (Total)	4700	1600	ug/kg	USEPA 6010	11/17/94	GR
Cobalt (Total)	16000	200	ug/kg	USEPA 6010	11/17/94	GR
Copper (Total)	9500	600	ug/kg	USEPA 6010	11/17/94	GR
Iron (Total)	10100000	2000	ug/kg	USEPA 6010	11/19/94	GR
Lead (Total)	5500	1000	ug/kg	USEPA 6010	11/17/94	GR
Magnesium (Total)	18200000	10000	ug/kg	USEPA 6010	11/19/94	GR
Manganese (Total)	255000	200	ug/kg	USEPA 6010	11/17/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/18/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/17/94	GR
Potassium (Total)	831000	10000	ug/kg	USEPA 6010	11/17/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/18/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	50000	10000	ug/kg	USEPA 6010	11/17/94	GR
Thallium (Total)	260	250	ug/kg	USEPA 7841	11/16/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/17/94	GR
Zinc (Total)	44000	1000	ug/kg	USEPA 6010	11/17/94	GR
Graphite Furnance Metals	11/17/94		MM/DD/YY	USEPA 3020	11/17/94	MAS

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Field CPY

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WW ENGINEERING & SCIENCE, INC.

ANALYTICAL REPORT

Job Number: 114077
Prepared For:

Conestoga-Rovers & Associates
Lou Almeida
651 Colby Dr
Waterloo Ontario, OT N2VIC2

Date: 12/22/94

Thomas J Geyer, CIH
Signature

12/22/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114077*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1-3 Parameter: Antimony Reason: 3
Explanation: Due to matrix interferences.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 5
Explanation: Due to matrix interferences.

Sample No.(s): ---- Parameter: Nitrophenol, Acetone, 2-Butone, Vinyl Acetate Xylenes Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	1400	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	380	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	ND	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/19/94	RDC

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	ND	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	ND	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	ND	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	ND	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	ND	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	ND	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	ND	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	ND	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	ND	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	ND	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	31-115 %		
2-Fluorophenol	55	0	%	25-131 %		
Nitrobenzene-d5	44	0	%	23-120 %		
Phenol-d6	43	0	%	24-113 %		
Terphenyl-d14	66	0	%	18-137 %		
2,4,6-Tribromophenol	52	0	%	19-122 %		
Date Analyzed:	11/19/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	12/01/94	GR
Aldrin	<1.7	1.7	ug/kg			
alpha-BHC	<1.7	1.7	ug/kg			
beta-BHC	<1.7	1.7	ug/kg			
delta-BHC	<1.7	1.7	ug/kg			
gamma-BHC (Lindane)	<1.7	1.7	ug/kg			
4,4'-DDD	<3.3	3.3	ug/kg			
4,4'-DDE	<3.3	3.3	ug/kg			
4,4'-DDT	<3.3	3.3	ug/kg			
Dieldrin	<3.3	3.3	ug/kg			
Endosulfan I	<3.3	3.3	ug/kg			
Endosulfan II	<3.3	3.3	ug/kg			

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<3.3	3.3	ug/kg			
Endrin	<3.3	3.3	ug/kg			
Endrin aldehyde	<3.3	3.3	ug/kg			
Heptachlor	<1.7	1.7	ug/kg			
Heptachlor epoxide	<1.7	1.7	ug/kg			
Toxaphene	<170	170	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<1.7	1.7	ug/kg			
alpha-Chlordane	<1.7	1.7	ug/kg			
gamma-Chlordane	<1.7	1.7	ug/kg			
PCB Aroclor 1016	<330	330	ug/kg			
PCB Aroclor 1221	<330	330	ug/kg			
PCB Aroclor 1232	<330	330	ug/kg			
PCB Aroclor 1242	<330	330	ug/kg			
PCB Aroclor 1248	<330	330	ug/kg			
PCB Aroclor 1254	<330	330	ug/kg			
PCB Aroclor 1260	<330	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	89	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	89	0	%	60-150%		
Date Analyzed:	12/01/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/22/94		Month/Day/Year	EPA 3550	11/22/94	RSP
BNAs in Soil Extraction Date:	11/18/94		Month/Day/Year	USEPA 3550	11/21/94	
Aluminum (Total)	6770000	4000	ug/kg	USEPA 6010	11/23/94	GR
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	2900	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	34000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	320	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	240	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	24500000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	9400	1600	ug/kg	USEPA 6010	11/21/94	GR
Cobalt (Total)	12000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	14000	600	ug/kg	USEPA 6010	11/21/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-052
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0001
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Iron (Total)	13600000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	15000	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	5590000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	262000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	11000	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	467000	10000	ug/kg	USEPA 6010	11/21/94	GR
enium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	<10000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	15000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	39000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT
% Solids	85	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	2000	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	17500000	4000	ug/kg	USEPA 6010	11/23/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	4300	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	62000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	600	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	76	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	104000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	19000	1600	ug/kg	USEPA 6010	11/21/94	GR
ılt (Total)	24000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	16000	600	ug/kg	USEPA 6010	11/21/94	GR
Iron (Total)	30700000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	14000	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	35600000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	336000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	<100	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	21000	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	2490000	10000	ug/kg	USEPA 6010	11/21/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	103000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	<250	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	29000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	46000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-053
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0002
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	82	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/20/94	RDC
Acetone	320	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	ND	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	ND	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	108	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/20/94	0	Month/Day/Year			
Aluminum (Total)	4080000	4000	ug/kg	USEPA 6010	11/23/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	<250	250	ug/kg	USEPA 7041	11/21/94	GR
Arsenic (Total)	4000	100	ug/kg	USEPA 7060	11/27/94	GR
Barium (Total)	15000	400	ug/kg	USEPA 6010	11/21/94	GR
Beryllium (Total)	240	200	ug/kg	USEPA 6010	11/21/94	GR
Cadmium (Total)	<50	50	ug/kg	USEPA 6010	11/21/94	GR
Calcium (Total)	112000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Chromium (Total)	5300	1600	ug/kg	USEPA 6010	11/21/94	GR
Cobalt (Total)	13000	200	ug/kg	USEPA 6010	11/21/94	GR
Copper (Total)	7300	600	ug/kg	USEPA 6010	11/21/94	GR
Iron (Total)	10800000	2000	ug/kg	USEPA 6010	11/23/94	GR
Lead (Total)	7100	1000	ug/kg	USEPA 6010	11/21/94	GR
Magnesium (Total)	27000000	10000	ug/kg	USEPA 6010	11/23/94	GR
Manganese (Total)	227000	200	ug/kg	USEPA 6010	11/21/94	GR
Mercury (Total)	110	100	ug/kg	USEPA 7471	11/22/94	GR
Nickel (Total)	8600	200	ug/kg	USEPA 6010	11/21/94	GR
Potassium (Total)	892000	10000	ug/kg	USEPA 6010	11/21/94	GR
Selenium (Total)	<500	500	ug/kg	USEPA 7740	11/27/94	GR
Silver (Total)	<200	200	ug/kg	USEPA 6010	11/21/94	GR
Sodium (Total)	45000	10000	ug/kg	USEPA 6010	11/21/94	GR
Thallium (Total)	290	250	ug/kg	USEPA 7841	11/21/94	GR
Vanadium (Total)	12000	2000	ug/kg	USEPA 6010	11/21/94	GR
Zinc (Total)	27000	1000	ug/kg	USEPA 6010	11/22/94	GR
Graphite Furnance Metals	11/21/94		MM/DD/YY	USEPA 3020	11/21/94	SAT

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LABORATORY TESTS RESULTS

12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: S-5770-111694-BTH-054
DATE SAMPLED.....: 11/16/94
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Project No. 5770

LABORATORY I.D...: 114077-0003
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 17:00
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
% Solids	92	0.1	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/22/94

JOB NUMBER: 114077 CUSTOMER: Conestoga-Rovers & Associates ATTN: Lou Almeida

CLIENT I.D.....: Trip Blank
DATE SAMPLED.....: 10/26/94
TIME SAMPLED.....: 12:54
WORK DESCRIPTION...: GM Pontiac J-Lot 5770

LABORATORY I.D...: 114077-0004
DATE RECEIVED....: 11/16/94
TIME RECEIVED....: 12:54
REMARKS.....: water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	11/20/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	1.6	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	96	0	%	70-121%		
Toluene-d8	100	0	%	81-117 %		
Date Analyzed:	11/24/94	0	Month/Day/Year			

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WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114110
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 12/14/94

Thomas J Geyer, CIH
Signature

12/14/94
Date:

Name: Thomas J. Geyer, CIH

Title: VP, Analaytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

12649 Richfield Court, Livonia, MI 48150. 313/462-3900 Fax 462-3911

STATEMENT OF DATA QUALIFICATIONS

CLIENT: *Conestoga-Rovers & Associates, Inc.*

JOB NUMBER: *114110*

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 1 Parameter: Pesticide/PCB Reason: 3, 10
Explanation: A dilution was required - the surrogates were diluted out.

Sample No.(s): 4 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): ---- Parameter: Beta-BHC Reason: 4
Explanation:

Sample No.(s): ---- Parameter: 4-Nitrophenol Reason: 4
Explanation:

Sample No.(s): 1 Parameter: Metals Reason: 5
Explanation: Due to high levels of dilution necessary for most parameters.

Sample No.(s): ---- Parameter: Magnesium, Manganese, Nickel Reason: 4
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	610	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	ND	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	108	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
EPA Method 8270 BNAs in Soil		*1		EPA Method 8270	11/23/94	RDC

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	330	ug/kg			
Acenaphthylene	ND	330	ug/kg			
Aniline	ND	1700	ug/kg			
Anthracene	ND	330	ug/kg			
Benzidine	ND	1700	ug/kg			
Benzo(a)anthracene	<330	330	ug/kg			
Benzo(a)pyrene	ND	330	ug/kg			
Benzo(b)fluoranthene	ND	330	ug/kg			
Benzo(k)Fluoranthene	ND	330	ug/kg			
Benzoic Acid	ND	1700	ug/kg			
Benzo(ghi)perylene	ND	330	ug/kg			
Benzyl Alcohol	ND	660	ug/kg			
Bis(2-Chloroethoxy)methane	ND	330	ug/kg			
Bis(2-Chloroethyl)ether	ND	330	ug/kg			
Bis(2-Chloroisopropyl)ether	ND	330	ug/kg			
Bis(2-Ethylhexyl)phthalate	980	330	ug/kg			
4-Bromophenyl phenylether	ND	330	ug/kg			
Butylbenzylphthalate	<330	330	ug/kg			
4-Chloroaniline	ND	330	ug/kg			
4-Chloro-3-Methylphenol	ND	330	ug/kg			
2-Chloronaphthalene	ND	330	ug/kg			
2-Chlorophenol	ND	330	ug/kg			
4-Chlorophenyl-phenylether	ND	330	ug/kg			
Chrysene	<330	330	ug/kg			
Dibenzo(a,h)Anthracene	ND	330	ug/kg			
Dibenzofuran	ND	330	ug/kg			
1,2-Dichlorobenzene	ND	330	ug/kg			
1,3-Dichlorobenzene	ND	330	ug/kg			
1,4-Dichlorobenzene	ND	330	ug/kg			
2,4-Dichlorophenol	ND	330	ug/kg			
3,3'-Dichlorobenzidine	ND	330	ug/kg			
Diethylphthalate	ND	330	ug/kg			
2,4-Dimethylphenol	ND	330	ug/kg			
Dimethylphthalate	ND	330	ug/kg			
Di-n-Butylphthalate	<330	330	ug/kg			
4,6-Dinitro-2-Methylphenol	ND	1700	ug/kg			
2,4-Dinitrophenol	ND	1700	ug/kg			
2,4-Dinitrotoluene	ND	330	ug/kg			
2,6-Dinitrotoluene	ND	330	ug/kg			
Di-n-Octylphthalate	ND	330	ug/kg			
Fluoranthene	660	330	ug/kg			
Fluorene	ND	330	ug/kg			
Hexachlorobenzene	ND	330	ug/kg			
Hexachlorobutadiene	ND	330	ug/kg			
Hexachlorocyclopentadiene	ND	330	ug/kg			

