Worldwide Facilities Group
Environmental & Regulatory Support
Remediation Team
Argonaut A /1004 H-M/C 482-310-004
Joseph B. Medved, P.E., CIH

October 10, 1997

Ms. Mirtha Capiro
Project Coordinator for MID 041 793 340
RCRA Enforcement Branch (HRE-8J)
U.S. EPA, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Via Personal Delivery

Re: In the Matter of General Motors Corp. (Saginaw Metal Casting Plants), U.S. EPA Docket No. V-W-003-95

Subject: Addendum to Description of Current Conditions Report, Saginaw Metal Casting Operations ("SMCO"), Saginaw, Michigan

Dear Ms. Capiro:

On behalf of General Motors (GM), and consistent with the schedule discussed in our September 29, 1997 conference call, enclosed are two copies of an Addendum to the Description of Current Conditions Report (DOCC) which was originally filed with the USEPA in August, 1995.

The purpose of this Addendum is to:

- Address comments concerning the DOCC received from the USEPA in your June 11, 1997 correspondence, our August 4, 1997 meeting at USEPA's Chicago offices, and our September 29, 1997 Conference Call;
- Clarify information in the original DOCC; and
- Update the DOCC to incorporate additional information that has been generated since the original DOCC was submitted;

485 West Milwaukee Avenue • Detroit, MI 48202-3220 • Phone (313) 556-0813 • FAX (313) 556-0803
Internet: LNUSGMB.VZX6N2@gmeds.com

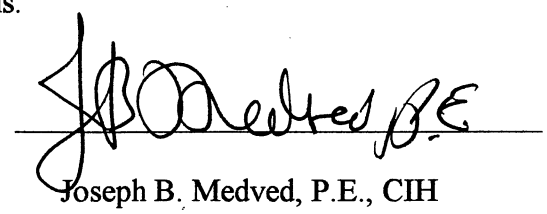
It is our understanding that further discussions regarding USEPA's comments on the RFI Workplan will be held during your site visit, which is currently scheduled for October 29 & 30, 1997. In the interim, please feel free to contact Jim McGuigan at EMCON, Jim Jorgensen on 517-894-7200 or myself on 313-556-0813.

Sincerely,

Joseph B. Medved, P.E., CIH
Project Manager

cc: Shin H. Ahn, P.E., Tetra Tech EM Inc.
Jim Sygo, Chief; Waste Management Division (WMD), MDEQ
Ed Haapla, District Supervisor, WMD, MDEQ, Bay City
Dr. Lisa Williams, U.S. DOI, E. Lansing Field Ofc., F&WS
James L. Jorgensen, GM Remediation Team
Jeff Braun, Esq., GM Legal Staff

I certify 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 gathered and evaluated 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.

Signature: 

Name: Joseph B. Medved, P.E., CIH

Title: GM Remediation Project Manager

Date: October 10, 1997

ADDENDUM TO

DESCRIPTION OF CURRENT CONDITIONS REPORT

GENERAL MOTORS CORPORATION
SAGINAW METAL CASTING OPERATIONS

SAGINAW, MICHIGAN

October, 1997

Prepared by

EMCON
603 East Diehl Road, Suite 123
Naperville, Illinois 60563-1477

Project 84068-063.005

CERTIFICATION STATEMENT

"I certify 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 gathered and evaluated 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."

SEE ATTACHED CERTIFICATION LETTER

_____ _____

Joseph B. Medved, P.E., CIH
GM Remediation Project Manager

Date

General Motors Corporation
Worldwide Facilities Group
Remediation Team

DISTRIBUTION LIST

USEPA RCRA Enforcement Branch, Project Coordinator	Mirtha Capiro (2 copies)
Tetra Tech EM Inc., USEPA Contractor	Shin H. Ahn, P.E.
MDNR Waste Management Division Chief	Jim Sygo
MDNR Waste Management Division, District Supervisor	Ed Haapla
USDOI, East Lansing Field Office	Dr. Lisa Williams
GM Project Manager	Joseph Medved, P.E., CIH
GM Field Representative	James Jorgensen, P.E.
GM Legal Counsel	Jeff Braun, Esq.
EMCON Principal-in-Charge	James J. McGuigan, P.E.
EMCON Project Manager	James J. McGuigan, P.E.
EMCON Document Coordinator	Amy Landgraf
EMCON Senior Peer Reviewer	Sally Bilodeau
PTI Quality Assurance Officer	Laura Jones

CONTENTS

1 INTRODUCTION

2 FACILITY DESCRIPTION

3 ENVIRONMENTAL SETTING

4 SUMMARY OF ENVIRONMENTAL PERMITS, ENFORCEMENT ACTIONS, AND REPORTS

5 SITE GEOGRAPHIC REGIONS AND AREAS OF INTEREST

6 REGION A: MISCELLANEOUS SLUICE SAND AND BULK STORAGE AREA AOI SUMMARY

7 REGION B: FORMER PARTS PLANT AOI SUMMARY

8 REGION C: PROCESS WATER RESERVOIR

9 REGION D: GREY IRON PLANT AOI SUMMARY

10 REGION E: RIVERDOCK AREA AOI SUMMARY

11 REGION F: AMDC BUILDING AND ADMINISTRATIVE BUILDING AOI SUMMARY

12 REGION G: FORMER NODULAR IRON PLANT AOI SUMMARY

13 REGION H: WASTEWATER TREATMENT SYSTEM AND STORMWATER DISCHARGE DITCH AOI SUMMARY

14 REGION I: CLASSIFIED SAND STAGING AREA AOI SUMMARY

15 REGION J: ON-SITE LANDFILL AOI SUMMARY

16 SUMMARY OF EXISTING DEGREE AND EXENT OF CONTAMINATION

CONTENTS (Continued)

17 INTRODUCTION TO THE RFI FACILITY INVESTIGATION

18 MISCELLANEOUS RELEASES

19 REFERENCES

LIST OF APPENDICES

APPENDIX 1
There are no Appendices corresponding to Section 1

APPENDIX 2
There are no Appendices corresponding to Section 2

APPENDIX 3
3.1 1995 Topographic Map (Scale 1" = 300')

3.2 1995 Topographic Map (Scale 1" = 100')

3.3 1997 Topographic Map (Scale 1" = 100')

APPENDIX 4
There are no Appendices corresponding to Section 4

APPENDIX 5
There are no Appendices corresponding to Section 5

APPENDIX 6
There are no Appendices corresponding to Section 6

APPENDIX 7
There are no Appendices corresponding to Section 7

APPENDIX 8
There are no Appendices corresponding to Section 8

APPENDIX 9
9.1 D.1 Current Grey Iron Oil House - RCRA Hazardous Waste Drum Accumulation Area

9.2 D.17 Former Grey Iron Oil House UST (G.I. #1)

9.3 D.18 Former Grey Iron Oil House USTs (G.I. #2 and G.I. #3)

LIST OF APPENDICES (Continued)

9.4 D.28 10/23/87 #8 Mold Line PCB Release

9.5 D.32 Contamination in Railroad Tracks West of the Cupola Cooling Tower

9.6 Grey Iron Garage Annex UST (G.I. #5)

APPENDIX 10

10.1 E.12 Riverdock Crane Repair Building UST (GI #9)

APPENDIX 11

There are no Appendices corresponding to Section 11

APPENDIX 12

12.1 G.4 Former (Original) Desulfurization Slag RCRA Treatment Unit - MDNR Inspection Reports

12.2 G.4 Former (Original) Desulfurization Slag RCRA Treatment Unit - 10/14/93 Arsenic Investigation Report

12.3 G.5 Former (Replacement) Desulfurization Slag RCRA Treatment Unit - MDNR Inspection Reports

12.4 G.7 Basement Sumps - Groundwater Investigation

12.5 G.7 Basement Sumps - Report on Storm Water Collection and Treatment

12.6 G.12 Former Nodular Iron Plant Oil House USTs South (N.I. #3, N.I. #4, N.I. #5, and N.I. #6)

12.7 G.16 Possible Chlorobenzene Release - MDNR Conversation Records

12.8 G.4 Former (Original) Desulfurization Slag RCRA Treatment Unit - Groundwater Analytical Summary

APPENDIX 13

13.1 Subsurface Investigation Work Plan for Water Recycle System

LIST OF APPENDICES (Continued)

13.2 Recycle Water System Drawing

13.3 H.3 Stormwater Discharge Ditch - MDNR Notice of Violation Letter

APPENDIX 14
14.1 Recyclable Materials Analytical Data

14.2 An Investigation of Groundwater Contamination by Organic Compounds Leached from Iron Foundry Solid Wastes

14.3 *Draft* Subsurface Investigation Workplan for Sand Areas

APPENDIX 15
15.1 On-Site Landfill - Additional Information

APPENDIX 16
There are no Appendices corresponding to Section 16

APPENDIX 17
There are no Appendices corresponding to Section 17

APPENDIX 18
There are no Appendices corresponding to Section 18

1 INTRODUCTION

In accordance with Task I of Attachment II to the Unilateral Administrative Order (Order), USEPA Document No. V-W-003-95, issued under Section 3008(h) of the Resource Conservation and Recovery Act (RCRA) to the General Motors Corporation (GM), on June 9, 1995 by the U.S. Environmental Protection Agency - Region V (USEPA), and effective on July 9, 1995, a Description of Current Conditions (DOCC) Report was submitted to USEPA on August 21, 1995. In correspondence dated June 11, 1997, USEPA stated that they had completed their review of the DOCC. The correspondence provided comments on both the DOCC and the RFI Workplan. These comments were discussed in a meeting at the USEPA's Chicago, IL offices on August 4, 1997. On September 12, 1997, GM provided USEPA a written preliminary response to USEPA's comments. USEPA replied in correspondence dated September 18, 1997, stating that GM's proposal to address DOCC comments in the form of an Addendum to the original DOCC was acceptable. The DOCC Addendum was further discussed in a telephone conference call on September 29, 1997. Based on these discussions, it was agreed that this Addendum to the DOCC would be submitted.

The purpose of this Addendum is to:

- Address comments concerning the DOCC received from USEPA in the June 11, 1997 correspondence, the August 4, 1997 meeting at USEPA, and the September 29, 1997 telephone conference call;
- Clarify information in the original DOCC;
- Update the DOCC to incorporate additional information that has been gathered and/or generated since the original DOCC was submitted; and
- Update the DOCC to include a description of events that have transpired since the original DOCC was submitted.

This Addendum follows the same format as the original DOCC. The Section numbers and titles are identical to the original DOCC. Where additional information and/or clarification is provided, it is referenced to the section in the original DOCC that discussed the information.

In addition, the following clarifications and general update information are being provided.

There are numerous references in the original DOCC to the Michigan Department of Natural Resources (MDNR). In the past this was the official title of the State regulatory agency responsible for environmental regulations. Subsequent to the publishing of the original DOCC, the State of Michigan reorganized the MDNR and split off the majority of environmental regulatory authority to a new department, the Michigan Department of Environmental Quality (MDEQ). Therefore, environmental programs described in the original DOCC referencing the MDNR may now be under the direction of the MDEQ.

A list of references utilized in compilation of the DOCC is included in this Addendum. This list is comprised of documents that were utilized in the compilation of the DOCC, but not included as Appendices. If a document is included as an Appendix in the DOCC or this Addendum, then it is not included on the reference list. Documents included in the reference list will be available for review, and copies of select documents are available upon request.

The original DOCC contains numerous tables summarizing available analytical laboratory data (i.e., Tables 6.1, 6.3, etc.). As a point of clarification, unless otherwise noted as a footnote to the table, blank spaces in these tables would indicate that data was not available for that particular parameter on that particular sample. If a particular constituent was analyzed for and not detected it would be noted on these tables as either not detected (ND) or reported as less than the detection limit.

In the original DOCC information was provided for each Area of Interest (AOI) when it was available. Several of the AOIs are no longer present (i.e., the Parts Plant and the Nodular Iron Plant have been dismantled) and the information provided in the DOCC was obtained based on our review of available file materials and interviews with former plant employees. In general, if information was not provided for a particular AOI it is likely that it was not available. For example, information on the existence of several AOIs (particularly at the Parts Plant) was obtained from historic drawings and maps. In many instances the closure/removal of these areas was not specifically documented, and therefore no specific information is available. A general statement could be made that since operating foundries produce an excess of recyclable sand materials, these materials were historically utilized to fill depressions, basements, etc.

2 FACILITY DESCRIPTION

2.1 Facility History, Ownership, and Surrounding Land Use

The terms "Process Water Reservoir", "Intake Water Reservoir", "Recycle Water Reservoir", and "River Reservoir" have historically been used to describe a site feature north of the Grey Iron Plant adjacent to the Saginaw River. In the DOCC we attempted to use consistent terminology throughout the text and figures. Unfortunately, several of the figures in the DOCC are simply file copies of available materials, and this feature is referred to by several names throughout the history of the site. We did not alter historical drawings, and therefore, it should be noted that the above referenced terms all refer to the same site feature.

The DOCC provided Facility and Adjoining Property Ownership information which was included in Appendix 2.3. The information on adjacent property ownership presented in the Table in this Appendix was prepared by Spicer Engineering of Saginaw, Michigan in June of 1994.

2.2 Physical Layout and Operations

Section 2.2.2 of the DOCC provides information on various recyclable materials that are generated during the foundry process. The amount of these recyclable materials generated varies with the production rate at the facility. As discussed in Section 2.1 of the DOCC in the site history section, both the Grey Iron Foundry and the Nodular Iron Foundry underwent several major expansions or modernizations over time. Each of these expansions/modernizations would have an impact on the quantities of recyclable materials being generated.

The Grey Iron Plant currently produces the following estimated quantities of recyclable materials:

- CORE SAND (Core Butts): 30,000 Tons/year
- CASTING SAND (Metals Reclamation Sand): 33,000 Tons/year
- QUENCHED SLAG: 1000 Tons/year
- CLASSIFIED SAND (from WW Treatment System): 60,000 Tons/year

It is estimated that the amount of recyclable materials generated from the Grey Iron Foundry was at its peak in the late 1970s, early 1980s.

The Nodular Iron Plant ceased production in 1987, and therefore no recyclable materials are currently being generated from the Nodular Iron Facility. It is estimated that during the operating life of the facility the following quantities of recyclable materials were typically generated:

- CORE SAND (Core Butts): 10,000 Tons/year
- CASTING SAND (Metals Reclamation Sand): 20,000 Tons/year
- DESULFURIZATION SLAG 10,000 Tons/year
- CLASSIFIED SAND (from WW Treatment System) 25,000 Tons/year

The Site Plan included in the DOCC (Figure 2.2) does not show the property line for the facility along the Saginaw River. The facility was acquired over several years as separate parcels. Historically the property line is shown on some parcels as the center of the river, and on other parcels to the river bank. In either case the property along the northwest side of the site goes up to the river. We believe the actual property line is likely governed by Michigan law regarding ownership rights to the river.

3 ENVIRONMENTAL SETTING

3.1 Topography and Surface Water Drainage

The DOCC contained a topographic map of the site that was based on a 1990 aerial photograph. A more recent 1995 topographic map of the entire facility is provided in this Addendum as **Appendix 3.1**. This topographic map is provided on a single sheet at a scale of 1" = 300'. The same 1995 topographic map is provided on 7 sheets at a scale of 1" = 100' in **Appendix 3.2**.

We have also appended, as **Appendix 3.3** two 1997 topographic maps of specific site features. The scale on these topographic maps is 1" = 100'. These site feature include:

- the On-Site Landfill located at the extreme northeast corner of the facility;
- the Core Sand (Core Butts) Pile located immediately north of the Grey Iron Plant, south of the Process Water Reservoir;
- the Casting Sand (Metals Reclamation) Pile (Pile A) located northeast of the Power House adjacent to Highway M-13;
- the Casting Sand (Metals Reclamation) Pile (Pile B) located northwest of the Power House; and
- the Classified Sand Pile (from WW Treatment Plant) located south of the Primary Settling Lagoons on the south side of the C & O Railroad R.O.W.

These areas are subject to major topographic changes due to the addition of materials (i.e., the filling of the landfill), or the removal of materials from the facility (i.e., the shipment off-site of stockpiled recyclable materials for reuse).

3.3 Regional and Site Hydrogeology

Section 3.3.2 of the DOCC describes a surficial or perched groundwater unit occurring beneath site fill materials (foundry sand) and above the harder, less-permeable clay layers. These clay layers extend from the former natural surface to bedrock. As a point of clarification the clay layers can be generally classified into two distinct clay units. The upper clay unit is comprised of 15 to 20 feet of brown clay till while the lower intervals

extending to bedrock are primarily grey in color. A transitional zone of brown clay changing to grey clay is usually located between 10 to 20 feet into the till. This situation is very common in Midwestern glacial tills and usually represents an upper physically and chemically (oxidized) weathered glacial till. These weathered brown tills would exhibit different physical and hydrogeological characteristics than the lower grey clays. These difference will be further evaluated during performance of the RFI Workplan.

Figure 2-10 in the DOCC shows existing monitoring wells for the facility. With the exception of the monitoring well network for the landfill, these wells were installed for isolated areas to address a specific concern (i.e., an UST Closure Assessment). These wells were installed at various points in time by different drillers, employing different well materials and different depths. Therefore, we do not believe that these isolated wells serve as a good basis for a site-wide hydrogeological contour map. There is a comprehensive *Hydrogeologic Monitoring Plan* for the on-site landfill. We believe this plan, which has received approval from the MDEQ, adequately addresses groundwater monitoring issues in proximity to the landfill. A copy of the *Hydrogeologic Monitoring Plan* and MDEQ's approval of the plan is included as an Appendix to Section 15 - On-Site Landfill AOI Summary of this Addendum.

3.5 Description of Surrounding Habitat

A review of the National Wetland Inventory Maps published by the U.S. Department of Interior, Fish and Wildlife Service, was performed and included in the DOCC. Any necessary field activity, including identification and classification of wetlands, will be performed as part of the subsequent field investigations and/or ecological assessments.

For purposes of the DOCC, available files and literature were reviewed and the MDNR and the U.S. Department of Interior, Fish and Wildlife Service were contacted in an effort to obtain information on local flora and fauna. Additional information will be collected during subsequent phases of the actual field investigation and during performance of the Ecological Risk Assessment.

Section 3.5.2 of the DOCC contained information regarding flood plains in proximity to the facility and provided the Flood Insurance Rate Maps published by the Federal Emergency Management Agency. The maps indicate the 100-year flood plain. By definition the 100-year flood plain is a flood that has the mathematical probability of occurring once every 100 years. Storms with a lower recurrence frequency (i.e., 25-year storms) would produce less flooding. The last significant flooding at the plant occurred in September, 1986. Based on reports from plant personnel, during the September, 1986 flood the entire roadway (Highway M-13) between the Grey Iron Plant and the Nodular Iron Plant was inundated with floodwaters. Portions of the front lawn of the Nodular Iron

Plant along Highway M-13 were also inundated. The Grey Iron and Nodular Iron manufacturing facilities were not impacted.

The DOCC indicated that the king rail, Rallus Eleganous, although present in the nearby Crow Island State Game Area marshes, cannot fly and is therefore confined to the wetland habitats found at the State Game Area. This is incorrect. The king rail, though it shows a preference for walking and running, can fly and is a migratory species. The availability of habitat at the GM Facility for the king rail will be evaluated as part of the Ecological Risk Assessment.

4 SUMMARY OF ENVIRONMENTAL PERMITS, ENFORCEMENT ACTIONS, AND REPORTS

There is no Addendum information for this Section of the original DOCC.

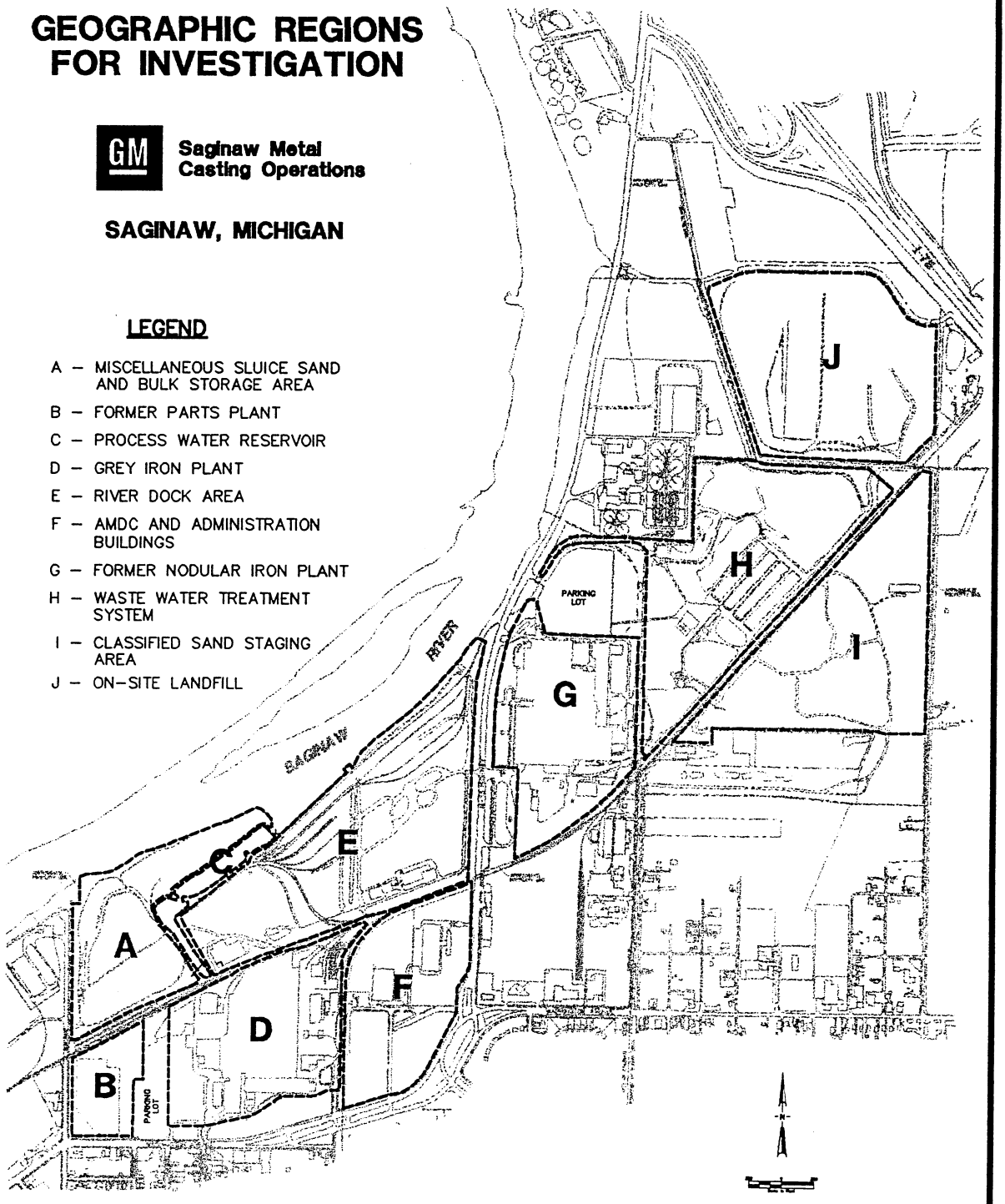
5 SITE GEOGRAPHIC REGIONS AND AREAS OF INTEREST

Figure 5.1, which is titled, "Geographic Regions of Investigation", was not labeled as Figure 5.1 in the original DOCC. A revised copy of this Figure is enclosed in this Addendum as the following page.

GEOGRAPHIC REGIONS FOR INVESTIGATION

Saginaw Metal Casting Operations

SAGINAW, MICHIGAN



emcon

DATE 9/19/95
DWN. PPV
APPR.
REVIS.
PROJECT NO.
84068063

FIGURE 5–1
GM SAGINAW
METAL CASTING OPERATIONS
SAGINAW, MIGHIGAN

f: \dwg\84068063\LIGMSP01.DWG PLOT 1=1350 9/19/95

6 REGION A: MISCELLANEOUS SLUICE SAND AND BULK STORAGE AREA AOI SUMMARY

A.1 Current Quench Slag Staging Area "B"

The DOCC states that the quench slag staging area covers approximately 120,000 square feet. The area shown on Figure 6.1 in the DOCC shows the quench slag staging area as approximately 333,000 square feet. The staging area shown on Figure 6.1 is larger because the quench slag has historically been stored throughout the area indicated on the Figure. When the DOCC was prepared in August of 1995, the "current" extent of the pile was as described (120,000 square feet). The dimensions on these piles change over time. More recent topographic information on the quench slag pile is shown on the topographic maps included in **Appendix 3.1** to this Addendum.

A.2 Former Bulk Raw Materials Storage

At the time the DOCC was prepared this area of the facility was not in use. Presently the area is being leased to an asphalt pavement company for the production of asphalt road mix in a batch plant.

A.3 Former Sluice Sand Settling/Reclaim Area

The ponds in this area were filled and closed sometime after 1983. No documentation on sampling or dredging of these ponds was available in the file material reviewed. These ponds were historically used as settling ponds for "sluiced" sand. "Sluicing" refers to the process of transporting particulate matter (sand) in a running water flow. The sluiced water was most likely pumped to this area via a series of pipes, but specific drawings were not found during our file review.

No specific historic analytical data was available for the sand that was sluiced to this area. The Grey Iron Foundry manufacturing process has remained relatively unchanged over the life of the facility. Therefore, the analytical data collected on the classified sand currently generated in the existing wastewater treatment system would be applicable to the sand placed in this area. Information regarding analytical data for the classified sand

was contained in Section 14 of the original DOCC and additional information is presented in Section 14 of this Addendum.

7 REGION B: FORMER PARTS PLANT AOI SUMMARY

B.1 Former Parts Plant RCRA Hazardous Waste Drum Storage Area

The status of the Parts Plant RCRA Storage Pad Closure appears to be in question. As stated in the DOCC the pad was closed and the USEPA was notified of the closure on 2/20/89. The USEPA has documentation that the closure went to Public Comment, but has no documentation after that point in time.

Table 7.1 Region B Areas Unlikely to Affect the Environment

Figure 2.4 in the DOCC is a 1977 Parts Plant Facility Map. A laboratory is shown in the northeast corner of the Parts Plant. Based on interviews with personnel from the Former Parts Plant, the laboratory in question was a production QA/QC laboratory - primarily utilized for metallurgical testing and some wet chemistry. Information on this laboratory was added to Table 7.1. A revised copy of Table 7.1 with this information included is included at the end of this Section.

Table 7.1

Region B Areas Unlikley to Affect the Environment

NAME	DESCRIPTION/SIZE	LOCATION	PERIOD OF OPERATION	MATERIAL MANAGED	RELEASE HISTORY
Former Chlorothene VG (1,1,1-TCA) AST	An aboveground tank (AST) inside, on a stand above the concrete floor for removal of residual oil and grease from gear cutting tools.	Inside the Electrical Department, on the west side of the Former Parts Plant.	1962 - 1983	Chlorothene VG (a.k.a. Methyl Chloroform or 1,1,1-Trichloroethane; 1,1,1-TCA)	There was no documented release. This item was removed concurrently with or prior to the demolition of the Former Parts Plant.
Former Degreaser Tank	Single AST located inside on a concrete pad.	Inside the NE portion of the building.	1962 - 1975	Solvent (primarily 1,1,1-TCA; also a report of TCE), also waste oil and paint removed from parts.	There was no information contained in the file material to document a release.
Former Deruster Tanks	Two ASTs inside, on a concrete pad.	Inside the NE part of the plant on the plant floor, and subsequently moved to a location north of this; by the corner of the laboratory.	Reported to be in operation from 1962 - 1982, no documentation as to when it actually began.	Approximately 20% phosphoric acid solution, soluble oil.	There was no information contained in the file material to document a release.
Former Manganese Phosphate Dip Tank	Single AST located inside on the concrete floor.	Inside the north part of the building.	Terminated at building closure in 1982; no documentation as to when it began.	Manganese phosphate and any residual material which rinsed off during dipping.	There was no information contained in the file material to document a release.
Former Lubrite System	System of ASTs placed inside on a concrete pad.	Middle of the plant production floor, in the approximate center of the Former Parts Plant.	Terminated at building closure in 1982; no documentation as to when it began.	Iron phosphate, soluble oil and residual materials, which were washed or rinsed off during the process.	There was no information contained in the file material to document a release.
Former Tin Plater	Single AST inside, on a concrete pad.	Middle of the plant production floor, just south of the lubrite system.	Terminated at building closure in 1982; no documentation as to when it began.	Alkaline cleaner, potassium stannate, rinse water and residual metal which was washed or rinsed off (no cyanide).	There was no information contained in the file material to document a release.
Former Bulk Storage Tanks	Multiple ASTs located within a diked area inside the Former Parts Plant Oil House.	Inside the Oil House building, north of the Former Parts Plant.	'1940 - 1985	Reportedly hydraulic oil, C-60 soluble oil and cutting oils.	There was no information contained in the file material to document a release.
Former Waste Oil Cooker Unit	Two "waste oil cooker" ASTs and a packed bed scrubber, on the second floor inside the Waste Water Treatment Plant.	Second floor of the Former Parts Plant Wastewater Treatment Plant.	1971 - 1983	Waste oil, wastewater and residual solids (i.e. iron, steel, aluminum).	There was no information contained in the file material to document a release and, since this unit was contained on the second floor of a building which has been removed, no evidence exists of its former presence.
Former Paint Spray Booth	Water wall type paint spray booth with filter packs inside the building.	East of engine assembly line, inside the NW portion of the plant.	1976 - 1983	Waste paints, sludges and solvents.	There was no information contained in the file material to document a release.
Former Battery Charging Area	Equipment placed on stands on a concrete floor inside the garage.	Behind the six car garage on the west side of the plant.	1974 - 1983	Batteries containing acids and metals, no wastes.	There was no information contained in the file material to document a release.

Table 7.1

Region B Areas Unlikley to Affect the Environment

NAME	DESCRIPTION/SIZE	LOCATION	PERIOD OF OPERATION	MATERIAL MANAGED	RELEASE HISTORY
Former PCB-Containing Transformer Fluid Leak	An insulator on a PCB containing transformer unit was reportedly broken while it was being moved and leaked into a containment pan and overflowed onto the concrete floor inside.	"Tarpaper Shack" area within the Former Parts Plant.	October 6, 1980	Approximately 135 gallons of fluid, reportedly PCB-containing, although no lab data was contained in the file material.	The fluid was recovered to 55-gallon drums and absorbent was used to remove the fluid from the concrete floor.
Former Parts Plant Oil House	Approximately 40' x 40' building with concrete walls and floor, utilized for drum storage and containing ASTs.	Attached to the north side of the Former Parts Plant.	1940 - 1982	Primarily drums of product oils (cutting oils, lubricating oils, hydraulic oils, etc.). Waste was reportedly not staged in this area.	There was no information contained in the file material to document a release.
Former QA/QC Laboratory	Production QA/QC laboratory primarily utilized for metallurgical testing and some wet chemistry.	Northeast corner of Parts Plant, just south of Oil House.	Terminated at building closure in 1982; no documentation as to when it began.	Small quantities of laboratory grade chemicals.	There was no information contained in the file material to document a release.

8 REGION C: PROCESS WATER RESERVOIR

C.1 Process Water Reservoir

NOTE: This site feature historically has also been referred to as the "Intake Water Reservoir", "Recycle Water Reservoir", and the "River Reservoir".

The DOCC states that the estimated surface area and volume of the process water reservoir is 266,000 square feet and 12 million cubic yards, respectively. The units for the volume of the reservoir should be million gallons, not million cubic yards.

9 REGION D: GREY IRON PLANT AOI SUMMARY

D.1 Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area

The Facility has been working with the MDEQ to obtain closure on the RCRA Drum Accumulation Area. Information regarding the closure of this area subsequent to the submittal of the original DOCC has been included in **Appendix 9.1** of this Addendum.

D.9 Current Small Core Sand Staging Area

The DOCC text states that there is a small pile of core sand staged outdoors just north of the Grey Iron Oil House that is possibly contaminated with "TEA". The acronym "TEA" is utilized at the facility for the chemical triethylamine. Triethylamine is used as a catalyst to harden the cores. A brief description on the different types of cores is given in the DOCC in Section 2.2.2. This area is presently utilized as the daily core butt pile. Core butts are placed in this pile and accumulate over the course of a day. At the end of each day the pile is removed and taken to the core butt staging area located north of the Grey Iron Main Building and the Advanced Development Lab.

D.17 Former Grey Iron Oil House UST (G.I. #1)

The Facility has been working with the MDEQ to close this UST. Information regarding the closure of this UST subsequent to the submittal of the original DOCC is included in **Appendix 9.2** of this Addendum.

D.18 Former Grey Iron Oil House USTs (G.I. #2 and G.I. #3)

A site assessment report documenting the removal of these two USTs was submitted to the Michigan State Police, Fire Marshal Division on June 23, 1993. The report was reviewed by the Fire Marshal Division staff and returned to GM on 7/6/93. Based on the Fire Marshal's review it was determined that "The contaminant concentrations are below

the threshold detection levels and there is no evidence of a confirmed release." A copy of the Site Assessment Report and the Fire Marshal's signed review report is included as **Appendix 9.3** of this Addendum.

D.19 Former Gasoline UST (G.I. #4)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

D.20 Former Garage Annex UST Service Maintenance Site (G.I. #5)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

D.21 Former Garage Oil/Water Separator UST (G.I. #7)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

D.22 Former Garage Annex Oil/Water Separator UST (G.I. #8)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

D.23 Former Cooling Tower UST (G.I. #10)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

D.28 10/23/87 #8 Mold Line PCB Release

Remediation of this area has been ongoing since the submittal of the DOCC. Updated information on activities in this area since submittal of the DOCC is included as **Appendix 9.4.**

D.32 Contamination in Railroad Tracks West of the Cupola Cooling Tower

Remediation of this area has been ongoing since the submittal of the DOCC. Updated information on activities in this area since submittal of the DOCC is included as **Appendix 9.5.**

Table 9.16 Region D Areas Unlikely to Affect the Environment

This Table includes a former gasoline UST (Original G.I. #5) that was removed circa 1977. This tank was located immediately north of the Grey Iron Plant Garage. It is not included as an AOI since two other USTs (G.I. #5 and G.I. #8) were subsequently removed, investigated, and remediated in this area. If contamination were present from Original G.I. #5, it would have likely been detected during these UST removals. A copy of the Site Assessment Report dated October 3, 1995 and the State MDEQ's letter confirming "that the corrective action at the site has resulted in UNRESTRICTED RESIDENTIAL USE of the site" is attached as **Appendix 9.6** to this Addendum.

Appendix 9.1 (Original DOCC) Plan Sheet of Waste/Material Storage Areas

This appendix provided a map that shows additional waste material storage areas; however, a north arrow was not included on the map. This map was from existing file material. The file copy does not have a north arrow. Based on the layout shown on the map, we believe north would be to the left.

10 REGION E: RIVERDOCK AREA AOI SUMMARY

E.11 Former Riverdock Crane Repair Building UST (G.I. #6)

This UST has received closure from the MDEQ and therefore investigation of this area under the RFI is not warranted.

E.12 Riverdock Crane Repair Building UST (G.I. #9)

This UST was abandoned in-place (filled with sand) in 1978 due to its inaccessibility (located beneath the overhead door of the Crane Repair Building). Although sampling for closure was not conducted specific to this tank, a closure assessment was conducted for UST G.I. #6 which was located approximately 10' west of this UST. UST G.I. #6 has received closure from the MDEQ. We have included the most recent information pertaining to the closure of UST G.I. #6 as **Appendix 10.1** to this Addendum. Due to the proximity of G.I. #9 to G.I. #6, we do not believe that an investigation of G.I. #9 is warranted under the RFI Workplan.

11 REGION F: AMDC BUILDING AND ADMINISTRATIVE BUILDING AOI SUMMARY

There is no Addendum information for this Section of the original DOCC.

12 REGION G: FORMER NODULAR IRON PLANT AOI SUMMARY

General Note: The Nodular Iron Plant is undergoing decommissioning. Since the original DOCC was filed the majority of the superstructure of the main building has been demolished and removed from the site. The demolition of the first floor slabs and basements will be undertaken in the near future.

G.2 Former RCRA Hazardous Waste Control Tank (AST)

This section of the DOCC discusses an aboveground storage tank; however, the first sentence in the paragraph refers to "AST(s)". We believe this is a typographical area. To the best of our knowledge only one AST was located at this location. This was a 575 gallon rectangular tank with an open metal grate on the top. 55 gallon drums of waste 1,1,1-trichloroethane would be loaded and unloaded atop this tank. The purpose of the AST was to act as containment in case any 1,1,1-TCA was spilled in the transfer process. This tank did not "store" waste TCA for any extended period of time; it acted as a overfill/spillage safety device.

G.4 Former (Original) Desulfurization Slag RCRA Treatment Unit

The DOCC discusses the original Desulfurization Slag RCRA Treatment Unit and discusses closure activities completed to date. The DOCC also referenced various MDNR inspection reports and correspondence regarding alleged operating violations. Copies of these documents are attached as **Appendix 12.1** to this Addendum.

During closure of this unit a statistically significant increase for arsenic in groundwater was detected in the shallow perched saturated zone. An October 14, 1993 report documents an investigation of the arsenic in the groundwater and concludes that the arsenic levels are related to ammonia concentrations found beneath the Nodular Iron Plant. Excerpts from this report were included in the DOCC. A copy of the entire report is appended to this Addendum as **Appendix 12.2**.

G.5 Former (Replacement) Desulfurization Slag RCRA Treatment Unit

The DOCC discusses the replacement Desulfurization Slag RCRA Treatment Unit and discusses closure activities completed to date. The DOCC also referenced various MDNR inspection reports and correspondence regarding alleged operating violations. Copies of these documents are attached as **Appendix 12.3** to this Addendum.

The DOCC also presents the results of post-excavation sampling as discussed on page 12-10 of the DOCC and summarized on Tables 12.12 through 12.15. The text mistakenly refers to arsenic data contained on Table 12.14. Table 12.14 does not contain any arsenic data for the eleven samples that are summarized on this Table.

G.7 Basement Sumps

The four basement sumps were originally designed to collect stormwater and groundwater from drain tiles and roof drains at the Nodular Iron Plant. They discharged, via a sewer line, directly to the storm water drainage ditch located directly north of the Nodular Iron Plant. The last study done on the groundwater in the vicinity to the sumps was conducted at the southeast corner of the building in June of 1994. A copy of the results of this investigation is included as **Appendix 12.4**. This investigation also discusses the presence of ammonia in proximity to the southeast corner of the main building. It is believed that the source of this ammonia was from the historic dumping of small quantities spent ammonia solution from a blueprint machine at the Nodular Iron Plant. The exact quantities of ammonia discharged at this location it unknown.

On page 12-13 of this section of the DOCC a reference is made to a 1983 report regarding proposed upgrades to the stormwater collection system. This engineering study was authored by Hubbell, Roth & Clark, Inc. as authorized by GM. A copy of the report in its entirety is included as **Appendix 12.5** in this Addendum.

On page 12-15 of the DOCC the text provides information about sampling results for the southwest sump. The units for the last series of reported chemical concentrations was inadvertently omitted from the text. The units on these concentrations are the same as for the remaining constituents listed on the table, parts per billion (ppb).

As referenced at the beginning of this section, the Nodular Iron Plant is currently undergoing dismantlement. The present status of the basement sumps is as follows:

- There is no discharge from the sump system to the stormwater ditch north of the facility. The outlet from the sumps to the ditch has been closed off. The stormwater ditch has been blocked (grouted) at the culverts beneath Veterans

Memorial Parkway. All stormwater sewers under the plant basement were cleaned and sampled. The external stormwater sewers were plugged prior to their discharge point into the stormwater ditch. Stormwater catch basins were removed and backfilled with sand. Stormwater drain lines under the basement will be plugged at the first catch basin upstream of the pump pits.

- The Southeast sump has been abandoned as part of the ongoing demolition
- The Southwest sump pit is operational, but is not connected to any outfall or sewers.
- The Northeast and Northwest sump pits that continue to collect water from the foundation drain system have been routed to the City of Saginaw sanitary sewer.

Upon completion of demolition activities the sumps will be decommissioned and the pumping will cease.

G.8 Former Virgin Oils Storage Pad

The Former Virgin Oils Storage Pad was located south of the Nodular Iron Oil House. It was comprised of a concrete pad that was atop four (4) USTs (USTs N.I. #3, N.I. #4, N.I. #5, and N.I. #6). This pad was removed when the USTs were removed.

G.12 Former Nodular Iron Plant Oil House USTs South (N.I. #3, N.I. #4, N.I. #5, and N.I. #6)

This section of the DOCC describes four USTs that were located south of the Oil House at the Nodular Iron Plant. The USTs at this location were reportedly steel, and they were removed on August 23, 1988. Results of sampling from the tank excavation for these four tanks was presented in the DOCC in Tabular form on page 12-19. The analytical results presented in this Table are for soil samples and the units for the results are mg/kg (PPM). These samples were also analyzed for EP Toxicity metals, and the one sample from beneath the waste oil tank was analyzed for PCBs. The residual waste oil pumped from the waste oil tank was also analyzed for PCBs prior to disposal. No PCBs were detected above the detection limit of 1 ppm. Copies of the laboratory reports for the 8 UST soil samples and the waste manifest and laboratory analysis for the waste oil is appended as **Appendix 12.6** to this Addendum.

G.15 Elevator Hydraulic Leaks

This section refers to spills of hydraulic oil from elevators that were also discussed previously in the DOCC. The previous discussion was contained in Section G.7 Basement Sumps. The discussion on the elevator hydraulic leaks is contained on page 12-13.

G.16 1/26/89 Possible Chlorobenzene Release

The only documentation concerning this possible release is a soil sample result and two MDNR (now MDEQ) telephone conversation record. The laboratory report and the two MDNR Conversation Records have been attached as **Appendix 12.7** to this Addendum.

Table 12.3 Former Waste Paint Shed RCRA Closure

This Table in the DOCC represents soil sampling results after the overexcavation of the area. The original sampling for this area is summarized in Table 12.2. The original samples (Table 12.2) were analyzed for organic and inorganic parameters, as presented in Table 12.2. The east side of the storage pad was excavated, and samples were then collected and analyzed only for those constituents that were above cleanup objectives during the initial round of sampling.

Table 12.8 Original Desulfurization Slag Unit - Groundwater Analytical Summary

This Table summarizes the results of groundwater sampling conducted in proximity to the original desulfurization slag RCRA Treatment Unit. The Table summarizes data from 1990 until 1991. Table 12.8 is referenced in the text on page 12-7. It should be noted that the text, on page12-6, references an earlier study that was conducted in this area, and presents an excerpt from the report that summarizes the data. A copy of this earlier report, in its entirety, is appended as **Appendix 12.8** to this Addendum.

Table 12.23 Soil Sampling Analytical Summary

Table 12.23 is a summary of soil sampling conducted in relation to the Virgin Oils Storage Pad. This was not indicated on the title of the Table.

Tables 12.25 and 12.26 Soil Sampling Analytical Summary

These Tables summarize analytical results in proximity to the Former Virgin Oils Storage Pad. Tables 12.25 and 12.26 do not contain any analytical data for the top three feet of soil since this soil was excavated during removal of USTs N.I. #3, #4, #5, and #6. This is discussed on page 12-16 of the DOCC. The samples summarized in the chart were collected from within the excavation, hence there was no upper three feet of soil to sample.

13 REGION H: WASTEWATER TREATMENT SYSTEM AND STORMWATER DISCHARGE DITCH AOI SUMMARY

Recycle Water System Investigation

On December 27, 1994, the MDNR (now the MDEQ) notified the Facility that the Water Recirculating System may require an MI Act 245 "discharge to groundwater permit". GM has been working with the MDEQ on formulating a workplan to investigate the recycle water system. Copies of pertinent documents related to the proposed investigation have been appended as **Appendix 13.1** to this Addendum. The attached workplan gives available information on the construction and operation of the recycle water system components.

Figure13.2 Recycle Water System Drawing

Figure 13.2 in the DOCC provides a drawing outlining the operation of the recycle water system employed at the facility. A larger copy of this diagram is appended to this Addendum as **Appendix 13.2**. This enlarged drawing should be easier to read.

Basically the recycle water system at the facility collects surface water and process water from the facility and conveys it to one of two primary classifiers via an overhead trestle system. At this point large solids are removed (classified sand) and the water passes on to a series of primary and secondary settling lagoons. Water is pumped out of the secondary settling lagoon into the Process Water Reservoir, from which it is pumped into the plant for use. The water then leaves the plant via the trestle system and the cycle begins again.

Excess water from the system is removed from the secondary settling lagoon, treated in a separate wastewater treatment system, and discharged to the City of Saginaw sanitary sewer system. Water pumped from the secondary settling pond is initially treated in a 750,000 gallon storage tank utilized for phenol destruction. The water then passes through a filter press to remove suspended particles (although a filter press is usually utilized to dewater sludges, this filter press is utilized more as a filter, removing suspended particles as the water passes through the device). The water then passes through a series of ion exchangers for removal of trace metals prior to discharge to the

sanitary sewer. The ion exchange beds are cleaned with hydrochloric acid, which is then neutralized with a caustic.

H.1 Primary Settling Basins

Available information regarding construction of the primary settling basins is included in the Subsurface Investigation Workplan for the water recycle system that has been included as **Appendix 13.1**.

The DOCC states that the surface area of each of the primary settling lagoons is 280,000 square feet. This is a typographical error. The total surface area for all four of the primary lagoons combined is 280,000 square feet. Therefore, the surface area of each lagoon is approximately 70,000 square feet. The capacity of each lagoon is approximately 2.4 million gallons, and therefore, the average depth for each lagoon is approximately 4.6 feet.

H.2 Secondary Settling Basin

Available information regarding construction of the secondary settling basin is included in the Subsurface Investigation Workplan for the water recycle system that has been included as **Appendix 13.1**. The secondary settling basin has never been dredged.

H.3 Stormwater Discharge Ditch

As discussed in Section **G.7 Basement Sumps** of this DOCC Addendum, discharges into this ditch from the Nodular Iron Plant have been disconnected. The outfall of the ditch beneath Veterans Memorial Parkway has been plugged. The former NPDES permit for discharge point 002 (this was the permit for the outfall of the stormwater ditch to the river) has been withdrawn per GM's request.

The DOCC also mentioned that the stormwater ditch had a boom to skim oil from the ditch. Based on discussions with plant personnel the boom was installed in the ditch on a permanent basis as a precautionary measure to remove oils. As stated above the ditch no longer has an outlet, as the culverts beneath Veterans Memorial Parkway have been plugged.

On page 13-7 of the DOCC a 6/17/91 MDNR Notice of Violation Letter is referenced which discusses contaminants of concern (COC) in the sump discharges to the ditch.

Urea and nitrogen are listed as two of the potential COCs. A potential source of the urea and nitrogen are the core binders utilized in the core making process. A copy of the letter is attached as **Appendix 13.3** to this Addendum.

H.4 Temporary Classified Sand Staging Areas

As described in the DOCC text, these are temporary piles that accumulate from the two primary classifiers when the conveyor system that normally transports the classified sand to the main pile south of the railroad tracks is not working (i.e., during extreme cold the conveyor freezes and will not operate). The size of the piles varies greatly. This material is identical to the classified sand normally stored south of the railroad tracks, which is discussed in Section 14 of the DOCC and this Addendum.

Table 13.1 Primary Settling Basin Sediment

This Table summarizes analytical data on the sediment from the primary settling basins. We believe the BOD levels in the sediment are primarily due to the organic binders that are used in the core making process.

Table 13.9 Stormwater Discharge Ditch - Sediment Sampling

This Table summarizes the results of sediment and water sampling along the stormwater discharge ditch. The results for the "water" samples are incorrectly reported in mg/L. The correct units on the "water" samples from the ditch should be µg/L. We suspect these samples were collected from the standing water in the ditch and were not filtered, therefore they may not be representative of "water" samples. The actual laboratory data for this summary table was presented in Appendix 13.2 of the original DOCC.

Table 13.18 Region H Areas Unlikely to Affect the Environment

The table lists the "Current Raw Material Storage Vaults". These vaults serve as holding/mix/aeration tanks for wastewater removed from the secondary settling pond that is going to be treated and ultimately discharged to the city sanitary sewer. Triple Super Phosphate is added to the water incoming from the secondary settling ponds in order to reduce metals and phenol levels prior to further treatment.