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	330	ug/kg			
Indeno (1,2,3-cd)pyrene	ND	330	ug/kg			
Isophorone	ND	330	ug/kg			
Naphthalene	<330	330	ug/kg			
Nitrobenzene	ND	330	ug/kg			
2-Methylnaphthalene	<330	330	ug/kg			
2-Methylphenol	ND	330	ug/kg			
4-Methylphenol	ND	330	ug/kg			
2-Nitroaniline	ND	1700	ug/kg			
3-Nitroaniline	ND	1700	ug/kg			
4-Nitroaniline	ND	1700	ug/kg			
2-Nitrophenol	ND	330	ug/kg			
4-Nitrophenol	ND	1700	ug/kg			
N-Nitrosodimethylamine	ND	330	ug/kg			
N-Nitrosodiphenylamine	ND	330	ug/kg			
N-Nitroso-di-n-Propylamine	ND	330	ug/kg			
Pentachlorophenol	ND	1700	ug/kg			
Phenanthrene	420	330	ug/kg			
Phenol	ND	330	ug/kg			
Pyrene	500	330	ug/kg			
1,2,4-Trichlorobenzene	ND	330	ug/kg			
2,4,5-Trichlorophenol	ND	330	ug/kg			
2,4,6-Trichlorophenol	ND	330	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	76	0	%	31-115 %		
2-Fluorophenol	58	0	%	25-131 %		
Nitrobenzene-d5	60	0	%	23-120 %		
Phenol-d6	58	0	%	24-113 %		
Terphenyl-d14	96	0	%	18-137 %		
2,4,6-Tribromophenol	88	0	%	19-122 %		
Date Analyzed:	11/30/94	0	Month/Day/Year			
Pesticides & PCBs in Soil		*1		USEPA 608/8080	11/30/94	GR
Aldrin	<20	20	ug/kg			
alpha-BHC	<20	20	ug/kg			
beta-BHC	<20	20	ug/kg			
delta-BHC	<20	20	ug/kg			
gamma-BHC (Lindane)	<20	20	ug/kg			
4,4'-DDD	<20	20	ug/kg			
4,4'-DDE	<20	20	ug/kg			
4,4'-DDT	<20	20	ug/kg			
Dieldrin	<20	20	ug/kg			
Endosulfan I	<20	20	ug/kg			
Endosulfan II	<20	20	ug/kg			

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan sulfate	<20	20	ug/kg			
Endrin	<20	20	ug/kg			
Endrin aldehyde	<20	20	ug/kg			
Heptachlor	<20	20	ug/kg			
Heptachlor epoxide	<20	20	ug/kg			
Toxaphene	<400	400	ug/kg			
Methoxychlor	<50	50	ug/kg			
Endrin ketone	<20	20	ug/kg			
alpha-Chlordane	<20	20	ug/kg			
gamma-Chlordane	<20	20	ug/kg			
PCB Aroclor 1016	<400	400	ug/kg			
PCB Aroclor 1221	<400	400	ug/kg			
PCB Aroclor 1232	<400	400	ug/kg			
PCB Aroclor 1242	<400	400	ug/kg			
PCB Aroclor 1248	<400	400	ug/kg			
PCB Aroclor 1254	1500	400	ug/kg			
PCB Aroclor 1260	<400	400	ug/kg			
Date Analyzed:	11/30/94	0	Month/Day/Year			
Pest/PCB in Soil Extraction Date:	11/22/94		Month/Day/Year	EPA 3550	11/22/94	RSP
BNAs in Soil Extraction Date:	11/21/94		Month/Day/Year	USEPA 3550	11/21/94	
Aluminum (Total)	14000000	500	ug/kg	USEPA 6010	11/28/94	TN
Antimony (Total)	ND	500	ug/kg	USEPA 7041	11/28/94	TN
Arsenic (Total)	13000	100	ug/kg	USEPA 7060	11/30/94	TN
Barium (Total)	67000	1000	ug/kg	USEPA 6010	11/28/94	TN
Beryllium (Total)	ND	1000	ug/kg	USEPA 6010	11/28/94	TN
Cadmium (Total)	2200	50	ug/kg	USEPA 7131	11/28/94	TN
Calcium (Total)	12000000	800	ug/kg	USEPA 6010	11/28/94	TN
Chromium (Total)	19000	2500	ug/kg	USEPA 6010	11/28/94	TN
Cobalt (Total)	9700	800	ug/kg	USEPA 6010	11/28/94	TN
Copper (Total)	30000	1000	ug/kg	USEPA 6010	11/28/94	TN
Iron (Total)	41000000	2000	ug/kg	USEPA 6010	11/28/94	TN

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-055
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0001
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Lead (Total)	77000	1000	ug/kg	USEPA 7421	11/28/94	TN
Magnesium (Total)	4800000	3800	ug/kg	USEPA 6010	11/28/94	TN
Manganese (Total)	670000	2000	ug/kg	USEPA 6010	11/28/94	TN
Mercury (Total)	230	100	ug/kg	USEPA 7471	11/27/94	TN
Nickel (Total)	25000	1000	ug/kg	USEPA 6010	11/28/94	TN
Potassium (Total)	2700000	5000	ug/kg	USEPA 7610	11/30/94	TN
Selenium (Total)	ND	500	ug/kg	USEPA 7740	11/23/94	TN
ver (Total)	ND	500	ug/kg	USEPA 7761	11/28/94	TN
Sodium (Total)	260000	1000	ug/kg	USEPA 7770	11/30/94	TN
Thallium (Total)	ND	500	ug/kg	USEPA 7841	11/28/94	TN
Vanadium (Total)	20000	1000	ug/kg	USEPA 6010	11/28/94	TN
Zinc (Total)	97000	1000	ug/kg	USEPA 6010	11/28/94	TN
% Solids	81	0.01	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-056
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0002
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	450	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	ND	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	<10	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	<10	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	114	0	%	74-121 %		
1,2-Dichloethane-d4	114	0	%	70-121%		
Toluene-d8	106	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Aluminum (Total)	8900000	500	ug/kg	USEPA 6010	11/28/94	TN

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-056
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0002
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Antimony (Total)	630	500	ug/kg	USEPA 7041	11/28/94	TN
Arsenic (Total)	9500	100	ug/kg	USEPA 7060	11/30/94	TN
Barium (Total)	92000	1000	ug/kg	USEPA 6010	11/28/94	TN
Beryllium (Total)	ND	1000	ug/kg	USEPA 6010	11/28/94	TN
Cadmium (Total)	4100	50	ug/kg	USEPA 7131	11/28/94	TN
Calcium (Total)	11000000	800	ug/kg	USEPA 6010	11/28/94	TN
Chromium (Total)	40000	2500	ug/kg	USEPA 6010	11/28/94	TN
alt (Total)	6900	800	ug/kg	USEPA 6010	11/28/94	TN
Copper (Total)	230000	1000	ug/kg	USEPA 6010	11/28/94	TN
Iron (Total)	29000000	2000	ug/kg	USEPA 6010	11/28/94	TN
Lead (Total)	910000	1000	ug/kg	USEPA 7421	11/28/94	TN
Magnesium (Total)	4700000	3800	ug/kg	USEPA 6010	11/28/94	TN
Manganese (Total)	280000	2000	ug/kg	USEPA 6010	11/28/94	TN
Mercury (Total)	ND	100	ug/kg	USEPA 7471	11/27/94	TN
Nickel (Total)	25000	1000	ug/kg	USEPA 6010	11/28/94	TN
Potassium (Total)	1700000	5000	ug/kg	USEPA 7610	11/30/94	TN
Selenium (Total)	ND	500	ug/kg	USEPA 7740	11/23/94	TN
Silver (Total)	ND	500	ug/kg	USEPA 7761	11/28/94	TN
Sodium (Total)	220000	1000	ug/kg	USEPA 7770	11/30/94	TN
Thallium (Total)	ND	500	ug/kg	USEPA 7841	11/28/94	TN
Vanadium (Total)	15000	1000	ug/kg	USEPA 6010	11/28/94	TN
Zinc (Total)	260000	1000	ug/kg	USEPA 6010	11/28/94	TN
% Solids	90	0.01	%		11/22/94	GR

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LABORATORY TESTS RESULTS
12/14/94

JOB NUMBER: 114110 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: S-5570-111894-BTH-057
DATE SAMPLED.....: 11/18/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac 5770/6318

LABORATORY I.D...: 114110-0003
DATE RECEIVED....: 11/18/94
TIME RECEIVED....: 16:37
REMARKS.....: Soil

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Soil		*1		EPA Method 8260	11/22/94	RDC
Acetone	590	100	ug/kg			
Benzene	ND	10	ug/kg			
Bromodichloromethane	ND	10	ug/kg			
Bromoform	ND	10	ug/kg			
Bromomethane	ND	10	ug/kg			
2-Butanone	<100	100	ug/kg			
Carbon disulfide	ND	100	ug/kg			
Carbon tetrachloride	ND	10	ug/kg			
Chlorobenzene	ND	10	ug/kg			
Chloroethane	ND	10	ug/kg			
Chloroform	ND	10	ug/kg			
Chloromethane	ND	10	ug/kg			
Dibromochloromethane	ND	10	ug/kg			
1,1-Dichloroethane	ND	10	ug/kg			
1,2-Dichloroethane	ND	10	ug/kg			
1,1-Dichloroethene	ND	10	ug/kg			
trans-1,2-Dichloroethene	ND	10	ug/kg			
1,2-Dichloropropane	ND	10	ug/kg			
cis-1,3-Dichloropropene	ND	10	ug/kg			
trans-1,3-Dichloropropene	ND	10	ug/kg			
Ethylbenzene	<10	10	ug/kg			
2-Hexanone	ND	100	ug/kg			
Methylene chloride	15	10	ug/kg			
4-Methyl-2-pentanone	ND	100	ug/kg			
Styrene	ND	10	ug/kg			
1,1,2,2,-Tetrachloroethane	ND	10	ug/kg			
Tetrachloroethene	ND	10	ug/kg			
Toluene	17	10	ug/kg			
1,1,1-Trichloroethane	ND	10	ug/kg			
1,1,2-Trichloroethane	ND	10	ug/kg			
Trichloroethene	ND	10	ug/kg			
Vinyl chloride	ND	10	ug/kg			
Xylenes (o,m & p)	<30	30	ug/kg			
cis-1,2-Dichloroethene	ND	10	ug/kg			
Vinyl acetate	ND	100	ug/kg			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	116	0	%	74-121 %		
1,2-Dichloethane-d4	120	0	%	70-121%		
Toluene-d8	108	0	%	81-117 %		
Date Analyzed:	11/22/94	0	Month/Day/Year			
Aluminum (Total)	7200000	500	ug/kg	USEPA 6010	11/28/94	TN

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APPENDIX B

LABORATORY ANALYTICAL RESULTS - GROUNDWATER

WW ENGINEERING & SCIENCE, INC.

A N A L Y T I C A L R E P O R T

Job Number: 114255
Prepared For:

Conestoga-Rovers & Associates, Inc
Lou Almeida
651 Colby Drive
Waterloo, Ontario, CN N2V 1C2

Date: 01/11/95

Thomas J Geyer, CIH
Signature

1/11/95
Date

Name: Thomas J. Geyer, CIH

Title: VP, Analytical Services

EARTH TECH
12649 Richfield Court
Livonia, MI 48150

STATEMENT OF DATA QUALIFICATIONS

CLIENT: CONESTOGA-ROVERS & ASSOCIATES

JOB NUMBER: 114255

____ All analyses have been validated and comply with our Quality Control Program. No qualifications required.

X The following analyses have been qualified for the reasons cited.

Sample No.(s): 0001 Parameter: Cadmium, Zinc Reason: 5
Explanation:

Sample No.(s): 0004 Parameter: Decachlorobiphenyl Reason: 7
Explanation:

Sample No.(s): 0006 Parameter: 2-Fluorophenol Reason: 7
Explanation:

Sample No.(s): --- Parameter: Acetone Reason: 4
Explanation:

Sample No.(s): 0001 Parameter: 4-Chloro-3-Methylphenol Reason: 5
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

Sample No.(s): ____ Parameter: ____ Reason: ____
Explanation:

KEY

1. Sample integrity suspect upon receipt (explain).
2. Analysis performed beyond EPA established maximum allowable holding time.
3. Detection limit elevated due to matrix interferences.
4. Laboratory control sample value outside established acceptable limits.
5. Matrix spike sample value outside established acceptable limits.
6. Duplicate analysis value outside established acceptable limits.
7. Surrogate/internal standard recoveries outside established acceptable limits.
8. Data point suspect due to potential laboratory contamination (explain).
9. Coelutes with the compound cited. Result may represent a combination of both compounds.
10. Other (explain).

Note: This document is included as part of the Analytical Report for the above referenced and should be retained as a permanent record thereof.

LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	ROC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	100	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 SNAs in Water		*1		EPA Method 8270	12/12/94	ROC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	43-116 %		
2-Fluorophenol	24	0	%	21-100 %		
Nitrobenzene-d5	52	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	84	0	%	33-141 %		
2,4,6-Tribromophenol	68	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	ug/l	Control Limits		
Decachlorobiphenyl	60	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	70	0	%	60-150%		
Date Analyzed:	12/13/94	0	month/day/year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	190	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	2.8	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	240	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	277000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	520	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	9000	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-001
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0001
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	1.9	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	118000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	290	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	104	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	56	0	%	43-116 %		
2-Fluorophenol	27	0	%	21-100 %		
Nitrobenzene-d5	48	0	%	35-114 %		
Phenol-d6	19	0	%	10-94 %		
Terphenyl-d14	76	0	%	33-141 %		
2,4,6-Tribromophenol	70	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
DATE SAMPLED.....: 12/07/94
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LABORATORY I.D...: 114255-0002
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	74	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene *	61	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	270	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	3.1	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	230	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	255000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	160	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	8300	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-002
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LABORATORY I.D...: 114255-0002
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	1.2	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	111000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-003
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-003
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	9.1	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	43-116 %		
2-Fluorophenol	18	0	%	21-100 %		
Nitrobenzene-d5	46	0	%	35-114 %		
Phenol-d6	27	0	%	10-94 %		
Terphenyl-d14	74	0	%	33-141 %		
2,4,6-Tribromophenol	63	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
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CLIENT I.D.....: GW-5770-120794-BTH-003
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LABORATORY I.D...: 114255-0003
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	51	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	84	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	45	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	4.1	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	160	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	80000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	210	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	2500	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-003
DATE SAMPLED.....: 12/07/94
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WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0003
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	15	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	19000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	19000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	ROC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	102	0	%	74-121 %		
1,2-Dichloethane-d4	100	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	ROC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

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LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	<5.0	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	62	0	%	43-116 %		
2-Fluorophenol	28	0	%	21-100 %		
Nitrobenzene-d5	60	0	%	35-114 %		
Phenol-d6	22	0	%	10-94 %		
Terphenyl-d14	74	0	%	33-141 %		
2,4,6-Tribromophenol	61	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	45	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	68	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 H Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 H Liq/Liq	12/08/94	PWS
Aluminum (Total)	84	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	340	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	181000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	3810	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	130	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	1700	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-004
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0004
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	40000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	28000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	36	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....:
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	1.3	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	<3.0	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	98	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d3	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	19	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	54	0	%	43-116 %		
2-Fluorophenol	22	0	%	21-100 %		
Nitrobenzene-d5	54	0	%	35-114 %		
Phenol-d6	17	0	%	10-94 %		
Terphenyl-d14	72	0	%	33-141 %		
2,4,6-Tribromophenol	58	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	51	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	65	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWS
Aluminum (Total)	59	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	110	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	122000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	43	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	280	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	1700	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-005
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0005
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	36000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	73000	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	220	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	<50	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	2.5	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	ND	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	106	0	%	74-121 %		
1,2-Dichloethane-d4	102	0	%	70-121%		
Toluene-d8	102	0	%	81-117 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Method 8270 BNAs in Water		*1		EPA Method 8270	12/12/94	RDC

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Acenaphthene	ND	5.0	ug/l			
Acenaphthylene	ND	5.0	ug/l			
Aniline	ND	20	ug/l			
Anthracene	ND	5.0	ug/l			
Benzidine	ND	50	ug/l			
Benzo(a)anthracene	ND	5.0	ug/l			
Benzo(a)pyrene	ND	5.0	ug/l			
Benzo(b)fluoranthene	ND	5.0	ug/l			
Benzo(k)Fluoranthene	ND	5.0	ug/l			
Benzoic Acid	ND	50	ug/l			
Benzo(ghi)perylene	ND	5.0	ug/l			
Benzyl Alcohol	ND	50	ug/l			
Bis(2-Chloroethoxy)methane	ND	5.0	ug/l			
Bis(2-Chloroethyl)ether	ND	5.0	ug/l			
Bis(2-Chloroisopropyl)ether	ND	5.0	ug/l			
Bis(2-Ethylhexyl)phthalate	ND	5.0	ug/l			
4-Bromophenyl phenylether	ND	5.0	ug/l			
Butylbenzylphthalate	ND	5.0	ug/l			
4-Chloroaniline	ND	20	ug/l			
4-Chloro-3-Methylphenol	ND	5.0	ug/l			
2-Chloronaphthalene	ND	5.0	ug/l			
2-Chlorophenol	ND	5.0	ug/l			
4-Chlorophenyl-phenylether	ND	5.0	ug/l			
Chrysene	ND	5.0	ug/l			
Dibenzo(a,h)Anthracene	ND	5.0	ug/l			
Dibenzofuran	ND	5.0	ug/l			
1,2-Dichlorobenzene	ND	1.0	ug/l			
1,3-Dichlorobenzene	ND	1.0	ug/l			
1,4-Dichlorobenzene	ND	1.0	ug/l			
2,4-Dichlorophenol	ND	5.0	ug/l			
3,3'-Dichlorobenzidine	ND	5.0	ug/l			
Diethylphthalate	ND	5.0	ug/l			
2,4-Dimethylphenol	ND	5.0	ug/l			
Dimethylphthalate	ND	5.0	ug/l			
Di-n-Butylphthalate	ND	5.0	ug/l			
4,6-Dinitro-2-Methylphenol	ND	20	ug/l			
2,4-Dinitrophenol	ND	20	ug/l			
2,4-Dinitrotoluene	ND	5.0	ug/l			
2,6-Dinitrotoluene	ND	5.0	ug/l			
Di-n-Octylphthalate	ND	5.0	ug/l			
Fluoranthene	ND	5.0	ug/l			
Fluorene	ND	5.0	ug/l			
Hexachlorobenzene	ND	5.0	ug/l			
Hexachlorobutadiene	ND	5.0	ug/l			
Hexachlorocyclopentadiene	ND	5.0	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-STH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Hexachloroethane	ND	5.0	ug/l			
Indeno (1,2,3-cd)pyrene	ND	5.0	ug/l			
Isophorone	ND	5.0	ug/l			
Naphthalene	ND	5.0	ug/l			
Nitrobenzene	ND	5.0	ug/l			
2-Methylnaphthalene	ND	5.0	ug/l			
2-Methylphenol	ND	5.0	ug/l			
4-Methylphenol	ND	5.0	ug/l			
2-Nitroaniline	ND	20	ug/l			
3-Nitroaniline	ND	20	ug/l			
4-Nitroaniline	ND	20	ug/l			
2-Nitrophenol	ND	5.0	ug/l			
4-Nitrophenol	ND	20	ug/l			
N-Nitrosodimethylamine	ND	5.0	ug/l			
N-Nitrosodiphenylamine	ND	5.0	ug/l			
N-Nitroso-di-n-Propylamine	ND	5.0	ug/l			
Pentachlorophenol	ND	1.0	ug/l			
Phenanthrene	ND	5.0	ug/l			
Phenol	ND	5.0	ug/l			
Pyrene	ND	5.0	ug/l			
1,2,4-Trichlorobenzene	ND	5.0	ug/l			
2,4,5-Trichlorophenol	ND	50	ug/l			
2,4,6-Trichlorophenol	ND	5.0	ug/l			
1,2 Diphenylhydrazine	ND	5.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
2-Fluorobiphenyl	42	0	%	43-116 %		
2-Fluorophenol	19	0	%	21-100 %		
Nitrobenzene-d5	40	0	%	35-114 %		
Phenol-d6	12	0	%	10-94 %		
Terphenyl-d14	78	0	%	33-141 %		
2,4,6-Tribromophenol	50	0	%	10-123 %		
Date Analyzed:	12/12/94	0	Month/Day/Year			
Pesticides and PCBs in Water		*1		USEPA 608/8080	12/13/94	DPZ
Aldrin	<0.01	0.01	ug/l			
alpha-BHC	<0.01	0.01	ug/l			
beta-BHC	<0.01	0.01	ug/l			
delta-BHC	<0.01	0.01	ug/l			
gamma-BHC (Lindane)	<0.01	0.01	ug/l			
4,4'-DDD	<0.02	0.02	ug/l			
4,4'-DDE	<0.02	0.02	ug/l			
4,4'-DDT	<0.02	0.02	ug/l			
Dieldrin	<0.02	0.02	ug/l			
Endosulfan I	<0.01	0.01	ug/l			