Under the description for the Current Wastewater Treatment Plant the Table states that the system has "biological contactors" as part of the treatment system. Biological treatment occurs in the aeration/mixing tanks and clarifiers. The system does not have "biological contactors" per se.

The table also refers to a leak of ferric chloride from an AST. The quantity of material released was not available in the file material reviewed. The material released was collected and containerized for proper disposal.

The last item in the Table is the Conveyor Oil Release. This is the conveyor which transfers classified sand from the primary classifiers across the railroad tracks to the storage area to the south. This conveyor system is also discussed in section **H.4, Temporary Classified Sand Staging Areas** above. The conveyor system's mechanical drive unit is lubricated with oil, which occasionally develops leaks. A 5-gallon container is placed beneath the system to catch any oil drips from the system. This container is in proximity to the temporary classified sand staging area, and the container sits on the ground surface.

14 REGION I: CLASSIFIED SAND STAGING AREA AOI SUMMARY

General

The original DOCC contained laboratory analyses for the recyclable materials generated at the facility. A large portion of these recyclable materials are comprised of classified sand, which are stored in this area. This material is routinely tested and characterized as inert by the MDEQ. **Appendix 14.1** presents the most recent information on the classified sand and the other recyclable materials generated at the Facility.

Although this area of the site stores only the classified sand, we have opted to include all the data on the recyclable materials under this Section. The recyclable materials include:

- Core Sand (Core Butts)
- Casting Sand (Metals Reclamation Sand)
- Quenched Slag
- Classified Sand

This data is routinely collected together, and therefore we felt it would be most convenient if it were all in one Appendix. Descriptions of the processes generating these other recyclable materials, and their storage locations throughout the Facility, are given in the DOCC.

We also have included a copy of a study performed by the American Foundrymen's Society on foundry sand from iron foundries. This is appended as **Appendix 14.2**.

None of the historical data or literature we reviewed suggested that PAHs were a concern with foundry sand. The "organic binders" utilized in the molding process are not typically petroleum based (the "oil" used in making "oil cores" is linseed oil).

This area is also the subject of the MDEQ's inquiry regarding the need for a "discharge to groundwater" permit (see discussion regarding Recycle Water System Investigation at the beginning of Section 13 in this Addendum). The facility has been working with the

MDEQ to develop a workplan for this area. A draft workplan for the investigation of the classified sand area is included as **Appendix 14.3** of this Addendum.

15 REGION J: ON-SITE LANDFILL AOI SUMMARY

J.1 GM On-Site Landfill

The On-Site Landfill is currently operating under a valid MDEQ license. A copy of the current license, the MDEQ approved *Hydrogeologic Monitoring Plan*, the most recent groundwater monitoring data, and a Groundwater Demonstration Report for MW-10 is included in **Appendix 15.1** of this Addendum. Since the landfill is currently operating as a licensed facility with an approved Hydrogeologic Monitoring Plan we believe that no additional information from this area will be necessary.

16 SUMMARY OF THE EXISTING DEGREE AND EXTENT OF CONTAMINATION

16.4 Potential Impacts to human Health and the Environment

This section includes a table that lists the towns and their respective populations within 0.5 miles of the facility. The table inadvertently left off the population estimates, which are given below:

Town Name	Population
• Saginaw	69,100
• Buena Vista Township	10,900
• Carolton	6,521
• Ziwaukee	1,850

The text in this section of the DOCC indicates that the Crow Island State Game Area is located northwest of the facility. The direction should be north-northeast. The Crow Island State Game Area is shown on Figure 3.3 in the DOCC.

17 INTRODUCTION TO THE RFI FACILITY INVESTIGATION

There is no Addendum information for this Section of the original DOCC.

18 MISCELLANEOUS RELEASES

There is no Addendum information for this Section of the original DOCC.

19 REFERENCES

Section 4.3 contains a list of significant environmental reports prepared for the Facility that were identified in a review of GM, EPA or MDNR files. Additional references are included below.

Aerial Photograph. GM SMCO Recyclable Materials Staging Piles. 1990.

"Aquifer Vulnerability to Surface Contamination in Michigan." Center for Remote Sensing and Department of Geography. Michigan State University, East Lansing, Michigan. 1992.

Baronski, Darwin, Saginaw City Park Division. Personal Communication with Amy A. Landgraf, EMCON. May 7, 1995.

"Birds and Bird Finding in the Saginaw Bay Area." Ron J. Weeks. 1995. Clare, Michigan: Campbell Printing, Inc.

Brauer, Sue, USEPA RCRA Enforcement. Telephone Interview with Chris Curtin, EMCON. February 2, 1994 and October 13, 1994.

"City of Saginaw and Charter Township of Buena Vista Zoning Maps." City of Saginaw Planning and Zoning Departments. 1990 and 1991.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 7, 1994.

Cooper, Scott, USEPA Environmental Science Division. Telephone Interview with Chris Curtin, EMCON. June 28, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 8, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 8, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 7, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan, EMCON. June 6, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 8, 1994.

General Motors Personnel. Personal Interview with Doug Dorgan and Chris Curtin, EMCON. June 8, 1994.

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General Motors Personnel. Personal Interview with Doug Dorgan, EMCON. June 7, 1994.

GM Former Parts Plant RCRA Hazardous Waste Drum Storage Area Correspondence to USEPA Region V Administrator. General Motors Corporation. April 4, 1983.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to MDNR. General Motors Corporation. July 13, 1983.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to MDNR. General Motors Corporation. September 4, 1984.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to MDNR. General Motors Corporation. April 7, 1987.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to MDNR. General Motors Corporation. January 19, 1988.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to MDNR. General Motors Corporation. September 27, 1991.

GM Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Response to October 19, 1994 Correspondence from MDNR. General Motors Corporation. November 11, 1994.

GM Former Parts Plant RCRA Hazardous Waste Drum Storage Area Correspondence to MDNR. General Motors Corporation. February 20, 1989.

GM Former Grey Iron Oil House UST (GI #1) Correspondence to MDNR. General Motors Corporation. March 17, 1993.

GM Former Gasoline UST (GI #4) Correspondence. General Motors Corporation. October 5, 1992.

GM Former Garage Annex UST Service Maintenance Site (GI #5) Termination Pumping Letter to MDNR. General Motors Corporation. October 5, 1992.

GM Powerhouse Fuel Oil ASTs Activity Report. Michigan Department of Natural Resources. March 7, 1984.

GM Former Nodular Iron Plant Oil House RCRA Hazardous Waste Drum Storage Area Correspondence to MDNR. General Motors Corporation. July 13, 1983.

GM Basement Sumps Internal Memo. General Motors Corporation. November 9, 1976.

GM Basement Sumps Internal Memo. General Motors Corporation. November 29, 1976

GM Basement Sumps Internal Memo. General Motors Corporation. April 5, 1977.

GM Basement Sumps Correspondence to MDNR. General Motors Corporation. January 3, 1989.

GM Basement Sumps Internal Memo. General Motors Corporation. November 5, 1991.

GM Basement Sumps Correspondence to MDNR. General Motors Corporation. November 15, 1991.

GM Basement Sumps Correspondence to MDNR. General Motors Corporation. February 18, 1993.

GM Basement Sumps Meeting Record with MDNR. General Motors Corporation. June 9, 1993.

GM Basement Sump Correspondence to MDNR. General Motors Corporation. August 16, 1993.

GM Basement Sump Correspondence to MDNR. General Motors Corporation. February 24, 1994.

GM Basement Sump Correspondence to MDNR. General Motors Corporation. March 10, 1994.

GM Elevator Hydraulic Leaks Internal Memo. General Motors Corporation. November 13, 1976.

GM Stormwater Discharge Ditch Correspondence to MDNR. General Motors Corporation. March 10, 1994.

GM Landfill Correspondence to MDNR. General Motors Corporation August 30, 1989.

"Hydrogeologic Atlas of Michigan, USEPA Underground Injection Control Program." Department of Geology College of Arts and Sciences. Western Michigan University, Kalamazoo, Michigan 1981.

MDNR Former Parts Plant RCRA Hazardous Waste Drum Storage Area correspondence to GM. Michigan Department of Natural Resources. July 19, 1988.

MDNR Former Parts Plant Electric Department PCB Storage Area correspondence to GM. Michigan Department of Natural Resources. June 27, 1983.

MDNR Molten Cyanide Dip Tanks and Emergency Dump Tank UST Activity Report. Michigan Department of Natural Resources. February 2, 1984.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Inspection Report. Michigan Department of Natural Resources. June 27, 1983.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Inspection Report. Michigan Department of Natural Resources. June 22, 1984.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Inspection Report. Michigan Department of Natural Resources. April 7, 1987.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Inspection Report. Michigan Department of Natural Resources. January 17, 1988.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Inspection Report. Michigan Department of Natural Resources. September 9, 1991.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Letter of Compliance. Michigan Department of Natural Resources. August 18, 1987.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Revised Closure Plan Correspondence. Michigan Department of Natural Resources. November 24, 1992.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Revised Closure Plan Approval Letter. Michigan Department of Natural Resources. March 31, 1993.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence regarding June 17, 1994 meeting with GM. Michigan Department of Natural Resources. July 27. 1994.

MDNR Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area Correspondence to GM. Michigan Department of Natural Resources. October 19, 1994.

MDNR Current Equipment Staging Area Internal Memo. Michigan Department of Natural Resources. March 17, 1994.

MDNR Former Grey Iron Oil House UST (GI #1) Correspondence to GM. Michigan Department of Natural Resources. March 17, 1993.

MDNR Former Grey Iron Oil House UST (GI #2 and #3) Correspondence to GM. Michigan Department of Natural Resources. July 6, 1993.

MDNR Former Gasoline UST (GI #4) Correspondence to GM. Michigan Department of Natural Resources. March 12, 1994.

MDNR Former Garage Annex UST Service Maintenance Site (GI #5) Correspondence to GM. Michigan Department of Natural Resources. March 12, 1993.

MDNR Former Garage/Oil Water Separator UST (GI #7) No Further Action Letter to GM. Michigan Department of Natural Resources. January 8, 1993.

MDNR Former Garage Annex Oil/Water Separator UST (GI #8) No Further Action Letter to GM. Michigan Department of Natural Resources. January 8, 1993.

MDNR Former Cooling Tower UST (GI #10) Corrective Action Complete Correspondence Letter to GM. Michigan Department of Natural Resources. September 2, 1994.

MDNR Powerhouse Fuel Oil ASTs Air Quality Division Activity Report. Michigan Department of Natural Resources. August 18, 1983

MDNR Powerhouse Fuel Oil ASTs Activity Report. Michigan Department of Natural Resources. January 6, 1984.

MDNR Former Mill Water Pump House UST (NI #9) Meeting Record. Michigan Department of Natural Resources. September 27, 1993.

MDNR Allegedly Buried Drums File Note. Michigan Department of Natural Resources. May 23, 1995.

MDNR ERD Incident Report Regarding Allegedly Buried Drums. Michigan Department of Natural Resources. May 24, 1991.

MDNR Allegedly Buried Drums Internal Message. Michigan Department of Natural Resources. November 6, 1990.

MDNR Former Nodular Iron Plant Oil House RCRA Hazardous Waste Drum Storage Area Inspection Report. Michigan Department of Natural Resources. June 27, 1983.

MDNR Former Nodular Iron Plant Oil House RCRA Hazardous Waste Drum Storage Area Inspection Report. Michigan Department of Natural Resources. July 16, 1990.

MDNR Former RCRA Hazardous Waste Control Tank (AST) Disapproval Letter for a Closure Plan. Michigan Department of Natural Resources. April 28, 1988.

MDNR Former RCRA Hazardous Waste Control Tank (AST) Closure Plan Approval Letter. Michigan Department of Natural Resources. June 10, 1988.

MDNR Former RCRA Hazardous Waste Control Tank (AST) Request for Further Work Correspondence. Michigan Department of Natural Resources. April 3, 1989.

MDNR Former RCRA Hazardous Waste Control Tank (AST) Meeting Record. General Motors Corporation and the Michigan Department of Natural Resources. August 8, 1989.

MDNR Former Nodular Iron Plant Waste Paint Shed RCRA Hazardous Waste Drum Storage Area Inspection Report. Michigan Department of Natural Resources. August 25, 1982.

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MDNR Former (Original) Desulfurization Slag RCRA Treatment Unit, "Weathering Slab" Closure Plan Approval Letter. Michigan Department of Natural Resources. September 26, 1988.

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MDNR Former (Replacement) Desulfurization Slag RCRA Treatment Unit, "Weathering Slab" Closure Plan Disapproval Letter. Michigan Department of Natural Resources. April 28, 1988.

MDNR Former (Replacement) Desulfurization Slag RCRA Treatment Unit, "Weathering Slab" Closure Plan Approval Letter. Michigan Department of Natural Resources. June 10, 1988.

MDNR Former (Replacement) Desulfurization Slag RCRA Treatment Unit, "Weathering Slab" Closure Plan Approval Letter. Michigan Department of Natural Resources. September 26, 1988.

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APPENDIX 3.1

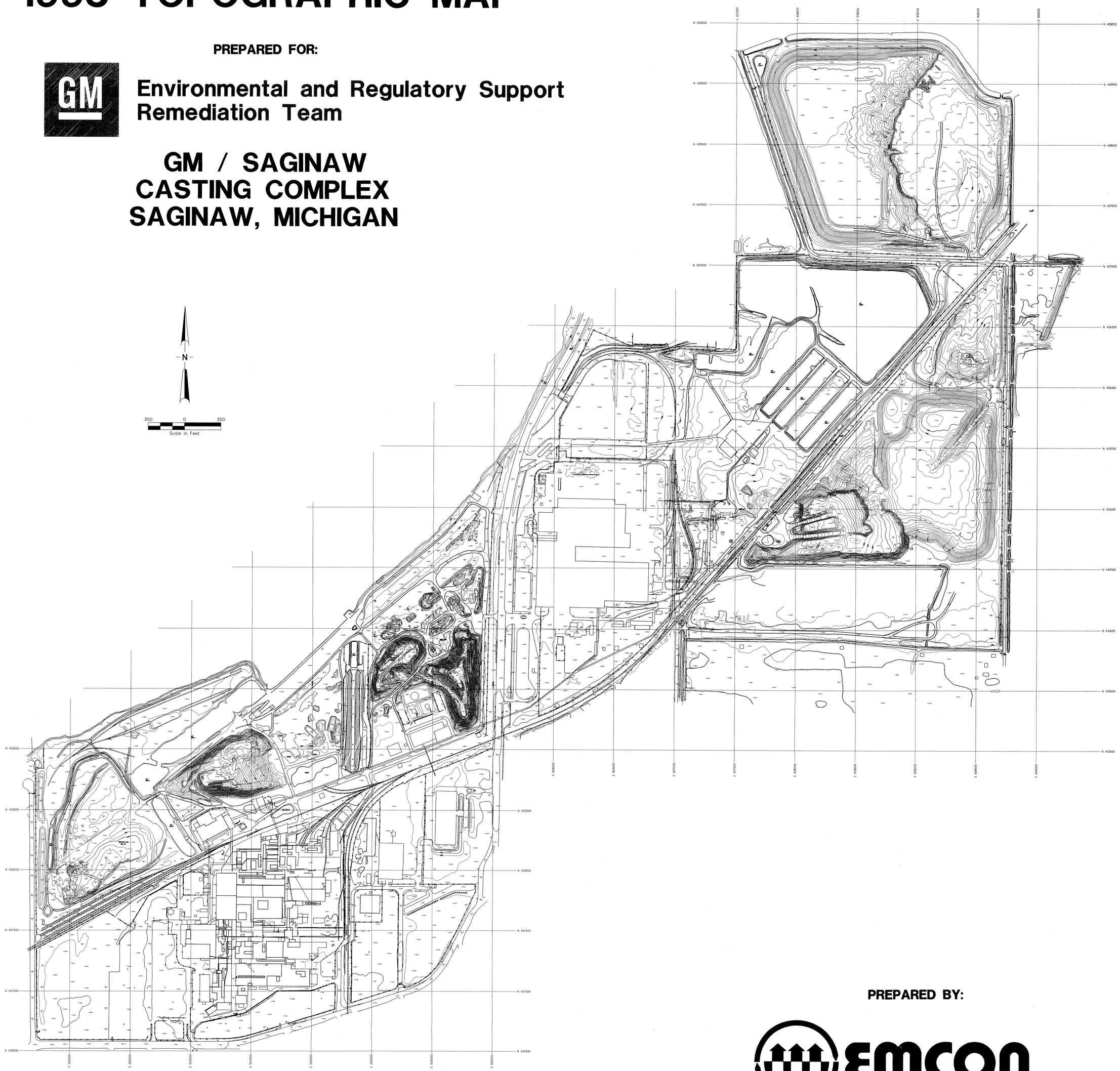
1995 Topographic Map (Scale 1" = 300')

1995 TOPOGRAPHIC MAP

PREPARED FOR:

Environmental and Regulatory Support
Remediation Team

GM / SAGINAW
CASTING COMPLEX
SAGINAW, MICHIGAN



PREPARED BY:

EMCON

DRAWN BY: PPV
DATE: 10/9/97
DWG NO.: F:\DWG\84068063\topos\95\ngmt-01.dwg

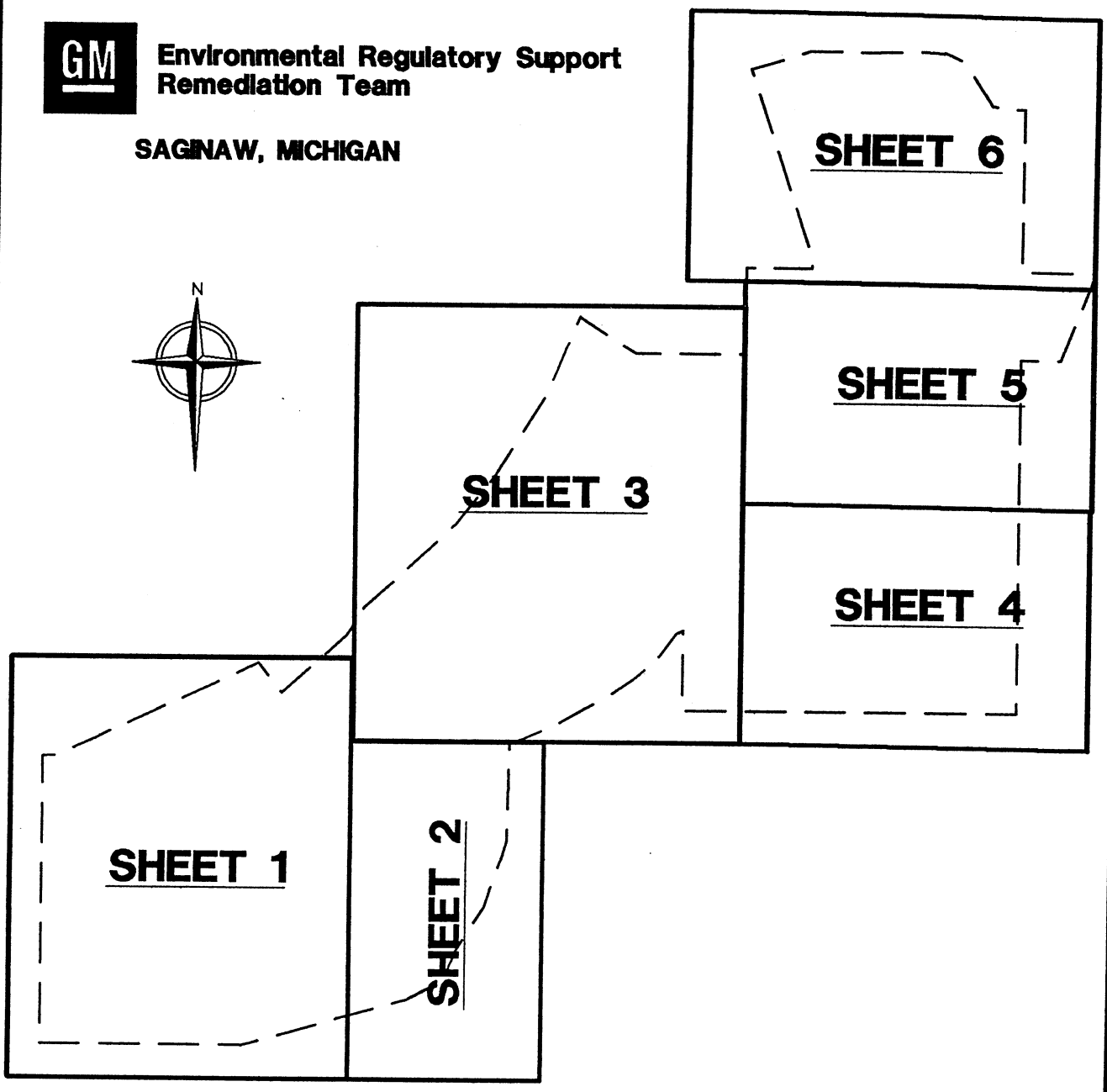
APPENDIX 3.2

1995 Topographic Maps (Scale 1" - 100')

1995 TOPOGRAPHIC SHEET INDEX

Environmental Regulatory Support Remediation Team

SAGINAW, MICHIGAN

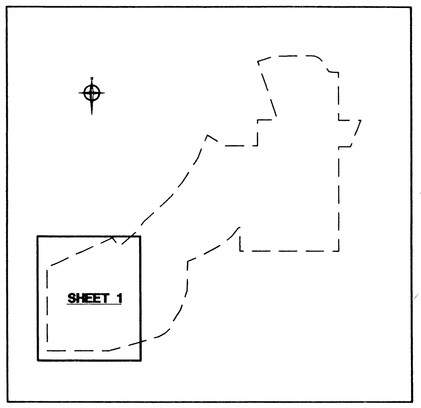


EMCON

DATE 10/10/97
DWN. PPV
APPR.
REVIS.
PROJECT NO.
84068063

GM SAGINAW
METAL CASTING OPERATIONS
SAGINAW, MIGHIGAN

N: \dwg\84068063\NAGMSI01.DWG PLOT 1=1 10/10/97



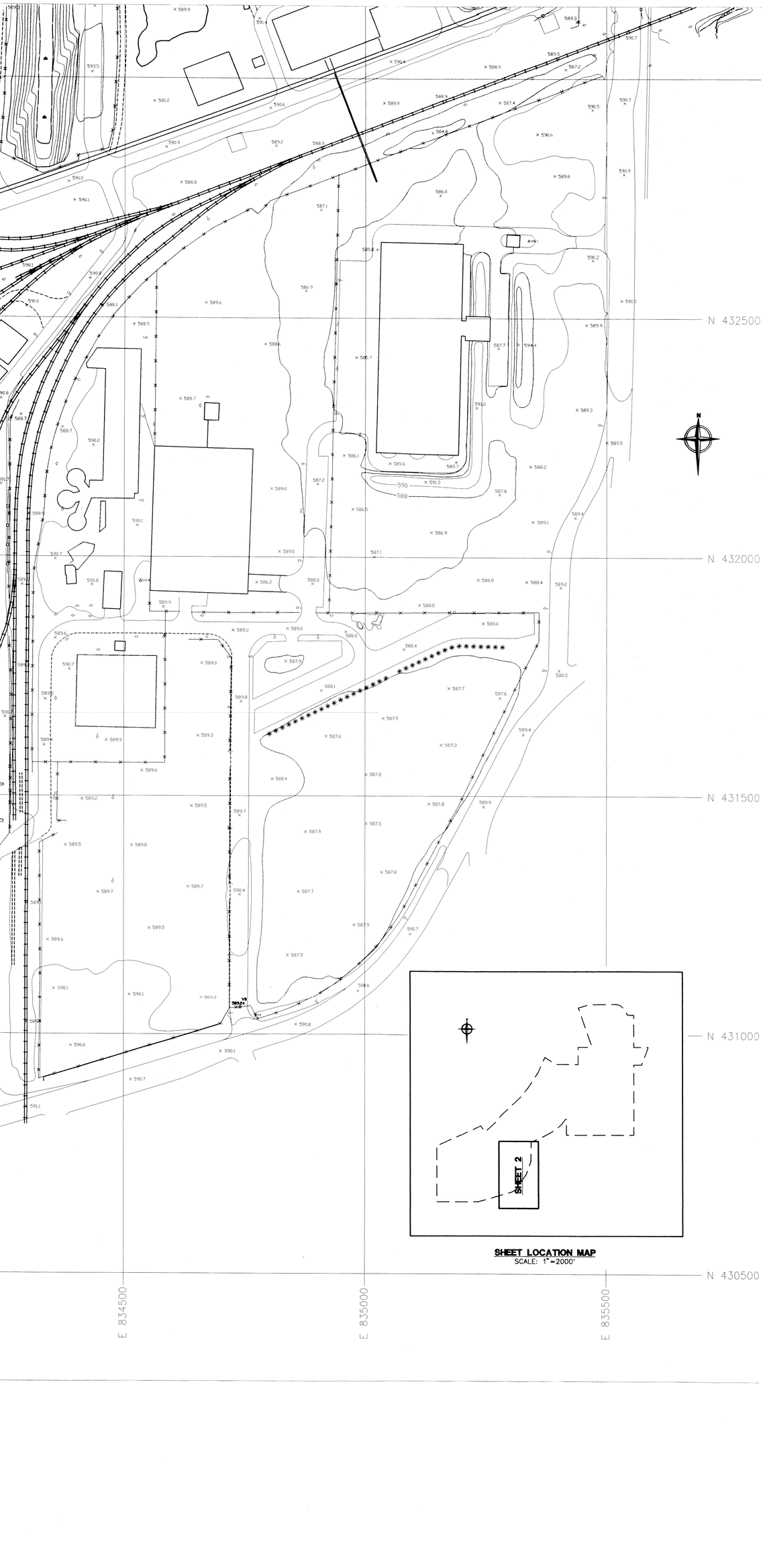
SHEET LOCATION MAP
SCALE: 1" = 2000'

N

N 433000
N 432500
N 432000
N 431500
N 431000
N 430500

E 832000
E 832500
E 833000
E 833500
E 834000

DEBRIS
QUECCHED SLAG PILE "B"
PILES



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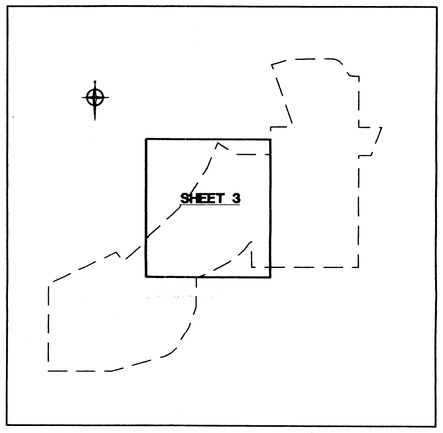
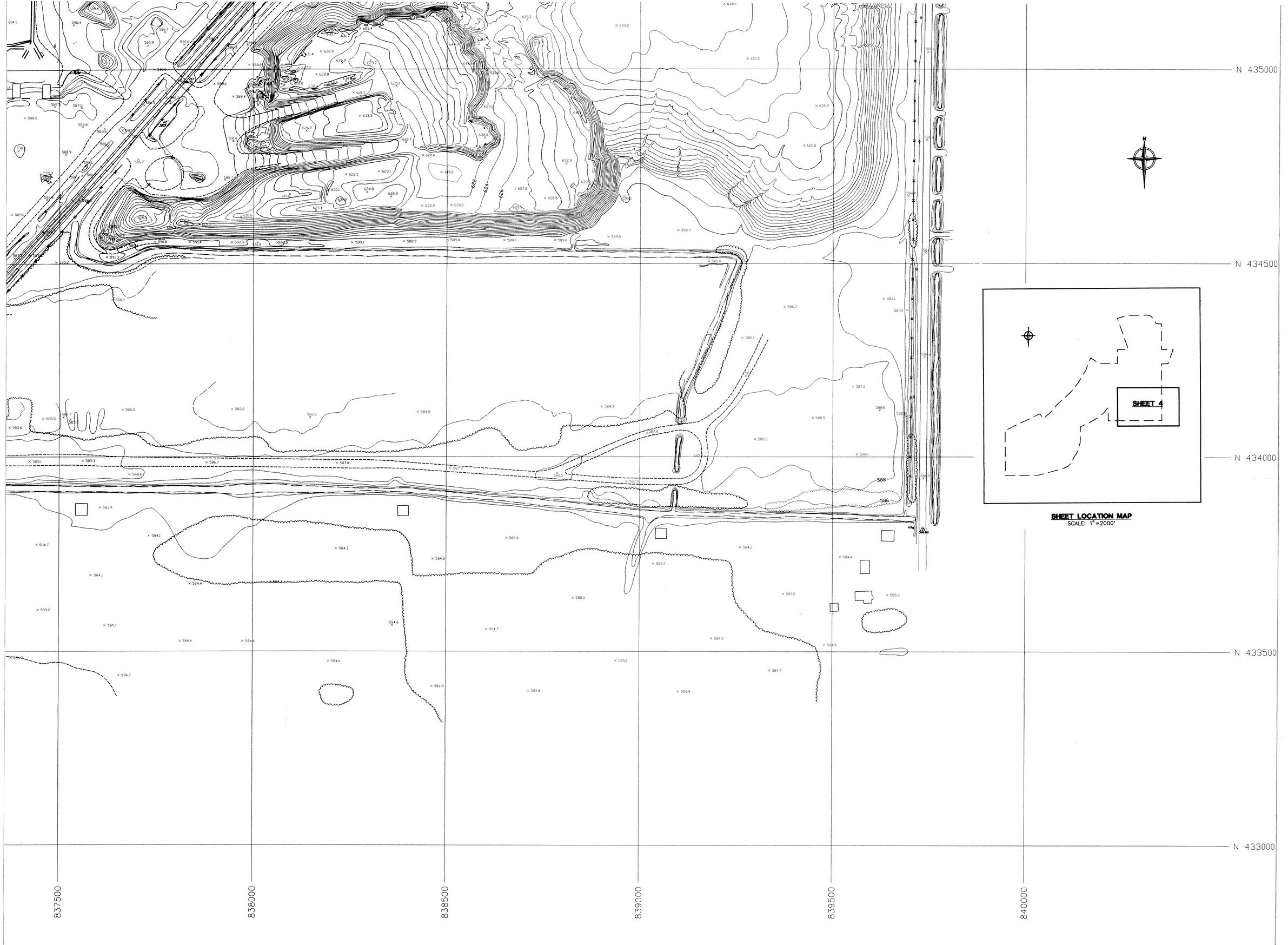
SCALE: 1" = 2000'



SHEET LOCATION MAP
SCALE: 1"=2000'

N

CONVEYORS


N 435000
N 434500
N 434000
N 433500
N 433000
837500
838000
838500
839000
839500
840000
SHEET 4
SHEET LOCATION MAP
SCALE: 1" = 2000'

SHEET LOCATION MAP
SCALE: 1"=2000'

E 837500
E 838000
E 838500
E 839000
E 839500
N 439000
N 438500
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N 437500
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580
570
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586
VE 578.9
N
SHEET 6
SHEET LOCATION MAP
SCALE: 1"=2000'

APPENDIX 3.3

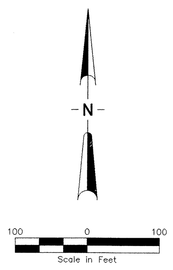
1997 Topographic Map (Scale 1" = 100')

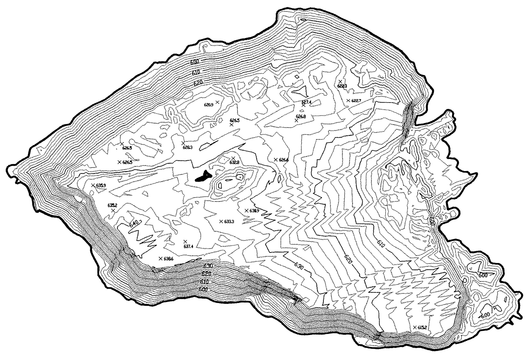
1997 TOPOGRAPHIC MAP

PREPARED FOR:

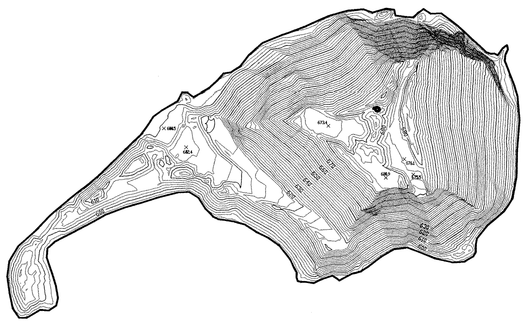
Environmental and Regulatory Support
Remediation Team

GM / SAGINAW
CASTING COMPLEX
SAGINAW, MICHIGAN

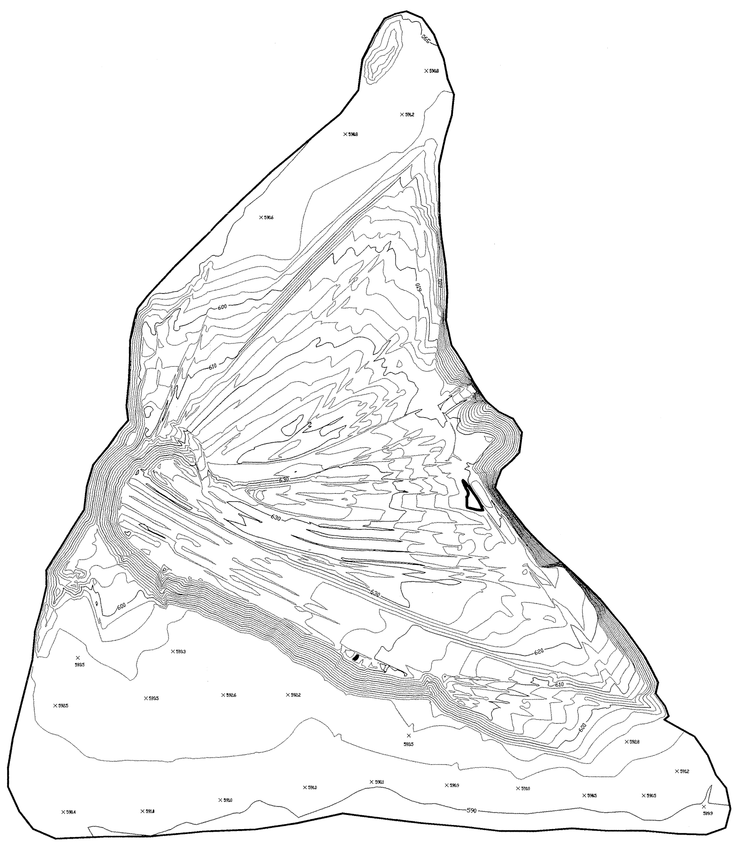




CORE SAND (CORE BUTTS) PILE



CASTING SAND
(METALS RECLAMATION)
(PILE A)



CLASSIFIED SAND PILE

CASTING SAND
(METALS RECLAMATION)
(PILE B)

PREPARED BY:

EMCON

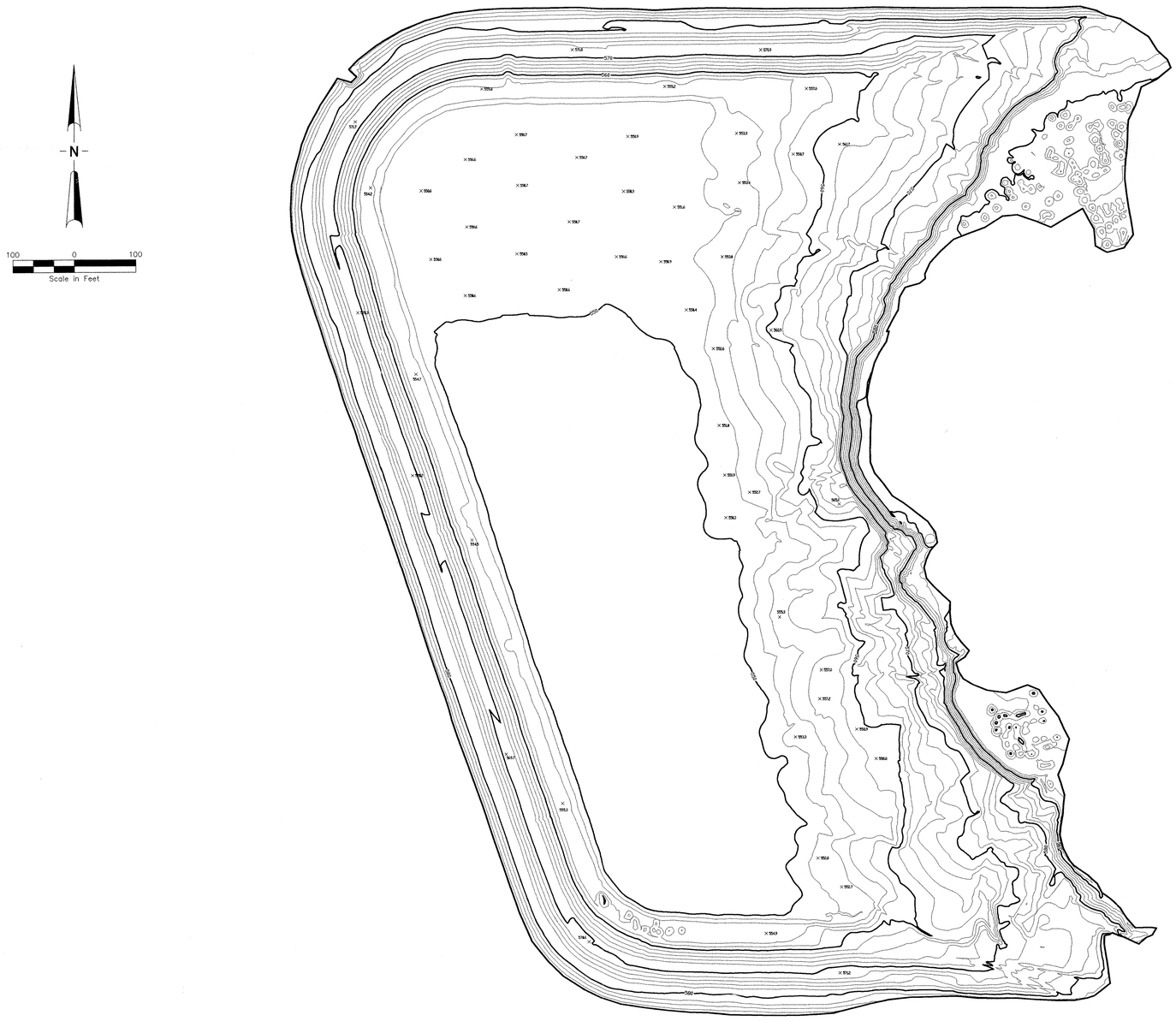
DRAWN BY: PPV
DATE: 10/9/97
DWG NO.: F:\DWG\84068063\topos\97\nagmt-01.dwg

1997 TOPOGRAPHIC MAP

PREPARED FOR:

Environmental and Regulatory Support
Remediation Team

GM / SAGINAW
CASTING COMPLEX
SAGINAW, MICHIGAN



PREPARED BY:

EMCON

DRAWN BY: PPV
DATE: 10/9/97
DWG NO.: F:\DWG\84068063\topos\97\nagmt-02.dwg

APPENDIX 9.1

D.1 Current Grey Iron Oil House
RCRA Hazardous Waste Drum Accumulation Area

D.1 Current Grey Iron Oil House RCRA Hazardous Waste Drum Accumulation Area

GM POWERTRAIN

Receipt No. P 409 235 110
CERTIFIED MAIL
Return Receipt Requested

Mr. Jim Sygo, Chief
Waste Management Division
Michigan Department of Environmental Quality
John A. Hannah Building
P.O. Box 30241
Lansing, Michigan 48909

August 16, 1996

Re: Response to Comments Dated March 15, 1996
on Closure Plan Amendment - Revision 1
General Motors Powertrain Group
Saginaw Metal Casting Operations (SMCO), Saginaw, Michigan

Dear Mr. Sygo:

Attached are General Motors responses to the Michigan Department of Environmental Quality letter dated March 15, 1996 regarding the RCRA Storage Pad Closure.

Please do not hesitate to call me at (517) 757-2686 or Ray Ilkka at (517) 757-1473 if you have any questions.

Sincerely,

J S Toth

J.S. Toth, Superintendent
Environmental Activities

enclosures
Attachment 1: Response to MDEQ Comments dated March 15, 1996
Attachment 2: Closure Pad Amendment - Revision 2

c: Mr. Kenneth Burda, Chief
Hazardous Waste Program Section
Waste Management Division
Michigan Department of Environmental Quality
John A. Hannah Building
P.O. Box 30421
Lansing, Michigan 48909

Ms. Angela Hahn, Engineer
Hazardous Waste Program Section
Waste Management Division
Michigan Department of Environmental Quality
John A. Hannah Building
P.O. Box 30421
Lansing, Michigan 48909

Ms. Mirtha Capiro, USEPA
RCRA Enforcement Branch (HRE-8J)
U.S. EPA, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

bc: C. Curtin, Emcon
R. Ilkka, GMPTG-SMCO
D. Kwasny, WFG Flint
L. Porath, GMPTG-SMCO
I. Richardson, CRA
M. Tomka, CRA
L. Tucker, GM Legal

RESPONSE TO COMMENTS DATED MARCH 15, 1996
ON CLOSURE PLAN AMENDMENT - REVISION 1
GENERAL MOTORS POWERTRAIN GROUP
SAGINAW METAL CASTINGS OPERATIONS, SAGINAW, MICHIGAN

Below are the response to comments prepared by Conestoga-Rovers & Associates (CRA) on behalf of General Motors (GM).

This letter presents GM's response to comments received in a letter dated March 15, 1996 from MDEQ to GM. The numbered comments are presented followed by GM's response. The revised Closure Plan Amendment - Revision 2 is attached.

Comment 1

In reference to page 2, Section 2.A, first paragraph, Closure Plan Amendment - Revision 1: Soil borings shall be completed using hollow stem augers to the depth of the water table and shall be continuously sampled using a split spoon sampler, in order to sample vertically down to the groundwater.

This modification is included to facilitate the identification and extent of potentially contaminated, unsaturated soil, as required by 40 CFR 265.112(b)(4).

Response to Comment 1

Section 2A has been revised to indicate soil borings will be completed to the depth of the water table.

Comment 2

In reference to page 2, Section 2.A, first paragraph, Closure Plan Amendment - Revision 1: Two additional borings shall be completed at the previous sites PB and PC, in order to sample vertically down to the groundwater at the sites where the Type B Groundwater Criteria were exceeded through Toxicity Characterization Leaching Procedure testing of surface soil samples.

This modification is included to facilitate the identification and extent of potentially contaminated unsaturated soil as required by 40 CFR 265.112(b)(4).

Response to Comment 2

Section 2A and Figure 2 have been revised to add soil borings at the previous locations of PB and PC.

Comment 3

In reference to page 2, Section 2.A, first paragraph, Closure Plan Amendment - Revision 1: Soil samples from each two foot interval shall be obtained at distinct recorded intervals. The depth and interval spanned for each sample submitted to the analytical laboratory shall be reported in the closure certification.

This modification is included to facilitate the identification and extent of potentially contaminated, unsaturated soil as required by 40 CFR 265.112(b)(4).

Response to Comment 3

Section 2A has been revised to specify that the depth and interval for each sample submitted to the laboratory will be reported in the closure certification.

Comment 4

In reference to page 3, Section 2.B, Closure Plan Amendment - Revision 1: The monitor well replacement for MW-10 shall be moved to a downgradient location north to the storage area next to the oil storage building (see the enclosed map for an approximate location). The boring for the downgradient monitor well shall be continued to the bottom of the first aquifer, with continuous groundwater sampling for methylene chloride and trichloroethylene. The second downgradient monitor well will not be needed at this time.

Well construction details for the proposed monitor wells must be submitted for approval prior to installation.

These modifications are included to assure proper placement of the monitoring well(s) around the storage area and to accurately determine the groundwater flow direction. Sampling to the bottom of the aquifer is required to assure determination of the proper sampling elevation. Well construction details need to be approved to assure the wells are properly installed to provide useful data.

Response to Comment 4

Section 2B and Figure 1 have been revised to specify that MW10-R will be installed across the aquifer, adjacent to the oil storage area, and MW12-R will be installed at the water table at the location of former MW12. References to a new downgradient well have been deleted. Under the closure plan amendment groundwater samples will be collected quarterly for one year. In the vicinity of the concrete storage pad clay has been encountered at depths ranging from 11 to 13 feet below ground surface. The proposed well construction will sample the surficial water bearing zone. Therefore, vertical groundwater sampling will not be completed at this time.

In addition, Figure 3 has been added to present well construction details for these wells.

Comment 5

In reference to page 3, Section 2.B, Closure Plan Amendment - Revision 1: If groundwater sample results are below the Type B Cleanup Criteria in the downgradient samples, GM may propose clean closure of the area in accordance with the original closure plan, following removal of soil for which leachate test results indicate levels exceeding Type B.

This modification is included to assure proper removal of contaminated soils as required by 40 CFR 265.114.

Response to Comment 5

Section 2B has been revised to specify that the type of closure will depend on both soil and groundwater investigation results.

Comment 6

In reference to page 3, Section 2.B, Closure Plan Amendment - Revision 1: If the downgradient monitor well is not downgradient after static water elevations have been measured, a new downgradient monitor well shall be installed. Well construction details for the monitor well must be submitted for approval prior to installation.

This modification is included to assure the proper location of the monitoring program to identify any potentially contaminated groundwater.

Responses to Comment 6

Section 2B has been revised to specify that a new downgradient well will be installed if static water levels indicate MW10-R is not downgradient.

Comment 7

In reference to page 3, Section 2.B, Closure Plan Amendment - Revision 1: The three monitoring wells shall be sampled and the static water level elevations measured at a pre-determined frequency. A sampling plan and an appropriate statistical analysis method for the data results shall be submitted to the Michigan Department of Environmental Quality (MDEQ) for approval before any groundwater sampling is done.

This modification is included to assure proper identification of potential groundwater contamination.

Responses to Comment 7

Section 2B has been revised to specify quarterly monitoring for one year at both downgradient wells and the upgradient well.

Comment 8

If a Type C closure is proposed, the vertical and horizontal extent of the contamination must be determined.

This modification is necessary to assure compliance with the requirements of 40 CFR 265.111(b).

Response to Comment 8

Section 3 has been revised to specify that the vertical and horizontal extent of contamination will be defined if a Type C closure is proposed.

Comment 9

GM shall notify the Waste Management Division (WMD), Hazardous Waste Program Section permit engineer (Ms. Angela Hahn at 517-373-7738) and the appropriate WMD district staff (Mr. Gene Suuppi at 517-684-9141 ext 8204) at least six working days prior to initiation of closure activities.

This modification is necessary to give the MDEQ the ability to split samples and have sufficient time to prepare for the sampling event.

Response to Comment 9

Section 4 has been revised to specify notification of the WMD at least six days prior to initiation of closure activities.

CLOSURE PLAN AMENDMENT - REVISION 2
MID 041 793 340
GENERAL MOTORS POWERTRAIN GROUP
SAGINAW METAL CASTINGS OPERATIONS, SAGINAW, MICHIGAN

This closure plan amendment revision 2 is based on the MDEQ letter dated March 15, 1996 for the RCRA Storage Pad at SMCO.

As required by the Closure Plan dated March 22, 1993, MDNR's July 27, 1994 letter and MDEQ's March 15, 1996 letter the following items are included in the closure plan amendment:

1. A summary of the existing data related to the unit;

2. A detailed proposal for the additional sampling needed to determine the horizontal and vertical extent of the contamination (i.e., sample location, analytical techniques, analytical detection limits, sampling technique and equipment decontamination techniques, etc.);

3. A proposal for the hydrogeologic study (i.e. determination of groundwater depth, and flow direction, and a groundwater sampling plan for all constituents ever stored on the pad). If the ground water sampling reveals exceedances of Act 307 Type B levels, groundwater remediation or controls to keep the contamination on site must be proposed as part of the study; and

4. The goal for the closure (i.e. clean closure vs. post closure care). If clean closure is desired, a strategy for soil remediation, such as excavation, should be proposed along with a method of verifying that the soil remaining in place is "clean".