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GM-5770-120794-STH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Endosulfan II	<0.02	0.02	ug/l			
Endosulfan sulfate	<0.02	0.02	ug/l			
Endrin	<0.02	0.02	ug/l			
Endrin aldehyde	<0.02	0.02	ug/l			
Heptachlor	<0.01	0.01	ug/l			
Heptachlor epoxide	<0.01	0.01	ug/l			
Toxaphene	<1.0	1.0	ug/l			
Methoxychlor	<0.5	0.5	ug/l			
Endrin ketone	<0.02	0.02	ug/l			
alpha-Chlordane	<0.02	0.02	ug/l			
gamma-Chlordane	<0.02	0.02	ug/l			
PCB Aroclor 1016	<0.2	0.2	ug/l			
PCB Aroclor 1221	<0.2	0.2	ug/l			
PCB Aroclor 1232	<0.4	0.4	ug/l			
PCB Aroclor 1242	<0.2	0.2	ug/l			
PCB Aroclor 1248	<0.2	0.2	ug/l			
PCB Aroclor 1254	<0.2	0.2	ug/l			
PCB Aroclor 1260	<0.2	0.2	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Decachlorobiphenyl	90	0	%	60-150%		
2,4,5,6-Tetrachloro-m-xylene	77	0	%	60-150%		
Date Analyzed:	12/13/94	0	Month/Day/Year			
Pest/PCB in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	SSH
BNAs in Water Extraction Date:	12/08/94		Month/Day/Year	EPA 3510 M Liq/Liq	12/08/94	PWB
Aluminum (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Antimony (Total)	<2.0	2.0	ug/l	USEPA 7041	12/10/94	GR
Barium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Beryllium (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Calcium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Iron (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Manganese (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Nickel (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Potassium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: GW-5770-120794-BTH-006
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0006
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Thallium (Total)	<2.0	2.0	ug/l	USEPA 7841	12/12/94	GR
Vanadium (Total)	<20	20	ug/l	USEPA 6010/200.7	12/10/94	GR
Cobalt, (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Arsenic (Total)	<1.0	1.0	ug/l	USEPA 7060	12/11/94	GR
Cadmium (Total)	<0.2	0.20	ug/l	USEPA 7131	12/09/94	GR
Lead (Total)	<1.0	1.0	ug/l	USEPA 7421	12/11/94	GR
Magnesium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Mercury (Total)	<0.2	0.2	ug/l	USEPA 7470	12/11/94	GR
Selenium (Total)	<2.0	2.0	ug/l	USEPA 7740	12/13/94	GR
Sodium (Total)	<500	500	ug/l	USEPA 6010/200.7	12/10/94	GR
Chromium (Total)	<50	50	ug/l	USEPA 6010/200.7	12/10/94	GR
Silver (Total)	<0.2	0.2	ug/l	USEPA 7761	12/13/94	GR
Copper (Total)	<10	10	ug/l	USEPA 6010/200.7	12/10/94	GR
Zinc, (Total)	<20	20	ug/l	USEPA 6010/200.7	12/11/94	GR

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LABORATORY TESTS RESULTS
01/11/95

JOB NUMBER: 114255 CUSTOMER: Conestoga-Rovers & Associates, Inc ATTN: Lou Almeida

CLIENT I.D.....: Sample ID: Trip Blank
DATE SAMPLED.....: 12/07/94
TIME SAMPLED.....: :
WORK DESCRIPTION...: Project ID: GM Pontiac J Lot 5770

LABORATORY I.D...: 114255-0007
DATE RECEIVED....: 12/07/94
TIME RECEIVED....: 17:30
REMARKS.....: Water

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Volatile Organics (TCL) in Water		*1		EPA Method 8260	12/13/94	RDC
Acetone	ND	50	ug/l			
Benzene	ND	1.0	ug/l			
Bromodichloromethane	ND	1.0	ug/l			
Bromoform	ND	1.0	ug/l			
Bromomethane	ND	1.0	ug/l			
2-Butanone	ND	50	ug/l			
Carbon disulfide	ND	50	ug/l			
Carbon tetrachloride	ND	1.0	ug/l			
Chlorobenzene	ND	1.0	ug/l			
Chloroethane	ND	1.0	ug/l			
Chloroform	ND	1.0	ug/l			
Chloromethane	ND	1.0	ug/l			
Dibromochloromethane	ND	1.0	ug/l			
1,1-Dichloroethane	ND	1.0	ug/l			
1,2-Dichloroethane	ND	1.0	ug/l			
1,1-Dichloroethene	ND	1.0	ug/l			
trans-1,2-Dichloroethene	ND	1.0	ug/l			
1,2-Dichloropropane	ND	1.0	ug/l			
cis-1,3-Dichloropropene	ND	1.0	ug/l			
trans-1,3-Dichloropropene	ND	1.0	ug/l			
Ethylbenzene	ND	1.0	ug/l			
2-Hexanone	ND	50	ug/l			
Methylene chloride	1.5	1.0	ug/l			
4-Methyl-2-pentanone	ND	50	ug/l			
Styrene	ND	1.0	ug/l			
1,1,2,2,-Tetrachloroethane	ND	1.0	ug/l			
Tetrachloroethene	ND	1.0	ug/l			
Toluene	ND	1.0	ug/l			
1,1,1-Trichloroethane	ND	1.0	ug/l			
1,1,2-Trichloroethane	ND	1.0	ug/l			
Trichloroethene	ND	1.0	ug/l			
Vinyl acetate	ND	50	ug/l			
Vinyl chloride	ND	1.0	ug/l			
Xylenes (o,m & p)	ND	3.0	ug/l			
cis-1,2-Dichloroethene	ND	2.0	ug/l			
SURROGATES	Recovery	0	%	Control Limits		
Bromofluorobenzene	104	0	%	74-121 %		
1,2-Dichloethane-d4	106	0	%	70-121%		
Toluene-d8	104	0	%	81-117 %		
Date Analyzed:	12/13/94	0	Month/Day/Year			

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APPENDIX C

DATA VALIDATION REPORTS

M E M O

TO: Frank Ring

REFERENCE NO: 5770

FROM: Lou Almeida/dm/4

DATE: January 13, 1995

C.C.: Brian Holbrook

RE: Analytical Data and Quality Assurance Review
J-Lot Extent of Contamination Study
Pontiac, Michigan

1.0 OVERVIEW

Fifty-three soil samples and four water samples were collected between November 3, 1994 and November 18, 1994 at the J-Lot Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of target compound list (TCL), volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); TCL Pesticides/polychlorinated biphenyls (Pest/PCBs); and target analyte list (TAL) metals.

This memo presents an analytical assessment and validation of results obtained in eleven analytical reports from Earth Tech Analytical Services (Earth Tech) located in Lavonia, Michigan, resulting from the analysis of the soil and water samples collected from the Site.

Analytical results were received in reports provided by Earth Tech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Earth Tech's quality control criteria. Earth Tech completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (February 1994), and "National Functional Guidelines for Inorganic Data

Review", (February 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries and field blank results.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by Earth Tech. Analytical methods and holding time criteria are presented in Table 1.

All samples submitted for analysis were analyzed prior to expiration of the prescribed holding time. Therefore, no qualifications were necessary on this basis.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for TCL VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene and 1,2-dichloroethane-d_4. Samples submitted for TCL SVOCs analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5, terphenyl-d_{14}, 2-fluorophenol, phenol-d_6 and 2,4,6-tribromophenol surrogates. Samples submitted for TCL Pesticides/PCB analysis were spiked with dechlorobiphenyl

and 2,4,5,6-tetrachloro-m-xylene surrogates. Surrogate recovery limits, as established by the laboratory, are summarized in Table 2.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with some exceptions. Sample results with unacceptable surrogate recoveries are presented in Table 3. Qualifications, based on unacceptable surrogate recoveries, are presented on Table 4.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants with only limited exceptions. In cases where analytes were detected in the method blank, qualifications were not necessary as the analyte was either not detected in the associated sample or the sample result greatly exceeded (greater than 10 times) the blank result.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. Earth Tech prepared and analyzed check samples with the investigative samples, for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology. No action is normally taken on

MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits for organic analyses, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision for organic analyses.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE (MS) INORGANIC ANALYSES

MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

MS recoveries fell within review limits (75-125%) with some exceptions. Samples whose MS recoveries fell outside review limits have been appropriately qualified and are summarized in Table 4. A summary of unacceptable inorganic MS recoveries is present in Table 5.

3.0 FIELD QA/QC

3.1 FIELD BLANKS

In order to assess sample equipment decontamination occurring in the field, four field rinsate blanks were collected and submitted for all analyses.

Field rinsate blanks were found to be free of target analytes with some exceptions. In all cases were a target analyte was detected in a rinsate blank the associated sample result greatly exceeded (greater than 10 times) the blank result. Qualifications were not deemed necessary on this basis.

4.0 CONCLUSION

The data provided by Earth Tech is acceptable for use noting the qualifications resulting from unacceptable surrogate spike and inorganic MS recoveries, as summarized in Table 4.

TABLE 2

SUMMARY OF SURROGATE CONTROL LIMITS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits*	
		Water Matrix	*Solid Matrix*
TCL VOCs	Bromofluorobenzene	74-121	74-121
	1,2-Dichloroethane-d_4	70-121	70-121
	Toluene-d_8	81-117	81-117
TCL SVOCs	2-Fluorobiphenyl	43-116	43-116
	Nitrobenzene-d_5	35-117	35-114
	Terphenyl-d_{14}	33-141	33-141
	2-Fluorophenol	21-100	21-100
	Phenol-d_6	18-137	33-146
	2,4,6-Tribromophenol	39-120	31-115
Pest/PCBs	Decachlorobiphenyl	60-150	60-150
	2,4,5,6-Tetrachloro-m-xylene	60-150	60-150

Notes:

TCL - Target Compound List
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychorinated Biphenyls

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
S-5770-110394-BTH-002	VOCs	Bromofluorobenzene	140	74-121
		1,2-Dichloroethane-d_4	124	70-121
S-5770-110394-BTH-003	VOCs	Bromofluorobenzene	122	74-121
		1,2-Dichloroethane-d_4	124	70-121
S-5770-110394-BTH-004	VOCs	1,2-Dichloroethane-d_4	56	70-121
S-5770-110394-BTH-006	VOCs	Bromofluorobenzene	128	74-121
S-5770-110394-BTH-008	VOCs	Bromofluorobenzene	124	74-121
		1,2-Dichloroethane-d_4	126	70-121
S-5770-110394-BTH-009	VOCs	1,2-Dichloroethane-d_4	126	70-121
S-5770-110494-BTH-012	VOCs	1,2-Dichloroethane-d_4	132	70-121
S-5770-110494-BTH-014	Pest/PCBs	Decachlorobiphenyl	212	60-150
S-5770-110494-BTH-019	Pest/PCBs	1,2-Dichloroethane-d_4	130	70-121
S-5770-110794-BTH-021	Pest/PCBs	1,2-Dichloroethane-d_4	132	70-121
S-5770-110794-BTH-022	Pest/PCBs	Bromofluorobenzene	124	74-121
S-5770-110894-BTH-024	Pest/PCBs	Decachlorobiphenyl	40	60-150
S-5770-110894-BTH-025	VOCs	1,2-Dichloroethane-d_4	124	70-121
S-5770-110894-BTH-026	VOCs	1,2-Dichloroethane-d_4	128	70-121
S-5770-110894-BTH-028	VOCS	1,2-Dichloroethane-d_4	130	70-121
S-5770-110894-BTH-030	Pest/PCBs	Decachlorobiphenyl	ND	60-150
		2,4,5,6-Tetrachloro-m-xylene	ND	60-150
S-5770-111094-BTH-038	VOCs	Bromofluorobenzene	128	74-121
S-5770-111094-BTH-039	VOCs	1,2-Dichloroethane-d_4	124	70-121

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
S-5770-111094-BTH-040	VOCs	Bromofluorobenzene	130	74-121
S-5770-111114-BTH-041	VOCs	Bromofluorobenzene	134	74-121
		Toluene-d_8	134	81-117
S-5770-111594-BTH-050	VOCs	1,2-Dichloroethane-d_4	128	70-121
S-5770-111594-BTH-051	VOCs	1,2-Dichloroethane-d_4	126	70-121

Notes:

VOCs - Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
ND - Not Detected/No Recovery

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110394-BTH-002	VOCs	Acetone	2200	2200J	2.2
		Toluene	14	14J	2.2
S-5770-110394-BTH-003	VOCs	Acetone	3200	3200J	2.2
		Toluene	19	19J	2.2
S-5770-110394-BTH-003	VOCs	Acetone	410	410J	2.2
		Benzene	ND(10)	10UJ	2.2
		Bromodichloromethane	ND(10)	10UJ	2.2
		Bromoform	ND(10)	10UJ	2.2
		Bromoethane	ND(10)	10UJ	2.2
		2-Butanone	ND(100)	100UJ	2.2
		Carbon disulfide	ND(100)	100UJ	2.2
		Carbon Tetrachloride	ND(10)	10UJ	2.2
		Chlorobenzene	ND(10)	10UJ	2.2
		Chloroethane	ND(10)	10UJ	2.2
		Chloroform	ND(10)	10UJ	2.2
		Chloromethane	ND(10)	10UJ	2.2
		Dibromochloromethane	ND(10)	10UJ	2.2
		1,1-Dichloroethane	ND(10)	10UJ	2.2
		1,2-Dichloroethane	ND(10)	10UJ	2.2
		1,1-Dichloroethene	ND(10)	10UJ	2.2
		trans-1,2-Dichloroethene	ND(10)	10UJ	2.2
		1,2-Dichloropropane	ND(10)	10UJ	2.2
		cis-1,3-Dichloropropene	ND(10)	10UJ	2.2
		Ethylbenzene	ND(10)	10UJ	2.2
		2-Hexanone	ND(100)	100UJ	2.2
		Methylene chloride	ND(10)	10UJ	2.2
		4-Methyl-2-pentanone	ND(100)	100UJ	2.2
		Styrene	ND(10)	10UJ	2.2
		1,1,2,2-Tetrachloroethane	ND(10)	10UJ	2.2
		Tetrachloroethene	ND(10)	10UJ	2.2
		Toluene	ND(10)	10UJ	2.2
		1,1,1-Trichloroethane	ND(10)	10UJ	2.2
		1,1,2-Trichloroethane	ND(10)	10UJ	2.2
		Trichloroethene	ND(10)	10UJ	2.2
		Vinyl chloride	ND(10)	10UJ	2.2
		Xylenes (o,m&p)	ND(30)	30UJ	2.2
		cis-1,2-Dichloroethene	ND(10)	10UJ	2.2
		Vinyl acetate	ND(10)	10UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110394-BTH-006	VOCs	Acetone	790	790J	2.2
		Methylene Chloride	18	18J	2.2
		Toluene	21	21J	2.2
S-5770-110394-BTH-008	VOCs	Acetone	170	170J	2.2
		Methylene Chloride	17	17J	2.2
		Toluene	23	23J	2.2
S-5770-110394-BTH-009	VOCs	Acetone	1000	1000J	2.2
		Methylene Chloride	18	18J	2.2
		Toluene	10	10J	2.2
S-5770-110494-BTH-012	VOCs	Acetone	5400	5400J	2.2
		Methylene Chloride	20	20J	2.2
		Toluene	28	28J	2.2
S-5770-110494-BTH-014	Pest/PCBs	Aroclor 1254	730	730J	2.2
S-5770-110494-BTH-019	VOCs	Acetone	4800	4800J	2.2
		Methylene Chloride	10	10J	2.2
		Toluene	23	23J	2.2
S-5770-110794-BTH-021	VOCs	Acetone	5200	5200J	2.2
	Metals	Arsenic	4600	4600J	2.6
		Manganese	270000	270000J	2.6
		Potassium	910000	910000J	2.6
S-5770-110794-BTH-022	VOCs	Acetone	700	700J	2.2
		Ethylbenzene	14	14J	2.2
		Toluene	67	67J	2.2
		Xylenes (o,m&p)	62	62J	2.2
S-5770-110894-BTH-024	Pest/PCBs	Aldrin	<1.7	1.7UJ	2.2
		alpha-BHC	<1.7	1.7UJ	2.2
		beta-BHC	<1.7	1.7UJ	2.2
		delta-BHC	<1.7	1.7UJ	2.2
		gamma-BHC (Lindane)	<1.7	1.7UJ	2.2
		4,4'-DDD	<3.3	3.3UJ	2.2
		4,4'-DDE	<3.3	3.3UJ	2.2
		4,4'-DDT	<3.3	3.3UJ	2.2
		Dieldrin	<3.3	3.3UJ	2.2
		Endosulfan I	<3.3	3.3UJ	2.2
		Endosulfan II	<3.3	3.3UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-110894-BTH-024	Pest/PCBs	Endosulfan sulfate	<3.3	3.3UJ	2.2
		Endrin	<3.3	3.3UJ	2.2
		Endrin aldehyde	<3.3	3.3UJ	2.2
		Heptachlor	<1.7	1.7UJ	2.2
		Heptachlor epoxide	<1.7	1.7UJ	2.2
		Toxaphene	<170	170UJ	2.2
		Methoxychlor	<50	50UJ	2.2
		Endrin ketone	<1.7	1.7UJ	2.2
		alpha-Chlordane	<3.3	3.3UJ	2.2
		gamma-Chlordane	<3.3	3.3UJ	2.2
		PCB Aroclor 1016	<330	330UJ	2.2
		PCB Aroclor 1221	<330	330UJ	2.2
		PCB Aroclor 1232	<330	330UJ	2.2
		PCB Aroclor 1242	<330	330UJ	2.2
		PCB Aroclor 1248	<330	330UJ	2.2
		PCB Aroclor 1254	<330	330UJ	2.2
		PCB Aroclor 1260	<330	330UJ	2.2
	Metals	Thallium	<250	250UJ	2.6
S-5770-110894-BTH-025	VOCs	Acetone	1400	1400J	2.2
		Toluene	32	32J	2.2
S-5770-110894-BTH-026	VOCs	Acetone	2600	2600J	2.2
		Toluene	12	12J	2.2
S-5770-110894-BTH-028	VOCs	Acetone	500	500J	2.2
		Toluene	35	35J	2.2
S-5770-110994-BTH-033	Metals	Manganese	320000	320000J	2.6
		Potassium	470000	470000J	2.6
S-5770-111094-BTH-038	VOCs	Acetone	5000	5000J	2.2
		Benzene	17	17J	2.2
		2-Butanone	230	230J	2.2
		Ethylbenzene	13	13J	2.2
		Toluene	21	21J	2.2
S-5770-111094-BTH-039	VOCs	Acetone	820	820J	2.2
		Toluene	14	14J	2.2
S-5770-111094-BTH-040	VOCs	Acetone	1500	1500J	2.2
		Toluene	19	19J	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/kg)*	*Qualified Result (µg/kg)*	*Section Reference*
S-5770-111094-BTH-041	VOCs	Acetone	2800	2800J	2.2
		Benzene	200	200J	2.2
		2-Butanone	4200	4200J	2.2
		Ethylbenzene	25000	25000J	2.2
		Methylene Chloride	13	13J	2.2
		4,-Methyl-2-pentanone	45000	45000J	2.2
		Toluene	2400	2400J	2.2
		Xylenes (o,m&p)	50000	50000J	2.2
	Metals	Arsenic	10000	10000J	2.6
S-5770-111594-BTH-050	VOCs	Acetone	6400	6400J	2.2
S-5770-111594-BTH-051	VOCs	Acetone	1900	1900J	2.2
		Ethylbenzene	15	15J	2.2
		Toluene	14	14J	2.2
		Xylenes (o,m&p)	95	95J	2.2
S-5770-111894-BTH-055	Metals	Arsenic	13000	13000J	2.6
		Barium	67000	67000J	2.6
		Chromium	19000	19000J	2.6
		Copper	30000	30000J	2.6
		Iron	41000000	41000000J	2.6
		Lead	77000	77000J	2.6
		Selenium	ND(500)	500UJ	2.6
		Silver	ND(500)	R	2.6
		Thallium	ND(500)	500UJ	2.6

Notes:

VOCs - Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychlorinated Biphenyls
UJ - The parameter was undetected. The sample reporting limit is an estimated limit.
J - The reported result is estimated.
R - The reported data is unuseable.