Each of these requirements is addressed in the following paragraphs:

1. <u>Summary of Existing Data</u>

   A summary of existing data was presented in Section 2.0 of the report entitled "Closure of a Hazardous Waste Concrete Storage Pad" dated December 20, 1993. This data indicated that TCLP data for methylene chloride was above Type B groundwater criteria, total trichloroethylene was above 20 times Type B groundwater criteria and TCLP trichloroethylene was above Type B groundwater criteria. All of the reported values were below the applicable generic Type C values.

   Table 1 and Table 2 present the results of previous investigations. Figure 2 presents previous sample locations.

2. Sampling and Analysis Plan/Detailed Proposal for Additional Sampling

A. Soil Sampling

In order to define the vertical and horizontal extent of soil contamination above Type B, nine soil borings will be completed at the locations presented on Figure 2. Soil borings will be completed using hollow stem augers to the depth of the water table and will be continuously sampled using a split spoon sampler. Samples from each 2 foot interval will be analyzed for total and leachable methylene chloride and trichloroethylene. The depth and interval sampled for each sample submitted to the analytical laboratory shall be reported in the closure certification.

Leachable analyses will be performed using an alternate leachate test as approved by MDNR in Item 3 of the Attachment to the MDNR Closure Plan approval letter dated March 31, 1993 and in accordance with MERA Memorandum #12, Revision 1 dated September 9, 1994. The approved leachate test for VOCs is the "Synthetic Precipitation Leaching Procedure" using U.S. EPA method 1312.

If the leachate test results are below the applicable Type B criteria in these proposed samples, GM may propose clean closure of the area in accordance with the original closure plan. If the levels are above Type B and below generic Type C, GM may propose clean closure of the area in accordance with the original closure plan following removal of soil for which leachate test results indicate levels above Type B or GM may propose a Type C closure. Table 3 presents the cleanup criteria.

Table 4 presents analytical methods and detection limits that will be utilized.

B. Hydrogeologic Study

If the leachate test results from the soil sampling indicate levels above Type B values, two replacement wells will be installed at the locations presented on Figures 1 and 2. Well construction details for the proposed replacement wells are presented on Figure 3. The replacement well MW12-R will be installed at the water table (approximately 10 feet deep) and the replacement well MW10-R will be installed across the first aquifer. The wells will have a 5-foot stainless steel well screen. The groundwater flow direction is expected to be to the northwest and was determined by a previous investigation in an adjacent area. Figure 1 presents the groundwater flow direction and the existing well in the vicinity of the RCRA Storage Pad. Attachment A presents the stratigraphic logs for borings and well completion details for the existing well in the area. The groundwater flow direction will be confirmed with a round of water levels after the replacement wells are installed. If static water levels

indicate replacement well MW10-R is not downgradient a new downgradient well will be installed.

Static water elevations will be measured on a quarterly basis for one year. All three wells will be sampled at that time and samples will be analyzed for methylene chloride and trichloroethylene as these are the only constituents that have been identified by previous samples from this area above the Type B cleanup criteria for soil. After one year, the sampling data will be evaluated and clean closure, generic Type C closure, further sampling, or other actions will be proposed based on the results. The type of closure proposed will also be dependant on the results of soil investigations, as discussed in Section A.

3. Soil Decontamination

GM will pursue clean closure for the RCRA Storage Pad in accordance with the closure plan.

GM proposes to amend the closure plan by adding an option of a generic Type C closure to the Closure Plan in accordance with MERA Memo #14, Revision 1 dated June 21, 1994. GM will pursue a Type C closure, if necessary, therefore, based on current data soil decontamination may not be necessary. If a Type C closure is proposed, the vertical and horizontal extent of contamination will be defined.

4. Cost Estimate

The cost estimate to complete the work identified in this closure plan amendment is $30,000. The WMD will be notified at least six days prior to initiation of closure activities.

5. Schedule

The schedule for completion of these activities is presented on Figure 4.

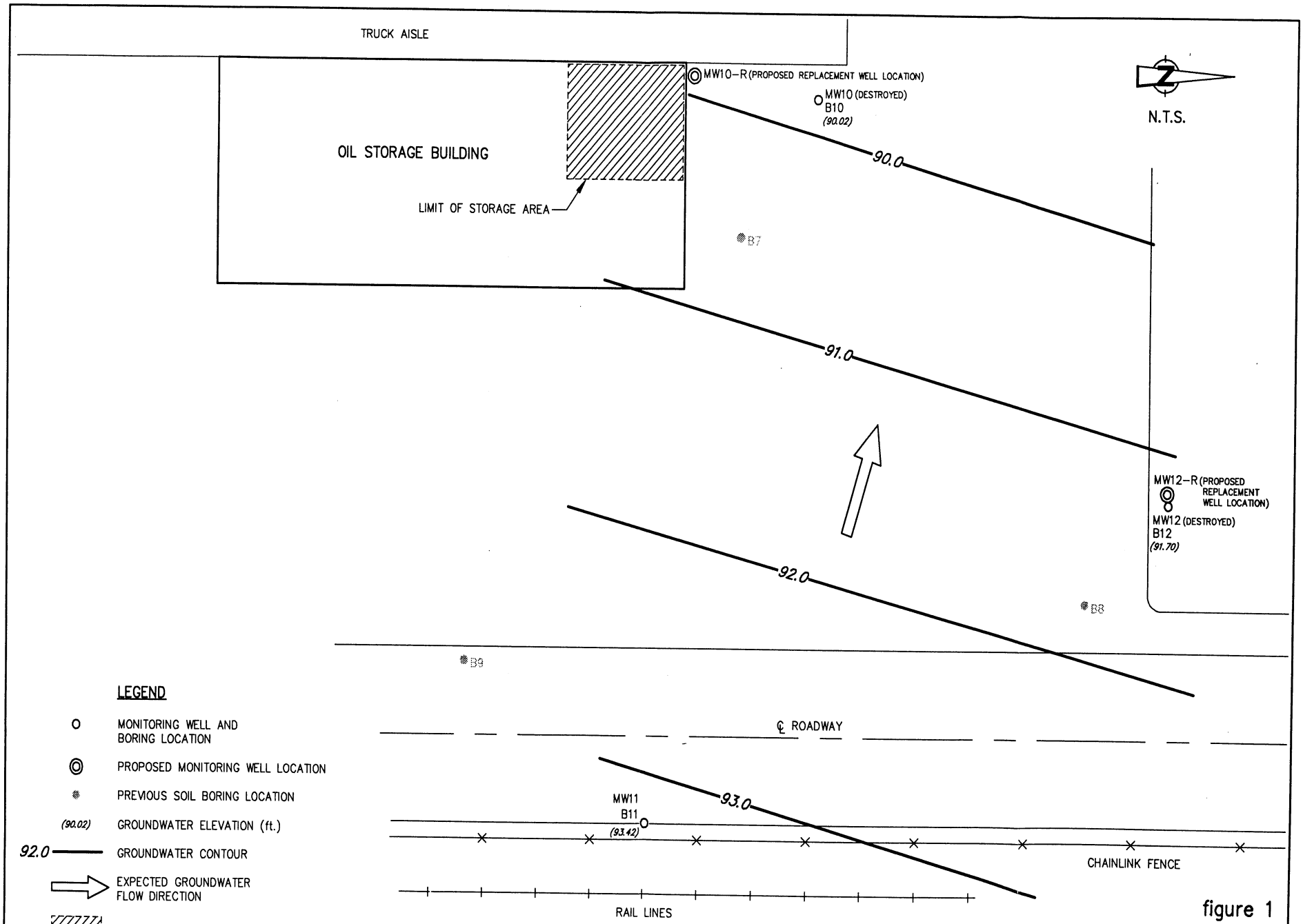
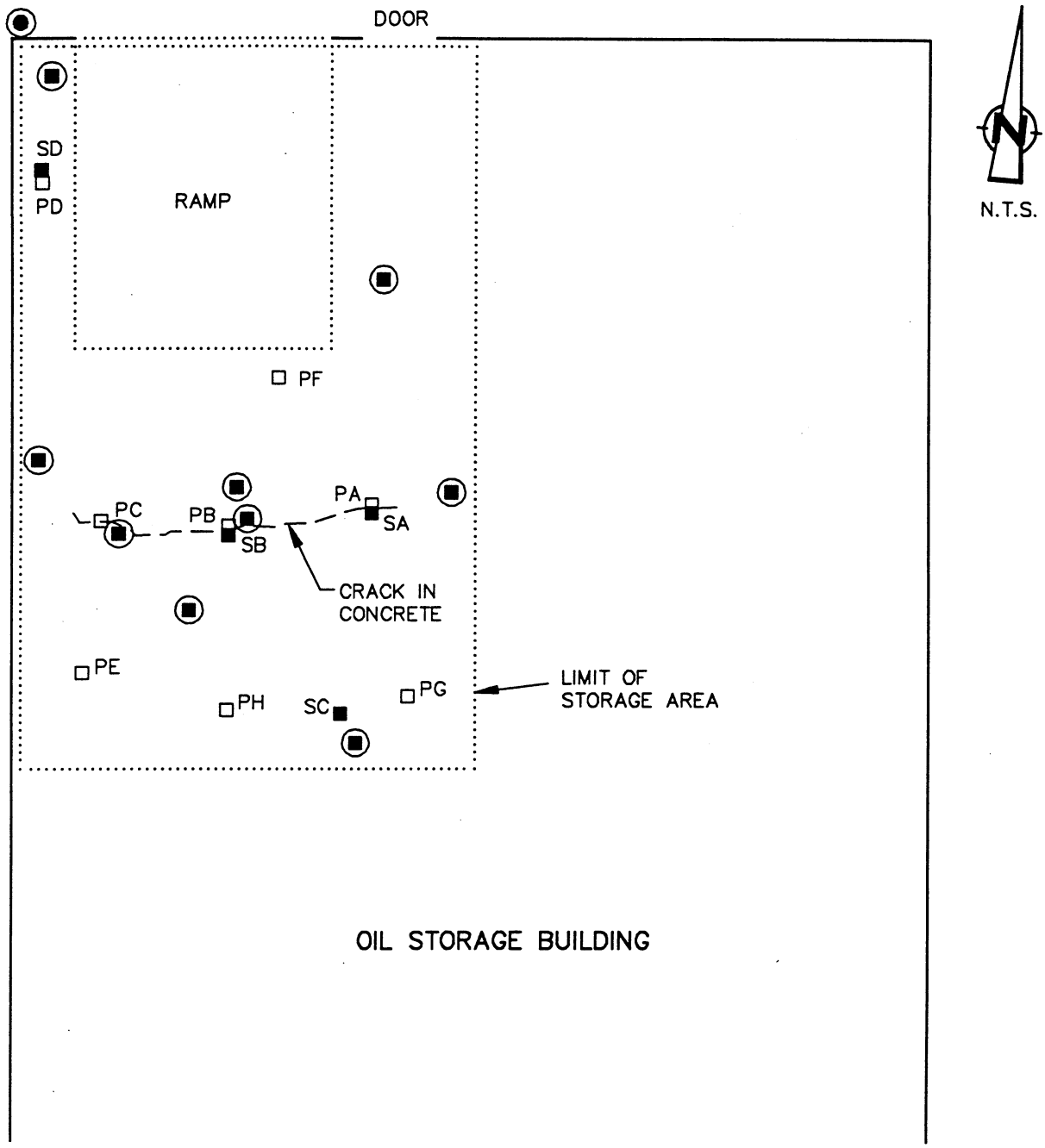


figure 1

PROPOSED SAMPLING AREA
HAZARDOUS WASTE STORAGE AREA
OIL STORAGE BUILDING – METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5670 (L) APR 17/96(W) REV.0 (P–06)



LEGEND

- ■ BOREHOLE LOCATION (MAY 29,1993)
- □ BOREHOLE LOCATION (SEPTEMBER 9,1993)
- ◉ PROPOSED BOREHOLE LOCATION
- ◉ PROPOSED MONITORING WELL LOCATION

figure 2

SAMPLE LOCATIONS
HAZARDOUS WASTE STORAGE AREA
OIL STORAGE BUILDING – METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5670 (L) APR 17/96(W) REV.0 (P-07)

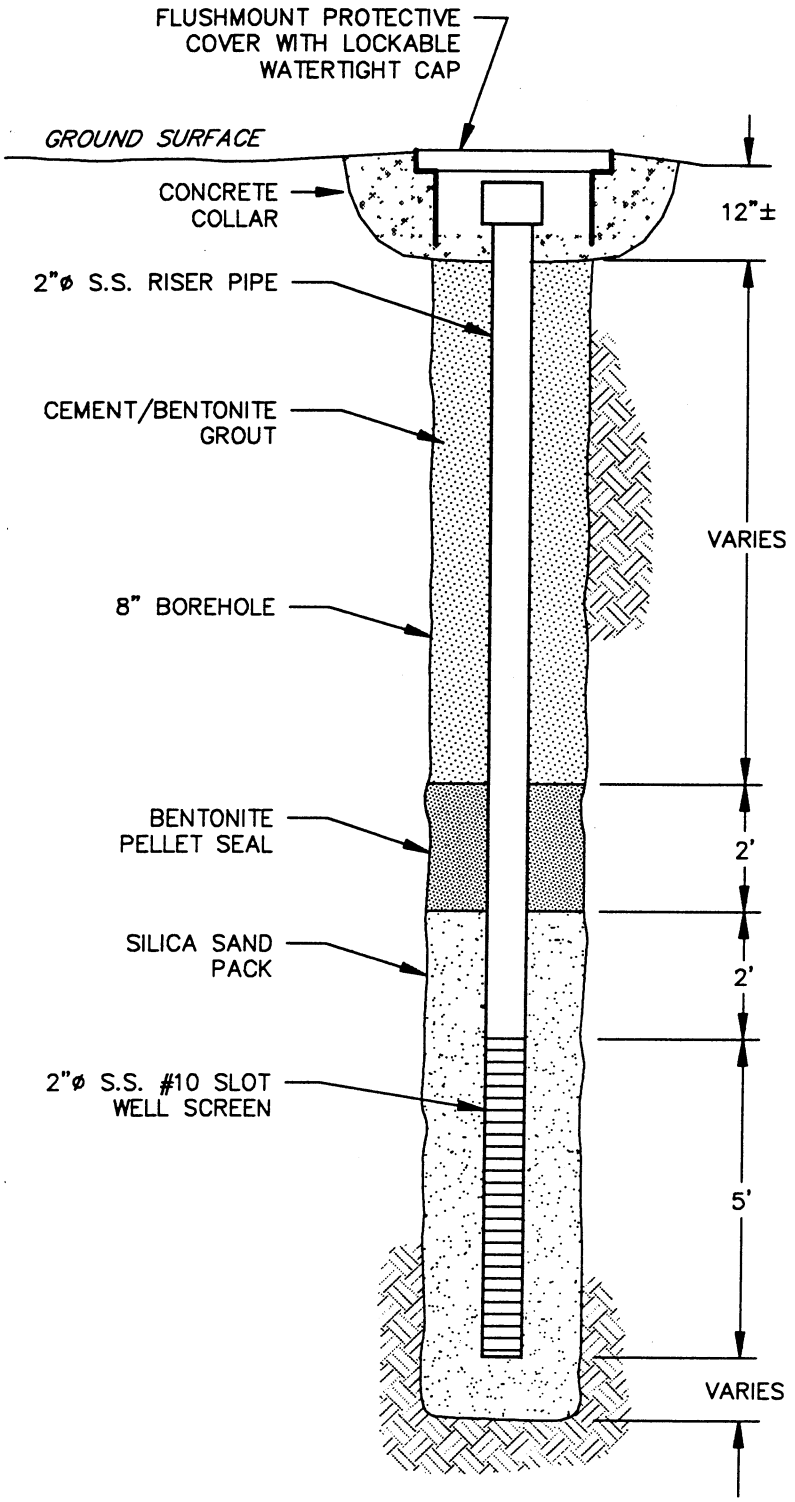
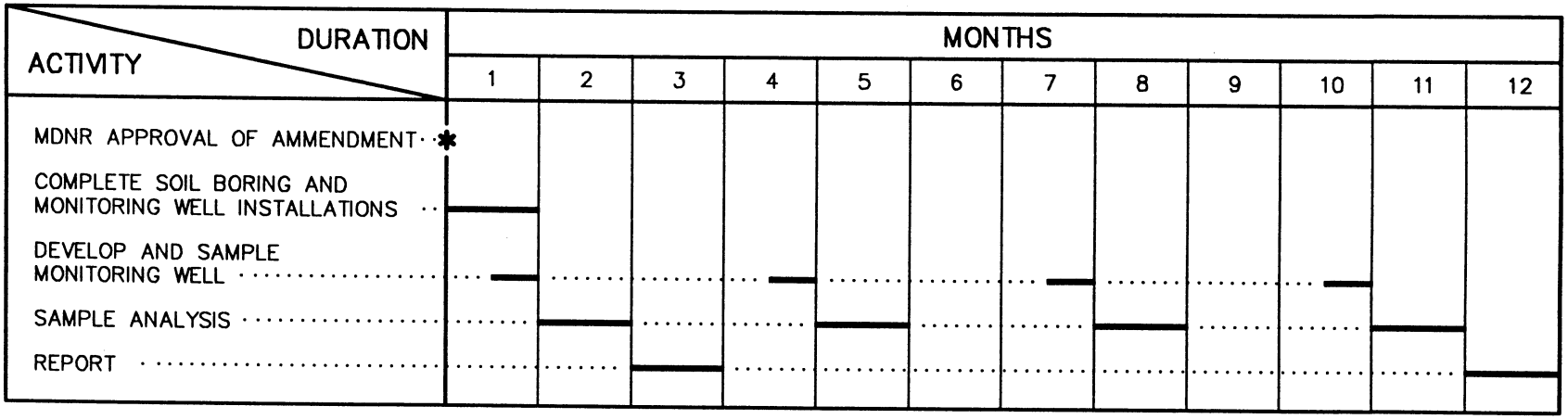


figure 3

TYPICAL MONITORING WELL DETAIL
OIL STORAGE BUILDING – METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5670 (L) MAR 27/96(W) REV.0 (D-01)



LEGEND

* EVENT

CRA ACTIVITY

figure 4

PROJECT SCHEDULE
HAZARDOUS WASTE STORAGE AREA
OIL STORAGE BUILDING – METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5670 (L) MAR 26/96(W) REV.0 (S–02)

TABLE 1

SUMMARY OF DETECTED COMPOUNDS
SOIL SAMPLES - MAY 1993
GM SAGINAW GREY IRON PLANT

Sample Name *Date*	*SA* *29-May-93*	*SB* *29-May-93*	*SC* *29-May-93*	*SD* *29-May-93*	*Type B* *MDNR* *20X GW*	*Type C* *MDNR* *20X GW*
1,1,1-Trichloroethane (µg/kg)	7	ND	ND	ND	4,000	4,000
Acetone (µg/kg)	100	650	160	ND	14,000	42,000
Benzene (µg/kg)	ND	5	ND	ND	24	100
Methylene Chloride (µg/kg)	ND	5	ND	ND	92	100
Toluene (µg/kg)	ND	ND	8	ND	16,000	20,000
Trichloroethene (µg/kg)	67	19	74	38	44	100
Xylenes (µg/kg)	14	ND	7	8	5,600	200,000
pH	NA	NA	7.97	10.13		

Notes:

Samples were analyzed for VOC using EPA methods 601 and 602.
NA - not available due to lack of sample quantity.

TABLE 2

SUMMARY OF DETECTED COMPOUNDS
SOIL SAMPLES - SEPTEMBER 1993
GM SAGINAW GREY IRON PLANT

Sample Name	*TCLP (µg/L)*						*Total (µg/kg)*					
Date	*PA* *9-Sep-93*	*PB* *9-Sep-93*	*PC* *9-Sep-93*	*PD* *9-Sep-93*	*Type B* *Groundwater*	*Type C* *Groundwater*	*PE* *9-Sep-93*	*PF* *9-Sep-93*	*PG* *9-Sep-93*	*PH* *9-Sep-93*	*Type B* *20 x GW*	*Type C* *20 x GW*
1,2-Dichloroethene (Total)	8	ND	ND	ND	77	230	ND	ND	ND	ND	1,500	3,400
1,1,1-Trichloroethane	ND	ND	ND	ND	200	580	7	ND	ND	ND	4,000	4,000
Benzene	ND	ND	ND	ND	1.2	12	ND	6	ND	ND	24	100
Methylene Chloride	8	6	6	ND	4.6	46	ND	ND	ND	ND	92	100
Trichloroethene	7	20	10	7	2.2	22	19	83	36	14	44	100

Note:

Samples were analyzed for VOC using EPA methods 601 and 602.

TABLE 3

CLEANUP CRITERIA
SAGINAW GREY IRON PLANT
SAGINAW, MICHIGAN

	MERA MEMO #8, REV.3 *Type B Criteria*		MERA MEMO #14, REV.1 *Type C Criteria*	
	groundwater(1) *(µg/L)*	*soil (2)* *(µg/kg)*	*groundwater (1)* *(µg/L)*	*soil (2)* *(µg/kg)*
Methylene Chloride	4.6	92	5	100
Trichloroethylene	2.2	44	5	100

Notes:

(1) Health-Based Drinking Water Value
(2) Groundwater Protection Value

TABLE 4

DETECTION LIMITS AND METHODS
SAGINAW GREY IRON PLANT
SAGINAW, MICHIGAN

	MDL		*Method*		
	groundwater (µg/L)	*soil (µg/kg)*	*groundwater*	*soil (total)*	*soil (leachable)*
Methylene Chloride	1	10	8260	8260	1312/8260
Trichloroethylene	1	10	8260	8260	1312/8260

Note:

All methods in accordance with SW-846

NO DATE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

FOIA Exempt

DATE:

SUBJECT: Preliminary Review, Visual Site Inspection - GMC - Central Foundry Saginaw, Michigan MID 041 793 340

FROM: Wayde Hartwick, Geologist
Michigan Permitting Section

TO: Richard Traub, Chief
Michigan Permitting Section

A Preliminary Review/Visual Site Inspection (PR/VSI) has been performed for GMC-Central Foundry in Saginaw, Michigan, MID 041 793 340 Recommendations for Solid Waste Management Units are summarized below.

GW-1 GW-2 NW-4 NW-5 Container storage areas at the facility are all 90-day accumulation areas. All have release controls in place. No evidence of releases was observed during the VSI. No further action is recommended for these units.

The underground storage tanks at the facility will all be removed and the underlying soils sampled to confirm/deny the presence of a release. No further action is recommended for these units. The two calcium carbide treatment pads have recently had ground-water NW-2 monitoring wells installed. Corrective action for these units will NW-3 be addressed during closure activities. No further action is recommended.

WW-3 WW-4 WW-6 OW-1 WW-1 WW-2 A new waste water treatment system is currently under construction. Concern that landfill leachate piped to the WWTP mixing tanks may have contaminated primary and secondary lagoons, still exits. A sampling program should be initiated by the facility to confirm/deny contamination when these WWTP units are taken out of commission.

NW-6 Classified sand piles and other sand piles are known to contain traced amounts of phenols and heavy metals. A hydrogeologic study and sampling program should be conducted by the facility to determine the impact of the classified sand piles and the WWTP units on the environment. The facility should initiate a study to determine the relative benefit of removing PCB-contaminated sediments from the Saginaw, River.

OW-1 Leachate removal from the landfill continues to be a problem. Although the landfill leachate is actively ??? being pumped to the WWTP mixing tanks, it doesn't appear to be keeping up with leachate production. An evaluation of the leachate removal system must be made to determine if removal efficiency can be enhanced.

APPENDIX 9.2

D.17 Former Grey Iron Oil House UST (G.I. #1)

CRA
651 Colby Drive
Waterloo, Ontario N2V 1C2
(519) 884-0510 (Colby Office)
(519) 725-3313 (Bathurst Office)

MEMO

TO: Laura Tucker
Dave Kwasny
Ray Ilkka
Ian Richardson

REFERENCE NO: 5397

FROM: Mike Tomka

DATE: October 15, 1996

RE: Leaking Underground Storage Tank Final Assessment Report
Oil Storage Building, Saginaw Metal Castings Facility

Attached please find a copy of the above referenced document for your files.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - UNDERGROUND STORAGE TANK DIVISION

DEQ

LEAKING UNDERGROUND STORAGE TANK
FINAL ASSESSMENT REPORT

INSTRUCTIONS: COMPLETION OF THIS REPORT WITH ALL APPLICABLE INFORMATION IS MANDATORY. The Certified Underground Storage Tank Professional (CP) MUST sign below. Failure to submit a report within the stated time period may result in Administrative Penalties as provided for in Part 213, Section 21321 of Act 451, P. A. 1994 as amended.

FACILITY NAME: General Motors Powertrain Group Saginaw Metal Castings Facility	FACILITY ID NUMBER: 010581
ADDRESS: 1629 North Washington Avenue, Saginaw, Michigan COUNTY:	MERA SITE ID NUMBER: 730015
DATE(S) RELEASE DISCOVERED: January 3, 1990	CONFIRMED RELEASE NUMBER(S):
O/O NAME: GMPTG Saginaw Metal Castings Facility	MUSTFA CLAIM NUMBER:
O/O ADDRESS: 1629 North Washington Avenue, Saginaw, Michigan	
CONTACT PERSON: Mr. Ray Ilkka, GMPTG	PHONE NUMBER: (517) 757-1473

ANSWER ALL QUESTIONS (DO NOT LEAVE BLANKS):

1. Has the UST been emptied? _x_ Yes ____ No (If no, explain why):
2. Free product present: a. Currently? ____ YES _x_ NO If YES, total gallons recovered since last report:
   b. Previously? ____ YES _x_ NO If YES, total gallons recovered to date:
3. Have vapors been identified in any confined spaces (basement, sewers)? ___ YES _x_ NO
4. State the number of homes where drinking water is or was affected as a result of a release from this facility: None
5. Estimated distance and direction from point of release to nearest:
   a. Private well: 2,000 feet b. Municipal well: N/A c. Surface water/wetland: 2,000 feet
6. Since last report: a. cubic yards of soil remediated: 0 b. gallons of groundwater remediated: 0
7. Totals to date: a. cubic yards of soil remediated: 0 b. gallons of groundwater remediated: 1,005,450
8. Michigan RBCA Site Classification (1-4): 4

CERTIFICATION OF REPORT COMPLETION

I, the undersigned CP, hereby attest to the best of my knowledge and belief that the statements in this document and all attachments are true, accurate and complete. I certify that it was submitted to the USTD on October 15, 1996.
(date submitted-*REQUIRED*)

Ian K. Richardson Oct 15/96
CP Original Signature - Required Date

Michael Tomka
PRINT QC Project Manager's Name

Ian K. Richardson
PRINT CP's Name

Conestoga-Rovers & Associates
Consultant

651 Colby Drive, Waterloo, Ontario
Address

(519)725-3313 (519)725-1394
Phone Number Fax Number

PLEASE RETURN THIS COMPLETED REPORT AND ASSOCIATED ATTACHMENTS TO THE APPROPRIATE USTD DISTRICT OFFICE LISTED ON THE BACK OF THIS PAGE.

UNDERGROUND STORAGE TANK DIVISION OFFICES AND LOCATIONS

[redacted]rmine in which county the UST release occurred. Return all completed forms and associated reports to the USTD office listed next to that county in the following table. Addresses for the USTD offices are listed below.

COUNTY	USTD OFFICE	COUNTY	USTD OFFICE	COUNTY	USTD OFFICE	COUNTY	USTD OFFICE
Alcona	Grayling	Dickinson	Marquette	Lake	Grayling	Oceana	Grand Rapids
Alger	Marquette	Eaton	Shiawassee	Lapeer	Shiawassee	Ogemaw	Grayling
Allegan	Plainwell	Emmet	Grayling	Leelanau	Grayling	Ontonagon	Marquette
Alpena	Grayling	Genesee	Shiawassee	Lenawee	Jackson	Osceola	Grayling
Antrim	Grayling	Gladwin	Grayling	Livingston	Shiawassee	Oscoda	Grayling
Arenac	Grayling	Gogebic	Marquette	Luce	Marquette	Otsego	Grayling
Baraga	Marquette	Grand Traverse	Grayling	Mackinac	Marquette	Ottawa	Grand Rapids
Barry	Plainwell	Gratiot	Shiawassee	Macomb	SE Michigan	Presque Isle	Grayling
Bay	Saginaw-Bay	Hillsdale	Jackson	Manistee	Grayling	Roscommon	Grayling
Benzie	Grayling	Houghton	Marquette	Marquette	Marquette	Saginaw	Saginaw-Bay
Berrien	Plainwell	Huron	Saginaw-Bay	Mason	Grayling	Sanilac	Saginaw-Bay
Branch	Jackson	Ingham	Shiawassee	Mecosta	Grand Rapids	Schoolcraft	Marquette
Calhoun	Jackson	Ionia	Grand Rapids	Menominee	Marquette	Shiawassee	Shiawassee
Cass	Plainwell	Iosco	Grayling	Midland	Saginaw-Bay	St Clair	SE Michigan
Charlevoix	Grayling	Iron	Marquette	Missaukee	Grayling	St Joseph	Plainwell
Cheboygan	Grayling	Isabella	Saginaw-Bay	Monroe	SE Michigan	Tuscola	Saginaw-Bay
Chippewa	Marquette	Jackson	Jackson	Montcalm	Grand Rapids	Van Buren	Plainwell
Clare	Grayling	Kalamazoo	Plainwell	Montmorency	Grayling	Washtenaw	Jackson
Clinton	Shiawassee	Kalkaska	Grayling	Muskegon	Grand Rapids	Wayne	SE Michigan
Crawford	Grayling	Kent	Grand Rapids	Newaygo	Grand Rapids	Wexford	Grayling
[redacted]a	Marquette	Keweenaw	Marquette	Oakland	SE Michigan		

CADILLAC OFFICE	JACKSON OFFICE	SAGINAW BAY OFFICE
ROUTE #1 8015 MACKINAW TRAIL CADILLAC MI 49601 616-775-9727 (PHONE) 616-775-9671 (FAX)	301 E LOUIS GLICK HIGHWAY JACKSON MI 49201 517-780-7900 (PHONE) 517-780-7855 (FAX)	503 N EUCLID AVE SUITE 9 BAY CITY MI 48706 517-684-9141 (PHONE) 517-684-9799 (FAX)
GAYLORD OFFICE	**MARQUETTE OFFICE**	**SHIAWASSEE OFFICE**
P0 BOX 667 GAYLORD MI 49735 517-732-3541 (PHONE) 517-732-0794 (FAX)	1990 US 41 SOUTH MARQUETTE MI 49855 906-228-6561 (PHONE) 906-228-5245 (FAX)	10650 BENNETT DR MORRICE MI 48857-9792 517-625-4600 (PHONE) 517-625-5000 (FAX)
GRAND RAPIDS OFFICE	**PLAINWELL OFFICE**	**SE MICHIGAN OFFICE**
350 OTTAWA ST NW GRAND RAPIDS MI 49503 616-456-5071 (PHONE) 616-456-1239 (FAX)	1342 SR-89 SUITE B PLAINWELL MI 49080-1915 616-692-2120 (PHONE) 616-692-3050 (FAX)	38980 SEVEN MILE RD LIVONIA MI 48152 313-953-0241 (PHONE) 313-432-1295 (FAX)
GRAYLING OFFICE		
1955 NORTH I-75 BL GRAYLING MI 49738 [redacted]517-348-6371 (PHONE) [redacted]7-348-8825 (FAX)		

TABLE OF CONTENTS

SECTION		TITLE	PAGE
		COVER SHEET	
		FACILITY AND OWNER OR OPERATOR INFORMATION	
		SITE QUESTIONS	
		REPORT CERTIFICATION	
		MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - USTD DISTRICT OFFICES AND CONTACTS	2 of 27
		TABLE OF CONTENTS	3 of 27
		LIST OF ATTACHMENTS	5 of 27
1.0		**REPORTING AND RESPONSE TO RELEASES INVOLVING FREE PRODUCT**	6 of 27
2.0		**DELINEATION OF THE EXTENT OF CONTAMINATION**	8 of 27
	2.1	SITE AND AREA MAPS	9 of 27
	2.2	SOIL CONDITIONS AND CHARACTERISTICS	10 of 27
	2.3	GROUNDWATER CONDITIONS AND CHARACTERISTICS	11 of 27
	2.4	CONDITIONS AND CHARACTERISTICS IN OTHER ENVIRONMENTAL MEDIA	13 of 27
3.0		**SITE CLASSIFICATION**	15 of 27
4.0		**RESULTS OF THE TIER II OR TIER III EVALUATION**	16 of 27
	4.1	CONFIRMATION OF EXPOSURE PATHWAYS AND SCENARIOS	16 of 27
	4.2	JUSTIFICATION FOR ALTERNATIVE ASSUMPTIONS OR MODELING PARAMETER SELECTIONS	18 of 27
	4.3	IDENTIFICATION OF TIER I RISKED-BASED SCREENING LEVELS OR TIER II / TIER III SITE-SPECIFIC TARGET LEVELS AND COMPARISON TO SITE DATA	19 of 27
	4.4	PROPOSED FOLLOW-UP ACTIVITIES	20 of 27
5.0		**FEASIBILITY ANALYSIS**	20 of 27

TABLE OF CONTENTS
(continued)

SECTION	TITLE	PAGE
6.0	**CORRECTIVE ACTION PLAN**	21 of 27
6.1	DESCRIPTION OF THE CORRECTIVE ACTION	21 of 27
6.2	AMBIENT AIR QUALITY MONITORING ACTIVITIES	22 of 27
6.3	PLANS FOR OPERATION AND MAINTENANCE	23 of 27
6.4	PLANS FOR PERFORMANCE MONITORING	23 of 27
6.5	SCHEDULE FOR IMPLEMENTATION OF THE CORRECTIVE ACTION	25 of 27
6.6	NOTICES AND RESTRICTIONS	25 of 27
6.7	FINANCIAL ASSURANCE MECHANISM	26 of 27
6.8	PERMITTING AND APPROVAL REQUIREMENTS	27 of 27

LIST OF ATTACHMENTS

(Include as Required and Check Box if Attached)
Attachments 1, 2, 6-12, 16-18, and 22-28 are to be submitted if applicable.
Attachments 3-5, 13-15, and 19-21 are found in the back of this document and should be completed and submitted when necessary.

ATTACHMENT NUMBER		DESCRIPTION
1	☐	Site Map Showing Extent of Remaining Free Product
2	☐	Free Product Recovery System Schematic
3	☐	Field Screening Results Table for Soils
4	x	Laboratory Results Table for Soils
5	x	Tier I RBSL / Tier II or Tier III SSTL Comparison Table for Soils
6	x	Site Map Showing Soil Sampling Locations, Maximum Contaminant Concentrations, and Sampling Depths
7	☐	Site Map(s) Showing Vertical and Horizontal Distribution of Contaminants in Soil
8	☐	Cross Sections Showing the Vertical and Horizontal Distribution of Soil Contaminants
9	x	Soil Boring Logs
10	x	Well Construction Diagrams
11	x	Groundwater Flow Map Showing Water Level Measurement Locations
12	☐	Description of Hydrogeologic Factors That Could Influence Groundwater Flow
13	☐	Field Screening Results Table for Groundwater
14	x	Laboratory Results Table for Groundwater
15	x	Tier I RBSL / Tier II or Tier III SSTL Comparison Table for Groundwater
16	x	Site Map Showing Groundwater Sampling Locations, Maximum Contaminant Concentrations, and Location of Contaminant Plume
17	☐	Cross Sections Showing the Vertical and Horizontal Distribution of Groundwater Contaminants
18	☐	Presentation of Time Series Groundwater Results
19	☐	Field Screening Results Tables for Other Media
20	☐	Laboratory Results Tables for Other Media
21	☐	Tier I RBSL / Tier II or Tier III SSTL Comparison Tables for Other Media
22	☐	Site Map Showing Sampling Locations and Maximum Contaminant Concentrations for Other Media
23	☐	Calculations Supporting the Development of the Tier I and Tier II or Tier III SSTLs
24	☐	Schematic of the Remedial System to Be Employed
25	☐	Maps Depicting Capture Zones, System Layout and Anticipated System Rates
26	☐	Performance Monitoring Plan
27	☐	Implementation Schedule for the Corrective Action
28	☐	Map Locating the Individuals and Population Segments Provided Public Notice

1.0 REPORTING AND RESPONSE TO RELEASES INVOLVING FREE PRODUCT

A. Has free product been encountered subsequent to submission of the Initial Assessment Report?
☐ Yes x No

If "No", skip to Section 2.0. If "Yes", continue with question "B" below.

B. Date and Time Free Product Was Discovered: _____/_____/_____ _____ AM / PM

C. Date and Time Free Product Fax Transmittal Sheet Submitted: _____/_____/_____ _____ AM / PM

D. Has there ever been free product in the on-site or off-site soils? ☐ Yes ☐ No

E. Is there currently free product in the on-site or off-site soils? ☐ Yes ☐ No

F. Is there currently free product in or around buried underground utilities? ☐ Yes ☐ No

G. Has there ever been free product on/in the groundwater? ☐ Yes ☐ No

H. Is there currently free product on/in the groundwater? ☐ Yes ☐ No

I. What initial response actions were performed at this site to address the presence of free product?

PURPOSE OF INITIAL RESPONSE ACTIONS	WERE ACTIONS TAKEN? (Yes/Date or No)	IF "Yes", DESCRIBE THE ACTIONS TAKEN AND THEIR RESULTS IF "No", INDICATE WHY NOT
To identify the presence of free product [324.21307(2)(c)]		
To recover free product in a manner that minimizes the spread of contamination into previously uncontaminated zones [324.21307(2)(c)(i)]		
To utilize recovery and disposal techniques appropriate to site conditions [324.21307(2)(c)(i)]		
To properly treat recovery by-products as required by law (identify the type of treatment applied and the expected effluent quality) [324.21307(2)(c)(i)]		

1.0 REPORTING AND RESPONSE TO RELEASES INVOLVING FREE PRODUCT (Continued)

PURPOSE OF INITIAL RESPONSE ACTIONS	WERE ACTIONS TAKEN? (Yes/Date or No)	IF "Yes", DESCRIBE THE ACTIONS TAKEN AND THEIR RESULTS. IF "No", INDICATE WHY NOT
To properly dispose of recovery by-products as required by law [324.21307(2)(c)(i)]		
To handle any flammable products in a safe and competent manner to prevent fires and explosions [324.21307(2)(c)(iii)]		

J. Complete the following table relating to free product recovery:

LOCATION OF OBSERVED FREE PRODUCT (Specify ID No.)	THICKNESS OF FREE PRODUCT OBSERVED (nearest 1/8")	TYPE OF FREE PRODUCT OBSERVED	LNAPL OR DNAPL*?	QUANTITY OF FREE PRODUCT RECOVERED (gallons)
IN WELLS				
IN BOREHOLES				
IN EXCAVATIONS				
OTHER LOCATIONS (Specify)				
TOTAL FREE PRODUCT RECOVERED TO DATE				

*LNAPL = Light Non-Aqueous Phase Liquid; DNAPL = Dense Non-Aqueous Phase Liquid

K. Has the extent of free product been defined? ☐ Yes ☐ No

1.0 REPORTING AND RESPONSE TO RELEASES INVOLVING FREE PRODUCT (Continued)

L. If "Yes", include the extent of free product on the site map included as Attachment No. 1.

M. Describe the free product recovery system that was or is being used ☐ or is proposed ☐ *(include a schematic as Attachment No. 2, if appropriate):* _____

N. If the free product recovery system is currently "proposed", provide the planned installation date: _____/_____/_____

O. Has the recovered free product been properly disposed? ☐ Yes ☐ No

P. If "No", specify: _____

Q. Provide the name of the person or persons responsible for implementing the free product removal measures:

Company Name _____
Company Address _____
_____
_____
Company Telephone No. ____(_____)_____
Contact Person _____
Contact Telephone No. ____(_____)_____

2.0 DELINEATION OF THE EXTENT OF CONTAMINATION

A. Were additional site assessment activities conducted subsequent to the submission of the Initial Assessment Report? x Yes ☐ No

2.0 DELINEATION OF THE EXTENT OF CONTAMINATION (Continued)

B. If "Yes", what environmental media were further investigated?
(Check all that apply):

x Soil x Groundwater ☐ Air ☐ Surface Water

☐ Sediments ☐ Biota ☐ Other *(Specify)*: _____

C. Was the Work Plan implemented as outlined in the Initial Assessment Report? ☐ Yes x No

D. If "No", describe the changes made to the sampling and analysis plan in detail and provide justification for why they were made *(attach additional sheets, as needed)*:
Work Plan was implemented as outlined but was generated and approved by MDEQ prior to Act 451 requirements.

2.1 SITE AND AREA MAPS

Area and site map(s), drawn to scale, may be used to effectively present a variety of information required to be included in this Final Assessment Report. It may not be possible to include all required information on one map. Multiple maps may be attached, with each highlighting a different type of information. However, use of multiple maps should be minimized. Placement of information on the site map(s) should be done in a clear and legible manner. The area map should show the location of the site boundaries in relation to the nearest major roads.

The base site map on which to display information required for the Final Assessment Report should include the following, as appropriate:

- *Location of each underground storage tank and associated piping in the leaking underground storage tank system (prior to excavation if tanks have been removed)*
- *Location of the release and the component of the underground storage tank system from which the release occurred*
- *Location of any other existing and former underground storage tanks at the site*
- *Approximate location of fill ports, dispensers, and other pertinent system components*
- *Location of nearby buildings, roadways, paved areas, or other structures*
- *Location of nearby surface waters or wetlands*
- *Location and depth of nearby underground sewers and utility lines*
- *Location of all wells within 100 feet of the property boundary*

2.2 SOIL CONDITIONS AND CHARACTERISTICS

A. Is soil contamination present? ☐ Yes x No

NOTE: If "Yes", complete questions "B" through "H". If "No", skip to Section 2.3.

B. Total volume of soil remediated or disposed to date: _____ yds^3

C. Describe any soil remediation or disposal activities performed to date: _____

_____

_____

_____

_____

_____

_____

_____

D. Attach Field Screening Results (Attachment No. 3) and Laboratory Results (Attachment No. 4) tables showing the results of all soil sampling performed to date for the listed parameters. *(NOTE: The USTD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)*

E. Provide in the Comparison Table for Soils (included as Attachment No. 5) the maximum contaminant concentrations detected to date in the remaining soils for each listed parameter. *(NOTE: Enter "ND" with the appropriate method detection limit when the parameter was not detected, and enter "NA" when the chemical was not analyzed. In areas where remediation has occurred, do not include sample results for areas where the soil has been subsequently removed or the characteristics of the soil left in place have been altered due to the remediation.)*

F. Show the maximum concentrations, sample depths, and horizontal extent of soil contamination in relation to the soil sampling locations on a site map. *(Include as Attachment No. 6.)*

G. Describe the vertical extent and distribution of the soil contaminants using depth-coded site maps (Attachment No. 7), cross sections (Attachment No. 8), and/or boring logs (Attachment No. 9):

_____

_____

_____

_____

_____

_____

_____

2.2 SOIL CONDITIONS AND CHARACTERISTICS (Continued)

H. Was any on-site soil contamination not related to the release discovered during the site characterization activities performed subsequent to the submission of the Initial Assessment Report?

☐ Yes ☐ No

If "Yes", answer question "I"; otherwise, skip to Section 2.3.

I. Provide the following information:

ON-SITE CONTAMINANTS NOT RELATED TO THE RELEASE	SOURCE OF THIS CONTAMINATION (If Known)	LOCATION OF THIS CONTAMINATION

2.3 GROUNDWATER CONDITIONS AND CHARACTERISTICS

A. Has groundwater been encountered at the site? x Yes ☐ No

B. If "No", provide the total depth investigated and the date of investigation:

Depth of Investigation: _____ ft BGS
Date of Investigation: _____/_____/_____

If "No", skip to Section 2.4; otherwise, continue with Section 2.3.

C. Is the groundwater potable? ☐ Yes x No
D. Is the groundwater currently a source of drinking water? ☐ Yes x No
E. Is groundwater being used for a purpose other than potable drinking use? ☐ Yes x No
F. Is more than one groundwater unit present beneath the site? x Yes ☐ No

Hydrogeologic Characteristics (*if appropriate*):

G. Average depth to groundwater (as measured in site well(s)): 8.5 to 9.5 ft BGS
H. Depth to bottom of water-bearing layer: 9.5 to 15 ft BGS
I. Depth to a potable groundwater unit: 80 ft BGS
J. Attach copies of boring logs (Attachment No. 9) and well construction diagrams (Attachment No. 10) for all monitoring wells.

Groundwater Flow Rate and Direction:

K. Predominant soil type in water-bearing stratum (*e.g., sand, silt*): sand
L. Effective porosity of water-bearing stratum unknown $cm^{3\ void}/cm^{3\ soil}$

2.3 GROUNDWATER CONDITIONS AND CHARACTERISTICS (Continued)

M. Hydraulic conductivity (☐ measured ☐ estimated): unknown cm/sec

N. Lateral hydraulic flow gradient (*attach a site map with groundwater flow direction and elevation data as Attachment No. 11 - USGS datum preferred*): unknown ft/ft to WNW (direction)

O. Effective groundwater flow rate: unknown ft/yr

P. Identify hydrogeologic conditions that could influence flow direction *(describe here or attach description as Attachment No. 12):* Unknown

Q. Is there any indication of a vertical flow gradient? ☐ Yes x No

R. If "Yes", describe: _____

S. Has the groundwater been affected by the release? x Yes ☐ No

If "No", skip to Section 2.4; otherwise, continue with Section 2.3.

T. Has there been more than one groundwater unit contaminated by the release? ☐ Yes x No

U. If "Yes", attach additional sheets answering questions "G" through "R" for each groundwater unit.

V. Describe any groundwater remediation activities performed to date: Three wells installed in February 1990. Three replacement wells installed in March and April 1990. Two replacement wells installed in December 1994. Groundwater monitoring activities since February 1990. Purge well installed at former UST location in March 1990. Groundwater pumping and treatment between July 1990 and November 1991. Additional purging in April 1992.

W. Total volume of groundwater remediated to date: 1,005,450 gallons

X. Does the known plume currently extend off-site? ☐ Yes x No ☐ Unknown

2.3 GROUNDWATER CONDITIONS AND CHARACTERISTICS (Continued)

Y. Attach Field Screening Results (Attachment No. 13) and Laboratory Results (Attachment No. 14) tables showing the results of all groundwater sampling performed to date for the listed parameters. *(NOTE: The USTD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)*

Z. Provide in the Comparison Table for Groundwater (Attachment No. 15) the maximum contaminant concentrations detected to date in the on-site or off-site groundwater for each listed parameter. *(NOTE: Enter "ND" with the appropriate method detection limit when the parameter was not detected, and enter "NA" when the chemical was not analyzed. In areas where remediation has occurred, do not include sample results for areas where the groundwater has been subsequently altered due to remediation.)*

AA. Show the maximum concentrations and the estimated aerial horizontal extent of the contaminated plume in relation to the groundwater sampling locations on the site map and include as Attachment No. 16.

BB. Describe the vertical extent and distribution of the groundwater contaminants using depth-coded cross sections (Attachment No. 17) that show screened intervals of the monitoring wells. Cross sections locations should be included on the site map:

_____
_____
_____
_____
_____
_____
_____

CC. Were multiple groundwater sampling events conducted at the site? x Yes ☐ No

DD. If "Yes", include a chronological summary of the results for each sampling location using the data tables provided in Attachment No. 14 and include as Attachment No. 18.

2.4 CONDITIONS AND CHARACTERISTICS IN OTHER ENVIRONMENTAL MEDIA

A. Is contamination present in any environmental media other than soil or groundwater?

☐ Yes x No

NOTE: If "Yes", answer questions "B" through "I". If "No", skip to Section 3.0.

2.4 CONDITIONS AND CHARACTERISTICS IN OTHER ENVIRONMENTAL MEDIA (Continued)

B. What other environmental media were investigated as part of this corrective action? (*Check all that apply*):

☐ Air ☐ Surface Water ☐ Sediment

☐ Biota ☐ Other (*Specify*): _____

NOTE: For each environmental media checked, answer questions "C" through "I".

C. Total volume of each of the other specified media remediated or disposed to date (*Specify units*): _____

D. Describe any remediation, treatment or disposal activities performed to date relative to each of the other specified media: _____

_____

_____

_____

_____

_____

E. Attach Field Screening Results (Attachment No. 19) and Laboratory Results (Attachment No. 20) tables showing the results of all sampling performed to date for the listed parameters in the other specified environmental media. *(NOTE: The USTD may request copies of the laboratory data sheets, chain-of-custody forms, and all available QA/QC information.)*

F. Provide in the Comparison Table for Other Environmental Media (Attachment No. 21) the maximum contaminant concentrations detected to date in each other specified environmental media for each listed parameter. *(NOTE: Enter "ND" with the appropriate method detection limit when the parameter was not detected, and enter "NA" when the chemical was not analyzed. In areas where remediation has occurred, do not include sample results for areas where the material has been subsequently removed or the characteristics of the material left in place have been altered due to the remediation.)*

G. Show the maximum concentrations, sample depths, and extent of contamination in the other specified environmental media (*as appropriate*) in relation to the sampling locations on the site map included as Attachment No. 22.

H. Describe the extent and distribution of the contaminants in the other specified media: _____

_____

_____

_____

_____

2.4 CONDITIONS AND CHARACTERISTICS IN OTHER ENVIRONMENTAL MEDIA (Continued)

I. If there is known contamination in the other specified media not related to the release, complete the following:

ON-SITE CONTAMINANTS NOT RELATED TO THE RELEASE	SOURCE OF THIS CONTAMINATION (If Known)	LOCATION OF THIS CONTAMINATION

3.0 SITE CLASSIFICATION

A. Indicate the current Site Classification Level *(See Attachment No. 10 of the "Guidance Document for Risk-Based Corrective Action at Leaking Underground Storage Tanks"):*

- ☐ Class 1: Immediate threat to human health, safety, or sensitive environmental receptors
- ☐ Class 2: Short-term threat to human health, safety, or sensitive environmental receptors
- ☐ Class 3: Long-term threat to human health, safety, or sensitive environmental receptors
- x Class 4: No demonstrable long-term threat to human health, safety, or sensitive environmental receptors

NOTE: Regardless of the classification level, all reports must be submitted within the legislative time frame unless an alternate schedule is approved in writing by the USTD.

B. Date of most recent classification or reclassification: 10 / 15 / 96

C. Is this classification a reclassification performed subsequent to the submission of the Initial Assessment Report? ☐ Yes x No

D. If "Yes", describe the conditions that have changed significantly since the prior classification to justify the reclassification: _____

4.0 RESULTS OF THE TIER II OR TIER III EVALUATION

4.1 CONFIRMATION OF EXPOSURE PATHWAYS AND SCENARIOS

A. Have any of the following site characteristics or conditions, transport mechanisms, exposure routes, or potential receptors at the site or the surrounding area been newly identified to be present or changed significantly in character since the submission of the Initial Assessment Report? ☐ Yes x No

B. If "Yes", check all that are newly identified or significantly changed since the submission of the Initial Assessment Report:

Site Characteristics or Conditions

- ☐ Neighboring Land Use or Local Zoning Changes
- ☐ New or Discontinued Uses of Groundwater At or Near the Site
- ☐ Changes in On-Site Facility Operations
- ☐ Construction of New Structures or Utilities At or Near the Site

Potential Transport Mechanism(s)

- ☐ Wind Erosion and Atmospheric Dispersion
- ☐ Volatilization and Atmospheric Dispersion
- ☐ Volatilization and Enclosed-Space Accumulation
- ☐ Leaching and Groundwater Transport
- ☐ Mobile Free-Liquid Migration
- ☐ Stormwater/Surface Water Transport
- ☐ Utility Corridors
- ☐ Other *(Specify)*: _____

Potential Exposure Route(s)

- ☐ Soil Ingestion
- ☐ Direct Contact of Soil with Skin
- ☐ Inhalation of Airborne Particulates
- ☐ Inhalation of Volatiles
- ☐ Potable Water Use
- ☐ Use of Non-Potable Water
- ☐ Other *(Specify)*: _____

Potential Receptor(s)

- ☐ Resident
- ☐ Commercial Worker III*
- ☐ Commercial Worker IV*
- ☐ Industrial Worker
- ☐ Construction Worker
- ☐ Sensitive Habitat
- ☐ Structures
- ☐ Utilities

4.1 CONFIRMATION OF EXPOSURE PATHWAYS AND SCENARIOS (Continued)

☐ Surface Waters ☐ Water Supply Wells ☐ Other *(Specify)*:_____

* As defined in Attachment No. 11 to the "Guidance Document for Risk-Based Corrective Action at Leaking Underground Storage Tanks"

C. For each item checked above, briefly describe the change and its potential impact on the selection of exposure route(s) and potential receptors for the Tier II or Tier III evaluation relative to the Tier I or Tier II evaluation included in the Initial Assessment Report (*use additional attached sheets, if necessary:*

_____
_____
_____

NOTE: A pathway must include three necessary elements:

1) a source (e.g., contamination);
2) a mechanism by which the contamination can become available to result in exposures at the source or via migration to other locations (e.g., free product and contaminated groundwater movement along a buried utility corridor); and
3) an individual who may come into contact, ingest, or inhale the contamination at the point of exposure (e.g., a utility maintenance worker digging to repair the line).

Examples include:

1. *inhalation of soils by an on-site construction worker*
2. *impacted soils leaching into potable ground water and being used by a nearby resident for drinking and bathing*
3. *inhalation of vapors resulting from the migration of free product by a neighboring industrial worker*
4. *groundwater discharging to wetlands*

D. List the most plausible potential residential exposure pathway(s) for the site: _____
_____
_____

E. List the most plausible potential commercial exposure pathway(s) for the site: _____
_____
_____
_____

F. List the most plausible potential industrial exposure pathway(s) for the site: _____
_____
_____
_____

4.1 CONFIRMATION OF EXPOSURE PATHWAYS AND SCENARIOS (Continued)

List the most plausible potential sensitive habitat exposure pathway(s) for the site: _____

_____

_____

_____

4.2 JUSTIFICATION FOR ALTERNATE ASSUMPTIONS OR MODELING PARAMETER SELECTIONS

A. Has a site-specific Tier II or Tier III evaluation been conducted for this Final Assessment Report?

☐ Yes x No

B. If "Yes", identify and justify where alternate assumptions or site-specific information was used in place of the default assumptions as defined in Attachment No. 11 of the "Guidance Document For Risk-Based Corrective Action At Leaking Underground Storage Tanks". *(If a Tier II evaluation was performed and described in the Initial Assessment Report, explicitly indicate where different assumptions or site-specific information were used in this Tier II or Tier III evaluation and why the change was justified.)*

ASSUMPTION	DEFAULT TIER I OR PRIOR TIER II SELECTION	ALTERNATE SELECTION	JUSTIFICATION OR BASIS FOR SUBSTITUTION *(Attach sheets if needed)*

C. Include the calculations supporting the development of the relevant Tier I RBSLs and Tier II or Tier III SSTLs as Attachment No. 23.

4.3 IDENTIFICATION OF TIER I RISK-BASED SCREENING LEVELS OR TIER II / TIER III SITE-SPECIFIC TARGET LEVELS AND COMPARISON TO SITE DATA

A. For each contaminated medium, complete a Tier I RBSL / Tier II or Tier III SSTL Comparison Table (Attachment No. 5 for soil, Attachment No. 15 for groundwater and Attachment No. 21 for other media, as appropriate) by:

1. Checking the box associated with the applicable land use scenario;

2. Checking the boxes associated with the contaminants currently present at the site;

3. Entering the current maximum detected on-site or off-site concentration for each selected contaminant, along with the corresponding sample identification number and date of sampling;

4. Entering the lowest applicable RBSL value from the Tier I Look-Up Tables (*refer to Attachment No. 11 of the "Guidance Document For Risk-Based Corrective Action At Leaking Underground Storage Tanks"*) for the specific exposure routes present and environmental medium being considered or a corresponding optional Tier II SSTL. *[NOTE: Include the exposure route code that identifies the basis for each applicable criterion noted. For example, 12 ug/kg (A) for a cleanup goal based on the direct contact with soil exposure route, and 12 ug/kg (B) for a cleanup goal based on the soil leaching to groundwater exposure route*];

5. Comparing the contaminant-specific maximum concentration to the corresponding RBSL or SSTL criterion; and

6. Identifying and recording whether or not there is an exceedence of the RBSL or the SSTL.

B. Tier I RBSL / Tier II or Tier III SSTL Comparison Tables are attached for the following *(Check all that apply):*

	ENVIRONMENTAL MEDIUM		
LAND USE	**SOIL**	**GROUNDWATER**	**OTHER** *(Specify)*
Residential	x	x	☐
Commercial III	☐	☐	☐
Commercial IV	☐	☐	☐
Industrial	☐	☐	☐

4.4 PROPOSED FOLLOW-UP ACTIVITIES

. Based on the results of the Tier II or III evaluation, indicate the follow-up activities proposed for the site:

☐	Site conditions do not exceed the relevant Tier I RBSLs or the calculated Tier II/ Tier III SSTLs do not rely on institutional controls	Proceed with site closure. **No further sections of Final Assessment Report need to be completed.**
x	Site conditions exceed some or all of the relevant Tier I RBSLs or Tier II/Tier III SSTLs	Propose final corrective action to achieve Tier I RBSLs or Tier II/Tier III SSTLs. **Continue with Section 5.0.**

5.0 FEASIBILITY ANALYSIS

A. As appropriate, given the site conditions, complete the following comparison table of the potentially applicable corrective actions that were considered for the facility to reduce the volume, toxicity and/or mobility of the released regulated substances (*both on-site and off-site, as applicable*), noting the principal advantages and disadvantages of each listed alternative. *(Indicate explicitly, where appropriate, the relative estimated net present value cost of each alternative corrective action, its indicated effectiveness and feasibility, and the time needed to implement and complete the alternative. Attach additional sheets, if necessary.)*

CORRECTIVE ACTION ALTERNATIVES	PRINCIPAL ADVANTAGES	PRINCIPAL DISADVANTAGES
Natural Attenuation and Long-Term Monitoring	Ease of Implementation and Low Cost	Continued Potential for Migration of Contaminated Groundwater
Groundwater Pumping and Treatment	Reduced Potential for Migration of Contaminated Groundwater	Higher Cost and Limited Effectiveness (due to low concentrations as encountered during previous pumping and treatment)

5.0 FEASIBILITY ANALYSIS (Continued)

B. Identify and briefly describe the preferred alternative. *(Attach additional sheets, if needed. Document the rationale for selecting this option by discussing how the selected remedial action will:*

- *Be protective of human health and the environment*
- *Comply with applicable or relevant and appropriate requirements*
- *Meet the requirements of the Risk-Based Corrective Action process*
- *Be a permanent solution (to the maximum extent possible)*
- *Be cost-effective)*

Natural attenuation and long-term monitoring (for benzene at MW-15) would be protective of human health and the environment because the impacted groundwater is currently localized in the MW-14 area and the monitoring component would identify any off-site migration of impacted groundwater. This is the most effective, (considering the limited effectiveness of previous groundwater pumping and treatment activities) most easily implemented, and least cost alternative.

C. Has a pilot study been conducted to demonstrate the performance of any component or subsystem associated with the corrective action? ☐ Yes x No

D. If "Yes", describe the pilot study or testing that was conducted and present the results *(attach additional sheets, if necessary)*:

E. If a pilot study or testing was not conducted, explain why they were not needed: No active remedial technology is proposed. An effective monitoring network has been in place for several years.

6.0 CORRECTIVE ACTION PLAN

6.1 DESCRIPTION OF THE CORRECTIVE ACTION

A. Describe the overall program and the primary components of the selected corrective action to be implemented at the facility (*attach additional sheets, if necessary*): Groundwater monitoring at MW-15 (the furthest downgradient well) for benzene on an annual basis, and groundwater elevation measurements at MW-11, MW-14 and MW-15 on an annual basis. The groundwater monitoring program may be revised after an appropriate time (i.e. 5 years) based on the analytical results of the provious monitoring.

B. Include a schematic drawing of the remedial system to be employed (Attachment No. 24).

6.1 DESCRIPTION OF THE CORRECTIVE ACTION (Continued)

C. Include maps depicting capture zones/zones of influence, system layout, and anticipated system rates (Attachment No. 25).

D. From Attachment No. 12 to the "Guidance Document for Risk-Based Corrective Action at Leaking Underground Storage Tanks" (*entitled "Guidance for Parameters, Analytical Methods, Sample Handling, Quality Control, and Cleanup Limits for Petroleum Hydrocarbon Releases"*), specify and justify the indicator parameters to be used (*if applicable*) to evaluate the implementation of the Corrective Action Plan. *(For each indicator parameter, identify the corresponding cleanup goal and the basis of the cleanup goal.)*

INDICATOR PARAMETER / Rationale for Selection	**IDENTIFIED CLEANUP GOAL**	**UNITS (ug/kg or ug/l)**	**BASIS OF THE CLEANUP GOAL**
Benzene Selected due to its being the only parameter to exceed generic residential drinking water criteria at downgradient well MW-14 which does not exceed generic residential drinking water criteria at upgradient well MW-11.	not applicable	not applicable	not applicable

6.2 AMBIENT AIR QUALITY MONITORING ACTIVITIES

A. Will ambient air quality be monitored during the implementation of the corrective action?

☐ Yes x No

B. If "No", explain why air monitoring is not needed: No exposure of contaminants to the air is expected.

6.2 AMBIENT AIR QUALITY MONITORING ACTIVITIES (Continued)

C. If "Yes", describe the air quality monitoring to be conducted during the corrective action:

PARAMETERS TO BE MONITORED	ACTION LEVEL (Basis for Action Level)	MONITORING DEVICE TO BE USED	MONITORING FREQUENCY	PROCEDURE TO BE FOLLOWED IF ACTION LEVEL EXCEEDED

6.3 PLANS FOR OPERATION AND MAINTENANCE

A. Does any equipment or system associated with the corrective action need to be operated or maintained in order for the RBSLs or SSTLs to be met? ☐ Yes x No

(NOTE: The USTD may request that operation and maintenance information and procedures for this equipment or systems be developed as identified in Section 21309(2)(b).)

6.4 PLANS FOR PERFORMANCE MONITORING

A. Does meeting the cleanup goals depend on the performance of a treatment system or a system for controlling the further release or migration of contaminants? ☐ Yes x No
If "No", skip to Section 6.5.

B. Identify the environmental media to be monitored during the corrective action *(Check all that apply)*:

ENVIRONMENTAL MEDIA TO BE MONITORED	ON-SITE	OFF-SITE
Soil		
Groundwater		
Surface Water		
Other *(Specify)*: _____		

6.4 PLANS FOR PERFORMANCE MONITORING (Continued)

. Provide the following information regarding the plan for performance monitoring which is included as Attachment No. 26:

REQUIRED INFORMATION OR CONTENTS	INCLUDED IN THE MONITORING PLAN? (Yes or No)	IDENTIFY SECTION(S) / PAGE(S) WITHIN THE MONITORING PLAN WHERE THE SPECIFIED INFORMATION IS PRESENTED
Location of monitoring points (Include a site map with locations marked) [324.21309a(2)(c)(i)]		
Monitoring frequency and schedule [324.21309a(2)(c)(iii)]		
Monitoring methodology and sample collection procedures [324.21309a(2)(c)(iv)]		
Monitoring parameters to be used as indicators, and the rationale for their selection [324.21309a(2)(c)(v)]		
Laboratory name, analytical method to be employed, method detection limits, and practical quantitation limits [324.21309a(2)(c)(vi)]		
uality assurance/ quality control (QA/QC) procedures and measures to be employed [324.21309a(2)(c)(vii)]		
Description of how the monitoring data will be presented and analyzed to demonstrate the effectiveness of the corrective action [324.21309a(2)(c)(viii) and (xi)]		
Operation and maintenance provisions for the monitoring activities [324.21309a(2)(c)(x)]		
Any contingency planning to address ineffective monitoring [324.21309a(2)(c)(ix)]		
Other information requested by USTD [324.21309a(2)(c)(xii)] *(Specify, if applicable):*_____		

NOTE: The USTD must be notified immediately if ineffective corrective action is indicated by monitoring activities.

6.5 SCHEDULE FOR IMPLEMENTATION OF THE CORRECTIVE ACTION

A. Attach the schedule for implementing the corrective action (*Include as Attachment No. 27. Reflect sufficient detail, a breakdown of the overall program into subcomponents, and the identification of key interim milestones (e.g., proposed submittal dates for Public Notice, Notice of Corrective Action, etc.) to demonstrate that the corrective action is implementable and has been adequately planned.)*

B. Date Confirmed Release Report Submitted:	01 / 03 / 90
C. Date Purge Well Remediation Program Report Submitted:	07 / 26 / 91
D. Date Supplemental Water Sampling Report Submitted:	10 / 01 / 92
E. Date Second Purge Well Remediation Program Report Submitted:	03 / 31 / 93
F. Date Supplemental Work Plan Submitted:	07 / 22 / 93
G. Date of Subsequent or Other Releases (*if appropriate*):	/ /
H. Proposed Corrective Action Start Date:	10 / 31 / 96
I. Dates of Key Interim Milestones (*Specify*):	
_____	/ /
_____	/ /
_____	/ /
_____	/ /
J. Proposed Remedial Activity Completion Date:	/ /
K. Expected Performance Monitoring Completion Date:	/ /

6.6 NOTICES AND RESTRICTIONS

A. Will the corrective action plan require the use of institutional controls to restrict land use or resources?

☐ Yes x No

If "No", skip to Section 6.7; otherwise, answer questions "B" through "F" below.

B. What notices or restrictions will be filed based on the planned corrective action?
(Check all that apply)

☐ Public Notice [324.21309a(3)] ☐ Notice of Corrective Action [324.21310a(1)]

☐ Restrictive Covenant [324.21310a(2)] ☐ Other Mechanisms [324.21310a(3)]

C. Will USTD guidance be used to establish the form and content of the required notice(s) as provided in Attachment 20 of the "Guidance Document for Risk-Based Corrective Action at Leaking Underground Storage Tanks"? ☐ Yes ☐ No

6.6 NOTICES AND RESTRICTIONS (Continued)

D. If "No", provide an explanation: _____

E. Describe all land use and/or resource limitations associated with the planned corrective action:

F. Identify the individuals or segments of the public to be provided notice of the proposed land use restrictions or limitations to be placed on resource use. (*Include a map showing location(s) of the individuals or segments of the public to be notified, if appropriate, as Attachment No. 28*):

6.7 FINANCIAL ASSURANCE MECHANISM

A. Has a financial assurance agreement, as provided for in R29.2161 to R29.2169 of the Michigan Administrative Code, been included for approval by the USTD to assure the effectiveness and integrity of the corrective action? ☐ Yes X No

B. If "No", provide an explanation: Due to the low cost of the limited groundwater monitoring program and anticipated short duration no financial assurance agreement is provided.

If "Yes", provide the following:

C. Date the financial assurance mechanism was submitted to USTD: _____/_____/_____
D. Amount of the financial assurance mechanism: $ _____
E. Coverage of the financial assurance mechanism *(check all that apply):*

☐ Monitoring ☐ Operation and Maintenance
☐ Oversight ☐ Other (*Specify*):_____

6.8 PERMITTING AND APPROVAL REQUIREMENTS

A. Will the corrective action result in any discharge during its implementation?

☐ Yes x No

If "No", no more information is necessary; if "Yes", continue with questions "B" and "C".

B. Describe the activity(s) representing the source of the discharge: _____

_____

_____

_____

_____

C. Provide the following information regarding the planned discharges:

SOURCE OF THE DISCHARGE	LOCATION OF THE DISCHARGE POINT (Attach a Site Map, if applicable)	WILL TREATMENT BE PERFORMED PRIOR TO DISCHARGE? IF SO, DESCRIBE.	ARE PERMITS REQUIRED FOR DISCHARGE? IF SO, DESCRIBE WHAT STEPS HAVE BEEN TAKEN TO OBTAIN THEM.

ATTACHMENT NO. 4
LABORATORY RESULTS SOIL
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	Excavation Soil		S5		S6		S7		S8	
Sample Depth (feet BGS)	Stockpile		N Wall Sample		S Wall Sample		E Wall Sample		W Wall Sample	
Date Collected	3/27/90		12/13/89		12/13/89		12/13/89		12/13/89	
Date Extracted										
Date Analyzed										
Analytical Method No.	EPA-8020		EPA-8020		EPA-8020		EPA-8020		EPA-8020	
Collection Method*	GS		GS		GS		GS		GS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	10	ND	10	ND	10	ND	10	ND	10
X Toluene	ND	10	ND	10	ND	10	ND	10	ND	10
X Ethylbenzene	36	10	ND	10	ND	10	ND	10	ND	10
X Total Xylenes	218	30	ND	30	ND	30	ND	30	ND	30
METALS										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Arsenic	3,300		NA		NA		NA		NA	
X Barium	12,000		NA		NA		NA		NA	
X Cadmium	ND	200	NA		NA		NA		NA	
X Chromium	2,500		NA		NA		NA		NA	
X Copper	8,600		NA		NA		NA		NA	
X Lead	3,000	400	ND	400	78,000	400	170,000	400	ND	400
X Mercury	ND	10	NA		NA		NA		NA	
X Selenium	60		NA		NA		NA		NA	
X Silver	1,400		NA		NA		NA		NA	
X Zinc	13,000		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	10	ND	10	ND	10	ND	10	ND	10
X 1,2-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10	ND	10
X 1,3-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10	ND	10
X 1,4-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT NO. 4 (Continued Page 2 of 5)
LABORATORY RESULTS SOIL
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES								
Sample ID	B7		B8		B9		B10	
Sample Depth (feet BGS)	9-11		6-8		6-8		20-22	
Date Collected	2/7/90		2/7/90		2/7/90		03/29/90	
Date Extracted								
Date Analyzed								
Analytical Method No.	EPA-8020		EPA-8020		EPA-8020		EPA-8020	
Collection Method*	SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	10	ND	10	58	10	ND	10
X Toluene	ND	10	ND	10	84	10	ND	10
X Ethylbenzene	ND	10	ND	10	ND	10	ND	10
X Total Xylenes	ND	30	ND	30	ND	30	ND	10
POLYNUCLEAR AROMATICS (PNAs)								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Acenaphthene	NA		NA		NA		NA	
X Acenaphthylene	NA		NA		NA		NA	
X Anthracene	NA		NA		NA		NA	
X Benzo(a)anthracene	NA		NA		NA		NA	
X Benzo(a)pyrene	NA		NA		NA		NA	
X Benzo(b)fluoranthene	NA		NA		NA		NA	
X Benzo(g,h,i)perylene	NA		NA		NA		NA	
X Benzo(k)fluoranthene	NA		NA		NA		NA	
X Chrysene	NA		NA		NA		NA	
X Dibenzo(a,h)anthracene	NA		NA		NA		NA	
X Fluoranthene	NA		NA		NA		NA	
X Fluorene	NA		NA		NA		NA	
X Indeno(1,2,3- cd)pyrene	NA		NA		NA		NA	
X Naphthalene	NA		NA		NA		NA	
X Phenanthrene	NA		NA		NA		NA	
X Pyrene	NA		NA		NA		NA	
METALS								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA	

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT NO. 4 (Continued page 3 of 5)
LABORATORY RESULTS SOIL
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

OTHER *(Specify)*								
Sample ID	B7		B8		B9		B10	
Sample Depth (feet BGS)	9-11		6-8		6-8		20-22	
Date Collected	2/7/90		2/7/90		2/7/90		03/29/90	
Date Extracted								
Date Analyzed								
Analytical Method No.	EPA-8020		EPA-8020		EPA-8020		EPA-8020	
Collection Method*	SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	10	ND	10	ND	10	ND	10
X 1,2-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10
X 1,3-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10
X 1,4-Dichlorobenzene	ND	10	ND	10	ND	10	ND	10

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT NO. 4 (Continued Page 4 of 5)
LABORATORY RESULTS SOIL
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES								
Sample ID	SB1		SB2		SB3		SB4	
Sample Depth (feet BGS)	0-1		0-1		0-1		0-1	
Date Collected	12/13/94		12/13/94		12/13/94		12/13/94	
Date Extracted								
Date Analyzed	1/4/95		1/4/95		1/4/95		1/4/95	
Analytical Method No.	EPA-239.2		EPA-239.2		EPA-239.2		EPA-239.2	
Collection Method*	SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	NA		NA		NA		NA	
X Toluene	NA		NA		NA		NA	
X Ethylbenzene	NA		NA		NA		NA	
X Total Xylenes	NA		NA		NA		NA	
POLYNUCLEAR AROMATICS (PNAs)								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Acenaphthene	NA		NA		NA		NA	
X Acenaphthylene	NA		NA		NA		NA	
X Anthracene	NA		NA		NA		NA	
X Benzo(a)anthracene	NA		NA		NA		NA	
X Benzo(a)pyrene	NA		NA		NA		NA	
X Benzo(b)fluoranthene	NA		NA		NA		NA	
X Benzo(g,h,i)perylene	NA		NA		NA		NA	
X Benzo(k)fluoranthene	NA		NA		NA		NA	
X Chrysene	NA		NA		NA		NA	
X Dibenzo(a,h)anthracene	NA		NA		NA		NA	
X Fluoranthene	NA		NA		NA		NA	
X Fluorene	NA		NA		NA		NA	
X Indeno(1,2,3- cd)pyrene	NA		NA		NA		NA	
X Naphthalene	NA		NA		NA		NA	
X Phenanthrene	NA		NA		NA		NA	
X Pyrene	NA		NA		NA		NA	
METALS								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	100,000	1,000	58,000	1,000	58,000	1,000	110,000	1,000

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

ATTACHMENT NO. 4 (Continued Page 5 of 5)
LABORATORY RESULTS SOIL
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES								
Sample ID	Oil House, Former Tank Location		Former RR Fill		Former Pipe Run		Former Fuel Dispenser	
Sample Depth (feet BGS)	7-9		3-5					
Date Collected	12/15/94		12/16/94		12/16/94		12/16/94	
Date Extracted								
Date Analyzed	12/29/94		12/29/94-12/30/94		12/29/94		12/30/94	
Analytical Method No.	SW-846,8020		SW-846, 8020/8070		SW-846, 8020		SW-846, 8020	
Collection Method*	SS		SS		SS		SS	
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	10	ND	10	ND	10	ND	10
X Toluene	ND	10	ND	10	ND	10	ND	10
X Ethylbenzene	ND	10	ND	10	ND	10	ND	10
X Total Xylenes	ND	30	ND	30	ND	30	ND	30
POLYNUCLEAR AROMATICS (PNAs)								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Acenaphthene	NA		ND	330	NA		NA	
X Acenaphthylene	NA		ND	330	NA		NA	
X Anthracene	NA		ND	330	NA		NA	
X Benzo(a)anthracene	NA		ND	330	NA		NA	
X Benzo(a)pyrene	NA		ND	330	NA		NA	
X Benzo(b)fluoranthene	NA		ND	330	NA		NA	
X Benzo(g,h,i)perylene	NA		ND	330	NA		NA	
X Benzo(k)fluoranthene	NA		ND	330	NA		NA	
X Chrysene	NA		ND	330	NA		NA	
X Dibenzo(a,h)anthracene	NA		ND	330	NA		NA	
X Fluoranthene	NA		ND	330	NA		NA	
X Fluorene	NA		ND	330	NA		NA	
X Indeno(1,2,3- cd)pyrene	NA		ND	330	NA		NA	
X Naphthalene	NA		ND	330	NA		NA	
X Phenanthrene	NA		ND	330	NA		NA	
X Pyrene	NA		ND	330	NA		NA	
METALS								
CONSTITUENT (ug/kg)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA	

BGS=Below Ground Surface
*Collection Method Codes (list all that apply); Grab Sample (GS), Split Spoon(SS), Hand Auger(HA), Geoprobe(GP), Continuous Corer (CC), Soil Gas (SG), Cone Penetrometer (CP), Hydropunch(HP)
*If Other (OT), Specify here:*_____
MDL= Method Detection Limit

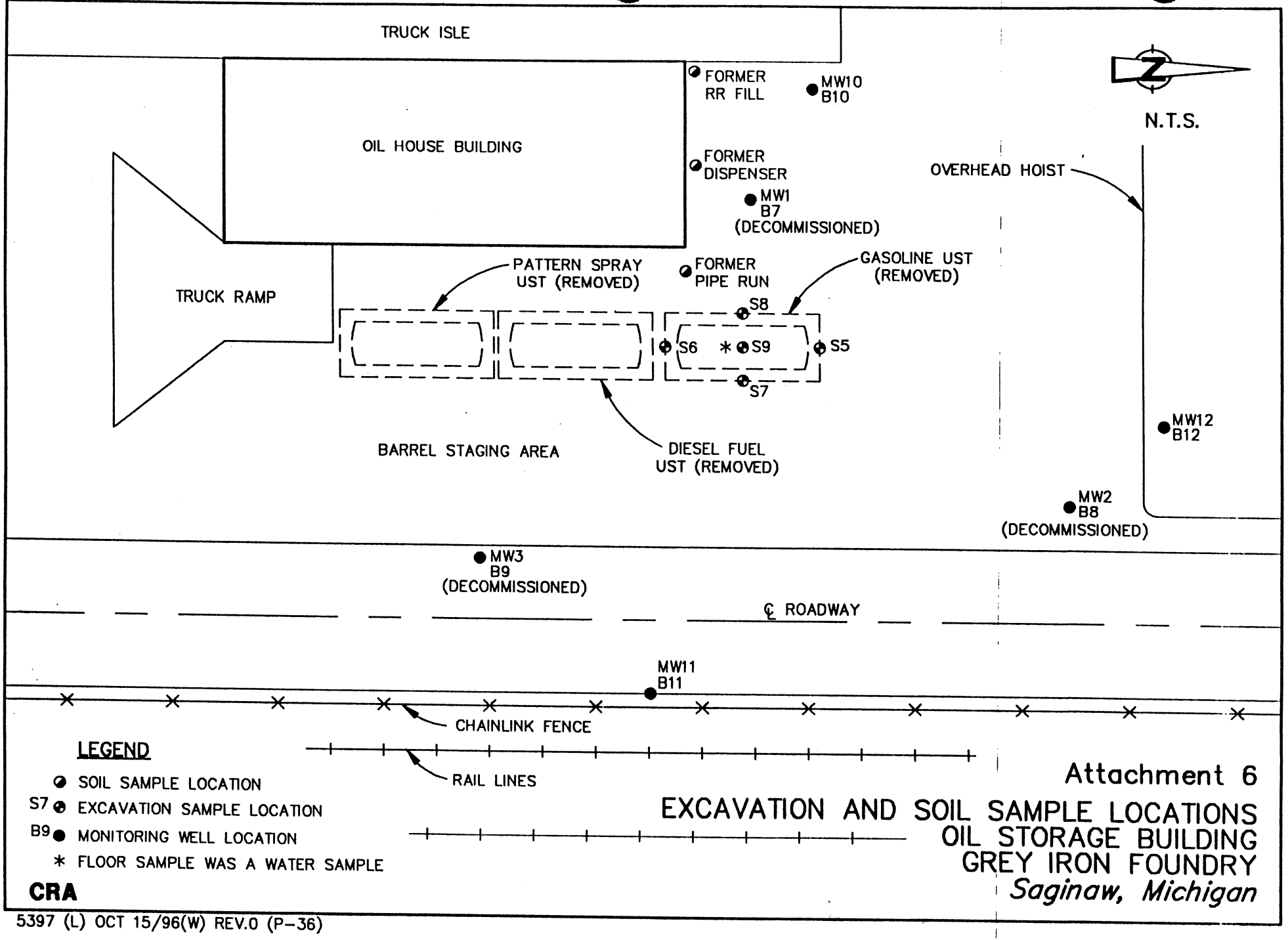
ATTACHMENT NO. 5
TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR SOILS
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

x Residential ☐ **Commercial III** ☐ **Commercial IV** ☐ **Industrial**
Exposure Codes

A. Direct Contact **B. Soil Leaching to Potable Groundwater**

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/kg)	Applicable Criterion with Exposure Codes (ug/kg)		Criterion Exceeded? (Yes or No)	
				Tier I RBSL	Tier II/III SSTL	Tier I RBSL	Tier II/III SSTL
VOLATILES							
X Benzene	B9	2/7/90	58	88,000 A		NO	
X Toluene	B9	2/7/90	84	24,000,000 A		NO	
☐ Ethylbenzene							
☐ Total Xylenes							
☐ MTBE							
METALS							
☐ Cadmium							
☐ Chromium III							
☐ Chromium VI							
X Total Lead	S7	12/13/89	170,000	400,000 A		NO	

D.L. = Detection Limit


TRUCK ISLE
FORMER RR FILL
MW10 B10
N.T.S.
OIL HOUSE BUILDING
FORMER DISPENSER
OVERHEAD HOIST
MW1 B7 (DECOMMISSIONED)
PATTERN SPRAY UST (REMOVED)
FORMER PIPE RUN
GASOLINE UST (REMOVED)
TRUCK RAMP
S8
S6
S9
S5
S7
MW12 B12
BARREL STAGING AREA
DIESEL FUEL UST (REMOVED)
MW2 B8 (DECOMMISSIONED)
MW3 B9 (DECOMMISSIONED)
℄ ROADWAY
MW11 B11
CHAINLINK FENCE
RAIL LINES
LEGEND
SOIL SAMPLE LOCATION
S7 EXCAVATION SAMPLE LOCATION
B9 MONITORING WELL LOCATION
* FLOOR SAMPLE WAS A WATER SAMPLE
CRA
Attachment 6
EXCAVATION AND SOIL SAMPLE LOCATIONS
OIL STORAGE BUILDING
GREY IRON FOUNDRY
Saginaw, Michigan
5397 (L) OCT 15/96(W) REV.0 (P-36)

ATTACHMENT 9

SOIL BORINGS

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

GEOENVIRONMENTA
SOIL BORING LOG

Boring No: B7 (MW

Project: GREY IRON FOUNDRY (Oil House Building) **GTL Job No:** E-0418B

Location: Saginaw, Michigan **Client:** Central Foundry Division - G.M.C.

DESCRIPTION Ground Surface Elevation = See *Note	Depth Below Surface (ft.)	Sample No. & Type	N (Blows per ft.)	qp (tsf)	PID (ppm)	Lab No.	PARAMETERS ANALYZED
Driller reported 12" of concrete PAVEMENT							
		1-SS			150		
Sandy foundry FILL; trace gravel and silt, cinders, slag and metal fragments - black - moist to wet (SP-FILL)	5						
		2-SS			250		
	10	3-SS			300		
Sandy CLAY; trace gravel - mottled, gray and brown (CL)							
		4-SS			20		
BORING TERMINATED AT 15'	15						
REMARKS: Monitoring Well MW1 was installed in boring immediately after completion. See Report of Wellpoint Installation sheet for MW1 backfilling procedures.	20						
*Note: Monitoring Well MW1 was removed from service on 04-01-90 due to structural damage caused by snow plows before any elevations could be surveyed in.	25						
	30						

*PID is an H-NU Systems Photoionization Detector with a 10.2 eV photoionization lamp. The meter is calibrated to Isobutylene and is capable of detecting total concentrations of volatile organic compounds down to approximately 1 part per million.

Changes in soil stratification indicated by the lines are approximate. The actual transition may vary between boring locations. Unless otherwise noted, the boring was backfilled with natural soil.

WATER LEVEL OBSERVATIONS		BORING STARTED	02-07-90
+/- 9-1/2'	WHILE SAMPLING OR WHILE DRILLING	BORING COMPLETED	02-07-90
8'2"	IMMEDIATELY AFTER COMPLETION	RIG: GTL B-34	DRAWN BY: LAD
	AFTER COMPLETION	OPERATOR: TRN/DJB	APPROVED: CAW/MC
		INSPECTOR: LEE	SHEET: 1 of 1

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

GEOENVIRONMENTA
SOIL BORING LOG

Boring No: B8/M.W

Project: GREY IRON FOUNDRY (Oil House Building) GTL Job No: E-04[illegible]

Location: Saginaw, Michigan Client: Central Foundry Division - G.M.C.

DESCRIPTION Ground Surface Elevation = See *Note	Depth Below Surface (ft.)	Sample No. & Type	N (Blows per ft.)	qp (tsf)	PID (ppm)	Lab No.	PARAMETERS ANALYZED
Driller reported 12" of concrete PAVEMENT							
		1-SS			30		
Sandy foundry FILL; trace gravel, silt, cinders and slag - black - moist to wet (SP-FILL)	5						
		2-SS			40		
	10	3-SS			20		
Fine to medium SAND; some clay, trace silt and gravel - grayish black - moist (SP)							
Sandy CLAY; trace gravel, occasional silt partings - mottled, gray and brown (CL)		4-SS			1		
	15						
BORING TERMINATED AT 15'							
REMARKS: Monitoring Well MW2 was installed in boring immediately after completion. See Report of Wellpoint Installation sheet for MW2 backfilling procedures.	20						
*Note: Monitoring Well MW2 was removed from service on 04-01-90 due to structural damage cause by snow plows before any elevations could be surveyed in.	25						
	30						

*PID is an H-NU Systems Photoionization Detector with a 10.2 eV photoionization lamp. The meter is calibrated to Isobutylene and is capable of detecting total concentrations of volatile organic compounds down to approximately 1 part per million.
Changes in soil stratification indicated by the lines are approximate. The actual transition may vary between boring locations. Unless otherwise noted, the boring was backfilled with natural soil.

WATER LEVEL OBSERVATIONS		BORING STARTED	02-07-9
+/- 9'	WHILE SAMPLING OR WHILE DRILLING	BORING COMPLETED	0[illegible]-9
7'9"	IMMEDIATELY AFTER COMPLETION	RIG: GTL B-34	DRAWN BY: LAD
		OPERATOR: TRN/DJB	APPROVED: CAW/I
	AFTER COMPLETION	INSPECTOR: LEE	SHEET: 1 of 1

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

GEOENVIRONMENTA
SOIL BORING LOG

Boring No: B9/M1

Project: GREY IRON FOUNDRY (Oil House Building) **GTL Job No:** E-0418B

Location: Saginaw, Michigan **Client:** Central Foundry Division - G.M.C.

DESCRIPTION Ground Surface Elevation = See *Note	Depth Below Surface (ft.)	Sample No. & Type	N (Blows per ft.)	qp (tsf)	PID (ppm)	Lab No.	PARAMETERS ANALYZED
Driller reported 12" of concrete PAVEMENT							
		1-SS			20		
Sandy foundry FILL; trace gravel, silt and clay - black - moist to wet (SP-FILL)	5						
		2-SS			25		
	10	3-SS			5		
Sandy CLAY; trace gravel, occasional silt partings - mottled, gray and brown (CL)							
		4-SS			5		
BORING TERMINATED AT 15'	15						
REMARKS: Monitoring Well MW3 was installed in boring immediately after completion. See Report of Wellpoint Installation sheet for MW3 backfilling procedures.	20						
*Note: Monitoring Well MW3 was removed from service on 04-01-90 due to structural damage cause by snow plows before any elevations could be surveyed in.	25						
	30						

*PID is an H-NU Systems Photoionization Detector with a 10.2 eV photoionization lamp. The meter is calibrated to Isobutylene and is capable of detecting total concentrations of volatile organic compounds down to approximately 1 part per million.

Changes in soil stratification indicated by the lines are approximate. The actual transition may vary between boring locations. Unless otherwise noted, the boring was backfilled with natural soil.

WATER LEVEL OBSERVATIONS		BORING STARTED	02-08-90
+/- 8-1/2'	WHILE SAMPLING OR WHILE DRILLING	BORING COMPLETED	02-08-90
7'6"	IMMEDIATELY AFTER COMPLETION	RIG: GTL B-34	DRAWN BY: LAD
	AFTER COMPLETION	OPERATOR: TRN/DJB	APPROVED: CAW/MC
		INSPECTOR: LEE	SHEET: 1 of 1

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5391
CLIENT GMPT - Saginaw
LOCATION 0.1 Harbor

DRILLING CONTRACTOR Matteco
DRILLER Bob Dwyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH3-94
DATE STARTED 12/12/94
DATE COMPLETED 12/13/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	Concrete (SP)										
1			tan/olive med sand, some gravel, black bands, fill	1	SS	3	7	12	15	1-3	0.3	R=24"	
				2	SS	8	10	17	22	3-5	0.2	R=24"	
				3	SS	6	8	12	14	5-7	0.6	R=24"	
		7'1/2		4	SS	9	12	13	15	7-9	17.4	R=24"	
7'1/2			black med foundry sand, fill (SP)										
				5	SS	6	8	10	12	9-11	6.3	R=24"	
		13		6	SS	5	6	7	7	11-13	5.1	R=24"	
13		13'1/2	sand loose, grey, med, wet, (SP)	7	SS	9	5	7	7	13-15'	4.9	R=24"	
13'1/2		14	sand & gravel loose, grey, wet (GW/SW)										
14		15	grey med sand, wet (SP)										
15			brown clay, hard, some silt & gravel (CL)	8	SS	4	5	8	10	15-17	3.7	R=24"	
				9	SS	4	5	7	10	17-19	5.3	R=24"	
				10	SS	5	8	9	14	19-21	6.2	R=24"	
				11	SS	3	3	4	6	21-23	3.9	R=24"	
		25		12	SS	3	3	4	5	23-25	2.8	R=24"	

25'
NOTES AND COMMENTS: BOH

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT GMPT - Saguenay
LOCATION Oil House - RR Spur

DRILLING CONTRACTOR Matec
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH 1 - 94
DATE STARTED 12/16/94
DATE COMPLETED 12/16/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID blkg = 0.5 (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	Concrete										
1			blackish grey foundry sand, med, trace gravel (SW)	1	SS	6	7	3	3	1-3	2.5	R=20"	
		5		2	SS	5	4	4	5	3-5	63	R=12"	
5		7	foundry sand, med, black, red, brown, tan (SP)	3	SS	1	1	5	15	5-7	2.7	R=16"	
7			black foundry sand, med (SP) moist	4	SS	3	2	2	2	7-9	12.1	R=1"	
		9 1/2		5	SS	2	4	8	12	9-11	2.7	R=18"	
9 1/2			brown clay, trace silt & gravel, blk spots,										
		11	moist (CL)										
	11		BOH										

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT GMPT - Seneca
LOCATION 0.1 Hoyt (closest low gradient)

DRILLING CONTRACTOR Matrix
DRILLER B. Dreyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION MW-14
DATE STARTED 12/16/96
DATE COMPLETED 12/16/96
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	NOTES AND COMMENTS
0		1	concrete								
1			black fine/c, sand, med, fine gravel, fill								
	8		" , little gravel	1	SS	4	4	6	7	8-10	R=6" N=10
			" , wet	2	SS	4	5	7	9	10-12	R=20" N=14
			" , wet	3	SS	5	7	8	8	12-14	R=2" N=15
		14½		4	SS	4	8	10	10	14-16	R=24 N=18
14½		16	brown clay, fine silt + gravel								
	16		Boh'								

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Cory Iron
PROJECT NUMBER 5397
CLIENT CMPT - Seaway
LOCATION 0.1 Hwy 6 (replace MW-16)

DRILLING CONTRACTOR Matec
DRILLER Bob Dwyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION MW-17
DATE STARTED 12/16/94
DATE COMPLETED 12/16/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	NOTES AND COMMENTS
0		1	concrete								
1		10	black med foundry sand, fill, moist								
10		10'1/2	brown clay, trace silt + gravel								
	10'1/2		Bolt								

ATTACHMENT 10

WELL COMPLETION DETAILS

GEO-TEST.LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

MONITORING WELL NO. MW1

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

GTL BORING NO. B7

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 02-07-90

ELEVATIONS*

Top of Well Casing: NA

Ground Surface: NA

Top of Screen: NA

Bottom of Screen: NA

PROTECTIVE OUTER CASING

Material: Steel, Above Ground Box

Size: 4"

Total Length: 5'

Padlocked: No

Vented: No

WELL CASING DATA

Material: Stainless Steel

Schedule: 40

Connections: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Total Length: 10.9'

Top Cap: Lockable PVC

Casing Vented: No

15.9'

WELL SCREEN DATA

Material: Stainless Steel

Schedule: 40

Connection: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Mesh Size: 0.010"

Total Length: 5'

Bottom Plug: Stainless Steel

0.1'

BACKFILL METHOD

Depth from Surface	Material
0' - 4'	Cement Grout
4' - 7'	Bentonite Clay
7' - 16'	Coarse Grained Silica Sand

*Benchmark: This wellpoint was replaced with our MW10 wellp due to structural damage cau by snow plows. Damage occur before any elevations could surveyed in.

Remarks Monitoring well MW1 was sampled on two occasions prior to being taken out of service (04-01-90).

Installed By: TRN/DJB/LEE

Drawn By: LAD

Approved By: CAW/MGN

GEO-TEST.LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

MONITORING WELL NO. MW2

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

GTL BORING NO. B8

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 02-07-90

ELEVATIONS*

Top of Well Casing: NA

Ground Surface: NA

Top of Screen: NA

Bottom of Screen NA

PROTECTIVE OUTER CASING

Material: Steel, Flush Mounted

Diameter: 6"

Total Length: 1'

Padlocked: Yes

Vented: Yes

WELL CASING DATA

Material: Stainless Steel

Schedule: 40

Connections: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Total Length: 8'

Top Cap: Lockable PVC

Casing Vented: No

13.0'

WELL SCREEN DATA

Material: Stainless Steel

Schedule: 40

Connection: Flush, Threaded

Outside Diameter: 2.4"

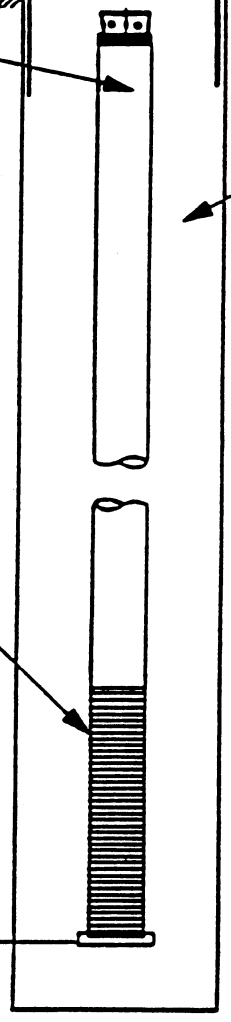
Inside Diameter: 2.0"

Mesh Size: 0.010"

Total Length: 5'

Bottom Plug: Stainless Steel

2.0'



BACKFILL METHOD

Depth from Surface	Material
0' - 4'	Cement Grout
4' - 7'	Bentonite Clay
7' - 11'	Coarse Grained, Silica Sand
11' - 15'	Natural, Medium Grained Sand

*Benchmark: This wellpoint was la replaced with our MW11 wellpoir due to structural damage caused by snow plows. Damage occurred before any elevations could be surveyed in.

Remarks Monitoring well MW2 was sampled on two occasions prior to being taken out of service (04-01-90).

Installed By: TRN/DJB/LEE

Drawn By: LAD

Approved By: CAW/MGN

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

REPORT OF WELLPOINT INSTALLA

MONITORING WELL NO. MW3

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

GTL BORING NO. B9

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 02-08-90

ELEVATIONS*

Top of Well Casing: NA

Ground Surface: NA

Top of Screen: NA

Bottom of Screen: NA

PROTECTIVE OUTER CASING

Material: Steel, Flush Mounted

Diameter: 8"

Total Length: 1'

Padlocked: Bolted

Vented: No

WELL CASING DATA

Material: Stainless Steel

Schedule: 40

Connections: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Total Length: 8.2'

Top Cap: Lockable PVC

Casing Vented: No

13.2'

WELL SCREEN DATA

Material: Stainless Steel

Schedule: 40

Connection: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Mesh Size: 0.010"

Total Length: 5'

Bottom Plug: Stainless Steel

1.8'

BACKFILL METHOD

Depth from Surface	Material
0' - 4'	Cement Grout
4' - 7'	Bentonite Clay
7' - 12'	Coarse Grained Silica Sand
12' - 15'	Natural, Medium Grained Sand

*Benchmark: This wellpoint was later replaced with our MW12 w point due to structural damage caused by snow plows. Damage occurred before any elevations could be surveyed in.

Remarks Monitoring well MW3 was sampled on two occasions prior to being taken out of service (04-01-90).