TABLE 5

SUMMARY OF UNACCEPTABLE INORGANIC MATRIX SPIKE RECOVERIES
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Metal*	*MS Recoveries (%)*	*Control Limits (%)*
S-5770-110794-BTH-021	Arsenic	64, 64	75-125
	Manganese	17, 20	75-125
	Potassium	178, 167	75-125
S-5770-110894-BTH-024	Thallium	69, 64	75-125
S-5770-110994-BTH-033	Manganese	61, 63	75-125
	Potassium	137, 173	75-125
S-5770-111094-BTH-041	Arsenic	132, 144	75-125
S-5770-111894-BTH-055	Arsenic	0, 0	75-125
	Barium	138, 183	75-125
	Chromium	152, 200	75-125
	Copper	1000, 975	75-125
	Iron	0, 535	75-125
	Lead	982, 535	75-125
	Selenium	30, 17	75-125
	Silver	0, 0	75-125
	Thallium	70, 72	75-125

MEMO

TO: Frank Ring

REFERENCE NO: 5770

FROM: Lou Almeida/dm/5

DATE: January 16, 1995

C.C.: Brian Holbrook

RE: Analytical Data and Quality Assurance Review
J-Lot Groundwater Sampling
Pontiac, Michigan

1.0 OVERVIEW

Six water samples were collected on December 7, 1994 at the J-Lot Site (Site) located in Pontiac, Michigan. Samples collected were submitted for the analysis of target compound list (TCL), volatile organic compounds (VOCs); semi-volatile organic compounds (SVOCs); TCL Pesticides/polychlorinated biphenyls (Pest/PCBs); and target analyte list (TAL) metals.

This memo presents an analytical assessment and validation of results obtained in an analytical report from Earth Tech Analytical Services (Earth Tech) located in Lavonia, Michigan, resulting from the analysis of the water samples collected from the Site.

Analytical results were received in a report provided by Earth Tech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Earth Tech's quality control criteria. Earth Tech completed sample analyses in accordance with the methods outlined in the United States Environmental Protection Agency (U.S. EPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The U.S. EPA documents entitled, "National Functional Guidelines for Organic Data Review", (February 1994), and "National Functional Guidelines for Inorganic Data Review", (February 1994), were used in the assessment and validation of the data.

Evaluation of the data was based upon quality assurance/quality control (QA/QC) information supplied in the final analytical report. The QA/QC information includes dates of analysis, surrogate spike recoveries, method blank results, check sample spike recoveries, matrix spike/matrix spike duplicate (MS/MSD) recoveries and trip blank results.

Details of the data assessment are outlined in the following sections.

2.0 QA/QC REVIEW

2.1 SAMPLE HOLDING TIME

The sample holding time criteria, as specified in SW-846 , were used as the basis of the review of sample holding time. Holding times were determined using sample collection dates noted in the chain-of-custody documents and sample analysis dates reported by Earth Tech. Analytical methods and holding time criteria are presented in Table 1.

All samples submitted for analysis were analyzed prior to expiration of the prescribed holding time. Therefore, no qualifications were necessary on this basis.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples submitted for TCL VOC analysis were spiked with the surrogate compounds toluene-d_8, bromofluorobenzene and 1,2-dichloroethane-d_4. Samples submitted for TCL SVOCs analysis were spiked with 2-fluorobiphenyl, nitrobenzene-d_5, terphenyl-d_{14}, 2-fluorophenol, phenol-d_6 and 2,4,6-tribromophenol surrogates. Samples submitted for TCL Pesticides/PCB analysis were spiked with dechlorobiphenyl and 2,4,5,6-tetrachloro-m-xylene surrogates. Surrogate recovery limits, as established by the laboratory, are summarized in Table 2.

In reviewing the data, it was determined that the reported surrogate recoveries fell within established control limits with some exceptions. Sample results with unacceptable surrogate recoveries are presented in Table 3. Qualifications, based on unacceptable surrogate recoveries, are presented on Table 4.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, method blank samples were analyzed in conjunction with the investigative samples.

The method blank results indicated that all blanks were free of contaminants. Qualifications were not required on this basis.

2.4 CHECK SAMPLES (CS)

Check sample data are assessed in order to determine method accuracy and laboratory performance. Earth Tech prepared and analyzed check samples with the investigative samples, for this program.

Upon review, all CS recoveries were well within acceptable control limits, demonstrating acceptable method accuracy and laboratory performance. Consequently, no data qualifications were necessary on this basis.

2.5 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ORGANIC ANALYSES

MS/MSD analyses provide insight into sample matrix effects on digestion and/or measurement methodology. No action is normally taken on MS/MSD data, in terms of qualification, as this data alone does not give a complete indication of overall accuracy and precision. However, in conjunction with other QC data, the need for qualifications can be assessed.

MS/MSD recoveries fell within laboratory-established control limits for organic analyses, with no exceptions. Consequently, acceptable method accuracy was demonstrated for this sample matrix.

The precision of the method is reflected by the reproducibility of the MS and MSD recoveries. A relative percent difference (RPD) was calculated for all MS/MSD results.

Upon review, it was noted that all RPD values fell below the laboratory established control maximums summarized, demonstrating acceptable method precision for organic analyses.

No data qualifications were deemed necessary on the basis of MS/MSD recoveries.

2.6 MATRIX SPIKE (MS) INORGANIC ANALYSES

MS analyses provide insight into the effect of the sample matrix on sample preparation and/or measurement methodology. MS data are assessed in order to determine the impact of the sample matrix on accuracy.

MS recoveries fell within review limits (75-125%) with two exceptions. The mercury MS recoveries for sample GW-5770-120794-BTH-003 exceeded acceptable limits, however, as mercury was not detected, a data qualification was not required. The cadmium MS recoveries for sample GW-5770-120794-BTH-001 were below acceptable limits. The data qualification for this sample result is presented in Table 4.

2.7 TRIP BLANK

In order to assess the existence and magnitude of VOC contamination attributable to sample transport, the environment and/or shipping, one trip blank was collected and submitted for analyses.

The trip blank was found to be free of target analytes. Qualifications were not deemed necessary on this basis.

3.0 CONCLUSION

The data provided by Earth Tech is acceptable for use noting the qualifications resulting from unacceptable surrogate spike and inorganic MS recoveries, as summarized in Table 4.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIMES
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Analysis	*Method*	*Holding time Criteria Water Matrix (days)*
TCL VOCs	SW-846 8240	14
TCL SVOCs	SW-846 8270	7/40
TCL Pest/PCBs	SW-846 8080	7/40
TAL Metals	SW-846 6010/7000 Series	6 months
Mercury	SW-846 7470	28

Notes:

TCL	-	Target Compound List
VOCs	-	Volatile Organic Compounds
SVOCs	-	Semi-Volatile Organic Compunds
Pest/PCBs	-	Pesticides/Polychlorinated Biphenyls
TAL	-	Target Analyte List
SW-846	-	USEPA's document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", 3rd Edition, September 1986.
7/40	-	7 days from the sample collection date to the sample extraction date, 40 days from the sample extraction date to the sample analysis date
14	-	14 days from the sample collection date to the sample analysis date

TABLE 2

SUMMARY OF SURROGATE CONTROL LIMITS
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Analysis	*Surrogate Compound*	*Control Limits Water Matrix*
TCL VOCs	Bromofluorobenzene	74-121
	1,2-Dichloroethane-d_4	70-121
	Toluene-d_8	81-117
TCL SVOCs	2-Fluorobiphenyl	40-106
	Nitrobenzene-d_5	36-102
	Terphenyl-d_{14}	39-120
	2-Fluorophenol	17-72
	Phenol-d_6	10-98
	2,4,6-Tribromophenol	34-116
Pest/PCBs	Decachlorobiphenyl	60-150
	2,4,5,6-Tetrachloro-m-xylene	60-150

Notes:

TCL - Target Compound List
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
Pest/PCBs - Pesticides/Polychorinated Biphenyls

TABLE 3

SUMMARY OF UNACCEPTABLE SURROGATE RECOVERIES
J-LOT GROUNDWATER SAMPLING
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Surrogate Compound*	*Recovery (%)*	*Control Limits (%)*
GW-5770-120794-BTH-003	Pest/PCBs	Decachlorobiphenyl	51	60-150
GW-5770-120794-BTH-004	Pest/PCBs	Decachlorobiphenyl	45	60-150
GW-5770-120794-BTH-005	Pest/PCBs	Decachlorobiphenyl	51	60-150

Note:

Pest/PCBs - Pesticides/Polychlorinated Biphenyls

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-001	Metals	Cadium	<0.2	0.2UJ	2.6
GW-5770-120794-BTH-003	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2
		Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2
		PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2
GW-5770-120794-BTH-004	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-004	Pest/PCBs	Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2
		PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2
GW-5770-120794-BTH-005	Pest/PCBs	Aldrin	<0.01	0.01UJ	2.2
		alpha-BHC	<0.01	0.01UJ	2.2
		beta-BHC	<0.01	0.01UJ	2.2
		delta-BHC	<0.01	0.01UJ	2.2
		gamma-BHC (Lindane)	<0.01	0.01UJ	2.2
		4,4'-DDD	<0.02	0.02UJ	2.2
		4,4'-DDE	<0.02	0.02UJ	2.2
		4,4'-DDT	<0.02	0.02UJ	2.2
		Dieldrin	<0.02	0.02UJ	2.2
		Endosulfan I	<0.01	0.01UJ	2.2
		Endosulfan II	<0.02	0.02UJ	2.2
		Endosulfan sulfate	<0.02	0.02UJ	2.2
		Endrin	<0.02	0.02UJ	2.2
		Endrin aldehyde	<0.02	0.02UJ	2.2
		Heptachlor	<0.01	0.01UJ	2.2
		Heptachlor epoxide	<0.01	0.01UJ	2.2
		Toxaphene	<1.0	1.0UJ	2.2
		Methoxychlor	<0.5	0.5UJ	2.2
		Endrin ketone	<0.02	0.02UJ	2.2
		alpha-Chlordane	<0.02	0.02UJ	2.2
		gamma-Chlordane	<0.02	0.02UJ	2.2
		PCB Aroclor 1016	<0.2	0.2UJ	2.2
		PCB Aroclor 1221	<0.2	0.2UJ	2.2
		PCB Aroclor 1232	<0.4	0.4UJ	2.2

TABLE 4

SUMMARY OF DATA QUALIFICATIONS
J-LOT EXTENT OF CONTAMINATION STUDY
PONTIAC, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Reported Result (µg/L)*	*Qualified Result (µg/L)*	*Section Reference*
GW-5770-120794-BTH-005	Pest/PCBs	PCB Aroclor 1242	<0.2	0.2UJ	2.2
		PCB Aroclor 1248	<0.2	0.2UJ	2.2
		PCB Aroclor 1254	<0.2	0.2UJ	2.2
		PCB Aroclor 1260	<0.2	0.2UJ	2.2

Notes:

Pest/PCBs - Pesticides/Polychlorinated Biphenyls
UJ - The parameter was undetected. The sample reporting limit is an estimated limit.