Installed By: TRN/DJB/LEE

Drawn By: LAD

Approved By: CAW/MGN

GEO-TEST.LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

REPORT OF WELLPOINT INSTALLAT

MONITORING WELL NO. MW10

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

GTL BORING NO. ----

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 04-06-90

ELEVATIONS*

Top of Well Casing: 99.41'

Ground Surface: 99.65'

Top of Screen: 88.9'

Bottom of Screen: 83.7'

PROTECTIVE OUTER CASING

Material: Steel, Flush Mounted

Diameter: 8"

Total Length: 1'

Padlocked: Bolted

Vented: No

WELL CASING DATA

Material: Stainless Steel

Schedule: 40

Connections: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Total Length: 10.7'

Top Cap: Lockable PVC

Casing Vented: No

15.9'

WELL SCREEN DATA

Material: Stainless Steel

Schedule: 40

Connection: Flush, Threaded

Outside Diameter: 2.4"

Inside Diameter: 2.0"

Mesh Size: 0.010"

Total Length: 5'

Bottom Plug: Stainless Steel

0.1'

BACKFILL METHOD

Depth from Surface	Material
0' - 1'	Concrete
1' - 6½'	Cement Grout
6½' - 8'	Bentonite Clay
8' - 10'	Coarse Grained, Silica Sand
10' - 16'	Natural, Medium Grained Sand

*Benchmark: East rim of manhole o east side of Oil House Bldg.(15' east and 40½' south of the north east corner of the Oil House Bldg.).

Remarks

Installed By: TRN/DJB/LEE

Drawn By: LAD

Approved By: CAW/MGN

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

REPORT OF WELLPOINT INSTALLATI

MONITORING WELL NO. MW11

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

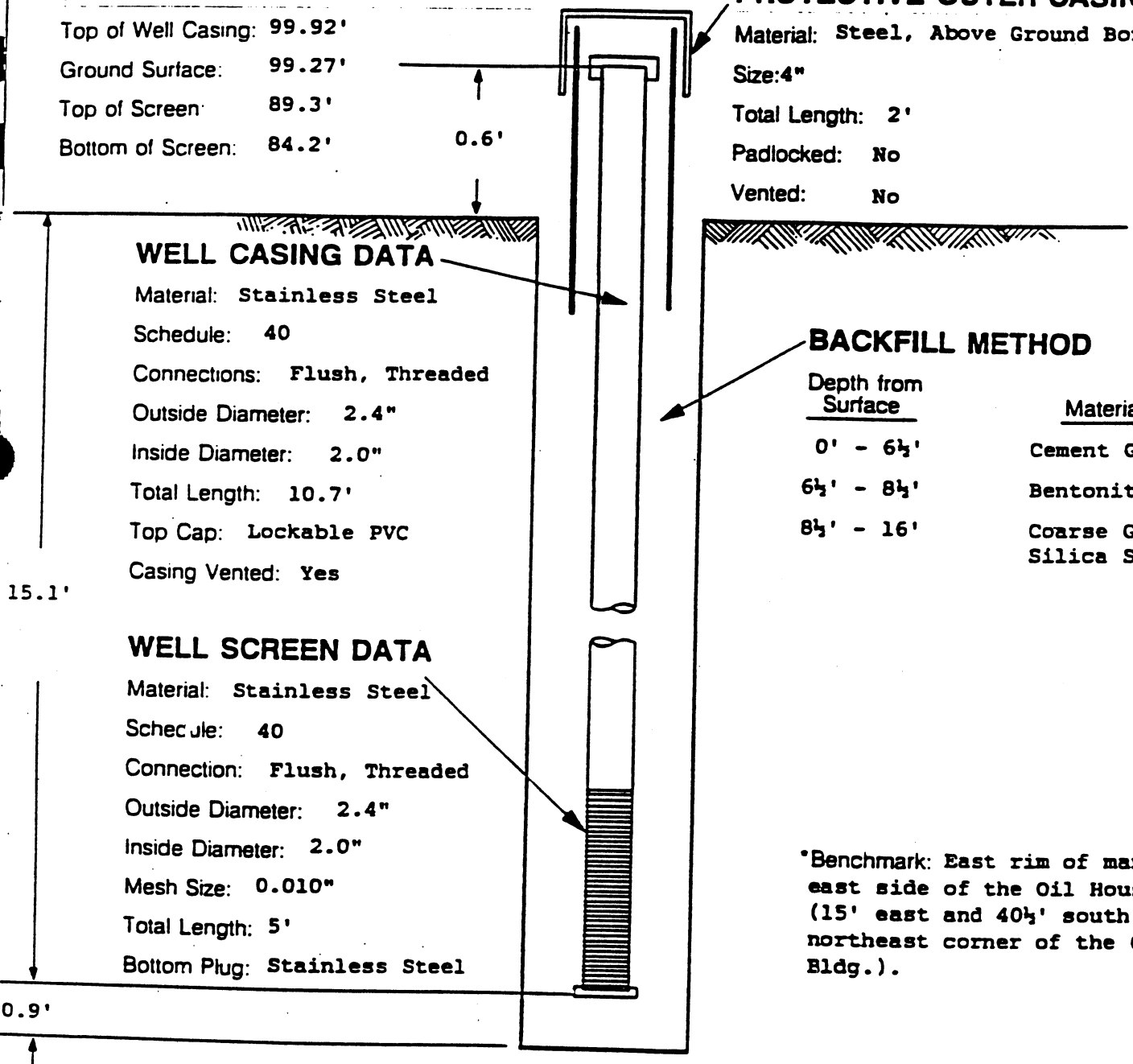
GTL BORING NO. B11

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 04-06-90

ELEVATIONS*

Top of Well Casing: 99.92'
Ground Surface: 99.27'
Top of Screen: 89.3'
Bottom of Screen: 84.2'



PROTECTIVE OUTER CASING

Material: Steel, Above Ground Box
Size: 4"
Total Length: 2'
Padlocked: No
Vented: No

WELL CASING DATA

Material: Stainless Steel
Schedule: 40
Connections: Flush, Threaded
Outside Diameter: 2.4"
Inside Diameter: 2.0"
Total Length: 10.7'
Top Cap: Lockable PVC
Casing Vented: Yes

BACKFILL METHOD

Depth from Surface	Material
0' - 6½'	Cement Grout
6½' - 8½'	Bentonite Clay
8½' - 16'	Coarse Grained, Silica Sand

WELL SCREEN DATA

Material: Stainless Steel
Schedule: 40
Connection: Flush, Threaded
Outside Diameter: 2.4"
Inside Diameter: 2.0"
Mesh Size: 0.010"
Total Length: 5'
Bottom Plug: Stainless Steel

*Benchmark: East rim of manhole east side of the Oil House Bld (15' east and 40½' south of th northeast corner of the Oil Ho Bldg.).

Remarks

Installed By: TRN/DJB/LEE
Drawn By: LAD
Approved By: CAW/MGN

GEO-TEST, LTD.
Geotechnical/Geoenvironmental
Construction Testing Consultants

REPORT OF WELLPOINT INSTALLATI

MONITORING WELL NO. MW12

PROJECT GREY IRON FOUNDRY (Oil House Building)

GTL JOB NO. E-0418B

LOCATION Saginaw, Michigan

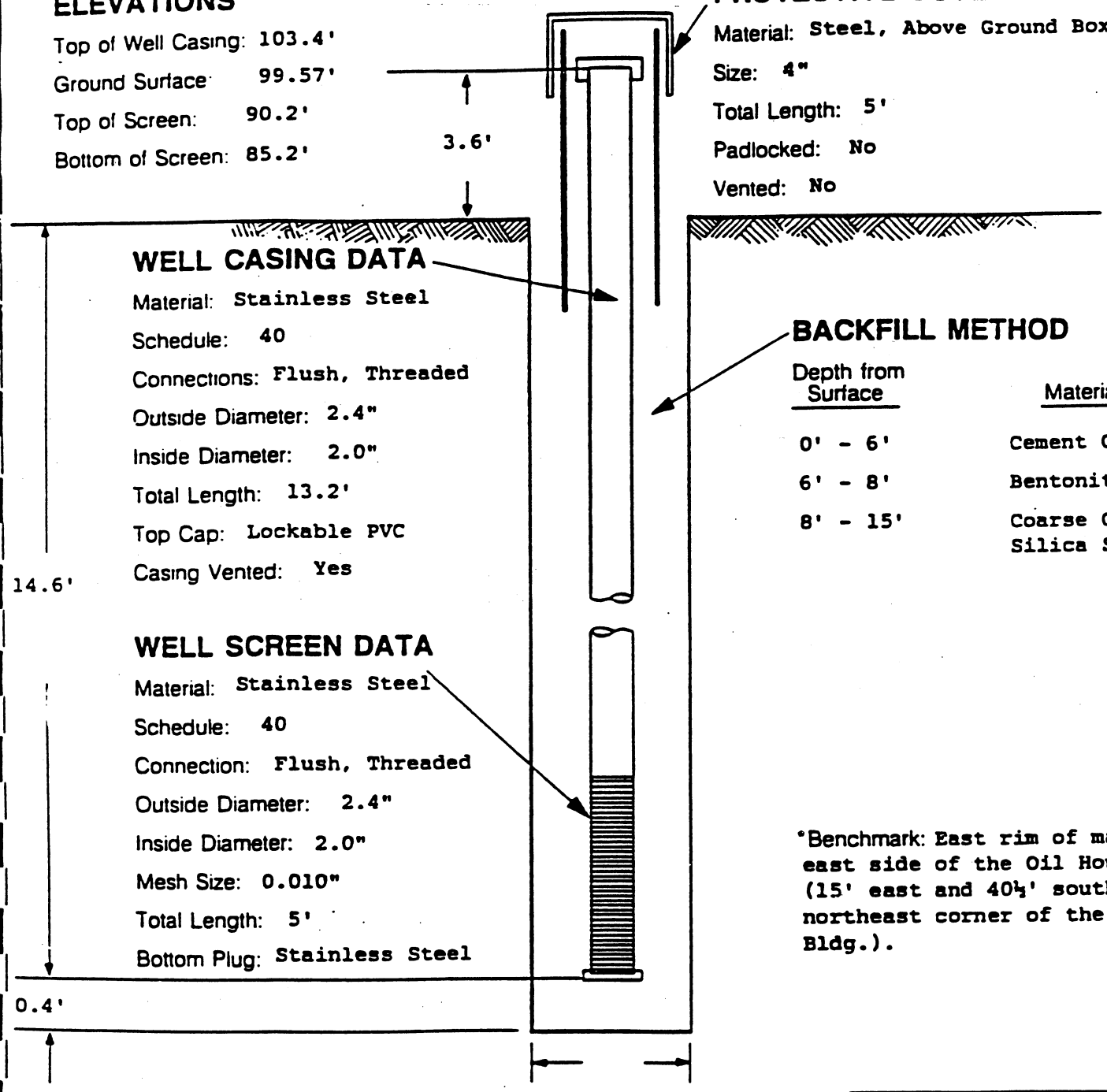
GTL BORING NO. ----

CLIENT Central Foundry Division - G.M.C.

DATE INSTALLED 04-06-90

ELEVATIONS*

Top of Well Casing: 103.4'
Ground Surface: 99.57'
Top of Screen: 90.2'
Bottom of Screen: 85.2'



PROTECTIVE OUTER CASING

Material: Steel, Above Ground Box
Size: 4"
Total Length: 5'
Padlocked: No
Vented: No

WELL CASING DATA

Material: Stainless Steel
Schedule: 40
Connections: Flush, Threaded
Outside Diameter: 2.4"
Inside Diameter: 2.0"
Total Length: 13.2'
Top Cap: Lockable PVC
Casing Vented: Yes

BACKFILL METHOD

Depth from Surface	Material
0' - 6'	Cement Gr
6' - 8'	Bentonite Clay
8' - 15'	Coarse Grained Silica Sand

WELL SCREEN DATA

Material: Stainless Steel
Schedule: 40
Connection: Flush, Threaded
Outside Diameter: 2.4"
Inside Diameter: 2.0"
Mesh Size: 0.010"
Total Length: 5'
Bottom Plug: Stainless Steel

*Benchmark: East rim of manhole east side of the Oil House Bl (15' east and 40½' south of t northeast corner of the Oil H Bldg.).

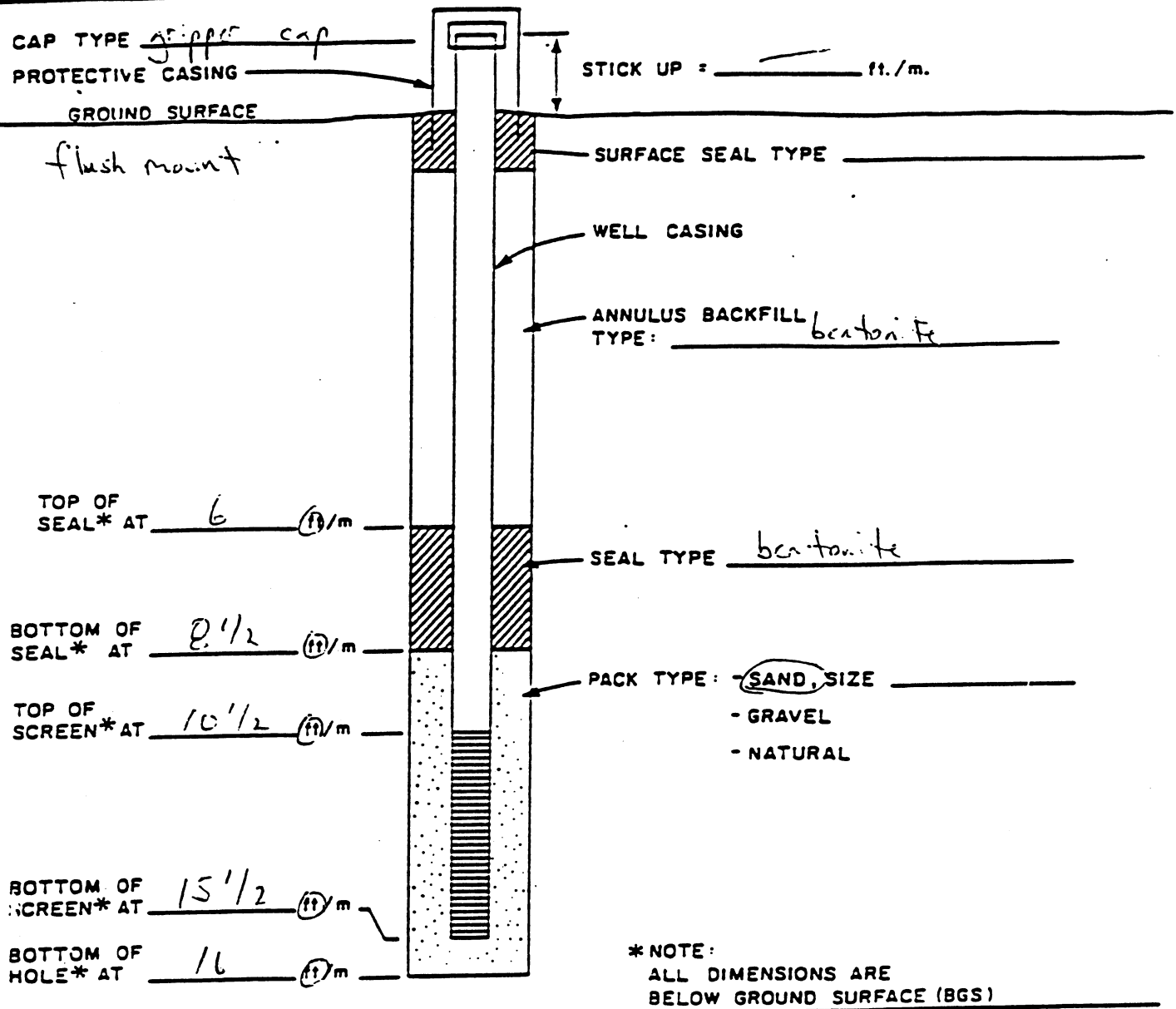
Remarks

Installed By: TRN/DJB/LEE
Drawn By: LAD
Approved By: CAW/MGN

WELL INSTRUMENTATION LOG

PROJECT NAME: Grey Iron
PROJECT Nº: 5397
CLIENT: GMPT - Saginaw
LOCATION: Oil House - nearest downgradient

HOLE DESIGNATION: MW-14
DATE COMPLETED: 12/16/94
DRILLING METHOD: HSA
CRA SUPERVISOR: SSH



SCREEN TYPE: ☒ continuous slot ☐ perforated ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other: _____

SCREEN LENGTH: 5 ft/m SCREEN DIAMETER: 2 in/cm SCREEN SLOT SIZE: _____

WELL CASING MATERIAL: _____ WELL CASING DIAMETER: _____ in/cm

BOREHOLE DIAMETER: _____

DEVELOPMENT: METHOD: bailer DURATION: _____

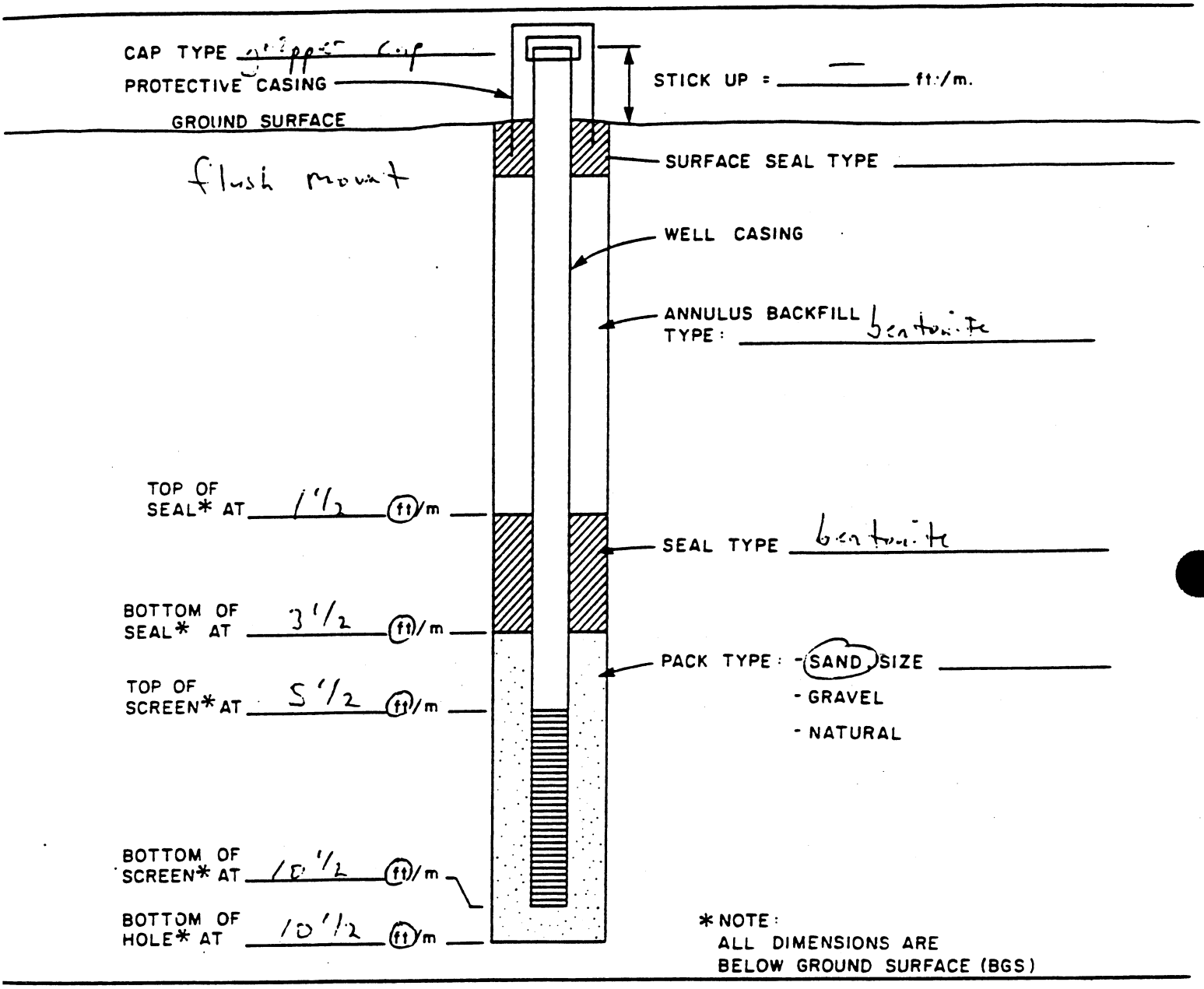
CRA

7/05/95

WELL INSTRUMENTATION LOG

PROJECT NAME: Gray Iron
PROJECT Nº: 5397
CLIENT: GMPT - Saginaw
LOCATION: Oil House - replace MW-10

HOLE DESIGNATION: MW-15
DATE COMPLETED: 12/16/94
DRILLING METHOD: HSA
CRA SUPERVISOR: SSH



SCREEN TYPE: ☒ continuous slot ☐ perforated ☐ louvre ☐ other:

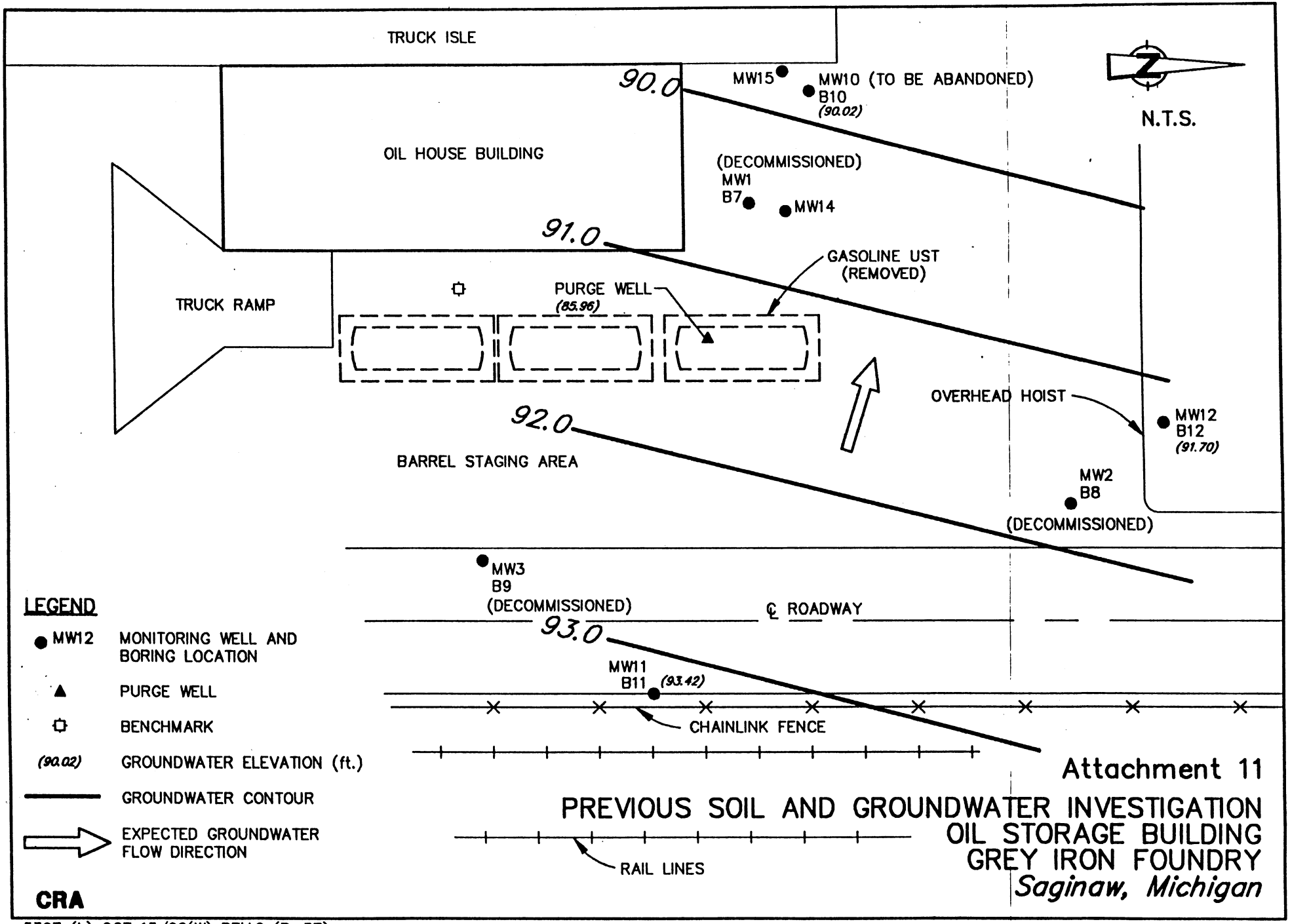
SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other:

SCREEN LENGTH: 5 ft/m SCREEN DIAMETER: 2 in/cm SCREEN SLOT SIZE:

WELL CASING MATERIAL: WELL CASING DIAMETER: in/cm

HOLE DIAMETER:

DEVELOPMENT: METHOD: bailer DURATION:



5397 (L) OCT 15/96(W) REV.0 (P-37)

MICHIGAN DEPARMENT OF ENVIRONMENTAL QUALITY - UNDERGROUND STORAGE TANK DIVISION

FINAL ASSESSMENT REPORT (Continued)

ATTACHMENT NO. 14
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES												
Sample ID	Excavation Floor, Water Sample		MW1		MW10		MW10		MW10		MW10	
Sample Depth (feet BGS)												
Date Collected	12/13/89		2/21/90		5/23/90		8/1/90		10/15/90		11/19/90	
Date Extracted												
Date Analyzed												
Collection Method*												
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	50	11,000	100	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	50	21,000	100	2	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	50	3,600	100	5.1	1	ND	1	ND	1	ND	1
X Total Xylenes	523	150	19,400	300	29.1	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA		NA	
METALS - FILTERED												
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead			NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS												
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA		NA	
OTHER *(Specify)*												
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	50	ND	100	ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	ND	50	ND	100	ND	1	ND	1	ND	1	ND	1
X 1,3-Dichlorobenzene	ND	50	ND	100	ND	1	ND	1	ND	1	ND	1
X 1,4-Dichlorobenzene	ND	50	ND	100	ND	1	ND	1	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 2 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW10		MW10		MW10		MW10		MW10	
Sample Depth (feet BGS)										
Date Collected	12/19/90		1/25/91		2/25/91		3/28/91		4/25/91	
Date Extracted										
Date Analyzed					3/13/91					
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-8020		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	1	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
☐ Chlorobenzene	ND	1	ND	1	ND	2	ND	1	ND	1
☐ 1,2-Dichlorobenzene	ND	1	ND	1	ND	2	ND	1	ND	1
☐ 1,3-Dichlorobenzene	ND	1	ND	1	ND	2	ND	1	ND	1
☐ 1,4-Dichlorobenzene	ND	1	ND	1	ND	2	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

MICHIGAN DEPARMENT OF ENVIRONMENTAL QUALITY - UNDERGROUND STORAGE TANK DIVISION

FINAL ASSESSMENT REPORT (Continued)

LABORATORY RESULTS GROUNDWATER

FACILITY NAME GMPT Saginaw Metal Castings Facility

FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW10		MW10		MW10		MW3		MW11	
Sample Depth (feet BGS)										
Date Collected	5/29/91		11/12/91		4/24/91		2/21/90		5/23/90	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	2.7	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	2.2	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	NA		ND	1	ND	1
X 1,2-Dichlorobenzene	ND	1	ND	1	NA		ND	1	ND	1
X 1,3-Dichlorobenzene	ND	1	ND	1	NA		ND	1	ND	1
X 1,4-Dichlorobenzene	ND	1	ND	1	NA		ND	1	ND	1

BGS = Below Ground Surface

* If Applicable

** Footnote and define all Collection Method Codes used in this table:_____

MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 4 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW11		MW11		MW11		MW11		MW11	
Sample Depth (feet BGS)										
Date Collected	8/1/90		10/15/90		11/19/90		12/19/90		1/25/91	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,3-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,4-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 5 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW11		MW11		MW11		MW11		MW11	
Sample Depth (feet BGS)										
Date Collected	2/25/91		3/28/91		4/25/91		5/29/91		11/12/91	
Date Extracted										
Date Analyzed	3/13/91									
Collection Method*										
Analytical Method No.	EPA-8020		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	1	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	ND	2	ND	1	ND	1	ND	1	ND	1
X 1,3-Dichlorobenzene	ND	2	ND	1	ND	1	ND	1	ND	1
X 1,4-Dichlorobenzene	ND	2	ND	1	ND	1	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 6 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW11		MW2		MW2		MW12		MW12	
Sample Depth (feet BGS)										
Date Collected	4/24/92		2/21/90		3/7/90		5/23/90		8/1/90	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	NA		ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	NA		ND	1	ND	1	ND	1	ND	1
X 1,3-Dichlorobenzene	NA		ND	1	ND	1	ND	1	ND	1
X 1,4-Dichlorobenzene	NA		ND	1	ND	1	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 7 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW12		MW12		MW12		MW12		MW12	
Sample Depth (feet BGS)										
Date Collected	10/15/90		11/19/90		12/19/90		1/25/91		2/25/91	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-8020	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	1
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2
X 1,3-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2
X 1,4-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 8 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW12		MW12		MW12		MW12		MW12	
Sample Depth (feet BGS)										
Date Collected	3/28/91		4/25/91		5/29/91		11/12/91		4/24/92	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,2-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,3-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,4-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 9 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	Purge Well		Purge Well		Purge Well		Purge Well		Purge Well	
Sample Depth (feet BGS)										
Date Collected	8/1/90		10/15/90		11/19/90		12/19/90		2/26/91	
Date Extracted										
Date Analyzed									3/13/91	
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-8020	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	2.7	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	8.4	3	ND	3	ND	3	ND	3	ND	1
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X 1,2-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2
X 1,3-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2
X 1,4-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	ND	2

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 10 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	Purge Well		Purge Well		Purge Well		Purge Well		Purge Well	
Sample Depth (feet BGS)										
Date Collected	3/28/91		4/25/91		5/29/91		11/12/91		4/24/92	
Date Extracted										
Date Analyzed										
Collection Method*										
Analytical Method No.	EPA-602		EPA-602		EPA-602		EPA-602		EPA-602	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Toluene	ND	1	ND	1	ND	1	ND	1	ND	1
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	ND	1
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	ND	3
X MTBE	NA		NA		NA		NA		NA	
METALS - FILTERED										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Total Lead	NA		NA		NA		NA		NA	
HALOGENATED HYDROCARBONS										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	NA		NA		NA		NA		NA	
OTHER *(Specify)*										
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,2-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,3-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	
X 1,4-Dichlorobenzene	ND	1	ND	1	ND	1	ND	1	NA	

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 11 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW11		MW11		MW11		MW14		MW14	
Sample Depth (feet BGS)										
Date Collected	8/17/95		12/12/95		3/7/96		12/19/94		2/7/95	
Date Extracted										
Date Analyzed	8/22/95-8/29/95		12/18/95-12/27/95		3/13/96-3/18/96		12/30/94		2/10/95-2/14/95	
Collection Method*										
Analytical Method No.	SW-846 8260		SW-846 8260		SW-846 8260A/8010B/8020B		SW-846, 8260			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	ND	1	ND	1	ND	1	ND	1	NA	
X Toluene	ND	1	ND	1	ND	1	ND	1	NA	
X Ethylbenzene	ND	1	ND	1	ND	1	ND	1	NA	
X Total Xylenes	ND	3	ND	3	ND	3	ND	3	NA	
X MTBE	ND	50	ND	5	ND	1	ND	50	NA	
HALOGENATED HYDROCARBONS										
Analytical Method No.	SW-846, 8260		SW-846, 8260		SW-846, 8260A		SW-846, 8260			
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	ND	1	ND	1	ND	1	ND	1	NA	
OTHER *(Specify)*										
Analytical Method No.	EPA 365.2, STD 4500, SW-846, 6010, 7421		EPA 365.2, STD 4500, SW-846, 6010, 7421		EPA 365.2, STD 4500, SW-846, 6010, 7421				EPA 365.2, STD 4500, SW-846, 6010, 7421	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chloride	2,200,000	40,000	2,500,000	1,000	NA		NA		1,600,000	10,000
X Copper	57	5	ND	6	84	6	NA		47	25
X Lead	26	2	ND	2	36	2	NA		260	3
X Magnesium	150,000	40	150,000	40	200,000	40	NA		17,000	40
X Phosphorus	91	4	1,300	20	NA		NA		44	2
X Sodium	930,000	1,000	1,100,000	100,000	1,100,000	1,000	NA		18,000	1,000
X Copper (Dissolved)	ND	5	ND	6	14	4	NA		ND	25
X Lead (Dissolved)	ND	2	ND	2	ND	2	NA		ND	3
X Magnesium (Dissolved)	110,000	40	120,000	40	105,000	40	NA		8,100	200
X Sodium (Dissolved)	1,200,000	1,000	1,400,000	100,000	970,000	1,000	NA		18,000	1,000
X Ethylene Bromide	ND	1	ND	1	ND	1	ND	1	NA	

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Paqe 12 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW14		MW14		MW14 DUP		MW14		MW14 DUP	
Sample Depth (feet BGS)										
Date Collected	12/12/95		3/7/96		3/7/96		8/17/95		8/17/95	
Date Extracted										
Date Analyzed	12/18/95-12/27/95		3/13/96-3/18/96		3/13/96-3/18/96		8/22/95-8/29/95		8/22/95-8/29/95	
Collection Method*										
Analytical Method No.	SW-846, 8260		SW-846, 8020B		SW-846, 8020B					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	63	4	25	2	24	5	40	1	39	1
X Toluene	100	4	43	2	45	5	110	4	97	1
X Ethylbenzene	210	4	130	2	127	5	240	4	190	2
X Total Xylenes	820	12	240	6	91	15	520	12	410	6
X MTBE	ND	20	ND	2	ND	5	ND	50	ND	50
HALOGENATED HYDROCARBONS										
Analytical Method No.	SW-846, 8260		SW-846, 8010B		SW-846, 8010B		SW-846, 8260		SW-846, 8260	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	ND	4	ND	2	ND	5	ND	1	ND	1
OTHER *(Specify)*										
Analytical Method No.	4500, SW-846, 6010		SW-846, 6010		SW-846, 6010		SW-846, 6010		SW-846, 6010	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	NA		NA		NA		NA		NA	
X 1,2-Dichlorobenzene	NA		NA		NA		NA		NA	
X 1,3-Dichlorobenzene	NA		NA		NA		NA		NA	
X 1,4-Dichlorobenzene	NA		NA		NA		NA		NA	
X Chloride	40,000	10,000	NA		NA		NA		NA	
X Copper	ND	6	37	4	36	4	140	5	NA	

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 13 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

OTHER *(Specify)*										
Sample ID	MW14		MW14		MW14 DUP		MW14		MW14 DUP	
Sample Depth (feet BGS)										
Date Collected	12/12/95		3/7/96		3/7/96		8/17/95		8/17/95	
Date Extracted										
Date Analyzed	12/18/95-12/27/95		3/13/96-3/18/96		3/13/96-3/18/96		8/22/95-8/29/95		8/22/95-8/29/95	
Collection Method*										
Analytical Method No.	SW-846, 7421,6010, EPA 365.2		SW-846, 7421,6010, EPA 365.2		SW-846, 7421,6010, EPA 365.2		SW-846, 7421,6010, EPA 365.2		SW-846, 7421,6010, EPA 365.2	
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Lead	ND	2	110	4	100	4	310	20	NA	
X Magnesium	12,000	40	14,000	40	13,000	40	16,000	40	NA	
X Phosphorus	590	20	NA		NA		58	4	34	4
X Sodium	20,000	10,000	150,000	1,000	130,000	1,000	19,000	1,000	NA	
X Copper (Dissolved)	ND	6	ND	4	ND	4	ND	5	ND	5
X Lead (Dissolved)	ND	2	ND	2	ND	2	ND	2	ND	2
X Magnesium (Dissolved)	10,000	40	9,600	40	9,500	40	7,400	40	6,600	40
X Sodium (Dissolved)	20,000	10,000	160,000	1,000	160,000	1,000	21,000	1,000	18,000	1,000
X Ethylene Bromide	ND	4	ND	2	ND	5	ND	1	ND	1

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

MICHIGAN DEPARMENT OF ENVIRONMENTAL QUALITY - UNDERGROUND STORAGE TANK DIVISION

FINAL ASSESSMENT REPORT (Continued)

ATTACHMENT NO. 14 (Continued Page 14 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

VOLATILES										
Sample ID	MW15		MW15		MW15					
Sample Depth (feet BGS)										
Date Collected	12/19/94		8/17/95		12/12/95					
Date Extracted										
Date Analyzed	12/22/94		8/22/95		12/13/95					
Collection Method*										
Analytical Method No.	SW-846, 8260		SW-846, 8260		SW-846, 8260					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Benzene	130	100	ND	1	ND	1				
X Toluene	1,300	100	ND	1	ND	1				
X Ethylbenzene	1,500	100	ND	1	ND	1				
X Total Xylenes	5,200	300	ND	3	ND	3				
X MTBE	ND	5,000	ND	50	ND	5				
HALOGENATED HYDROCARBONS										
Analytical Method No.	SW-846, 8260		SW-846, 8260		SW-846, 8260					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X 1,2-Dichloroethane	ND	100	ND	1	ND	1				
OTHER *(Specify)*										
Analytical Method No.	SW-846, 6010, 7421		SW-846, 6010, 7421		SW-846, 6010, 7421					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Chlorobenzene	NA		NA		NA					
X 1,2-Dichlorobenzene	NA		NA		NA					
X 1,3-Dichlorobenzene	NA		NA		NA					
X 1,4-Dichlorobenzene	NA		NA		NA					
X Chloride	50,000	10,000	500,000	10,000	2,500,000	1,000				
X Copper	190	20	39	5	ND	6				
X Lead	1,000	30	93	4	ND	2				
X Magnesium	36,000	40	46,000	40	59,000	40				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

ATTACHMENT NO. 14 (Continued Page 15 of 15)
LABORATORY RESULTS GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

OTHER *(Specify)*										
Sample ID	MW15		MW15		MW15					
Sample Depth (feet BGS)										
Date Collected	12/19/94		8/17/95		12/12/95					
Date Extracted										
Date Analyzed	12/22/94		8/22/95		12/13/95					
Collection Method*										
Analytical Method No.	EPA 365.2, SW-846, 7421,6010		EPA 365.2, SW-846, 7421,6010		EPA 365.2, SW-846, 7421,6010					
CONSTITUENT (ug/l)	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL	Conc	MDL
X Phosphorus	60	2	58R	4	220	20				
X Sodium	21,000	1,000	190,000	1,000	310,000	100,000				
X Copper (Dissolved)	NA		ND	5	ND	6				
X Lead (Dissolved)	NA		ND	2	ND	2				
X Magnesium (Dissolved)	NA		43,000	40	54,000	40				
X Sodium (Dissolved)	NA		200,000	1,000	320,000	100,000				
X Ethylene Bromide	ND	100	ND	1	ND	1				

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit

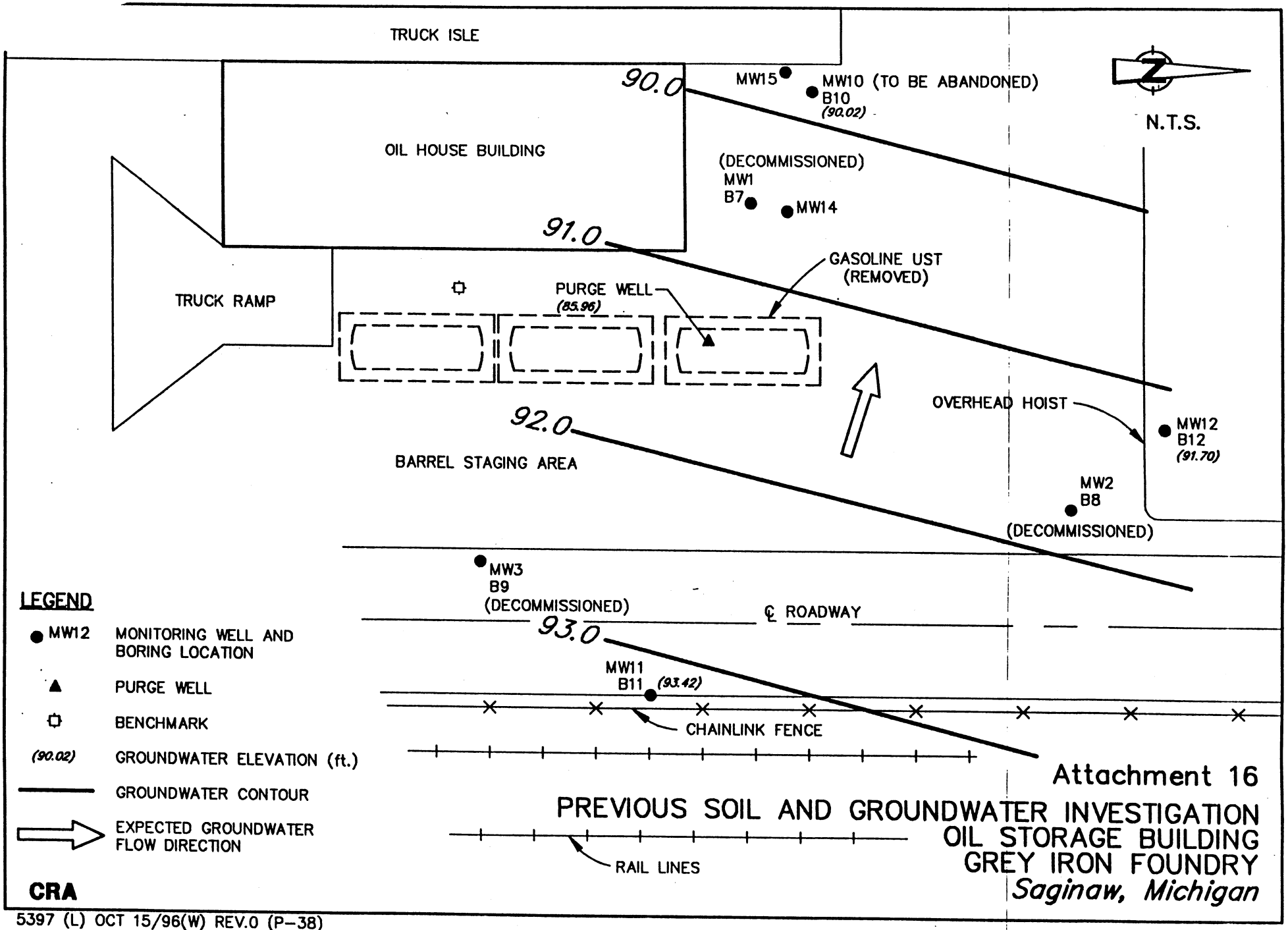
ATTACHMENT NO. 15
TIER I RBSL/TIER II OR TIER III SSTL COMPARISON TABLE FOR GROUNDWATER
FACILITY NAME GMPT Saginaw Metal Castings Facility
FACILITY NUMBER 010581

X **Residential** ☐ **Commercial** ☐ **Industrial**

Exposure Codes
A. Potable **B. Groundwater/Surface Water Interface**

Contaminant	Sample ID with Maximum Detected Concentration	Corresponding Sample Date	Maximum Detected Concentration (ug/l)	Applicable Criterion with Exposure Code (ug/l)		Criterion Exceeded? (Yes or No)	
				Tier I RBSL	Tier II/III SSTL	Tier I RBSL	Tier II/III SSTL
VOLATILES							
X Benzene	MW15	12/19/94	130	5		YES	
X Toluene	MW15	12/19/94	1,300	1,000		YES	
X Ethylbenzene	MW15	12/19/94	1,500	700		YES	
X Total Xylenes	MW15	12/19/94	5,200	10,000		YES	
☐ MTBE							
METALS - FILTERED							
☐ Cadmium							
☐ Chromium III							
☐ Chromium VI							
OTHER *							
X Chloride	MW11	12/12/95	2,500,000	- -		NO	
X Copper	MW15	12/19/94	190	1,400		NO	
X Total Lead	MW15	12/19/94	1,000	4		YES	
X Magnesium	MW11	3/7/96	200,000	420,000		NO	
X Phosphorus	MW11	12/12/95	1,300	- -		NO	
X Sodium	MW11	12/12/95, 3/7/96	1,100,000	160,000		YES	
X Copper (Dissolved)	MW11	3/7/96	14	1,400		NO	
X Lead (Dissolved)			ALL ND				
X Magnesium (Dissolved)	MW11	12/12/95	120,000	420,000		NO	
X Sodium (Dissolved)	MW11	12/12/95	1,400,000	160,000		YES	
☐							

BGS = Below Ground Surface
* If Applicable
** Footnote and define all Collection Method Codes used in this table:_____
MDL = Method Detection Limit


TRUCK ISLE
MW15
MW10 (TO BE ABANDONED)
B10
(90.02)
90.0
N.T.S.
OIL HOUSE BUILDING
(DECOMMISSIONED)
MW1
B7
MW14
91.0
GASOLINE UST
(REMOVED)
TRUCK RAMP
PURGE WELL
(85.96)
OVERHEAD HOIST
MW12
B12
(91.70)
92.0
BARREL STAGING AREA
MW2
B8
(DECOMMISSIONED)
MW3
B9
(DECOMMISSIONED)
℄ ROADWAY
93.0
MW11
B11
(93.42)
CHAINLINK FENCE
RAIL LINES
LEGEND
MW12 MONITORING WELL AND BORING LOCATION
PURGE WELL
BENCHMARK
(90.02) GROUNDWATER ELEVATION (ft.)
GROUNDWATER CONTOUR
EXPECTED GROUNDWATER FLOW DIRECTION
CRA
Attachment 16
PREVIOUS SOIL AND GROUNDWATER INVESTIGATION
OIL STORAGE BUILDING
GREY IRON FOUNDRY
Saginaw, Michigan
5397 (L) OCT 15/96(W) REV.0 (P-38)

Z 237 708 668

Receipt for Certified Mail
No Insurance Coverage Provided.
Do not use for International Mail
(See Reverse)

Sent to	
Street and No.	
P.O., State and ZIP Code	
Postage	$
Certified Fee	
Special Delivery Fee	
Restricted Delivery Fee	
Return Receipt Showing to Whom & Date Delivered	
Return Receipt Showing to Whom, Date, and Addressee's Address	
TOTAL Postage & Fees	$
Postmark or Date	

PS Form **3800**, March 1993

Is your **RETURN ADDRESS** completed on the reverse side?

SENDER:
- Complete items 1 and/or 2 for additional services.
- Complete items 3, and 4a & b.
- Print your name and address on the reverse of this form so that we can return this card to you.
- Attach this form to the front of the mailpiece, or on the back if space does not permit.
- Write "Return Receipt Requested" on the mailpiece below the article number.
- The Return Receipt will show to whom the article was delivered and the date delivered.

I also wish to receive the following services (for an extra fee):
1. ☐ Addressee's Address
2. ☐ Restricted Delivery

Consult postmaster for fee.

3. Article Addressed to:
Ms. Joyce Broka
MDEQ - USTD
Saginaw Bay District office
503 N. Euclid Ave
Bay City MI 48706

4a. Article Number
Z 237 708 668

4b. Service Type
☐ Registered ☐ Insured
☒ Certified ☐ COD
☐ Express Mail ☐ Return Receipt for Merchandise

5. Signature (Addressee)

6. Signature (Agent)
[signature]

7. Date of Delivery
10 2 96

8. Addressee's Address (Only if requested and fee is paid)

Thank you for using Return Receipt Service.

PS Form **3811**, December 1991 ☆U.S. GPO: 1993—352-714 **DOMESTIC RETURN RECEIPT**

GM POWERTRAIN

Receipt No. Z 237 708 668
CERTIFIED MAIL
Return Receipt requested

September 27, 1996

Ms Joyce Broka
Michigan Department of Environmental Quality
Underground Storage Tank Division
Saginaw Bay District Office
503 N, Euclid Ave
Bay City, MI 48706

Subject: GMPTG - Saginaw Metal Casting Operations (SMCO)
Status of Underground Storage Tank Site near Oil Storage Building, formerly U.S.T. #1.