APPENDIX D

STREAMLINED RISK ASSESSMENT CALCULATIONS

TABLE : 1

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : INDUSTRIAL WORKER
SITE : J-LOT SITE
SECTOR : SOIL
LOCATION : ON-SITE

$$\text{EQUATION : INTAKE (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} + \frac{CS \times IR \times ABS \times CF \times EF \times ED}{BW \times AT} \times PTF$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg soil/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (10E-06 kg/mg)
EF = Exposure Frequency (days/years)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time (period over which exposure is averaged -- days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor (unitless)
PTF = Percent of Time Factor: Percent of time in contaminated area. (%/100)

VARIABLE ASSUMPTIONS	MEAN	RME	REFERENCES
CS (mg/kg)	MEAN	95th %	RAGS (1)
IR - ADULT (mg/exposure)	50	50	RAGS (1,2)
SA - ADULT) (cm2)	2000	2000	DEAP (3)
CF (kg/mg)	0.000001	0.000001	RAGS (1,2)
EF (days/year)	250	250	RAGS (1) & PROFESSIONAL JUDGEMENT
ED - (CARCINOGEN) (yrs)	10	25	RAGS (1,2)
ED - (NON-CARC.) (yr)	10	25	RAGS (1,2)
BW (ADULT) (kg)	70	70	RAGS (1,2)
AT (CARCINOGEN) (yrs x days/yr)	25550	25550	RAGS (1,2)
AT (NON-CARCINOGEN) (yrs x days/yr)	3650	9125	RAGS (1,2)
AF (mg/cm2)	0.2	1	DEAP (3)
ABS ORAL (CHEMICAL SPECIFIC)			
DERMAL (CHEMICAL SPECIFIC)			
PTF	1	1	PROFESSIONAL JUDGEMENT

NOTE:
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991
(3) EPA DERMAL EXPOSURE ASSESSMENT: PRINCIPLES AND APPLICATIONS, EPA/600/8-89/011B, JANUARY 1992.

TABLE : 2

MEDIA CONCENTRATIONS AND CHEMICAL CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	MEDIA CONCENTRATION				ORAL BIOAVAIL. FACTOR		DERMAL BIOAVAIL. FACTOR	
PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	MEAN %/100	RME %/100	MEAN %/100	RME %/100
PAHs								
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.50	0.01	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.50	0.01	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
PCBs								
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.50	0.01	0.01
METALS								
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.50	0.01	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.50	0.01	0.01

NA = NOT AVAILABLE

TABLE : 3

EXPOSURE, RISK AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	95th %	MEAN	95th %	MEAN	95th %
PAHs								
BENZO(A)ANTHRACENE	2.98E-08	3.00E-07	2.18E-08	2.19E-07	2.09E-07	8.41E-07	0.00E+00	0.00E+00
BENZO(A)PYRENE	2.18E-08	2.12E-07	1.59E-07	1.55E-06	1.52E-07	5.93E-07	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	3.60E-08	3.69E-07	2.63E-08	2.69E-07	2.52E-07	1.03E-06	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	1.02E-08	6.96E-08	7.46E-08	5.08E-07	7.15E-08	1.95E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	2.23E-08	2.05E-07	1.63E-08	1.50E-07	1.56E-07	5.75E-07	0.00E+00	0.00E+00
PCBs								
AROCLOR-1254	2.68E-08	1.71E-07	2.06E-07	1.32E-06	1.87E-07	4.79E-07	2.68E-03	6.84E-03
METALS								
ARSENIC	2.43E-07	1.05E-06	4.26E-07	1.84E-06	1.70E-06	2.95E-06	5.68E-03	9.83E-03
LEAD	8.72E-06	7.19E-05	0.00E+00	0.00E+00	6.10E-05	2.01E-04	4.36E-02	1.44E-01
	TOTAL LIFETIME ADDED CANCER RISK:		9.30E-07	5.85E-06	HAZARD INDEX:		5.19E-02	1.60E-01

TABLE : 4

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : INDUSTRIAL WORKER

	MEDIA CONCENTRATION		LIFETIME UPPER BOUND EXCESS CANCER RISK		HAZARD QUOTIENT CDI/RfD	
	MEAN	RME				
PARAMETER	mg/kg	mg/kg	MEAN	95th %	MEAN	95th %
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	2.18E-08	2.19E-07	0.00E+00	0.00E+00
BENZO(A)PYRENE	5.37E-01	1.35E+00	1.59E-07	1.55E-06	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	2.63E-08	2.69E-07	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.46E-08	5.08E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	1.63E-08	1.50E-07	0.00E+00	0.00E+00
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	2.06E-07	1.32E-06	2.68E-03	6.84E-03
METALS						
ARSENIC	6.00E+00	6.70E+00	4.26E-07	1.84E-06	5.68E-03	9.83E-03
LEAD	2.15E+02	4.57E+02	0.00E+00	0.00E+00	4.36E-02	1.44E-01
	TOTAL LIFETIME ADDED CANCER RISK:		9.30E-07	5.85E-06		
			HAZARD INDEX:		5.19E-02	1.60E-01

TABLE : 5

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : CONSTRUCTION WORKER
SITE : J-LOT SITE
SECTOR : SOIL
LOCATION : ON-SITE

$$\text{EQUATION : INTAKE (mg/kg-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times EF \times ED}{BW \times AT} + \frac{CS \times IR \times ABS \times CF \times EF \times ED}{BW \times AT} \times PTF$$

where :

CS = Chemical Concentration in Soil (mg/kg)

IR = Ingestion Rate (mg soil/day)

SA = Skin Surface Area Available for Contact (cm2/event)

CF = Conversion Factor (10E-06 kg/mg)

EF = Exposure Frequency (days/years)

ED = Exposure Duration (years)

BW = Body Weight (kg)

AT = Averaging Time (period over which exposure is averaged -- days)

AF = Soil to Skin Adherence Factor (mg/cm2)

ABS = Absorption Factor (unitless)

PTF = Percent of Time Factor: Percent of time in contaminated area. (%/100)

VARIABLE ASSUMPTIONS	MEAN	RME	REFERENCES
CS (mg/kg)	MEAN	95th %	RAGS (1)
IR - ADULT (mg/exposure)	50	50	RAGS (1,2)
SA - ADULT) (cm2)	5300	5300	DEAP (3)
CF (kg/mg)	0.000001	0.000001	RAGS (1,2)
EF (days/year)	250	250	RAGS (1) & PROFESSIONAL JUDGEMENT
ED - (CARCINOGEN) (yrs)	1	1	RAGS (1,2)
ED - (NON-CARC.) (yr)	1	1	RAGS (1,2)
BW (ADULT) (kg)	70	70	RAGS (1,2)
AT (CARCINOGEN) (yrs x days/yr)	25550	25550	RAGS (1,2)
AT (NON-CARCINOGEN) (yrs x days/yr)	365	365	RAGS (1,2)
AF (mg/cm2)	0.2	1	DEAP (3)
ABS ORAL (CHEMICAL SPECIFIC)			
DERMAL (CHEMICAL SPECIFIC)			
PTF	1	1	PROFESSIONAL JUDGEMENT

NOTE:

(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND MANUAL, DECEMBER 1989, EPA/540/1-89/002.

(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991

(3) EPA DERMAL EXPOSURE ASSESSMENT: PRINCIPLES AND APPLICATIONS, EPA/600/8-89/011B, JANUARY 1992.

TABLE : 6

MEDIA CONCENTRATIONS AND CHEMICAL CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	MEDIA CONCENTRATION				ORAL BIOAVAIL. FACTOR		DERMAL BIOAVAIL. FACTOR	
PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	MEAN %/100	RME %/100	MEAN %/100	RME %/100
PAHs								
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.50	0.01	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.50	0.01	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.50	0.01	0.01
PCBs								
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.50	0.01	0.01
METALS								
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.50	0.01	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.50	0.01	0.01

NA = NOT AVAILABLE

TABLE : 7

EXPOSURE, RISK AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	95th %	MEAN	95th %	MEAN	95th %
PAHs								
BENZO(A)ANTHRACENE	3.66E-09	2.08E-08	2.67E-09	1.52E-08	2.56E-07	1.46E-06	0.00E+00	0.00E+00
BENZO(A)PYRENE	2.67E-09	1.47E-08	1.95E-08	1.07E-07	1.87E-07	1.03E-06	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	4.42E-09	2.56E-08	3.23E-09	1.87E-08	3.10E-07	1.79E-06	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	1.25E-09	4.83E-09	9.15E-09	3.52E-08	8.78E-08	3.38E-07	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	2.74E-09	1.42E-08	2.00E-09	1.04E-08	1.92E-07	9.97E-07	0.00E+00	0.00E+00
PCBs								
AROCLOR-1254	3.28E-09	1.19E-08	2.53E-08	9.13E-08	2.30E-07	8.30E-07	3.28E-03	1.19E-02
METALS								
ARSENIC	2.99E-08	7.31E-08	5.23E-08	1.28E-07	2.09E-06	5.11E-06	6.97E-03	1.70E-02
LEAD	1.07E-06	4.98E-06	0.00E+00	0.00E+00	7.49E-05	3.49E-04	5.35E-02	2.49E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.14E-07	4.06E-07	HAZARD INDEX:		6.37E-02	2.78E-01

TABLE : 8

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
POPULATION : ADULTS
EXPOSURE SCENARIO : CONSTRUCTION WORKER

	MEDIA CONCENTRATION		LIFETIME UPPER BOUND EXCESS CANCER RISK		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN mg/kg	RME mg/kg	MEAN	95th %	MEAN	95th %
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	2.67E-09	1.52E-08	0.00E+00	0.00E+00
BENZO(A)PYRENE	5.37E-01	1.35E+00	1.95E-08	1.07E-07	0.00E+00	0.00E+00
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.23E-09	1.87E-08	0.00E+00	0.00E+00
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	9.15E-09	3.52E-08	0.00E+00	0.00E+00
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	2.00E-09	1.04E-08	0.00E+00	0.00E+00
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	2.53E-08	9.13E-08	3.28E-03	1.19E-02
METALS						
ARSENIC	6.00E+00	6.70E+00	5.23E-08	1.28E-07	6.97E-03	1.70E-02
LEAD	2.15E+02	4.57E+02	0.00E+00	0.00E+00	5.35E-02	2.49E-01
	TOTAL LIFETIME ADDED CANCER RISK:		1.14E-07	4.06E-07		
			HAZARD INDEX:		6.37E-02	2.78E-01

TABLE : 9

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : RESIDENTIAL - CHILD
SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE

EQUATION : $$\text{INTAKE (mg/kg-day)} = \frac{(CS \times CF \times SA \times AF \times ABS \times EF \times ED)}{(BW \times AT)} + \frac{(CS \times IR \times ABS \times CF \times EF \times ED)}{(BW \times AT)}$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (kg/mg)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time - period over which exposure is averaged (days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor

VARIABLE	MEAN	RME	REFERENCES:
CS (mg/kg)	Mean	95% UCL	
IR CHILD (mg/day)	200	200	RAGS (1,2)
SA CHILD (cm2)	1983	2295	DEAP (3)
CF (mg/kg)	0.000001	0.000001	EFH (4)
EF (days/yr)	350	350	RAGS (1,2)
ED - carc. (yr)	5	5	RAGS (1,2)
ED - non-carc. (yr)	5	5	RAGS (1,2)
BW CHILD (kg)	15	15	RAGS (1,2)
AT - carcinogen (years x days)	25550	25550	RAGS (1,2)
AT - non-carcinogen (years x days)	1825	1825	RAGS (1,2)
AF (mg/cm2)	0.2	1	RAGS (1)
ABS ORAL (chemical specific)	CHEMICAL-SPECIFIC		
ABS DERMAL (chemical specific)	CHEMICAL-SPECIFIC		

NOTES :
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND" MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991.
(3) "DERMAL EXPOSURE ASSESSMENT : PRINCIPLES AND APPLICATIONS", EPA/600/8-91/011B, JANUARY 1992.
(4) EXPOSURE FACTORS HANDBOOK, EPA/600/8-89/043, MARCH 1990.