Dear Ms. Broka:

SMCO removed the underground storage tank near the Oil Storage Building in December 1989. SMCO has been involved in investigation and remediation since that time. Conestoga Rovers & Associates, a Qualified Underground Storage Tank consultant, is currently working with SMCO on this site. An updated Corrective Action Plan will be submitted to the MDEQ by October 15, 1996.

If you have any questions, please call me at (517) 757-1473.

Sincerely,

Raymond A Ilkka

Raymond A. Ilkka,
General Supervisor
Environmental Activities

bc: D. Kwasny
M. Tomka, CRA
J. Toth
L. Tucker

CRA

CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510 (Colby Office)
(519) 725-3313 (Bathurst Office)

DATE:	September 9, 1996	REFERENCE NO:	5397
TO:	Ray Ilkka (GM) Dave Kwasny (GM)	CRA FAX TELEPHONE: CRA OPERATOR TELEPHONE:	(519)725-1394 (519)725-3313
FAX NO:	517-757-1652 810-236-7391	**Facsimile is Receiver's Original**	x
FROM:	Sylvie Eastman for Mike Tomka	Original Will Follow By:	
TOTAL PAGES SENT: (including cover page)	19	o Mail o Overnight Courier o Hand Delivery	_____ _____ _____

Attached please find a revised draft letter report regarding the supplemental groundwater investigation for former UST in the Oil Storage Building Area at GM Saginaw Metal Casting Operations, for your review and comment. Attachment A (monitoring well logs), Attachment B (analytical reports) and Attachment C (data validation reports) have not been included.

Dave K.

Figure 6
Method of contouring
switched

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September 6, 1996 **-DRAFT FOR REVIEW -** Reference No. 5397

Ms. Ann Smolarz
Underground Storage Tank Division
Michigan Department of Environmental Quality
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Smolarz:

Re: Supplemental Groundwater Investigation
for Former UST in the Oil Storage Building Area
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the results of a supplemental groundwater investigation of a former UST in the Oil Storage Building area at the Saginaw Metal Casting Operations, Saginaw, Michigan. This supplemental investigation was completed in accordance with a work plan dated October 7, 1994 which was submitted to the Michigan Department of Environmental Quality (MDEQ) (formerly MDNR). The supplemental groundwater investigation field work was completed between December 13, 1994 and December 12, 1995.

1.0 BACKGROUND

1.1 UST Removal

A 10,000-gallon gasoline UST was removed in December of 1989. The tank was originally installed in 1954. During excavation of the UST an underground cooling water main was ruptured and cooling water spilled into the excavation. The cooling water was collected and containerized and the main was repaired. The tank was reported to be free of perforations. No replacement tank was installed.

In addition, two 10,000-gallon USTs were removed and replaced in 1981. One tank contained pattern spray (mineral oil) and the other contained diesel fuel. These two USTs were removed in 1993. The tanks were reported to be free of perforations and clean closure certificates were obtained for both tanks. No replacement tanks were installed.

1.2 Excavation Verification Sampling

Gasoline UST

After excavating the gasoline UST in 1989, five samples were collected from the side walls and floor of the excavation. The four sidewall samples were soil samples. The excavation floor sample was a water sample since the excavation encountered the water table. In addition, a soil sample was collected from the excavated material.

The excavation wall samples were analyzed for purgeable aromatics (benzene, toluene, ethylbenzene, chlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, p-xylene, m-xylene and o-xylene) and lead. The only constituent reported above detection limits was lead in two samples, at 78 and 170 mg/kg. The excavation floor sample was a water sample which was analyzed for the same compounds as the excavation wall samples. The excavation floor water sample contained 93 µg/L of p-xylene, 220 µg/L of m-xylene, 210 µg/L of o-xylene and 0.305 mg/L of lead. The excavated material was analyzed for purgeable aromatics, total petroleum hydrocarbons and metals. The soil sample from the excavated material contained 36 µg/kg of ethylbenzene, 48 µg/kg of p-xylene and 170 µg/kg of o-xylene.

All parameters reported in soil samples were below Act 451 Tier I Residential direct contact criteria (dated June 5, 1995) and former Act 307 Type B direct contact criteria (dated February 4, 1994). However, total xylene concentrations in the excavation floor water sample exceeded Act 451 Tier I Residential aesthetic drinking water criteria and former Act 307 Type B aesthetic drinking water criteria for groundwater but did not exceed Act 451 Tier 1 Residential or former Act 307 Type B health-based drinking water criteria.

Mineral Oil and Diesel Fuel USTs

After excavating the mineral oil and diesel fuel USTs in 1993, seven samples were collected from the excavation (one excavation was completed to remove both tanks). These consisted of a composite wall sample, four floor samples, a composite soil stockpile sample, and a composite transfer line sample.

The samples were analyzed for polynuclear aromatic hydrocarbons and no parameters were detected. These tanks obtained clean closure.

1.3 Previous Groundwater Investigation

GM submitted the analytical data and a groundwater investigation and remediation work plan to MDNR on January 21, 1990. The investigation and remediation was required due to groundwater concentrations for xylenes in the excavation floor water sample above Act 451 Tier I Residential aesthetic drinking water criteria and former Act 307 Type B aesthetic drinking water criteria.

In February 1990, three wells (MW1, MW2 and MW3) were installed around the former gasoline UST to evaluate groundwater quality. Soil samples were collected from the three borings (B7, B8 and B9) completed to install the wells (MW1, MW2 and MW3, respectively) and analyzed for purgeable aromatics. The sample from B9 contained 58 µg/kg of benzene and 84 µg/kg of toluene. All other parameters and samples reported were non-detect. All reported parameters were below Act 451 Tier I Residential direct contact criteria and former Act 307 Type B direct contact criteria.

Monitoring wells MW1, MW2 and MW3 were sampled in February 1990. Samples were analyzed for purgeable aromatics. Benzene, toluene, ethylbenzene and xylenes (BTEX) were reported above Act 451 Tier I Residential drinking water criteria and former Act 307 Type B drinking water criteria in the sample from MW1. Toluene was reported below Act 451 Residential drinking water criteria and former Act 307 Type B drinking water criteria in the sample from MW3. All other parameters were non-detect.

In March and April 1990, three replacement wells (MW10, MW11 and MW12) were installed in the Oil Storage Building area near the former UST location to replace the original wells which were damaged during snow removal. A soil sample was collected from the boring (B10) completed to install MW10 and analyzed for purgeable aromatics and petroleum hydrocarbons. All parameters were non-detect.

Monitoring wells MW10, MW11 and MW12 were sampled in May and August 1990 and then monthly between October 1990 and May 1991. Samples were analyzed for purgeable aromatics. All results were non-detect with the

exception of toluene, ethylbenzene and xylenes which were detected below Act 451 Tier I Residential drinking water criteria and former Act 307 Type B drinking water criteria in the sample from MW10 collected in May 1990.

1.4 Purge Well Operation

The purge well in the Oil Storage Building area was installed in March 1990 due to elevated BTEX levels in the February 1990 sample from MW1 and pumping was initiated when it was connected to the waste water treatment system in July 1990. In November 1991 the purge system was terminated because 8 consecutive groundwater samples showed consistent non-detect reports for purgeable aromatics. The purge well was located at the former UST location. The purge system operated at approximately 5 gallons per minute and had purged 999,950 gallons by November 1991.

In April 1992 pumping was re-initiated at the Oil Storage Building area. This pumping event occurred to ensure that groundwater quality remained acceptable after the depressed water table returned to the previous static level and any hydrocarbons remaining in the soil were permitted to desorb. Approximately 5,500 gallons of water were extracted prior to sampling. The sample was analyzed for purgeable aromatics. Benzene was reported below Act 451 Tier I Residential drinking water criteria and former Act 307 Type B drinking water criteria. All other parameters were non-detect. GM informed MDEQ of the decision to terminate pumping in a letter dated October 5, 1992.

2.0 DATA REQUIREMENTS

In a letter dated March 12, 1993, the MDEQ requested additional information. GM responded to this letter on March 31, 1993 and provided additional information. A supplemental site investigation was required to address the following data requirements.

1. additional stratigraphic definition;

2. additional soil data for lead in order to determine a site-specific background value; and

3. additional downgradient groundwater monitoring.

The required work plan was submitted in October 1994.

3.0 SUPPLEMENTAL INVESTIGATIONS

3.1 Supplemental Soil Investigation

On December 15, 1994, additional stratigraphic definition was conducted in the Oil Storage Building area. One deep (25 feet) soil boring was completed (BH3-94). One soil sample was collected based on highest PID reading from the soil boring at a depth of 7 to 9 feet below ground surface and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX). All BTEX parameters were non-detect. Soil samples were also collected from the former pipe run and from fuel dispenser and analyzed for BTEX. All BTEX parameters were non-detect. In addition, one soil sample was collected from the former "RR Fill" location and analyzed for BTEX and polynuclear aromatics (PNA). All BTEX and PNA parameters were non-detect.

In addition, four soil samples were collected from four shallow boreholes from the southeast portion of the Site and analyzed for lead in order to determine the Site-specific background value for lead. An additional four soil samples were collected to verify the results of the initial four samples. In accordance with MDEQ Guidance Document, Verification of Soil Remediation, April 1994, Revision 1, the Site specific background value for lead was calculated to be 185 mg/kg. The results of the UST excavation verification samples from 1989 are all below the calculated site-specific background value for lead.

The soil investigation results were previously submitted to MDEQ in a letter dated October 18, 1995.

3.2 Supplemental Groundwater Investigation

A groundwater monitoring network was established in the Oil Storage Building area during 1990 as discussed in Section 1.3. On December 16, 1994, two additional downgradient monitoring wells (MW14 and MW15) were installed downgradient of the former Oil Storage Building UST due to damage to wells MW10 and MW12. Figure 1 presents the well locations. The

recent monitoring wells are stainless steel wells with 5-foot screens and are screened at the water table. The monitoring well logs and completion details, are presented in Attachment A.

Water Level Measurement

The four rounds of static water levels required by the work plan were measured on December 19, 1994, April 13, 1995, August 16, 1995 and December 12, 1995, and an additional round of static water levels was taken on March 7, 1996. The groundwater contours are presented on Figures 1 through 5. The groundwater elevations are presented on Table 2. Historical groundwater contours are presented on Figure 6.

First Round Sampling

MW14 and MW15 were developed on December 19, 1994. Groundwater samples from the downgradient monitoring wells (MW14 and MW15) were collected on December 19, 1994 and analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, and ethylene bromide. MW15 was also analyzed for total values for chloride, copper, lead, magnesium, phosphorus and sodium. The results are presented on Table 1. Benzene, toluene, ethylbenzene and xylene were reported at 130 µg/L, 1,300 µg/L, 1,500 µg/L and 5,200 µg/L, respectively in MW15. An error in these results may have occurred such as switching samples from MW14 and MW15 since similar results were not reproduced in subsequent sampling events. All detections except xylene are above Tier I Residential health-based drinking water criteria. Xylene was reported above aesthetic drinking water criteria. All other organic parameters were non-detect. Total lead was reported above Act 451 Tier I Residential drinking water criteria at 1,000 µg/L at MW15. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDNR.

A second groundwater sample was collected from MW14 on February 7, 1995 and analyzed for total and dissolved metals (chloride, copper, lead, magnesium, phosphorus, and sodium). MW14 was inadvertently not sampled for metals in December 1994. The sample was analyzed for both total and dissolved metals due to the high total lead levels in MW15, to determine whether lead was in the groundwater or the sediment. The results are presented on Table 1. Total lead was reported above Act 451 Tier I Residential

drinking water criteria at 260 µg/L, in MW14 but dissolved lead was non-detect indicating that the lead value was representative of the sediment in the groundwater sample. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDEQ.

Second Round Sampling

Groundwater samples from downgradient wells MW14 and MW15 were collected on August 17, 1995. One sample from upgradient well MW11 was also collected. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide, and total and dissolved metals (chloride, copper, lead, magnesium, phosphorus and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential health-based drinking water criteria except benzene in samples from MW14 and MW14 duplicate, sodium in MW11 and MW15, and total lead for samples MW11, MW14 and MW15. Dissolved lead was non-detect in all samples indicating that the lead value was representative of the sediment in the groundwater sample. Xylenes and ethylbenzene were reported above aesthetic drinking water criteria in MW14. Chloride was reported above aesthetic drinking water criteria in MW11 and MW15. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDEQ. The October 18, 1995 letter also recommended the collection of two additional rounds of groundwater samples to define groundwater quality due to inconsistent results in the first two rounds.

Third Round Sampling

Groundwater samples from downgradient wells MW14 and MW15, and upgradient well MW11 were collected on December 12, 1995. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide and total and dissolved metals (chloride, copper, lead, magnesium, phosphorus and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential health-based drinking water criteria except benzene in MW14 and sodium in MW11 and MW15. Xylenes and ethylbenzene were reported above aesthetic drinking water criteria in MW14. Chloride was reported above aesthetic drinking water criteria in MW11 and MW15. The analytical reports are presented in Attachment B. The data validation report is presented in Attachment C.

Fourth Round Sampling

Groundwater samples from upgradient well MW11 and downgradient well MW14 were collected on March 7, 1996. Downgradient well MW15 was dry. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide and total and dissolved metals (copper, lead, magnesium and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential health-based drinking water criteria except benzene in MW14 and sodium in MW11. Ethylbenzene was reported above aesthetic drinking water criteria in MW14. Total lead was reported above Act 451 Tier I Residential health-based drinking water criteria in MW11 and MW14 but dissolved lead was non-detect, indicating that the lead value was representative of the sediment in the groundwater sample. The analytical reports are presented in Attachment B. The data validation report is presented in Attachment C.

4.0 CONCLUSIONS

Groundwater monitoring results organized by location are presented on Table 1. Volatile organics have not been detected at upgradient well MW11. BTEX parameters were detected at MW14 in three of the four samples, and benzene was reported above Act 451 Tier I Residential health-based drinking water criteria in all three samples. BTEX parameters were detected at MW15 in one of the four samples and benzene, toluene, and ethylbenzene were reported above Act 451 Tier I Residential health-based drinking water criteria. These results may have been error, possibly due to switching samples from MW14 and MW15, since they were not reproduced in subsequent sampling events. Total lead was reported above Act 451 Tier I Residential drinking water criteria in all samples except those collected on December 12, 1995. However, dissolved lead was consistently non detect, indicating that the total lead represented sediment in the groundwater sample. Total and dissolved sodium were reported above Act 451 Tier I Residential health-based drinking water criteria in all samples from upgradient monitoring well MW11 and samples from downgradient well MW15 collected on August 17, 1995 and December 12, 1995.

With the exception of the first sampling round, which may have been in error, the only results above Act 451 Tier I Residential health-based drinking

water criteria are for benzene in MW14 and sodium in MW11 and MW15. Xylenes and ethylbenzene have been reported above aesthetic drinking water criteria but below health-based drinking water criteria in MW14. Since MW11 is an upgradient well, the sodium is expected to be unrelated to the former UST. Since impacts from the former UST have not been verified in MW15, the furthest downgradient well, the impact to groundwater is localized. Therefore, CRA recommends continued monitoring of MW15 for benzene on an annual basis to identify any migration of groundwater contamination from MW14.

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P. Eng.

MRT/cf/4
Encl.

c.c. Laura Tucker, GM
Joe Toth, GM
Dave Kwasny, GM
Ray Ilkka, GM
Jim McGuigan, Emcon
Ian Richardson, CRA

SENT BY: 9- 9-96 ; 8:44AM ; CRA BATHURST→ 517 757 1652;#11/13

TABLE 1

GROUNDWATER SAMPLE SUMMARY
OIL STORAGE BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	MW11 Aug/95 (µg/L)	MW11 Dec/95 (µg/L)	MW11 Mar/96 (µg/L)	MW14 Dec/94 (µg/L)	MW14 Feb/95 (µg/L)	MW14 Aug/95 (µg/L)	MW14 dup Aug/95 (µg/L)	Act 451 Tier I Residential Health-Based Drinking Water (µg/L)
Benzene	<1.0	<1.0	<1.0	<1.0	NA	40	39	5
Toluene	<1.0	<1.0	<1.0	<1.0	NA	120	97	1,000
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	NA	240	190	700
Xylenes	<3.0	<3.0	<3.0	<3.0	NA	520	410	10,000
Chloride	2,200,000	2,500,000	NA	NA	1,600,000	NA	NA	–
Copper	57	<6.0	64	NA	47	140	NA	1,400
Lead	26	<2.0	36	NA	260	310	NA	4
Magnesium	150,000	150,000	200,000	NA	17,000	16,000	NA	420,000
Phosphorus	91	1,300	NA	NA	44	58	34	–
Sodium	930,000	1,100,000	1,100,000	NA	18,000	19,000	NA	160,000
Copper (dissolved)	<5 UJ	<6.0	14	NA	<25	<5	<5	1,400
Lead (dissolved)	<2 UJ	<2.0	<2	NA	<3	<2	<2	4
Magnesium (dissolved)	110,000J	120,000	105,000	NA	8,100	7,400	6,600	420,000
Sodium (dissolved)	1,200,000 J	1,400,000	970,000	NA	16,000	21,000	18,000	160,000
Methyl-tertiary-butyl-ether	<50	<5.0	<1.0	<50	NA	<50	<50	240
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	5
Ethylene Bromide	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	–

Notes:

NA - not analyzed
J - The analyte was positively identified; the associated numerical value is the approximate concentraion of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. Criteria used are from MDNR Operational Memorandum #8, Revision 4, dated June 5, 1995.

09/09/96 MON 08:53 [TX/RX NO 9333] 011

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TABLE 1

GROUNDWATER SAMPLE SUMMARY
OIL STORAGE BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	MW14 Dec/95 (µg/L)	MW14 Mar/96 (µg/L)	MW14 dup Mar/96 (µg/L)	MW15 Dec/94 (µg/L)	MW15 Aug/95 (µg/L)	MW15 Dec/95 (µg/L)	Act 451 Tier I Residential Health-Based Drinking Water (µg/L)
Benzene	63	25	24	130	<1.0	<1.0	5
Toluene	100	43	45	1,300	<1.0	<1.0	1,000
Ethylbenzene	210	130	127	1,500	<1.0	<1.0	700
Xylenes	820	240	97	5,200	<3.0	<3.0	10,000
Chloride	40,000	NA	NA	50,000	500,000	2,500,000	–
Copper	<6.0	37	36	190	39	<6.0	1,400
Lead	<2.0	110	100	1,000	93	<2.0	4
Magnesium	12,000	14,000	13,000	36,000	46,000	59,000	420,000
Phosphorus	590	NA	NA	60	58R	220	–
Sodium	20,000	150,000	130,000	21,000	190,000	310,000	160,000
Copper (dissolved)	<6.0	<4	<4	NA	<5	<6.0	1,400
Lead (dissolved)	<2.0	<2	<2	NA	<2	<2.0	4
Magnesium (dissolved)	10,000	9,600	9,500	NA	43,000	54,000	420,000
Sodium (dissolved)	20,000	160,000	160,000	NA	200,000	320,000	160,000
Methyl-tertiary-butyl-ether	<20	<2	<5.0	<5,000	<50	<5.0	240
1,2-Dichloroethane	<4.0	<2	<5.0	<100	<1.0	<1.0	5
Ethylene Bromide	<4.0	<2	<5.0	<100	<1.0	<1.0	–

Notes:

NA - not analyzed
J - The analyte was positively identified; the associated numerical value is the approximate concentraion of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. Criteria used are from MDNR Operational Memorandum #3, Revision 4, dated June 5, 1995.

09/09/96 MON 08:53 [TX/RX NO 9333] 012

TABLE 2

GROUNDWATER ELEVATIONS
OIL STORAGE BUILDING AREA

Well No.	*Ref. Elev. (ft. AMSL)*	*12/19/94*	*04/13/95*	*08/16/95*	*12/12/95*	*03/07/96*
MW-11	591.13	584.13	583.81	584.38	584.10	583.89
MW-14	590.60	580.50	580.83	581.34	581.07	580.85
MW-15	590.39	580.89	582.06	581.26	581.04	dry

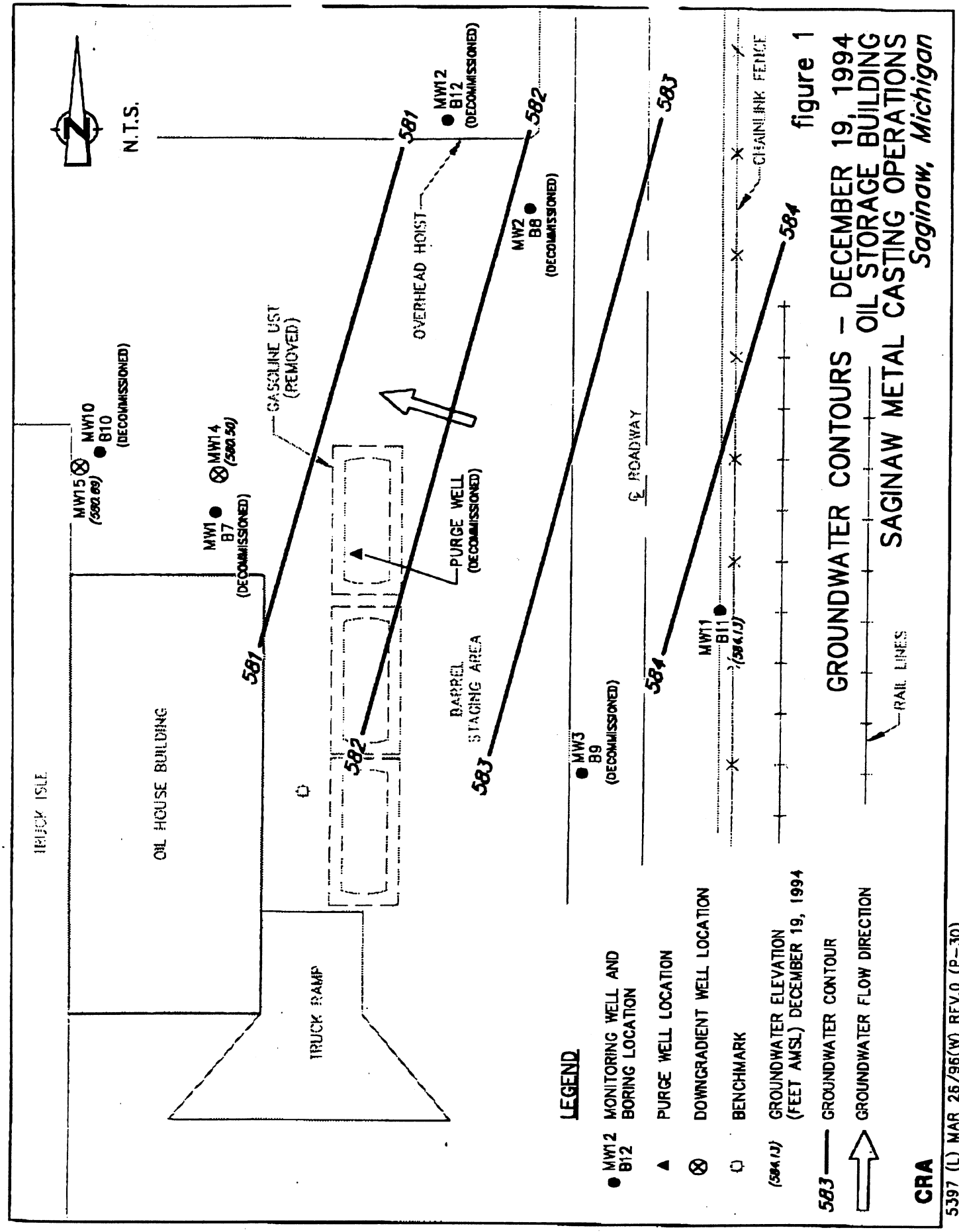

figure 1

GROUNDWATER CONTOURS – DECEMBER 19, 1994
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

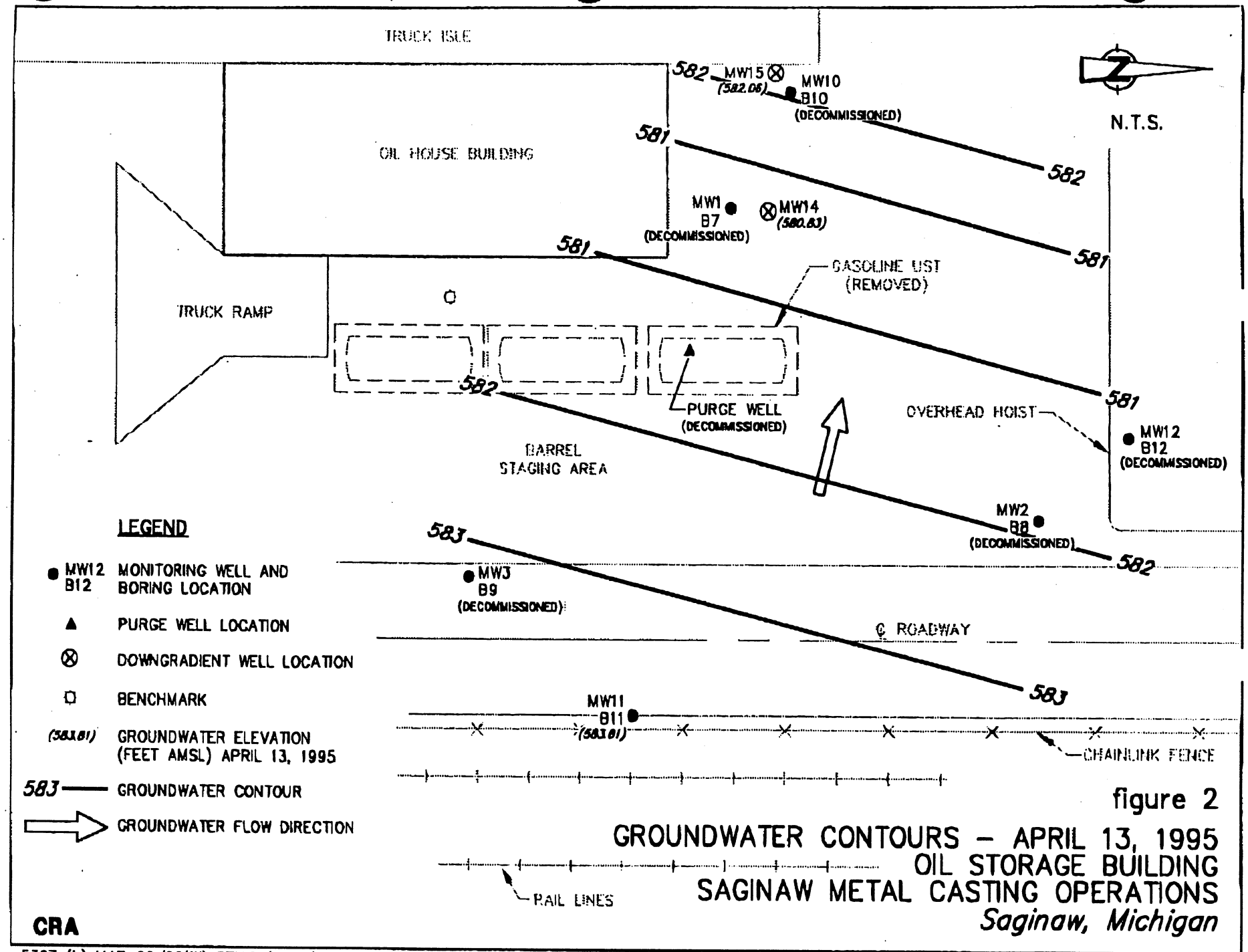

figure 2

GROUNDWATER CONTOURS – APRIL 13, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

5397 (L) MAR 26/96(W) REV.0 (P-31)

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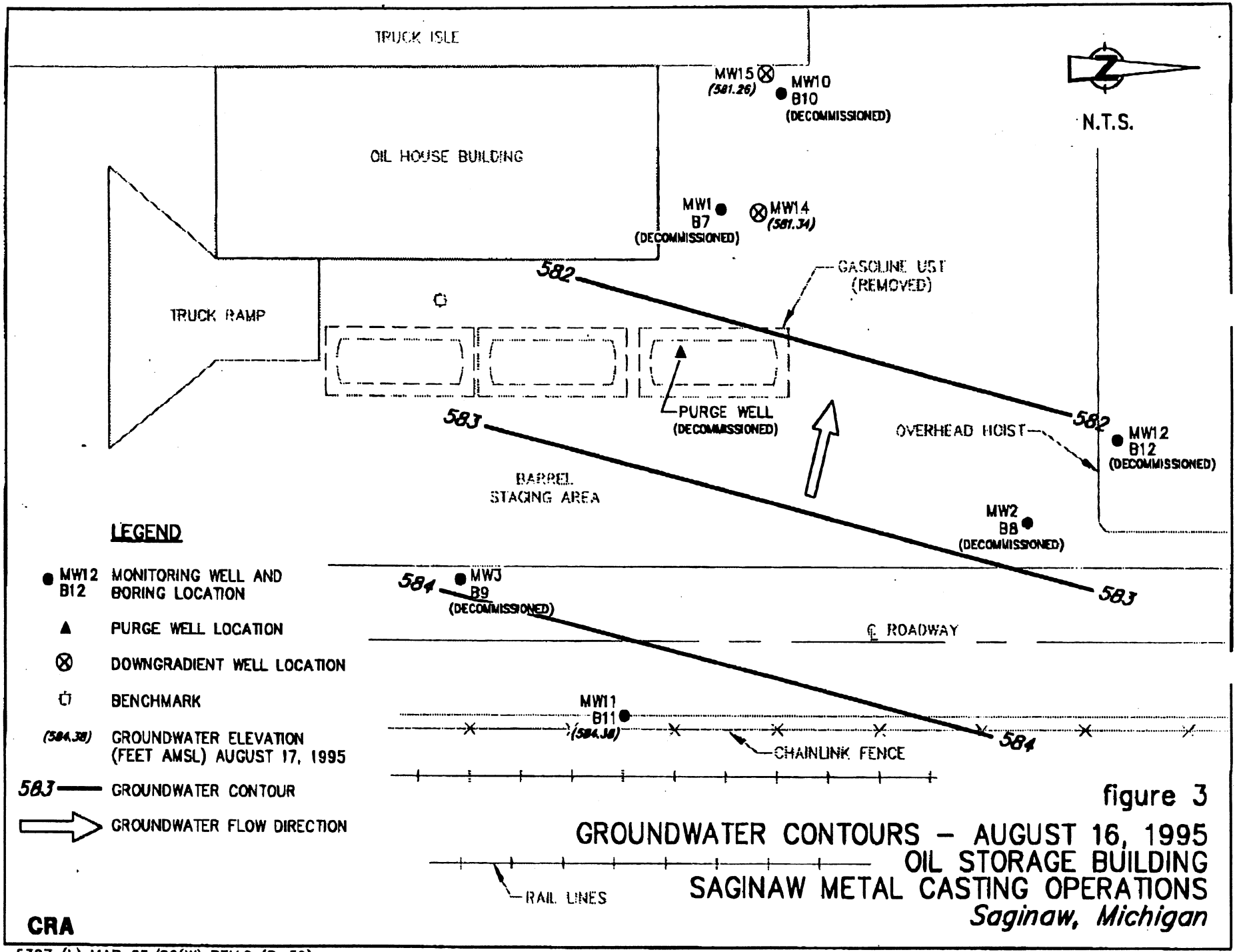

figure 3

GROUNDWATER CONTOURS – AUGUST 16, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-J2)

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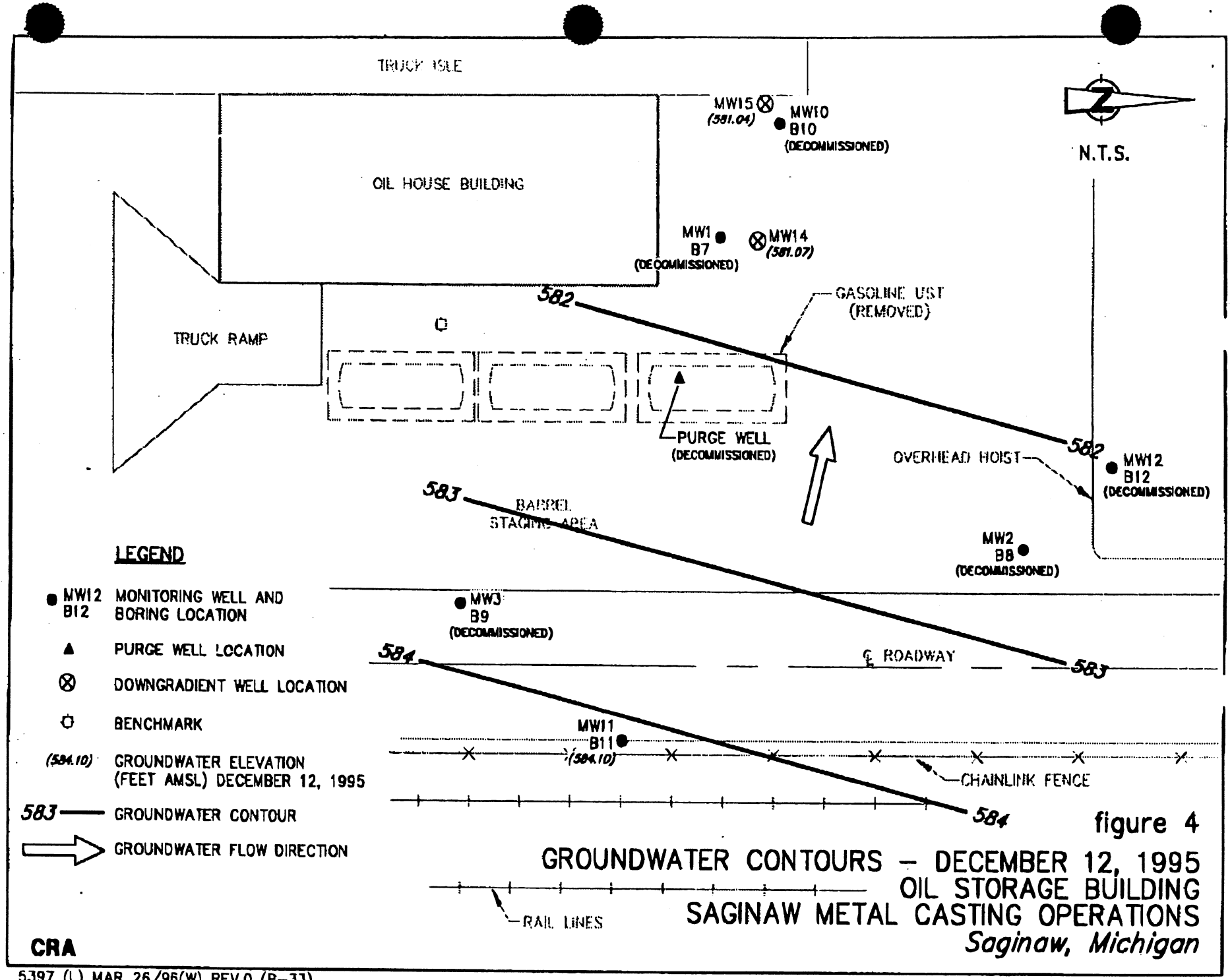

figure 4

GROUNDWATER CONTOURS – DECEMBER 12, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-33)

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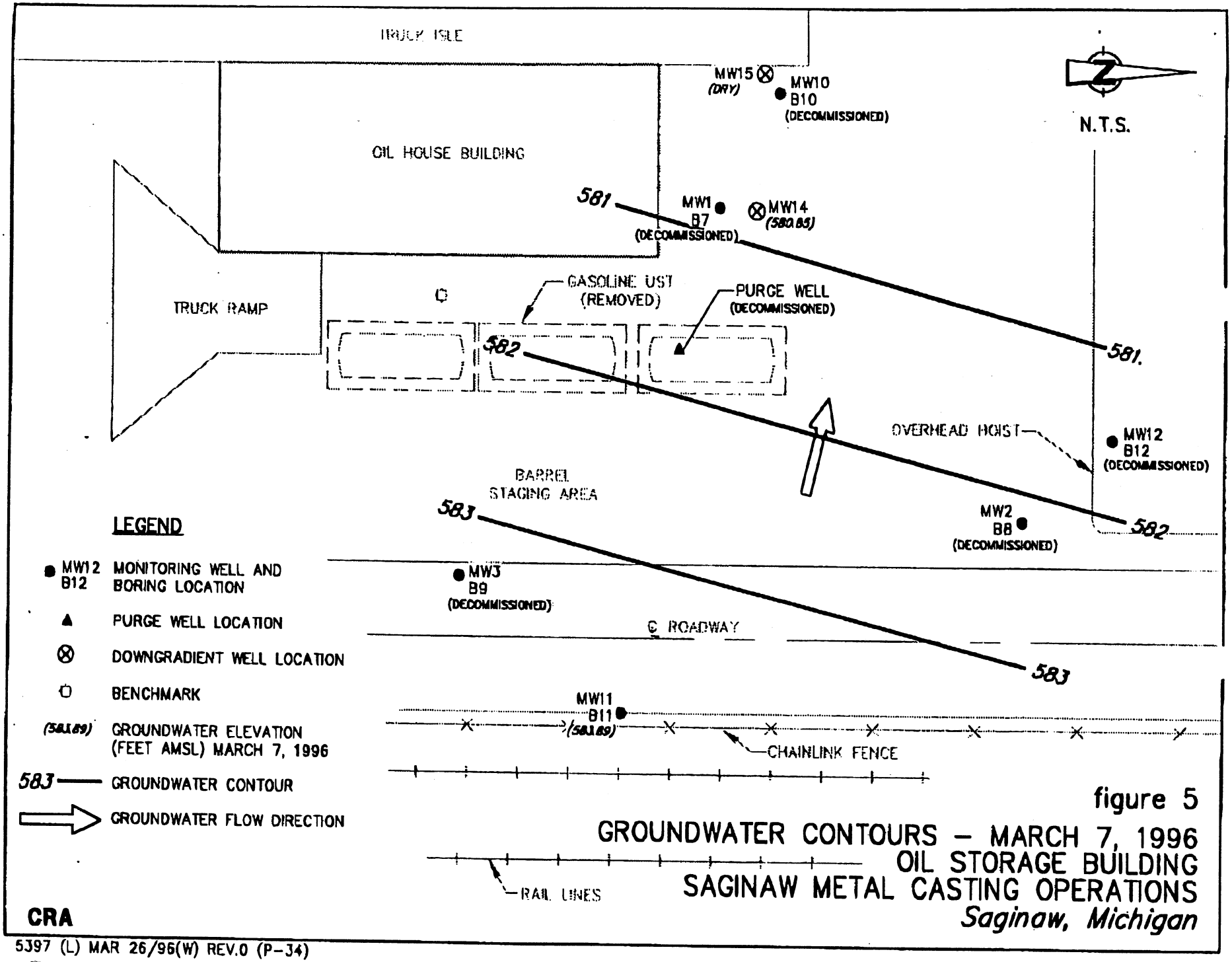

figure 5

GROUNDWATER CONTOURS – MARCH 7, 1996
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

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5397 (L) MAR 26/96(W) REV.0 (P-34)

09/09/96 MON 08:53 [TX/RX NO 9333] 018

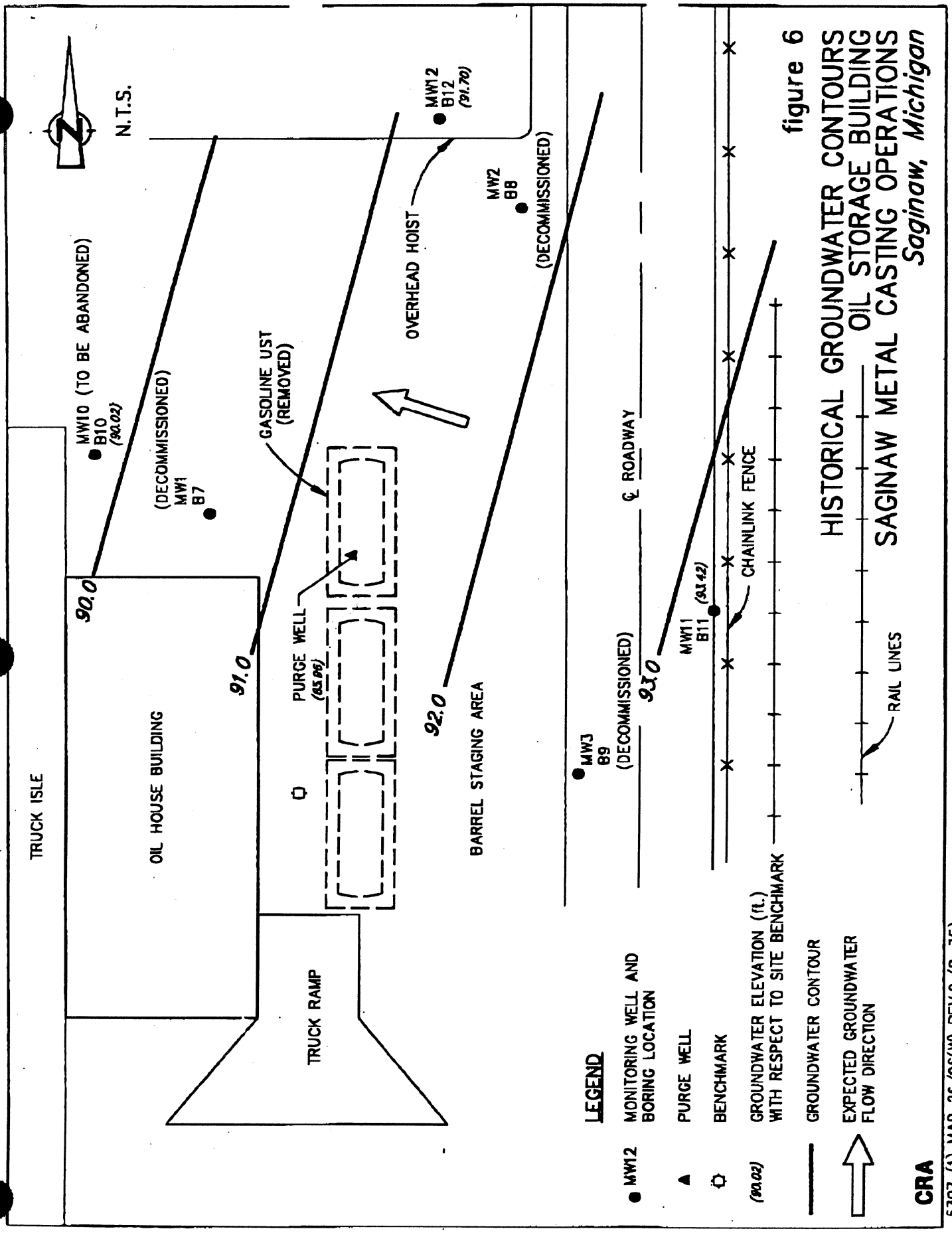

figure 6

HISTORICAL GROUNDWATER CONTOURS
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive
Waterloo, Ontario, Canada N2V 1C2
(519) 884-0510 (Colby Office)
(519) 725-3313 (Bathurst Office)

DATE: June 11, 1996

TO: Ray Ilkka (GM)

FAX NO: 517-757-1652

FROM: Sylvie Eastman for Mike Tomka

TOTAL PAGES SENT: 18
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for Former UST in the Oil Storage Building Area
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the results of a supplemental groundwater investigation of a former UST in the Oil Storage Building area at the Saginaw Metal Casting Operations, Saginaw, Michigan. This supplemental investigation was completed in accordance with a work plan dated October 7, 1994 which was submitted to the Michigan Department of Environmental Quality (MDEQ) (formerly MDNR). The supplemental groundwater investigation field work was completed between December 13, 1994 and December 12, 1995.

1.0 BACKGROUND

1.1 UST Removal

A 10,000-gallon gasoline UST was removed in December of 1989. The tank was originally installed in 1954. During excavation of the UST an underground cooling water main was ruptured and cooling water spilled into the excavation. The cooling water was collected and containerized and the main was repaired. The tank was reported to be free of perforations. No replacement tank was installed.

In addition, two 10,000-gallon USTs were removed and replaced in 1981. One tank contained pattern spray (mineral oil) and the other contained diesel fuel. These two USTs were removed in 1993. The tanks were reported to be free of perforations and clean closure certificates were obtained for both tanks. No replacement tanks were installed.

1.2 Excavation Verification Sampling

Gasoline UST

After excavating the gasoline UST in 1989, five samples were collected from the side walls and floor of the excavation. The four sidewall samples were soil samples. The excavation floor sample was a water sample since the excavation encountered to the water table. In addition, a soil sample was collected from the excavated material.

The excavation wall samples were analyzed for purgeable aromatics (benzene, toluene, ethylbenzene, chlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, p-xylene, m-xylene and o-xylene) and lead. The only constituent reported above detection limits was lead in two samples, at 78 and 170 mg/kg. The excavation floor sample was a water sample which was analyzed for the same compounds as the excavation wall samples. The excavation floor water sample contained 93 µg/L of p-xylene, 220 µg/L of m-xylene, 210 µg/L of o-xylene and 0.305 mg/L of lead. The excavated material was analyzed for purgeable aromatics, total petroleum hydrocarbons and metals. The soil sample from the excavated material contained 36 µg/kg of ethylbenzene, 48 µg/kg of p-xylene and 170 µg/kg of o-xylene.

All parameters were below Act 451 Tier I Residential criteria (dated June 5, 1995). However, total xylene concentrations in the excavation floor water sample exceeded former Act 307 Type B criteria for groundwater (dated March 20, 1992).

Mineral Oil and Diesel Fuel USTs

After excavating the mineral oil and diesel fuel USTs in 1993, seven samples were collected from the excavation (one excavation was completed to remove both tanks). These consisted of a composite wall sample, four floor samples, a composite soil stockpile sample, and a composite transfer line sample.

The samples were analyzed for polynuclear aromatic hydrocarbons and no parameters were detected. These tanks therefore obtained clean closure.

1.3 Previous Groundwater Investigation

GM submitted the analytical data and a groundwater investigation and remediation work plan to MDNR on January 21, 1990. The investigation and remediation was required due to groundwater concentrations for xylenes in the excavation floor water sample above former Act 307 Type B criteria.

In February 1990, three wells (MW1, MW2 and MW3) were installed around the former gasoline UST to evaluate groundwater quality. Soil samples were collected from the three borings (B7, B8 and B9) completed to install the wells (MW1, MW2 and MW3, respectively) and analyzed for purgeable aromatics. The sample from B9 contained 58 µg/kg of benzene and 84 µg/kg of toluene. All other parameters and samples reported were non-detect. All reported parameters were below former Act 307 Type B and Act 451 Tier I Residential criteria.

Monitoring wells MW1, MW2 and MW3 were sampled in February 1990. Samples were analyzed for purgeable aromatics. BTEX was reported above former Act 307 Type B and Act 451 Tier I Residential criteria in the sample from MW1. Toluene was reported below former Act 307 Type B and Act 451 Residential criteria in the sample from MW3. All other parameters were non-detect.

In March and April 1990, three replacement wells (MW10, MW11 and MW12) were installed in the Oil Storage Building area near the former UST location to replace the original wells which were damaged during snow removal. A soil sample was collected from the boring (B10) completed to install MW10 and analyzed for purgeable aromatics and petroleum hydrocarbons. All parameters were non-detect.

Monitoring wells MW10, MW11 and MW12 were sampled in May and August 1990 and then monthly between October 1990 and May 1991. Samples were analyzed for purgeable aromatics. All results were non-detect with the exception of toluene, ethylbenzene and xylenes which were detected below former Act 307 Type B and Act 451 Tier I Residential criteria in the sample from MW10 collected in May 1990.

1.4 Purge Well Operation

The purge well in the Oil Storage Building area was installed in March 1990 due to elevated BTEX levels in the February 1990 sample from MW1 and pumping was initiated when it was connected to the waste water treatment system in July 1990. In November 1991 the purge system was terminated because 8 consecutive groundwater samples showed consistent non-detect reports for purgeable aromatics. The purge well was located at the former UST location. The purge system operated at approximately 5 gallons per minute and had purged 999,950 gallons by November 1991.

In April 1992 pumping was re-initiated at the Oil Storage Building area. This pumping event occurred to ensure that groundwater quality remained acceptable after the depressed water table returned to the previous static level and any hydrocarbons remaining in the soil were permitted to desorb. Approximately 5,500 gallons of water were extracted prior to sampling. The sample was analyzed for purgeable aromatics. Benzene was reported below former Act 307 Type B and Act 451 Tier I Residential criteria. All other parameters were non-detect. GM informed MDEQ of the decision to terminate pumping in a letter dated October 5, 1992.

2.0 DATA REQUIREMENTS

In a letter dated March 12, 1993, the MDEQ requested additional information. GM responded to this letter on March 31, 1993 and provided additional information. A supplemental site investigation was required to address the following data requirements.

1. additional stratigraphic definition;

2. additional soil data for lead in order to determine a site-specific background value; and

3. additional downgradient groundwater monitoring.

The required work plan was submitted in October 1994.

3.0 SUPPLEMENTAL INVESTIGATIONS

3.1 Supplemental Soil Investigation

On December 15, 1994, additional stratigraphic definition was conducted in the Oil Storage Building area. One deep (25 feet) soil boring was completed (BH3-94). One soil sample was collected based on highest PID reading from the soil boring at a depth of 7 to 9 feet below ground surface and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX). All BTEX parameters were non-detect. Soil samples were also collected from the former pipe run and from fuel dispenser and analyzed for BTEX. All BTEX parameters were non-detect. In addition, one soil sample was collected from the former "RR Fill" location and analyzed for BTEX and polynuclear aromatics (PNA). All BTEX and PNA parameters were non-detect.

In addition, four soil samples were collected from four shallow boreholes from the southeast portion of the Site and analyzed for lead in order to determine the Site-specific background value for lead. An additional four soil samples were collected to verify the results of the initial four samples. In accordance with MDEQ Guidance Document, Verification of Soil Remediation, April 1994, Revision 1, the Site specific background value for lead was calculated to be 185 mg/kg. The results of the UST excavation verification samples from 1989 are all below the calculated site-specific background value for lead.

The soil investigation results were previously submitted to MDEQ in a letter dated October 18, 1995.

3.2 Supplemental Groundwater Investigation

A groundwater monitoring network was established in the Oil Storage Building area during 1990 as discussed in Section 1.3. On December 16, 1994, two additional downgradient monitoring wells (MW14 and MW15) were installed downgradient of the former Oil Storage Building UST due to damage to wells MW10 and MW12. Figure 1 presents the well locations. The recent monitoring wells are stainless steel wells with 5-foot screens and are screened at the water table. The monitoring well logs and completion details, are presented in Attachment A.

Water Level Measurement

The four rounds of static water levels required by the work plan were measured on December 19, 1994, April 13, 1995, August 16, 1995 and December 12, 1995, and an additional round of static water levels was taken on March 7, 1996. The groundwater contours are presented on Figures 1 through 5. The groundwater elevations are presented on Table 2. Historical groundwater contours are presented on Figure 6.

First Round Sampling

MW14 and MW15 were developed on December 19, 1994. Groundwater samples from the downgradient monitoring wells (MW14 and MW15) were collected on December 19, 1994 and analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, and ethylene bromide. MW15 was also analyzed for total values for chloride, copper, lead, magnesium, phosphorus and sodium. The results are presented on Table 1. Benzene, toluene, ethylbenzene and xylene were reported at 130 µg/L, 1,300 µg/L, 1,500 µg/L and 5,200 µg/L, respectively in MW15. An error in these results may have occurred such as switching samples from MW14 and MW15 since similar results were not reproduced in subsequent sampling events. All detections except xylene are above Tier I Residential criteria. All other organic parameters were non-detect. Total lead was reported above Act 451 Tier I Residential criteria at 1,000 µg/L at MW15. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDNR.

A second groundwater sample was collected from MW14 on February 7, 1995 and analyzed for total and dissolved metals (chloride, copper, lead, magnesium, phosphorus, and sodium). MW14 was inadvertently not sampled for metals in December 1994. The sample was analyzed for both total and dissolved metals due to the high total lead levels in MW15, to determine whether lead was in the groundwater or the sediment. The results are presented on Table 1. Total lead was reported above Act 451 Tier I Residential criteria at 260 µg/L, in MW14 but dissolved lead was non-detect indicating that the lead value was representative of the sediment in the groundwater sample. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDEQ.

Second Round Sampling

Groundwater samples from downgradient wells MW14 and MW15 were collected on August 17, 1995. One sample from upgradient well MW11 was also collected. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide, and total and dissolved metals (chloride, copper, lead, magnesium, phosphorus and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential criteria except benzene in samples from MW14 and MW14 duplicate, sodium in MW11 and MW15, and total lead for samples MW11, MW14 and MW15. Dissolved lead was non-detect in all samples indicating that the lead value was representative of the sediment in the groundwater sample. The analytical reports and data validation report were presented in the October 18, 1995 letter to MDEQ. The October 18, 1995 letter also recommended the collection of two additional rounds of groundwater samples to define groundwater quality due to inconsistent results in the first two rounds.

Third Round Sampling

Groundwater samples from downgradient wells MW14 and MW15, and upgradient well MW11 were collected on December 12, 1995. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide and total and dissolved metals (chloride, copper, lead, magnesium, phosphorus and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential criteria except benzene in MW14 and sodium in MW11 and MW15. The analytical reports are presented in Attachment B. The data validation report is presented in Attachment C.

Fourth Round Sampling

Groundwater samples from upgradient well MW11 and downgradient well MW14 were collected on March 7, 1996. Downgradient well MW15 was dry. Samples were analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide and total and dissolved metals (copper, lead, magnesium and sodium). The results are presented in Table 1. All detections were reported below Act 451 Tier I Residential criteria except benzene in MW14 and sodium in MW11. Total lead was reported above Act

451 Tier I Residential criteria in MW11 and MW14 but dissolved lead was non-detect, indicating that the lead value was representative of the sediment in the groundwater sample. The analytical reports are presented in Attachment B. The data validation report is presented in Attachment C.

4.0 CONCLUSIONS

Groundwater monitoring results organized by location are presented on Table 1. Volatile organics have not been detected at upgradient well MW11. BTEX parameters were detected at MW14 in three of the four samples, and benzene was reported above Act 451 Tier I Residential criteria in all three samples. BTEX parameters were detected at MW15 in one of the four samples and benzene, toluene, and ethylbenzene were reported above Act 451 Tier I Residential criteria. These results may have been error, possibly due to switching samples from MW14 and MW15, since they were not reproduced in subsequent sampling events. Total lead was reported above Act 451 Tier I Residential criteria in all samples except those collected on December 12, 1995. However, dissolved lead was consistently non detect, indicating that the total lead represented sediment in the groundwater sample. Total and dissolved sodium were reported above Act 451 Tier I Residential criteria in all samples from MW11 and samples from MW15 collected on August 17, 1995 and December 12, 1995.

With the exception of the first sampling round, which may have been in error, the only results above Act 451 Tier I Residential Values are for benzene in MW14 and sodium in MW11 and MW15. Since MW11 is an upgradient well, the sodium is expected to be unrelated to the former UST. Since impacts from the former UST have not been verified in MW15, the furthest downgradient well, the impact to groundwater is localized. Therefore, CRA recommends continued monitoring of MW15 for benzene on an annual basis to identify any migration of groundwater contamination from MW14.

June 11, 1996

Reference No. 5397

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P. Eng.

MRT/cf/4
Encl.

c.c. Laura Tucker, GM
Joe Toth, GM
Dave Kwasny, GM
Ray Ilkka, GM
Jim McGuigan, Emcon
Ian Richardson, CRA

SENT BY: 6-11-96 ;10:52AM ; CONESTOGA ROVERS→ 517 757 1652;#11/18

TABLE 1

GROUNDWATER SAMPLE SUMMARY
OIL STORAGE BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	MW11 Aug/95 (µg/L)	MW11 Dec/95 (µg/L)	MW11 Mar/96 (µg/L)	MW16 Dec/94 (µg/L)	MW14 Feb/95 (µg/L)	MW14 Aug/95 (µg/L)	MW14 dup Aug/95 (µg/L)	MW14 Dec/95 (µg/L)	MW14 Mar/96 (µg/L)	MW14 dup Mar/96 (µg/L)	MW15 Dec/94 (µg/L)	MW15 Aug/95 (µg/L)	MW15 Dec/95 (µg/L)	Act 451 Tier I Residential (µg/L)
Benzene	<1.0	<1.0	<1.0	<1.0	NA	40	39	63	25	24	130	<1.0	<1.0	5
Toluene	<1.0	<1.0	<1.0	<1.0	NA	110	97	100	43	65	1,300	<1.0	<1.0	1,000
Ethylbenzene	<1.0	<1.0	<1.0	<1.0	NA	240	190	210	130	127	1,500	<1.0	<1.0	700
Xylenes	<3.0	<3.0	<3.0	<3.0	NA	520	410	820	240	97	5,200	<3.0	<3.0	10,000
Chloride	2,200,000	2,500,000	NA	NA	1,600,000	NA	NA	40,000	NA	NA	50,000	500,000	2,500,000	–
Copper	57	<6.0	84	NA	67	140	NA	<6.0	37	36	190	39	<6.0	1,400
Lead	26	<2.0	36	NA	260	310	NA	<2.0	110	100	1,000	93	<2.0	4
Magnesium	150,000	150,000	200,000	NA	17,000	16,000	NA	12,000	14,000	13,000	36,000	46,000	59,000	420,000
Phosphorus	91	1,300	NA	NA	44	58	34	590	NA	NA	60	58R	220	–
Sodium	930,000	1,100,000	1,100,000	NA	18,000	19,000	NA	20,000	150,000	130,000	21,000	190,000	310,000	160,000
Copper (dissolved)	<5 UJ	<6.0	14	NA	<25	<5	<5	<6.0	<4	<4	NA	<5	<6.0	1,400
Lead (dissolved)	<2 UJ	<2.0	<2	NA	<3	<2	<2	<2.0	<2	<2	NA	<2	<2.0	4
Magnesium (dissolved)	110,000J	120,000	105,000	NA	8,100	7,400	6,600	10,000	9,600	9,500	NA	43,000	54,000	420,000
Sodium (dissolved)	1,200,000 J	1,400,000	970,000	NA	18,000	21,000	18,000	20,000	160,000	160,000	NA	200,000	320,000	160,000
Methyl-tertiary-butyi-ether	<50	<5.0	<1.0	<50	NA	<50	<50	<20	<2	<5.0	<5,000	<50	<5.0	240
1,2-Dichloroethane	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<4.0	<2	<5.0	<100	<1.0	<1.0	5
Ethylene Bromide	<1.0	<1.0	<1.0	<1.0	NA	<1.0	<1.0	<4.0	<2	<5.0	<100	<1.0	<1.0	–

Notes:

NA - not analyzed

J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified. Criteria used are from MDNR Operational Memorandum #8, Revision 4, dated June 5, 1995.

CRA 5307\tbl-4-Tt-Wat

TABLE 2

GROUNDWATER ELEVATIONS
OIL STORAGE BUILDING AREA

Well No.	*Ref. Elev. (ft. AMSL)*	*12/19/94*	*04/13/95*	*08/16/95*	*12/12/95*	*03/07/96*
MW-11	591.13	584.13	583.81	584.38	584.10	583.89
MW-14	590.60	580.50	580.83	581.34	581.07	580.85
MW-15	590.39	580.89	582.06	581.26	581.04	dry

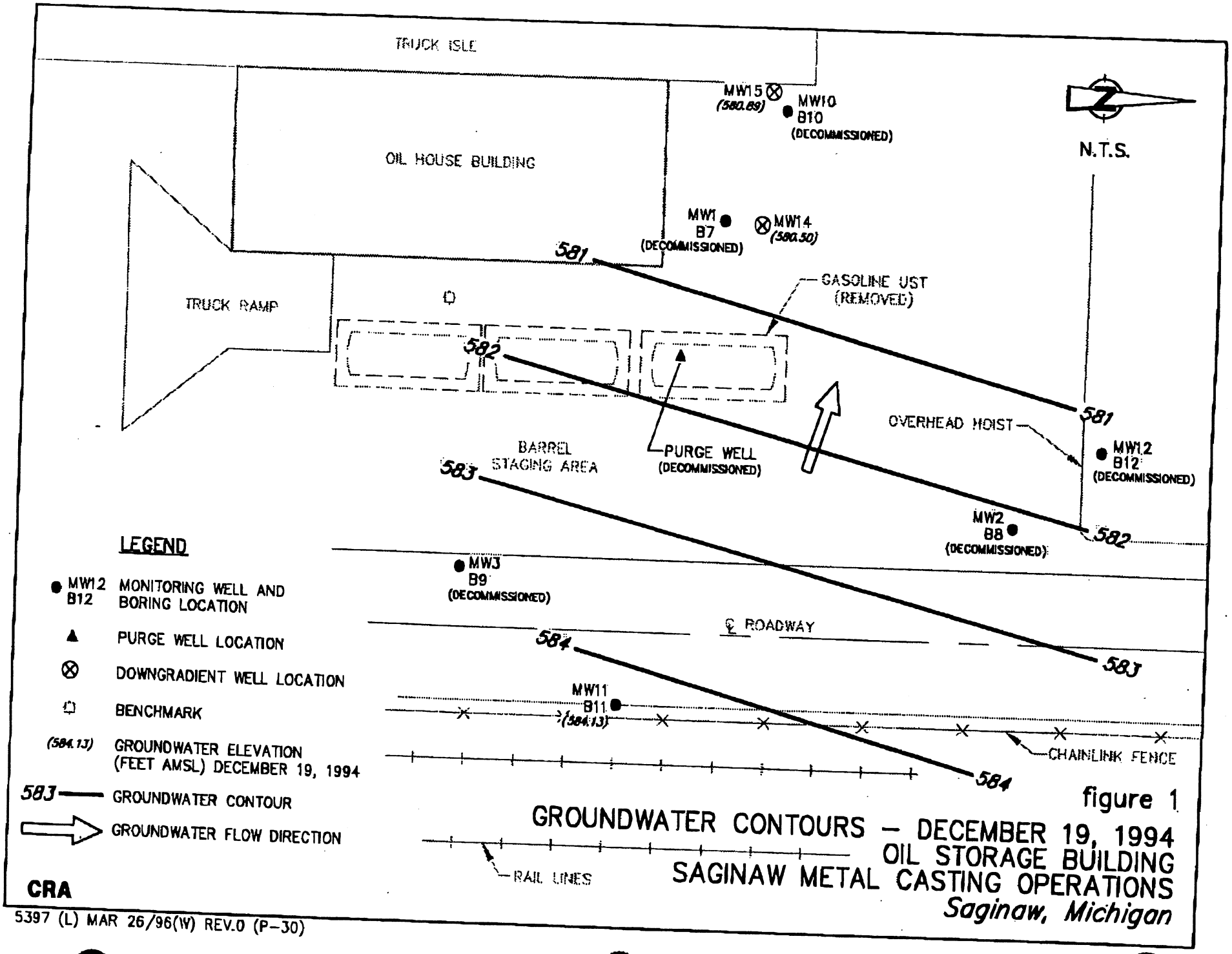

figure 1

GROUNDWATER CONTOURS – DECEMBER 19, 1994
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-30)

SENT BY: 6-11-96 ;10:53AM ; CONESTOGA ROVERS→ 517 757 1652;#13/18

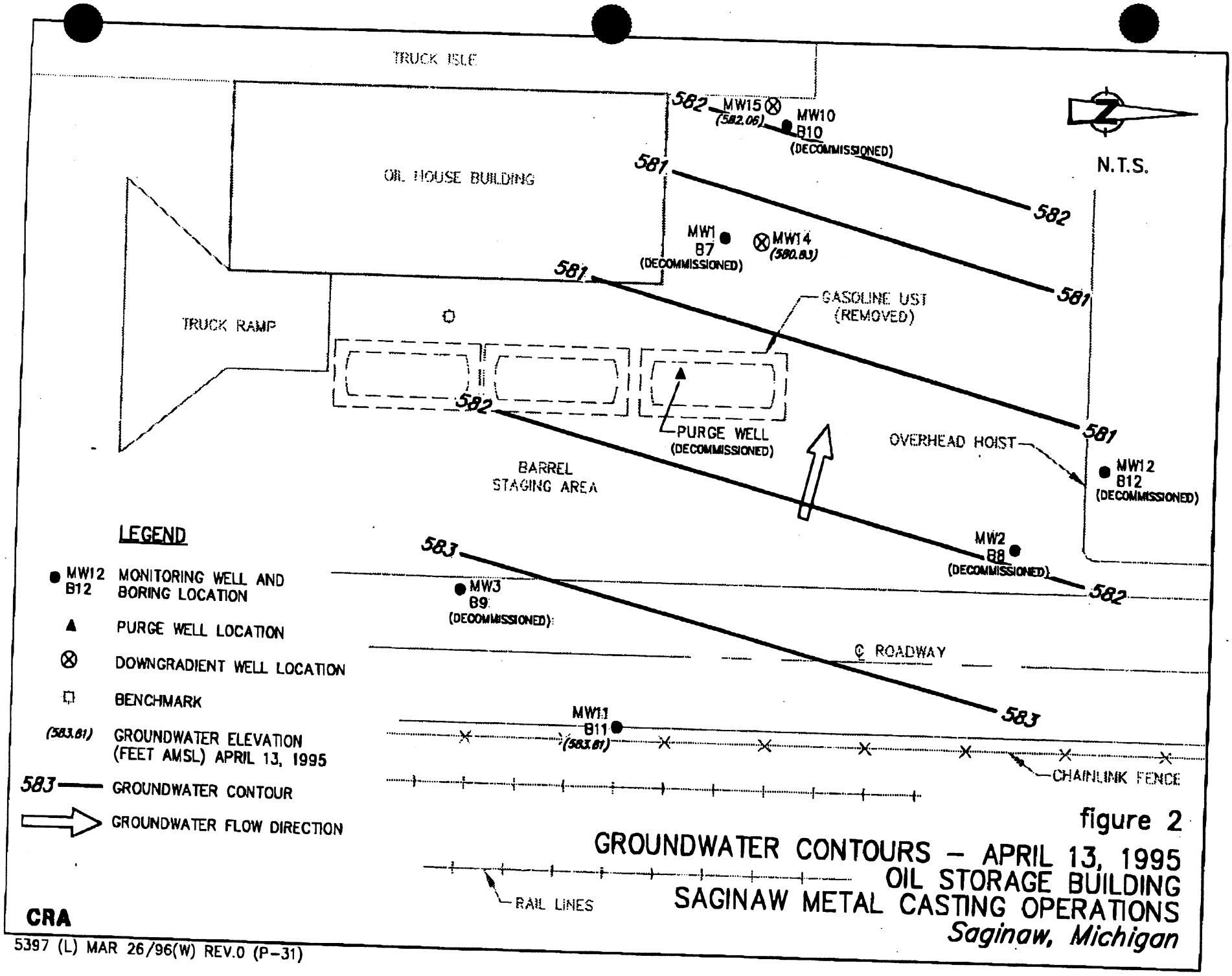

figure 2

GROUNDWATER CONTOURS – APRIL 13, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-31)

SENT BY: 6-11-96 ;10:53AM ; CONESTOGA ROVERS→ 517 757 1652;#14/18

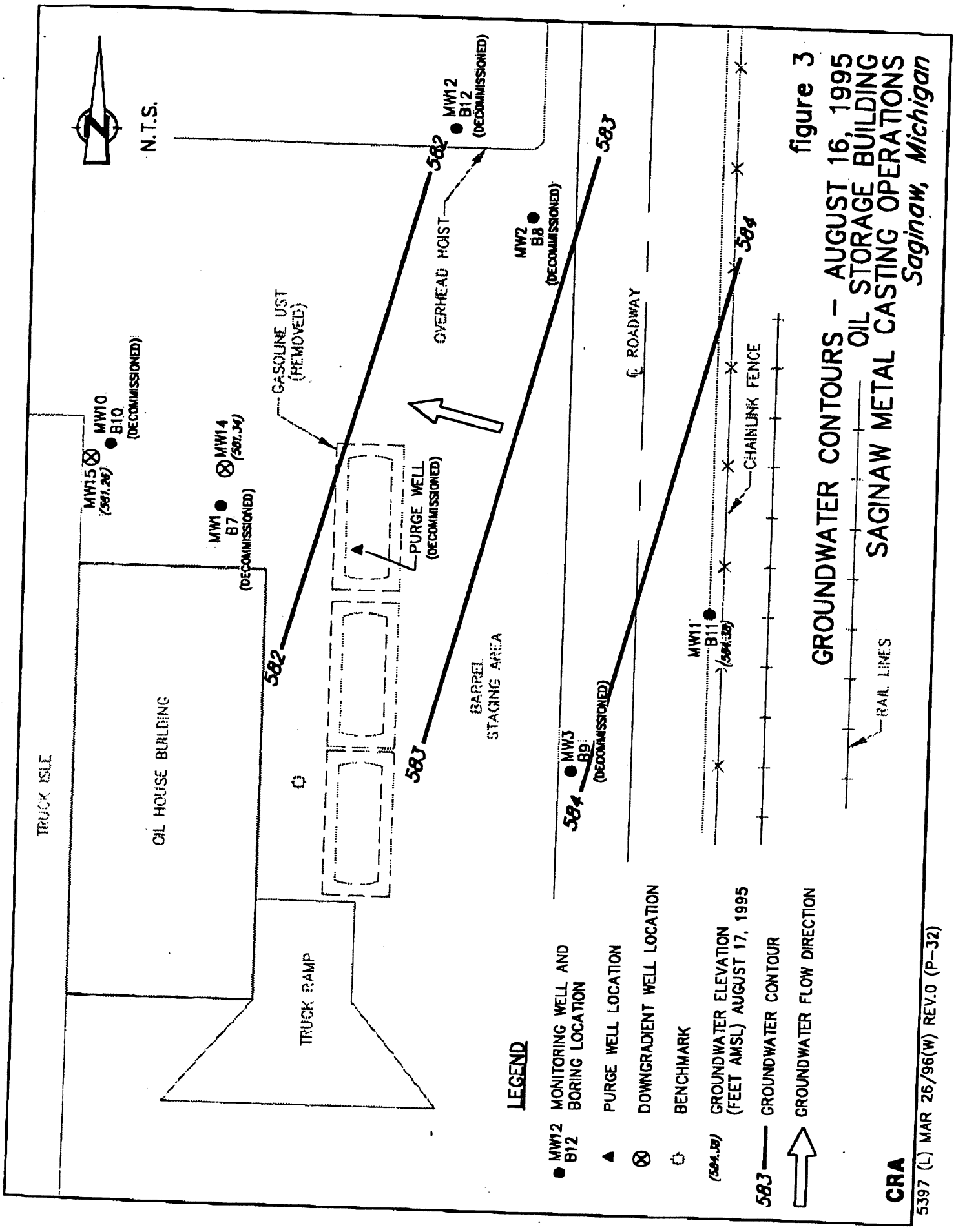

figure 3

GROUNDWATER CONTOURS – AUGUST 16, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

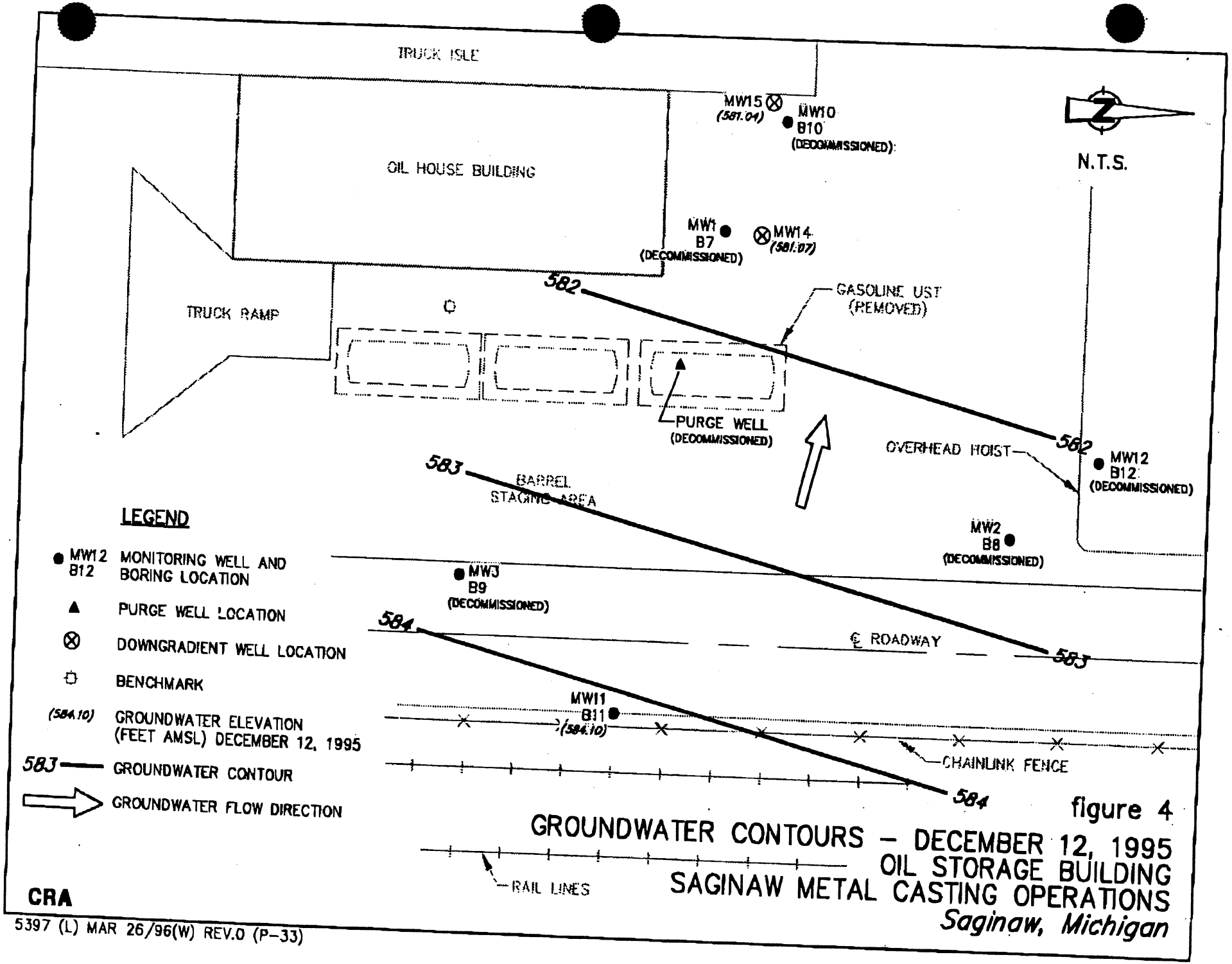

figure 4

GROUNDWATER CONTOURS – DECEMBER 12, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-33)

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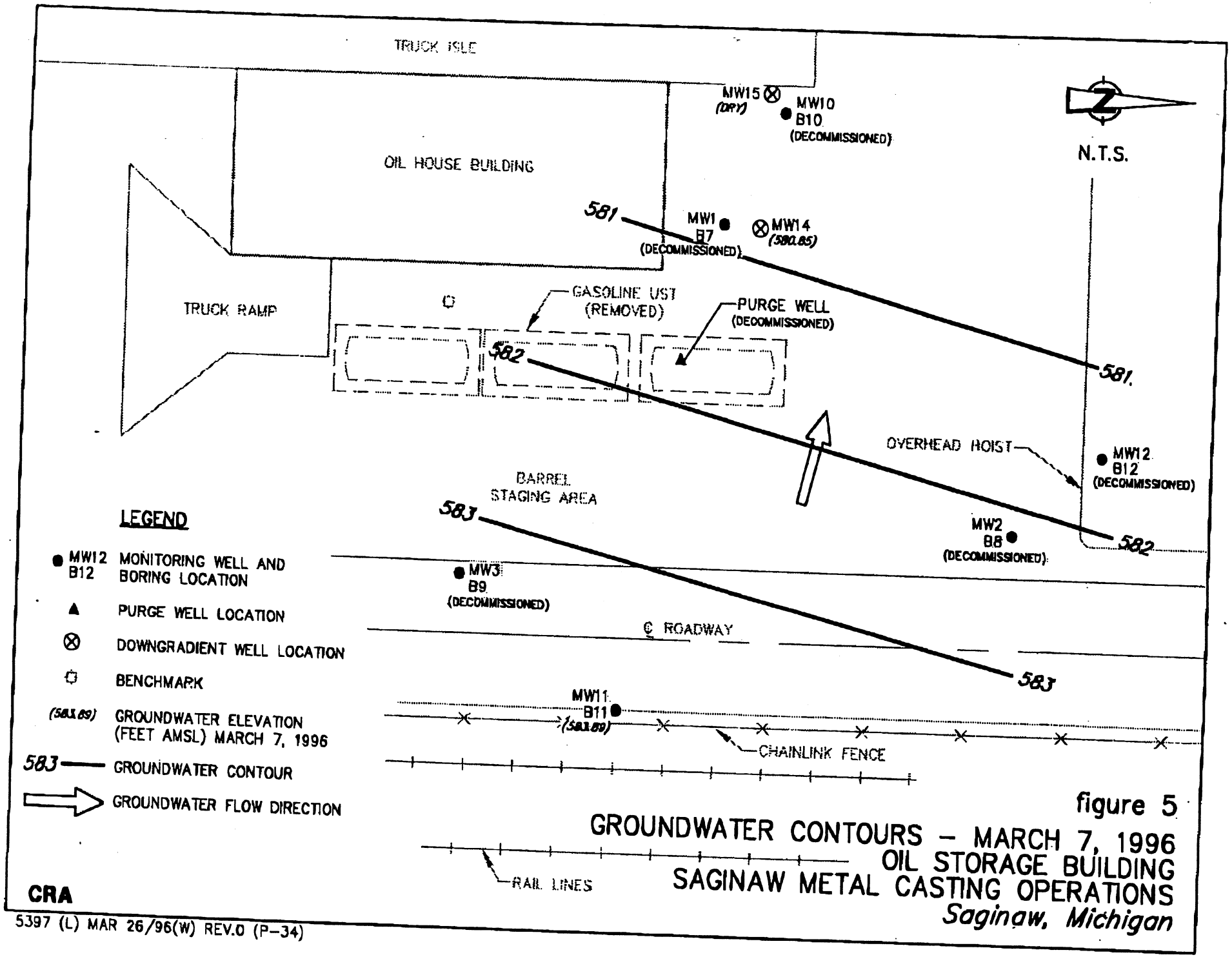


figure 5

GROUNDWATER CONTOURS – MARCH 7, 1996
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) MAR 26/96(W) REV.0 (P-34)

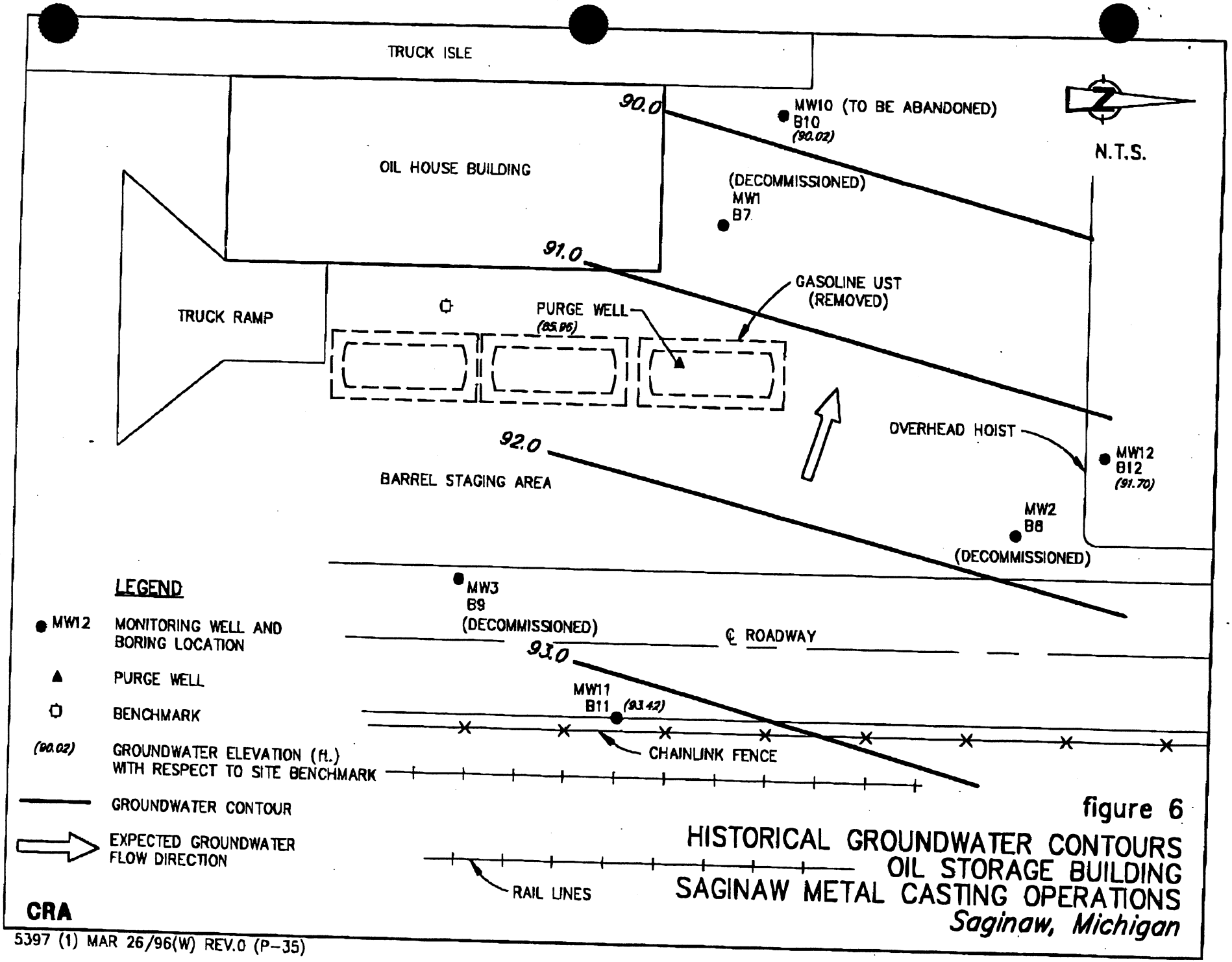


figure 6

HISTORICAL GROUNDWATER CONTOURS
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (1) MAR 26/96(W) REV.0 (P-35)

06/11/96 TUE 10:54 [TX/RX NO 7896]

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

October 18, 1995

Reference No. 5397

Ms. Ann Smolarz
Underground Storage Tank Division
Michigan Department of Natural Resources
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Smolarz:

Re: Supplemental Investigation
for Former UST in the Oil Storage Building Area
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the results of a supplemental investigation of a former UST in the Oil Storage Building area at the Saginaw Metal Casting Operations, Saginaw, Michigan. This supplemental investigation was completed in accordance with a work plan dated October 7, 1994 which was submitted to MDNR. The supplemental investigation field work was completed between December 13, 1994 and August 17, 1995.

1.0 BACKGROUND

A 10,000-gallon gasoline UST was removed in December of 1989. The tank was originally installed in 1954. An underground cooling water main was ruptured during excavation and cooling water spilled into the excavation. The cooling water was collected and containerized and the main was repaired. The tank was reported to be free of perforations. No replacement tank was installed.

In addition, two 10,000-gallon USTs were removed and replaced in 1981. One tank contained pattern spray (mineral oil) and the other contained diesel fuel. These two USTs were removed in 1993. The tanks were reported to be free of perforations and clean closure certificates were obtained for both tanks. No replacement tanks were installed.

After excavating the gasoline UST in 1989, five samples were collected from the side walls and floor of the excavation. The four sidewall samples were soil samples. The excavation floor sample was a water sample since the excavation encountered to the water table. In addition, a soil sample was collected from the excavated material.

The excavation wall samples were analyzed for purgeable aromatics (benzene, toluene, ethyl benzene, chlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,2-dichlorobenzene, p-xylene, m-xylene and o-xylene) and lead. The only constituent reported above detection limits was lead in two samples, at 78 and 170 mg/kg. The excavation floor sample was a water sample which was analyzed for the same compounds as the excavation wall samples. The excavation floor water sample contained 93 µg/L of p-xylene, 220 µg/L of m-xylene, 210 µg/L of o-xylene and 0.305 mg/L of lead. All parameters were below Tier I Residential criteria, under Act 451, as amended (former Act 307).

The excavated material was analyzed for purgeable aromatics, petroleum hydrocarbons and metals. The soil sample from the excavated material contained 36 µg/kg of ethylbenzene, 48 µg/kg of p-xylene and 170 µg/kg of o-xylene. All parameters were below Tier I Residential criteria, under Act 451, as amended.

Soil samples were collected from four borings which were installed around the former gasoline UST. The four samples from borings B-7, B-8, B-9 and B-10 were analyzed for purgeable aromatics. The sample from boring B-10 was also analyzed for petroleum hydrocarbons. The sample from B9 contained 58 µg/kg of benzene and 84 µg/kg of toluene. All other parameters and samples reported were non-detect. All parameters were below Tier I Residential criteria, under Act 451, as amended.

GM submitted the analytical data and a groundwater investigation and remediation work plan to MDNR on January 21, 1990. The investigation and remediation was required due to groundwater concentrations for xylenes in the excavation floor water sample above former Act 307 Type B criteria.

In March 1990, three replacement wells were installed in the Oil Storage Building area near the former UST location to replace the original wells which were damaged. The purge well in the Oil Storage Building area was installed in March 1990 and pumping was initiated when it was connected to the waste water treatment system in July 1990. In November 1991 the purge system was terminated because 8 consecutive groundwater samples showed consistent non-detect reports for purgeable aromatics. The purge well was located at the former UST location. The purge system operated at approximately 5 gallons per minute and had purged 999,950 gallons by

November 1991. In April 1992, benzene was reported in a groundwater sample from the purge well below former Act 307 Type B criteria, and current Tier I Residential criteria.

GM informed MDNR of the decision to terminate pumping in a letter dated October 5, 1992. In a letter dated March 17, 1993, the MDNR requested additional downgradient groundwater monitoring, additional stratigraphic definition and additional soil data for lead in order to determine a site-specific background value.

A supplemental investigation work plan was prepared to address the MDNR concerns. The final work plan was submitted to the MDNR on October 7, 1994.

2.0 SUPPLEMENTAL INVESTIGATION

The following presents the results of the supplemental investigation based on the October 7, 1994 work plan.

2.1 SOIL INVESTIGATION

On December 15, 1994, additional stratigraphic definition was conducted in the Annex Building area. One deep (25 feet) soil boring was completed (BH3-94). Continuous samples were collected from the soil boring. The location of the soil boring is presented on Figure 1. The soil boring log is presented in Attachment A. One soil sample was collected based on highest PID reading from the soil boring at a depth of 7 to 9 feet below ground surface and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX). All BTEX parameters were non-detect. Soil samples were also collected from the former pipe run and from fuel dispenser and analyzed for BTEX. All BTEX parameters were non-detect. In addition, one soil sample was collected from the former RR Fill and analyzed for BTEX and polynuclear aromatics (PNA). All BTEX and PNA parameters were non-detect. The soil sample results are presented on Table 1. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C.

In addition, four soil samples were collected from four shallow boreholes from the southeast portion of the Site and analyzed for lead in order to determine the Site-specific background value for lead. An additional four soil samples were collected to verify the results of the initial four samples. The soil sample locations are presented on Figures 4 and 5. In accordance with MDNR Guidance Document, Verification of Soil Remediation, April 1994, Revision 1, the Site specific background value for lead was calculated to be 185 mg/kg.

The background value for lead was determined in order to identify whether UST excavation verification samples from 1989 containing lead were above site-specific background values. The results of the UST excavation verification samples are all below the calculated site-specific background value for lead. Therefore, no additional work is required to address lead.

2.2 GROUNDWATER INVESTIGATION

A groundwater monitoring network consisting of one well was established in the Oil Storage Building area during 1990. On December 16, 1994, two additional downgradient monitoring wells (MW14 and MW15) were installed downgradient of the former Oil Storage Building UST. Figure 1 presents the well locations. The recent monitoring wells are stainless steel wells with 5-foot screens and are screened at the water table. The monitoring well logs and completion details, are presented in Attachment A.

All existing monitoring wells in the vicinity of the Oil Storage Building area have been surveyed to the USGS datum.

No pump test was conducted at the purge well (as proposed by the October 1994 Work Plan) since it was previously abandoned when purging was discontinued in 1990.

MW14 and MW15 were developed on December 19, 1994. Groundwater samples from the downgradient monitoring wells (MW14 and MW15) were collected on December 19, 1994 and analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, and ethylene bromide. MW-15 was also analyzed for total values for chloride, copper, lead, magnesium, phosphorus and sodium. The results are

presented on Table 1. Benzene, toluene, ethylbenzene and xylene were reported at 130 µg/L, 1,300 µg/L, 1,500 µg/L and 5,200 µg/L, respectively in MW-15. All detections except xylene are above Tier I Residential criteria. All other organic parameters were non-detect. Lead was reported above Tier I Residential criteria at 1,000 µg/L at MW-15. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C.

A second groundwater sample was collected from MW-14 on February 7, 1995 and analyzed for total and dissolved metals (chloride, copper, lead, magnesium, phosphorus, and sodium). Total lead was reported above Tier I Residential criteria at 260 µg/L, in MW-14 but dissolved lead was non-detect indicating that the lead value was representative of the sediment in the groundwater sample.

In addition, groundwater samples from downgradient wells MW-14 and MW-15 were collected on August 17, 1995. One sample from upgradient well MW-11 was also collected. All detections were reported below Tier I Residential criteria except benzene in samples from MW14 and MW14 duplicate and dissolved lead for samples MW11, MW14 and MW15. The results are presented in Table 1. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C.

In addition, three of the four rounds of static water levels required by work plan were measured on December 19, 1994, April 13, 1995 and August 16, 1995. The groundwater contours are presented on Figure 1, Figure 2 and Figure 3. The groundwater elevations are presented on Table 2. Groundwater elevations will be measured during the upcoming final quarter to define groundwater flow directions over a period of one year.

3.0 CONCLUSIONS

The Site-specific background value for lead of 185 mg/kg indicates that lead results in the original excavation are within calculated background concentrations.

October 18, 1995 Reference No. 5397

Benzene, toluene, and ethylbenzene were reported above Tier I Residential criteria in the downgradient well MW-15 sample collected on December 19, 1994. All remaining sample results are below Tier I Residential criteria.

Benzene was reported above Tier I Residential criteria in the downgradient well MW-14 sample collected on August 17, 1995. Dissolved lead also exceeded the Tier I Residential criteria in wells MW-11, MW-14 and MW-15. All remaining sample results are below Tier I Residential criteria.

Since groundwater data collected are not consistent, GM proposes to collect two additional rounds of groundwater elevations and samples over the next six months in order to define groundwater quality in this area.

GM will submit groundwater data from the remaining quarter by December 1995.

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P. Eng.

MRT/cf/3
Encl.

c.c.: Laura Tucker, GM
Joe Toth, GM
Reg Sobczynski, GM
Ray Ilkka, GM
Jim McGuigan, Emcon
Ian Richardson, CRA

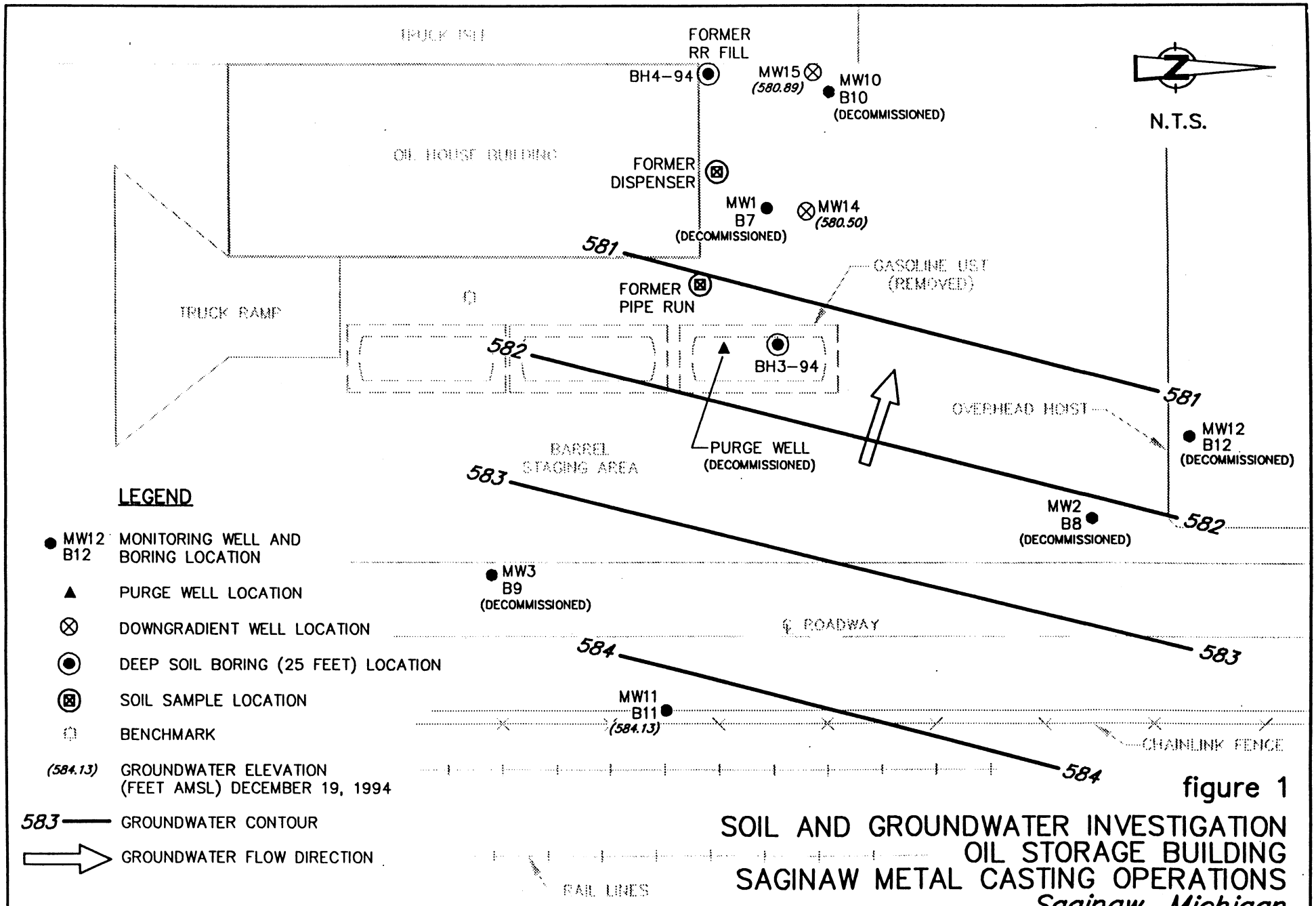
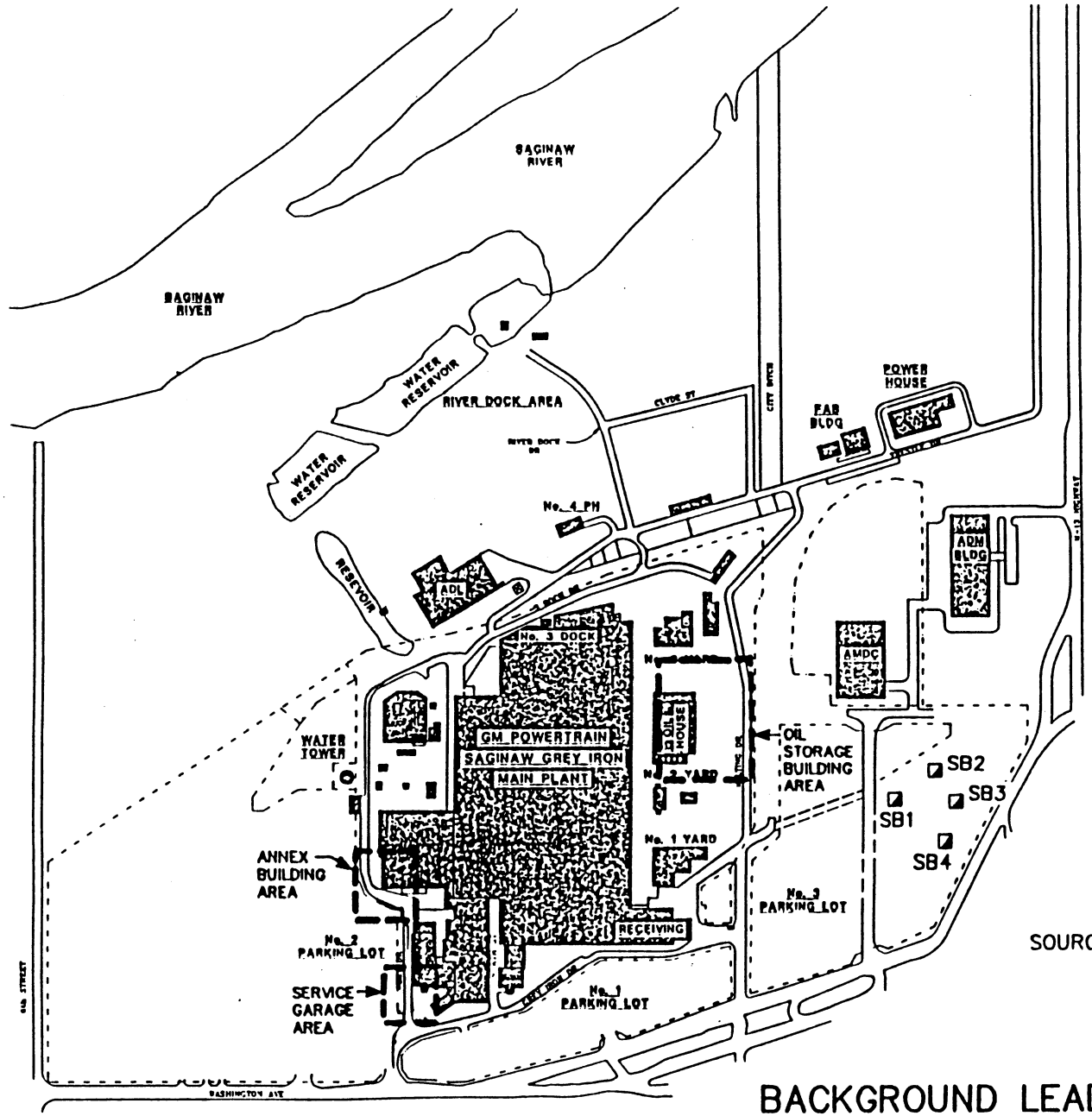


figure 1

SOIL AND GROUNDWATER INVESTIGATION
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-22)



N.T.S.