TABLE : 10

MEDIA CONCENTRATIONS/CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	ORAL ABSORPTION FACTOR (%/100)	DERMAL ABSORPTION FACTOR (%/100)
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.01
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.01
METALS						
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.01

NA= Not Available

TABLE : 11

EXPOSURE, RISKS AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	RME	MEAN	RME	MEAN	RME
PAHs								
BENZO(A)ANTHRACENE	3.49E-07	1.07E-06	2.55E-07	7.83E-07	4.89E-06	1.50E-05	NV	NV
BENZO(A)PYRENE	2.55E-07	7.56E-07	1.86E-06	5.52E-06	3.57E-06	1.06E-05	NV	NV
BENZO(B)FLUORANTHENE	4.22E-07	1.32E-06	3.08E-07	9.61E-07	5.91E-06	1.84E-05	NV	NV
DIBENZO(a,h)ANTHRACENE	1.20E-07	2.48E-07	8.73E-07	1.81E-06	1.67E-06	3.48E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	2.62E-07	7.33E-07	1.91E-07	5.35E-07	3.66E-06	1.03E-05	NV	NV
PCBs								
AROCLOR-1254	3.13E-07	6.11E-07	2.41E-06	4.70E-06	4.39E-06	8.55E-06	6.27E-02	1.22E-01
METALS								
ARSENIC	2.85E-06	3.76E-06	4.98E-06	6.58E-06	3.99E-05	5.27E-05	1.33E-01	1.76E-01
LEAD	1.02E-04	2.57E-04	NV	NV	1.43E-03	3.59E-03	1.02E+00	2.57E+00
NV = No Value	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:		1.09E-05	2.09E-05			HAZARD INDEX: 1.22E+00	2.86E+00

TABLE : 12

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL-CHILD

			LIFETIME UPPER BOUND EXCESS CANCER RISK		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN mg/kg	RME mg/kg	MEAN	RME	MEAN	RME
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	2.55E-07	7.83E-07	NV	NV
BENZO(A)PYRENE	5.37E-01	1.35E+00	1.86E-06	5.52E-06	NV	NV
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.08E-07	9.61E-07	NV	NV
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	8.73E-07	1.81E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	1.91E-07	5.35E-07	NV	NV
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	2.41E-06	4.70E-06	6.27E-02	1.22E-01
METALS						
ARSENIC	6.00E+00	6.70E+00	4.98E-06	6.58E-06	1.33E-01	1.76E-01
LEAD	2.15E+02	4.57E+02	NV	NV	1.02E+00	2.57E+00
NV = No Value	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:				HAZARD INDEX:	
ND = Not Detected			1.09E-05	2.09E-05	1.22E+00	2.86E+00

TABLE : 13

EXPOSURE SCENARIO FORMULA AND ASSUMPTIONS

EXPOSURE SCENARIO : RESIDENTIAL - ADULT
SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : ON-SITE

EQUATION : $$\text{INTAKE (mg/kg-day)} = \frac{(CS \times CF \times SA \times AF \times ABS \times EF \times ED)}{(BW \times AT)} + \frac{(CS \times IR \times ABS \times CF \times EF \times ED)}{(BW \times AT)}$$

where :
CS = Chemical Concentration in Soil (mg/kg)
IR = Ingestion Rate (mg/day)
SA = Skin Surface Area Available for Contact (cm2/event)
CF = Conversion Factor (kg/mg)
EF = Exposure Frequency (days/year)
ED = Exposure Duration (years)
BW = Body Weight (kg)
AT = Averaging Time - period over which exposure is averaged (days)
AF = Soil to Skin Adherence Factor (mg/cm2)
ABS = Absorption Factor

VARIABLE	MEAN	RME	REFERENCES:
CS (mg/kg)	Mean	95% UCL	
IR ADULT (mg/day)	100	100	RAGS (1,2)
SA ADULT (cm2)	5300	5300	DEAP (3)
CF (mg/kg)	0.000001	0.000001	EFH (4)
EF (days/yr)	350	350	RAGS (1,2)
ED - carc. (yr)	5	25	RAGS (1,2)
ED - non-carc. (yr)	5	25	RAGS (1,2)
BW ADULT (kg)	70	70	RAGS (1,2)
AT - carcinogen (years x days)	25550	25550	RAGS (1,2)
AT - non-carcinogen (years x days)	1825	9125	RAGS (1,2)
AF (mg/cm2)	0.2	1	RAGS (1)
ABS ORAL (chemical specific)	CHEMICAL-SPECIFIC		
ABS DERMAL (chemical specific)	CHEMICAL-SPECIFIC		

NOTES :
(1) EPA "RISK ASSESSMENT GUIDANCE FOR SUPERFUND" MANUAL, DECEMBER 1989, EPA/540/1-89/002.
(2) SUPPLEMENTAL GUIDANCE: "STANDARD DEFAULT EXPOSURE FACTORS", OSWER DIRECTIVE: 9285.6-03, MARCH 25, 1991.
(3) "DERMAL EXPOSURE ASSESSMENT : PRINCIPLES AND APPLICATIONS", EPA/600/8-91/011B, JANUARY 1992.
(4) EXPOSURE FACTORS HANDBOOK, EPA/600/8-89/043, MARCH 1990.

TABLE : 14

MEDIA CONCENTRATIONS/CONSTANTS

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

PARAMETER	MEAN mg/kg	RME mg/kg	ORAL CSF 1/(mg/kg/d)	ORAL RfD mg/kg/d	ORAL ABSORPTION FACTOR (%/100)	DERMAL ABSORPTION FACTOR (%/100)
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	7.30E-01	NA	0.50	0.01
BENZO(A)PYRENE	5.37E-01	1.35E+00	7.30E+00	NA	0.50	0.01
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	7.30E-01	NA	0.50	0.01
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	7.30E+00	NA	0.50	0.01
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	7.30E-01	NA	0.50	0.01
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	7.70E+00	7.00E-05	0.50	0.01
METALS						
ARSENIC	6.00E+00	6.70E+00	1.75E+00	3.00E-04	0.50	0.01
LEAD	2.15E+02	4.57E+02	NA	1.40E-03	0.50	0.01

NA= Not Available

TABLE : 15

EXPOSURE, RISKS AND HAZARD CALCULATIONS

SITE : J-LOT SITE
SECTOR : SURFACE SOIL
LOCATION : NA
MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

	LIFETIME AVERAGE DAILY INTAKE (mg/kg/day)		LIFETIME UPPER BOUND EXCESS CANCER RISK		ANNUAL AVERAGE DAILY INTAKE (mg/kg/d)		HAZARD QUOTIENT CDI/RfD	
PARAMETER	MEAN	RME	MEAN	RME	MEAN	RME	MEAN	RME
PAHs								
BENZO(A)ANTHRACENE	4.36E-08	9.62E-07	3.19E-08	7.03E-07	6.11E-07	2.69E-06	NV	NV
BENZO(A)PYRENE	3.18E-08	6.79E-07	2.32E-07	4.96E-06	4.46E-07	1.90E-06	NV	NV
BENZO(B)FLUORANTHENE	5.27E-08	1.18E-06	3.85E-08	8.63E-07	7.38E-07	3.31E-06	NV	NV
DIBENZO(a,h)ANTHRACENE	1.49E-08	2.23E-07	1.09E-07	1.63E-06	2.09E-07	6.24E-07	NV	NV
INDENO(1,2,3-cd)PYRENE	3.27E-08	6.58E-07	2.39E-08	4.80E-07	4.57E-07	1.84E-06	NV	NV
PCBs								
AROCLOR-1254	3.91E-08	5.48E-07	3.01E-07	4.22E-06	5.48E-07	1.53E-06	7.83E-03	2.19E-02
METALS								
ARSENIC	3.56E-07	3.38E-06	6.23E-07	5.91E-06	4.98E-06	9.45E-06	1.66E-02	3.15E-02
LEAD	1.27E-05	2.30E-04	NV	NV	1.78E-04	6.45E-04	1.27E-01	4.61E-01
	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:						HAZARD INDEX:	
			1.36E-06	1.88E-05			1.52E-01	5.14E-01

NV = No Value

TABLE : 16

SUMMARY TABLE

SITE : J-LOT SITE
SECTOR : N/A
LOCATION : ON-SITE

MEDIA : SOIL
EXPOSURE SCENARIO : RESIDENTIAL - ADULT

PARAMETER	MEAN mg/kg	RME mg/kg	LIFETIME UPPER BOUND EXCESS CANCER RISK MEAN	LIFETIME UPPER BOUND EXCESS CANCER RISK RME	HAZARD QUOTIENT CDI/RfD MEAN	HAZARD QUOTIENT CDI/RfD RME
PAHs						
BENZO(A)ANTHRACENE	7.36E-01	1.91E+00	3.19E-08	7.03E-07	NV	NV
BENZO(A)PYRENE	5.37E-01	1.35E+00	2.32E-07	4.96E-06	NV	NV
BENZO(B)FLUORANTHENE	8.89E-01	2.35E+00	3.85E-08	8.63E-07	NV	NV
DIBENZO(a,h)ANTHRACENE	2.52E-01	4.43E-01	1.09E-07	1.63E-06	NV	NV
INDENO(1,2,3-cd)PYRENE	5.51E-01	1.31E+00	2.39E-08	4.80E-07	NV	NV
PCBs						
AROCLOR-1254	6.60E-01	1.09E+00	3.01E-07	4.22E-06	7.83E-03	2.19E-02
METALS						
ARSENIC	6.00E+00	6.70E+00	6.23E-07	5.91E-06	1.66E-02	3.15E-02
LEAD	2.15E+02	4.57E+02	NV	NV	1.27E-01	4.61E-01
	TOTAL ADDITIONAL ESTIMATED CANCER RISKS:		1.36E-06	1.88E-05	HAZARD INDEX: 1.52E-01	5.14E-01

NV = No Value
ND = Not Detected