LEGEND

SOIL SAMPLE LOCATION
(S-5397-121394-SSH-SB1)

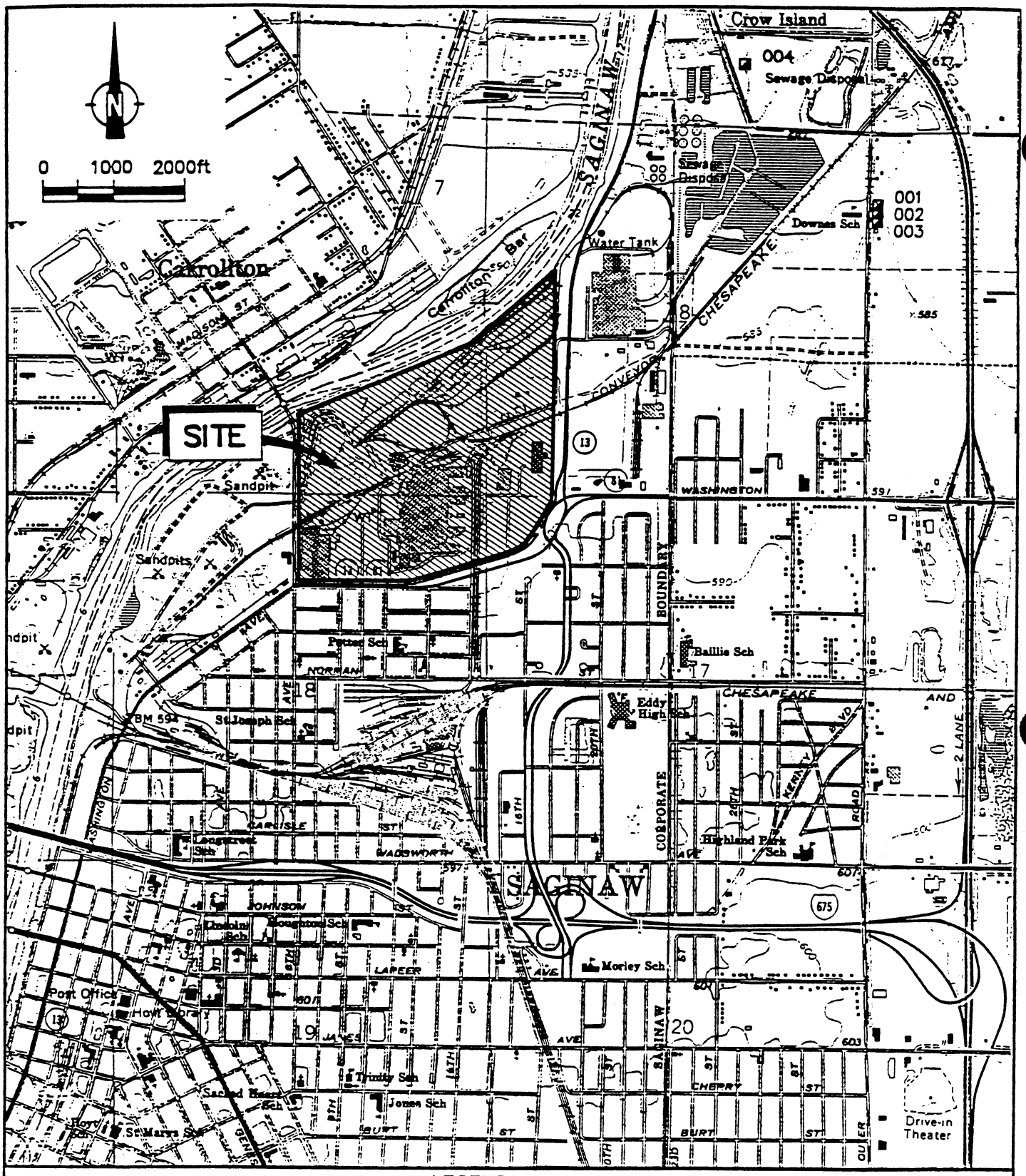
SOURCE: WILLIAM A. KIBBE & ASSOC. INC. JUNE 15, 1993.

figure 4

BACKGROUND LEAD SAMPLE LOCATIONS
SAGINAW METALS CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEP 07/95 (W) REV.0



SOURCE: USGS QUADRANGLE MAP, SAGINAW, MICH.

LEGEND

■ SOIL SAMPLE LOCATION (S-5397-31395-TAH-001)

figure 5

ADDITIONAL BACKGROUND LEAD SAMPLE LOCATIONS
SAGINAW METALS CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEP 07/95 (W) REV.0

TABLE 1

SOIL AND GROUNDWATER SAMPLE SUMMARY
OIL STORAGE BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	S-5397-121394-SSH-				S-5397-31396-TAH-				S-5397-121494-SSH-				MDNR Tier I Residential (µg/kg)
	SB-1 (µg/kg)	SB-2 (µg/kg)	SB-3 (µg/kg)	SB-4 (µg/kg)	001 (µg/kg)	002 (µg/kg)	003 (µg/kg)	004 (µg/kg)	103 (7-9') (µg/kg)	104 (3-5') (µg/kg) RR Fill	105 (µg/kg) Piperun	106 (µg/kg) Fuel Dispenser	
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	<10	<10	100
Toluene	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	<10	<10	16,000
Ethylbenzene	NA	NA	NA	NA	NA	NA	NA	NA	<10	<10	<10	<10	4,700
Xylenes	NA	NA	NA	NA	NA	NA	NA	NA	<30	<30	<30	<30	74,000
Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Lead	100,000	58,000	58,000	110,000	1,000 (1)	96,000	98,000	7,000 (1)	NA	NA	NA	NA	185,000 (2)
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Phosphorus	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Copper (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Lead (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Magnesium (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Sodium (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Methyl-tertiary-butyl-ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,800
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	100
Ethylene Bromide	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Benzo(g,h,i)perylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Benzo(k)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Naphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Acenaphthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Acenaphthylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Fluorene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Phenanthrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	
Chrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA	<330	NA	NA	

Notes:

NA - not analyzed
J - The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.
(1) - Statistical Outlier
(2) - Site-specific Background Value

TABLE 1

SOIL AND GROUNDWATER SAMPLE SUMMARY
OIL STORAGE BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	MW-14 GW-5397-121994-SSH- 107 (µg/L)	MW-15 108 (µg/L)	MW-14 GW-5397-020795-SSH- 401 (µg/L)	MDNR Tier I Residential (µg/L)	MW14 104B (µg/L)	MW14 dup 105B (µg/L)	MW15 W-5397-950817-SSH- 103B (µg/L)	MW11 106B (µg/L)
Benzene	<1.0	130	NA	5	40	39	<1.0	<1.0
Toluene	<1.0	1,300	NA	1,000	110	97	<1.0	<1.0
Ethylbenzene	<1.0	1,500	NA	700	240	190	<1.0	<1.0
Xylenes	<3.0	5,200	NA	10,000	520	410	<3.0	<3.0
Chloride	NA	50,000	1,600,000	–	NA	NA	500,000	2,200,000
Copper	NA	190	47	–	<5	<5	<5	<5 UJ
Lead	NA	1,000	260	4	<2	<2	<2	<2 UJ
Magnesium	NA	36,000	17,000	–	7,400	6,600	43,000	110,000J
Phosphorus	NA	60	44	–	58	34	58 R	91
Sodium	NA	21,000	18,000	–	21,000	18,000	200,000	1,200,000 J
Copper (dissolved)	NA	NA	<25	–	140	NA	39	57
Lead (dissolved)	NA	NA	<3	4	310	NA	93	26
Magnesium (dissolved)	NA	NA	8,100	–	16,000	NA	46,000	150,000
Sodium (dissolved)	NA	NA	18,000	–	19,000	NA	190,000	930,000
Methyl-tertiary-butyl-ether	<50	<5,000	NA	240	<50	<50	<50	<50
1,2-Dichloroethane	<1.0	<100	NA	5	<1.0	<1.0	<1.0	<1.0
Ethylene Bromide	<1.0	<100	NA	–	<1.0	<1.0	<1.0	<1.0
Benzo(a)anthracene	NA	NA	NA		NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA		NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA		NA	NA	NA	NA
Benzo(g,h,i)perylene	NA	NA	NA		NA	NA	NA	NA
Benzo(k)fluoranthene	NA	NA	NA		NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA		NA	NA	NA	NA
Naphthalene	NA	NA	NA		NA	NA	NA	NA
Acenaphthene	NA	NA	NA		NA	NA	NA	NA
Acenaphthylene	NA	NA	NA		NA	NA	NA	NA
Fluorene	NA	NA	NA		NA	NA	NA	NA
Phenanthrene	NA	NA	NA		NA	NA	NA	NA
Anthracene	NA	NA	NA		NA	NA	NA	NA
Fluoranthene	NA	NA	NA		NA	NA	NA	NA
Pyrene	NA	NA	NA		NA	NA	NA	NA
Chrysene	NA	NA	NA		NA	NA	NA	NA

Notes:

NA - not analyzed
J - The analyte was positively identified; the associated numerical value is the approximate concentraion of the analyte in the sample.
UJ - The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
R - The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analtye cannot be verified.
(1) - Statistical Outlier
(2) - Site-specific Background Value

TABLE 2

GROUNDWATER ELEVATIONS
OIL STORAGE BUILDING AREA

Well No.	*Ref. Elev. (ft. AMSL)*	*12/19/94*	*04/13/95*	*08/16/95*
MW-11	591.13	584.13	583.81	584.38
MW-14	590.60	580.50	580.83	581.34
MW-15	590.39	580.89	582.06	581.26

Attachment A
Boring Logs and Well Completion Details

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT GMPT - Saginaw
LOCATION 0.1 Hwy

DRILLING CONTRACTOR Matteo
DRILLER Bob Dwyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH3-94
DATE STARTED 12/13/94
DATE COMPLETED 12/15/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID bkg=0.7 (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1	Concrete (SP)										
1			fine/coarse med sand, some gravel, black brick, fill	1	SS	3	7	12	15	1-3	0.3	R=24"	
				2	SS	8	10	17	22	3-5	0.2	R=24"	
				3	SS	6	8	12	14	5-7	0.6	R=24"	
		7'1/2		4	SS	9	12	13	15	7-9	17.4	R=24"	
7'1/2			black med foundry sand, fill (SP)										
				5	SS	6	8	10	12	9-11	6.3	R=24"	
		13		6	SS	5	6	7	7	11-13	5.1	R=24"	
13		13'1/2	sand, some gravel, grey, med, wet, (SP)	7	SS	9	5	7	7	13-15	4.9	R=24"	
13'1/2		14	sand & gravel, some, grey, wet (GW/SW)										
14		15	grey med sand, wet (SP)										
15			brown clay, hard, trace silt & gravel (CL)	8	SS	4	5	8	10	15-17	3.7	R=24"	
				9	SS	4	5	7	10	17-19	5.3	R=20"	
				10	SS	5	8	9	14	19-21	6.2	R=24"	
				11	SS	3	3	4	6	21-23	3.9	R=24"	
		25		12	SS	3	3	4	5	23-25	2.8	R=24"	

25'
NOTES AND COMMENTS: Bent

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT GMPT - Seniac
LOCATION C.1 House
(closest base gradient)

DRILLING CONTRACTOR Matrec
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

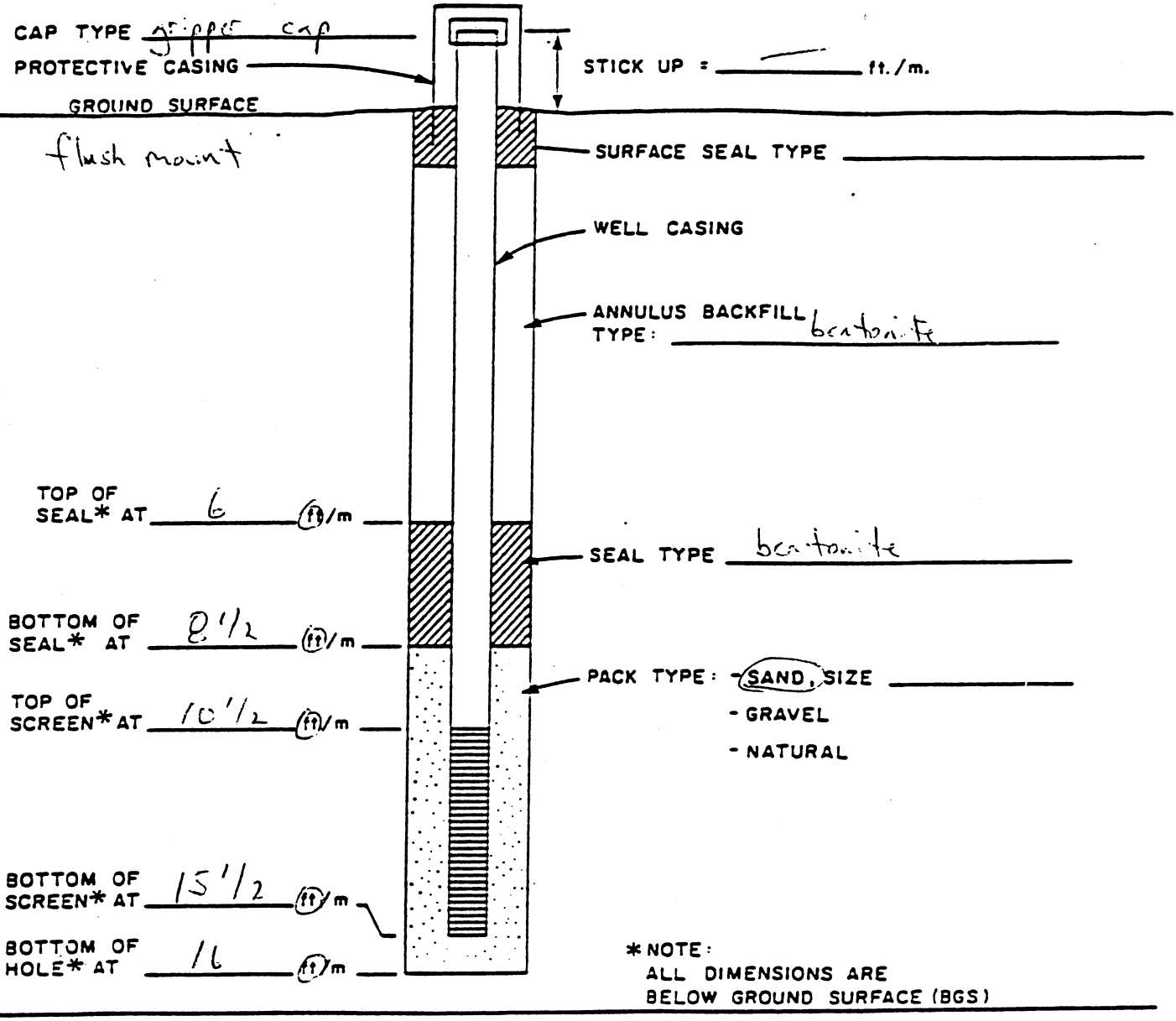
HOLE DESIGNATION MW-14
DATE STARTED 12/16/94
DATE COMPLETED 12/16/94
DRILLING METHOD HSA
CRA SUPERVISOR SSM

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLE METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	NOTES AND COMMENTS
0		1	concrete								
1			black foundry sand, med fine gravel, f.n								
	8		" , little gravel	1	SS	4	4	6	7	8-10	R=6" N=10
			" , wet	2	SS	4	5	7	9	10-12	R=20" N=14
			" , wet	3	SS	5	7	8	8	12-14	R=2" N=15
		14½		4	SS	4	8	10	10	14-16	R=24 N=18
14½		16	brown clay fine silt + gravel								
	16		Grill								

WELL INSTRUMENTATION LOG

PROJECT NAME: Grey Iron
PROJECT Nº: 5397
CLIENT: GMPT - Saginaw
LOCATION: Oil House - nearest downgradient

HOLE DESIGNATION: MW-14
DATE COMPLETED: 12/16/94
DRILLING METHOD: HSA
CRA SUPERVISOR: SSH



SCREEN TYPE: ☒ continuous slot ☐ perforated ☐ louvre ☐ other:

SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other:

SCREEN LENGTH: 5 (ft)/m SCREEN DIAMETER: 2 (in)/cm SCREEN SLOT SIZE:

WELL CASING MATERIAL: WELL CASING DIAMETER: in/cm

DIAMETER:

DEVELOPMENT: METHOD: bailer DURATION:

2/09/95

CRA

Attachment B
Analytical Reports

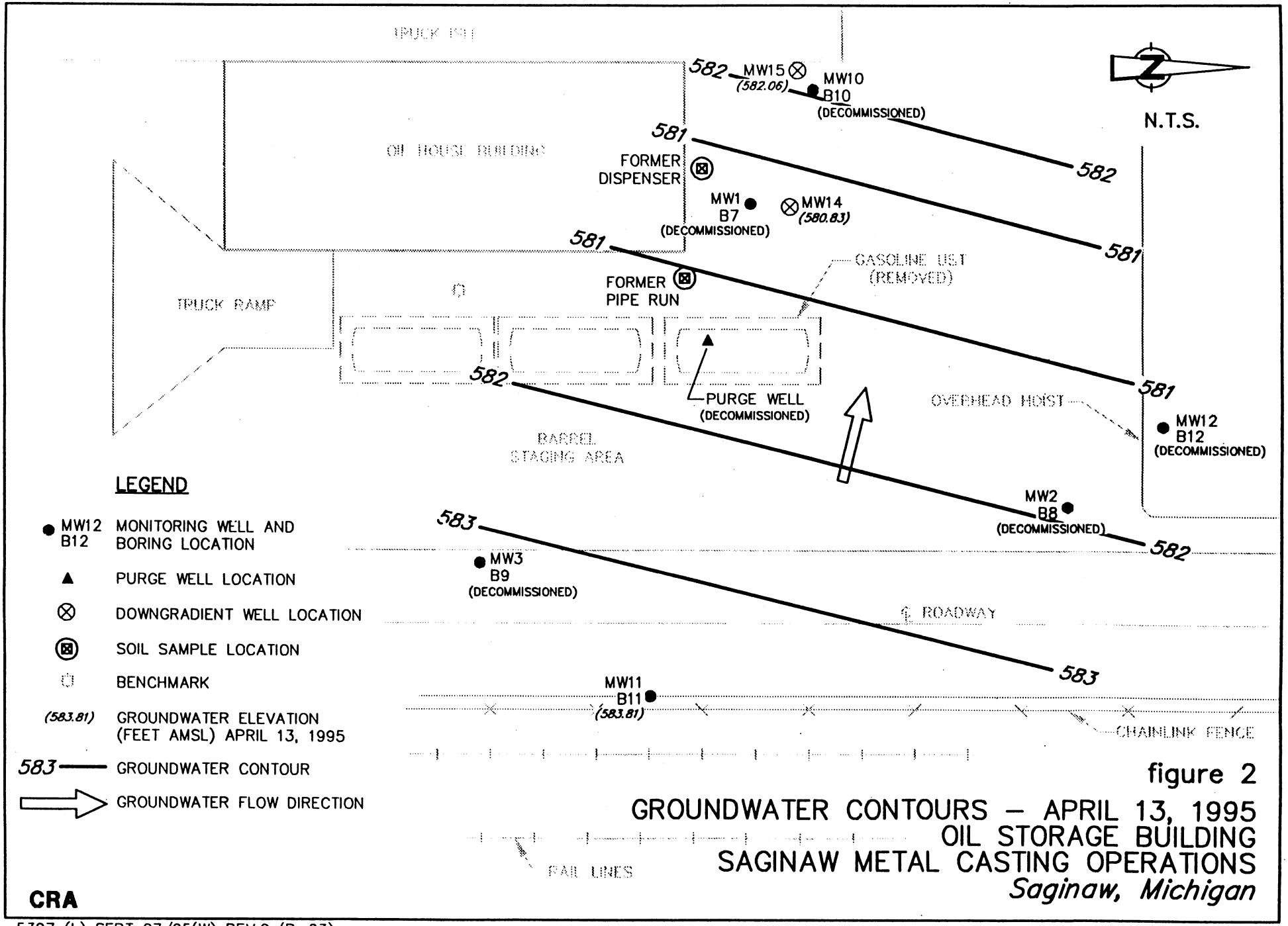


figure 2

GROUNDWATER CONTOURS – APRIL 13, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-23)

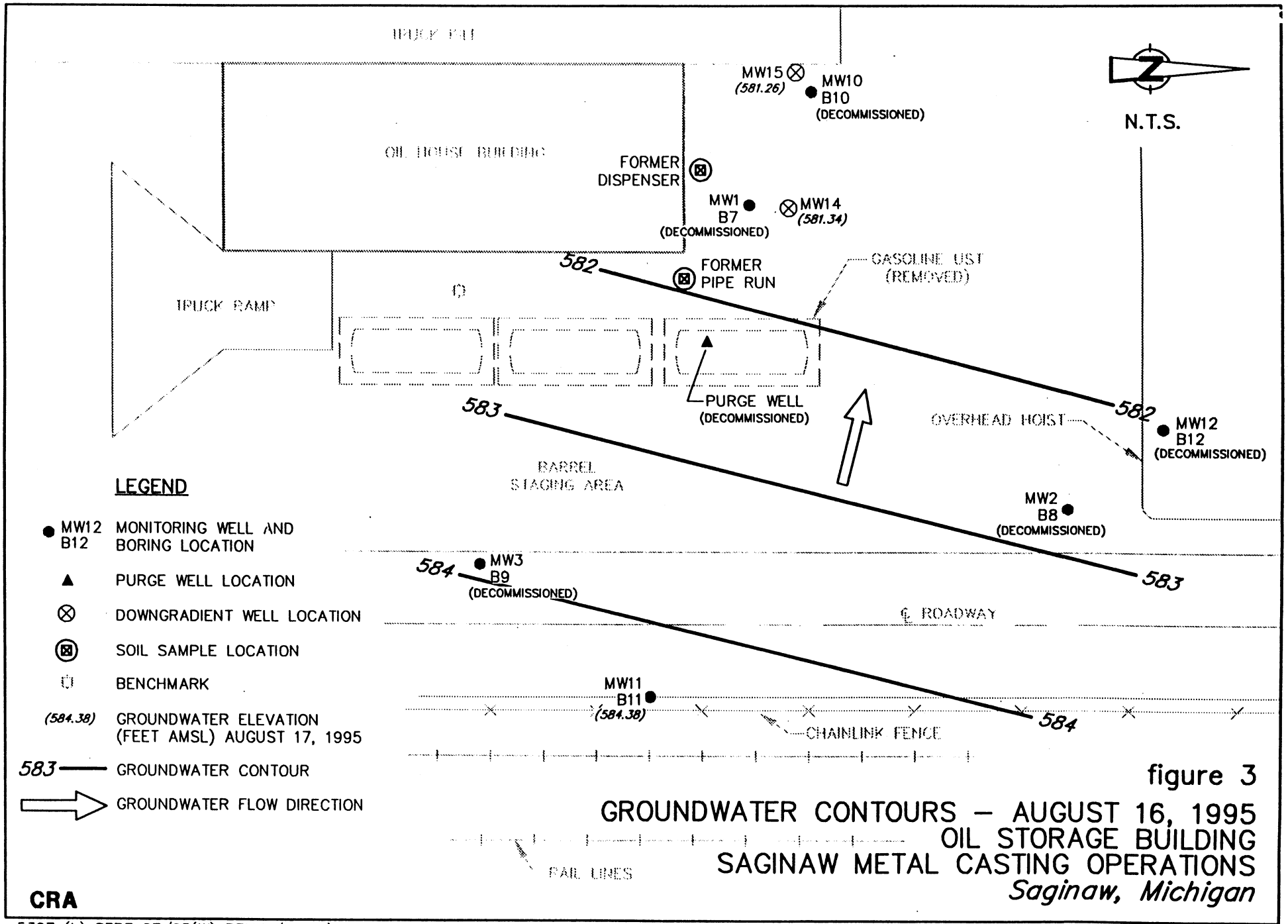


figure 3

GROUNDWATER CONTOURS – AUGUST 16, 1995
OIL STORAGE BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-24)

Attachment B.1

Soil Analytical Reports
(December 16, 1994)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Analytical Report

Lab I.D. :	**46635**
Report Date :	**01/05/1995**
Project :	**GM-Grey Iron #5663**
Client :	**Conestoga Rovers & Associates**
	651 Colby Drive
	Waterloo, Ontario
	Canada N2V 1C2
Attention :	**Mr. Mike Tomka**

11 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

SB-2

Sample:	46635-7063	Matrix:	Soil
Client Sample:	S-5397-121394-SSH-SB-2	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	58	mg/kg	1	EPA 239.2	01/04/1995 MC
			Note: Results are reported on a dry weight basis.		
PHYSICAL PROPERTY ANALYSIS					
% Solids	78.5	%	0.1	Standard Mtd. 2540G	12/29/1994 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	46635-7065	Matrix:	Soil
Client Sample:	S-5397-121394-SSH-SB-4	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH

SB-4

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	110	mg/kg	1	EPA 239.2	01/04/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	78.1	%	0.1	Standard Mtd. 2540G	12/29/1994 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	46635-7070	Matrix:	Soil
Client Sample:	S-5397-121694-SSH-104	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH RR Fill 3-5' bgs

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	92.2	%	0.1	Standard Mtd. 2540G	12/29/1994 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	12/29/1994 LS
Toluene	ND	ug/kg	10	"	12/29/1994 LS
Ethylbenzene	ND	ug/kg	10	"	12/29/1994 LS
Xylenes (Total)	ND	ug/kg	30	"	12/29/1994 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	12/30/1994 TJ
Benzo (a) Pyrene	ND	ug/kg	330	"	12/30/1994 TJ
Benzo (b) Fluoranthene	ND	ug/kg	330	"	12/30/1994 TJ
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	12/30/1994 TJ
Benzo (k) Fluoranthene	ND	ug/kg	330	"	12/30/1994 TJ
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	12/30/1994 TJ
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	12/30/1994 TJ
Naphthalene	ND	ug/kg	330	"	12/30/1994 TJ
Acenaphthene	ND	ug/kg	330	"	12/30/1994 TJ
Acenaphthylene	ND	ug/kg	330	"	12/30/1994 TJ
Fluorene	ND	ug/kg	330	"	12/30/1994 TJ
Phenanthrene	ND	ug/kg	330	"	12/30/1994 TJ
Anthracene	ND	ug/kg	330	"	12/30/1994 TJ
Fluoranthene	ND	ug/kg	330	"	12/30/1994 TJ
Pyrene	ND	ug/kg	330	"	12/30/1994 TJ
Chrysene	ND	ug/kg	330	"	12/30/1994 TJ
Semi Volatile Extraction	-	-	-	"	12/27/1994 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

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Services Inc.

Conestoga Rovers & Associates

Sample:	46635-7072	Matrix:	Soil
Client Sample:	S-5397-121694-SSH-106	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH

Fuel Dispenser

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	89.6	%	0.1	Standard Mtd. 2540G	12/29/1994 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	12/30/1994 LS
Toluene	ND	ug/kg	10	"	12/30/1994 LS
Ethylbenzene	ND	ug/kg	10	"	12/30/1994 LS
Xylenes (Total)	ND	ug/kg	30	"	12/30/1994 LS

Note: Results are reported on a dry weight basis.

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

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Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

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CT&E Environmental
Services Inc.

ORGANIC QC

FOR

ANATECH REPORTS 46635 AND 46699

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

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CT&E Environmental
Services Inc.

46635 BTEX QC

Anatech Analytical Laboratories

EPA Method 8020/602

Soil Matrix Spike/Spike Duplicate

Operator: LS | MS File: 122994AJ | Date Analyzed: 12-29-94

Instrument ID: BTEX PID/HALL | MSD File: 122994AK | Spike Lot: VI, 70.4

Sample ID: 46618-6988 | Calibration File: CPI1143.FIC

Compound	Sample conc. (ug/Kg)	Spike level (ug/Kg)	MS conc. (ug/Kg)	MS recovery (%Rec)	QC Range (%Rec)
MTBE	ND	20	17.9	89.5	NA
Benzene		20	12.4	62	39-150
Toluene		20	10.7	53.5	46-148
Ethylbenzene		20	8.7	43.5	32-160
Chlorobenzene		20	12.0	60.0	55-135
p & m - Xylene		40	12.6	63 32	NA
o - Xylene, ~~Styrene~~		~~40~~ 20	8.2	41	NA
4-BFB (surr.)	29.5	50	33.5	~~83.8~~ 67	NA
1,4-Dichlorobenzene	ND	20	10.2	51	37-154
1,3-Dichlorobenzene		20	10.2	51	50-141
1,2-Dichlorobenzene		20	8.9	44	42-143

Compound	MSD conc. (ug/Kg)	MSD Rec. (% Rec)	%RSD	QC check conc. (ug/Kg)	QC Range (%Rec)
MTBE	17.8	89	1	19.2	NA
Benzene	12.5	62.5	1	19.3	39-150
Toluene	11.3	56.5	5	20.6	46-148
Ethylbenzene	9.8	49	5	20.1	32-160
Chlorobenzene	17.2	86	36	19.7	55-135
p & m - Xylene	15.4	~~77~~ 39	20	39.2	NA
o - Xylene, ~~Styrene~~	9.1	45.5	10	19.8	NA
4-BFB (surr.)	32.8	65 6	3	55.2	NA
1,4-Dichlorobenzene	10.1	50.5	1	19.6	37-154
1,3-Dichlorobenzene	10.2	51	0	19.7	50-141
1,2-Dichlorobenzene	8.6	43	2	19.5	42-143

Comments: The MS/MSD was analyzed on another's client's sample

Anatech Analytical Laboratories

EPA Method 8020/602

Soil Matrix Spike/Spike Duplicate

Operator: IS | MS File: 12309482 | Date Analyzed: 12-30-94

Instrument ID: BTEX PID/HALL | MSD File: 12309483 | Spike Lot: V1,70,4

Sample ID: 46733-7572 | Calibration File: LP1114B.FIL

Compound	Sample conc. (ug/Kg)	Spike level (ug/Kg)	MS conc. (ug/Kg)	MS recovery (%Rec)	QC Range (%Rec)
MTBE	ND	20	18.2	91	NA
Benzene		20	17.6	88	39-150
Toluene		20	18.1	91	46-148
Ethylbenzene		20	18.2	91	32-160
Chlorobenzene		20	18.2	91	55-135
p & m - Xylene		40	35.1	88	NA
o - Xylene, ~~Styrene~~		~~40~~ 20	17.9	90	NA
4-BFB (surr.)	44.4	50	52.4	105	NA
1.4-Dichlorobenzene	ND	20	17.3	87	37-154
1.3-Dichlorobenzene		20	17.8	89	50-141
1.2-Dichlorobenzene		20	17.6	88	42-143

Compound	MSD conc. (ug/Kg)	MSD Rec. (% Rec)	%RSD	QC check conc. (ug/Kg)	QC Range (%Rec)
MTBE	17.3	86	5.6		NA
Benzene	16.3	82	7		39-150
Toluene	16.9	84	8		46-148
Ethylbenzene	17.3	86	6		32-160
Chlorobenzene	17.1	86	6		55-135
p & m - Xylene	33.0	82	7		NA
o - Xylene, ~~Styrene~~	17.0	85	6		NA
4-BFB (surr.)	48.1	96	9		NA
1.4-Dichlorobenzene	15.0	75	15		37-154
1.3-Dichlorobenzene	16.3	82	8		50-141
1.2-Dichlorobenzene	15.3	76	15		42-143

Comments: The MS/MSD was analyzed on another client's sample

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Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
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METAL QC

FOR

ANATECH REPORT 46635

Attachment B.2

Groundwater Analytical Reports
(December 19, 1994)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

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Services Inc.

Rec'd CRA

JAN 19 1995

Analytical Report

Lab I.D. :	46699
Report Date :	01/11/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario
	Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

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Services Inc.

Conestoga Rovers & Associates

MW15

Sample:	46699-7413	Matrix:	Water
Client Sample:	GW-5397-121994-SSH-108	Location:	
COLLECTED:	12/19/1994 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	12/22/1994 09:53	Sampled By:	S S H

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Copper (ICAP)	0.19	mg/L	0.02	SW-846 Mtd. 6010	12/30/1994 JJB
Lead (ICAP)	1.0	mg/L	0.03	"	12/30/1994 JJB
Magnesium (ICAP)	36	mg/L	0.04	"	12/30/1994 JJB
Sodium (ICAP)	21	mg/L	1	"	12/30/1994 JJB
NON-METALLIC INORGANIC ANALYSIS					
Chloride	50	mg/L	10	Standard Mtd. 4500 CL-	01/06/1995 DM
Total Phosphorus	0.060	mg/L	0.002	EPA 365.2	01/09/1995 GY
VOLATILE AROMATIC HYDRO.					
Benzene	130	ug/L	100	SW-846 Mtd. 8260	12/30/1994 DL
Toluene	1300	ug/L	100	"	12/30/1994 DL
Ethylbenzene	1500	ug/L	100	"	12/30/1994 DL
Xylenes (Total)	5200	ug/L	300	"	12/30/1994 DL
GC/MS VOLATILE ORGANIC					
Methyl Tertiary Butyl Ether	ND	ug/L	5000	SW-846 Mtd. 8260	12/30/1994 DL
1,2-Dichloroethane	ND	ug/L	100	"	12/30/1994 DL
1,2-Dibromoethane	ND	ug/L	100	"	12/30/1994 DL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/11/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
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46699 GC/MS VOC QC

NOTES:

1. The MS/MSD were analyzed on another client's sample.

2. Because of instrument availability, the samples were analyzed by GC/MS and not by GC.

Quantitation Report Quanfile: 12BLK30A Quan Entries: 75
Comment: BLANK, 30 UG/L.
Sorted via: Entry Number ^ (S) = Standard

Cal	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
54	4-chlorotoluene	A	23:13	1,282	0.030	BB
55	tert-butylbenzene	A	23:51	835	0.020	BB
56	1,2,4-trimethylbenzene	A	23:56	3,718	0.089	BB
57	sec-butylbenzene	A	24:15	282	0.007	BB
58	1,3-dichlorobenzene	A	24:36	3,537	0.146	BB
59	p-isopropyltoluene	A	24:34	2,852	0.069	BB
60	1,4 dichlorobenzene	A	24:36	3,537	0.118	BB
61	n-butylbenzene	A	25:19	5,606	0.106	BB
62	1,2 dichlorobenzene	A	25:19	1,881	0.127	BB
63	1,2-dibromo-3-chloropr	A	NF	NF	NF	NF
64	1,2,4-trichlorobenzene	A	28:21	3,574	0.620	BB
65	hexachlorobutadiene	A	NF	NF	NF	NF
66	napthalene	A	28:48	32,876	~~1.173~~	BB
67	1,2,3-trichlorobenzene	A	29:15	3,931	0.745	BB
68	acetone	A	NF	NF	NF	NF
69	carbon disulfide	A	5:18	890	0.093	BV
70	2-butanone (MEK)	A	9:34	28	0.186	BB
71	4-methyl-2-pentanone (	A	16:13	168	0.050	BB
72	2-hexanone	A	18:42	1,328	0.376	BB
73	vinyl acetate	A	5:02	888	0.356	BB
74	2-chloroethyl vinyl et	A	14:46	4	0.003	BB
75	Acetonitrile	A	18:25	694	0.043	BB

Quantitation Report Quanfile: 12CC30A Quan Entries: 75
Comment: QC CHECK, 20 UG/L.
Sorted via: Entry Number ^ (S) = Standard

Cal	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
54	4-chlorotoluene	A	23:14	837,388	20.487	BB
55	tert-butylbenzene	A	23:49	997,335	24.256	BB
56	1,2,4-trimethylbenzene	A	23:55	869,344	21.926	BB
57	sec-butylbenzene	A	24:15	1,051,045	24.945	BB
58	1,3-dichlorobenzene	A	24:27	527,405	22.927	BV
59	p-isopropyltoluene	A	24:31	922,853	23.267	BB
60	1,4 dichlorobenzene	A	24:37	565,595	19.799	VB
61	n-butylbenzene	A	25:19	984,883	19.512	BB
62	1,2 dichlorobenzene	A	25:18	356,096	25.358	BB
63	1,2-dibromo-3-chloropr	A	22:43	130,015	8.616	BB
64	1,2,4-trichlorobenzene	A	28:21	137,841	25.229	BB
65	hexachlorobutadiene	A	28:42	107,528	24.219	BB
66	napthalene	A	28:48	699,018	25.473	BB
67	1,2,3-trichlorobenzene	A	29:16	127,630	25.536	BB
68	acetone	A	6:27	126,136	14.176	BB
69	carbon disulfide	A	5:15	1,919	0.148	BB
70	2-butanone (MEK)	A	9:24	2,703	11.422	BB
71	4-methyl-2-pentanone (	A	16:10	117,847	28.837	BB
72	2-hexanone	A	18:40	89,237	20.960	BB
73	vinyl acetate	A	4:58	35,153	21.670	BB
74	2-chloroethyl vinyl et	A	14:56	0	0.001	BB
75	Acetonitrile	A	18:24	366,155	17.149	BB

Quantitation Report Quanfile: DEC30MS Quan Entries: 75
Comment: MOOS, 46730-7526, 5 ML. PURGE.
Sorted via: Entry Number ^ (S) = Standard

Cal	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
54	4-chlorotoluene	A	23:16	810,374	19.863	BB
55	tert-butylbenzene	A	23:53	972,143	23.688	BB
56	1,2,4-trimethylbenzene	A	23:58	883,266	22.319	BB
57	sec-butylbenzene	A	24:18	985,952	23.444	BB
58	1,3-dichlorobenzene	A	24:30	510,675	22.242	BV
59	p-isopropyltoluene	A	24:36	864,430	21.835	BB
60	1,4 dichlorobenzene	A	24:41	516,567	18.117	VB
61	n-butylbenzene	A	25:22	892,984	17.724	BB
62	1,2 dichlorobenzene	A	25:22	361,123	25.765	BB
63	1,2-dibromo-3-chloropr	A	22:46	142,699	9.474	BB
64	1,2,4-trichlorobenzene	A	28:24	120,368	22.072	BB
65	hexachlorobutadiene	A	28:45	81,186	18.320	BB
66	napthalene	A	28:51	704,735	25.730	BB
67	1,2,3-trichlorobenzene	A	29:19	112,143	22.480	BB
68	acetone	A	6:33	149,156	19.170	BB
69	carbon disulfide	A	5:19	5,207	0.457	BB
70	2-butanone (MEK)	A	9:30	249,369	950.703	BB
71	4-methyl-2-pentanone (	A	16:15	132,133	28.121	BB
72	2-hexanone	A	18:45	146,501	35.870	BB
73	vinyl acetate	A	5:01	983,500	693.317	BB
74	2-chloroethyl vinyl et	A	14:43	0	0.001	BB
75	Acetonitrile	A	18:27	380,735	15.509	BB

2B

REVIEWED BY: JBC

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: Anatech Analytical Laboratories Date Analyzed 12/27/94

Extraction 8270 Batch: 113 Date Extracted 12/21/94 Inst. Batch: Dec-27

Matrix Spike - Sample No.: 46624-7009

COMPOUND	SPIKE ADDED (mg/L)	SAMPLE CONCENTRATION (mg/L)	MS CONCENTRATION (mg/L)	MS % REC #	QC. LIMITS REC.
Acenaphthene	3333	0	2267	68	(27-133)
4-Chloro-3-methylphenol	6667	0	3667	55	(22-147)
2-Chlorophenol	6667	0	4367	66	(23-134)
1,4-Dichlorobenzene	3333	0	1833	55	(20-124)
2,4-Dinitrotoluene	3333	0	1867	56	(1-191)
4-Nitrophenol	6667	0	4067	61	(1-132)
n-Nitroso-di-n-propylamine	3333	0	1800	54	(1-230)
Pentachlorophenol	6667	0	4967	75	(14-176)
Phenol	6667	0	4200	63	(5-112)
Pyrene	3333	0	3067	92	(26-127)
1,2,4-Trichlorobenzene	3333	0	1733	52	(44-142)

COMPOUND	SPIKE ADDED (mg/L)	MSD CONCENTRATION (mg/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Acenaphthene	3333	2367	71	4	28	(27-133)
4-Chloro-3-methylphenol	6667	3800	57	4	42	(22-147)
2-Chlorophenol	6667	4133	62	5	40	(23-134)
1,4-Dichlorobenzene	3333	1767	53	4	28	(20-124)
2,4-Dinitrotoluene	3333	1867	56	0	38	(1-191)
4-Nitrophenol	6667	4367	66	7	50	(1-132)
n-Nitroso-di-n-propylamine	3333	1633	49	10	38	(1-230)
Pentachlorophenol	6667	5567	84	11	50	(14-176)
Phenol	6667	3967	60	6	30	(5-112)
Pyrene	3333	3700	111	19	31	(26-127)
1,2,4-Trichlorobenzene	3333	1767	53	2	28	(44-142)

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

Comments: _____

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
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INORGANIC QC

FOR

ANATECH REPORT 46699

46647 Report

RUN DATE: 1-6-95
ANALYTE: Chloride
INSTRUMENT:
BATCH NO.:
ANALYST: DM
UNITS: mg/L

REPORT DATE: 1-6-95
METHOD: 4500 Cl⁻ B
RUN NO.:
DIGESTION DATE:
REVIEW (Init/Date): DS 1/17/95

BLANKS	CONCENTRATION	LOD	Q
Prep Blank		10	
ICB	ND		
CCB			

Control Limits: =1 x LOD

CALIBRATION VERIFICATION	TRUE	FOUND	% RECOVERY	Q
INITIAL	35.45	36.4	103%	
CONTINUING		35.4	100%	

=10% - =15%

DUPLICATE ANLYSIS

SAMPLE NUMBER	SAMPLE	DUPLICATE	RPD	Q
	46			

=20% IF < 10 x LOD = 1 x LOD

SPIKE RECOVERY SAMPLE NUMBER	SPIKED SAMPLE RESULT	SAMPLE RESULT	SPIKE ADDED	%R	Q
Preparation	46	46/23*	25	94%	
**	45	46/23*	25	88%	

* 1/2 Sample result used to calculate QC. =15%

** Sample of Simular matrix was used to Calculate QC.

Report
46699

Anatech QC Report
Inorganic Data Package

Batch QC Report

Batch # M-4436 Source :

Matrix (soil/water): Water Units (ug/L or mg/kg): ug/L

Analyte	Run #	LOD	Prep Blank	C	Prep Spike True Value	Found	%Recovery	C
Al								
Sb								
As								
Ba								
Be								
Cd								
Ca								
Cr								
Co								
Cu	992	20	ND		10,000	9918	99%	
Fe								
Pb	992	30	ND		10000	10,200	102%	
Mg	992	40	ND		10,000	9,509	95%	
Mn								
Hg								
Ni								
K								
Se								
Ag								
Na	992	1000	ND		10,000	9,761	98%	
Tl								
V								
Zn								

Comments:

Report 96011

Anatech QC Report
Inorganic Data Package

Matrix Spike Recovery Report

Sample #_____ Batch # M-4436

Matrix (soil/water): Water Units (ug/L or mg/kg): mg/L

Control Limits: +/- 15%

Analyte	Run #	Spiked Sample Recovery (SSR)	Sample Result (SR)	Spike Added (SA)	% Recovery	C
Al						
Sb						
As						
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu	992	9,861	ND	10,000	99%	*
Fe						
Pb	992	10280	ND	10,000	103%	*
Mg	992	9,634	ND	10,000	96%	*
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na	992	10,000	ND	10,000	100%	*
Tl						
V						
Zn						

Comments: * Sample of similar Matrix was analyzed for QC

Attachment B.3

Groundwater Analytical Report
(February 7, 1995)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Analytical Report

Lab I.D. :	50802
Report Date :	02/14/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

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Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

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CT&E Environmental
Services Inc.

Conestoga Rovers & Associates MW14

Sample:	50802-3018	Matrix:	Water
Client Sample:	GW-5397-020795-SSH-401	Location:	
COLLECTED:	02/07/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	02/09/1995 16:27	Sampled By:	SH

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Copper (ICAP)	ND	mg/L	0.025	SW-846 Mtd. 6010	02/10/1995 CG
Lead (GFAA)	ND	mg/L	0.003	SW-846 Mtd. 7421	02/14/1995 MC
Magnesium (ICAP)	8.1	mg/L	0.2	SW-846 Mtd. 6010	02/10/1995 CG
Sodium (ICAP)	18	mg/L	1	"	02/10/1995 CG

ND = Non Detectable

Laboratory Manager
C. David Hainer

Reported : 02/14/1995

Attachment B.4

Soil Analytical Reports
(March 13, 1995)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

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Services Inc.

Analytical Report

Lab I.D. :	51378
Report Date :	03/22/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
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Services Inc.

Conestoga Rovers & Associates

002

Sample:	51378-5185	Matrix:	Soil
Client Sample:	S-5397-31395-TAH-002	Location:	
COLLECTED:	03/13/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	03/14/1995 15:47	Sampled By:	TH

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (ICAP)	96	mg/kg	2	SW-846 Mtd. 6010	03/21/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	80.8	%	0.1	Standard Mtd. 2540G	03/17/1995 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/22/1995

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616-843-1877
FAX: 616-845-9942

ANATECH
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Services Inc.

Conestoga Rovers & Associates

004

Sample:	51378-5187	Matrix:	Soil
Client Sample:	S-5397-31395-TAH-004	Location:	
COLLECTED:	03/13/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	03/14/1995 15:47	Sampled By:	TH

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (ICAP)	7	mg/kg	2	SW-846 Mtd. 6010	03/21/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	80.4	%	0.1	Standard Mtd. 2540G	03/17/1995 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/22/1995

Attachment B.5

Groundwater Analytical Reports
(August 17, 1995)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

5397

Analytical Report

Lab I.D. :	54889
Report Date :	08/30/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

10 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division
CT&E Environment
Services In

Conestoga Rovers & Associates

Sample:	54889-0324	Matrix:	Water
Client Sample:	W-5397-950817-SSH-106B	Location:	
COLLECTED:	08/17/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	08/18/1995 15:26	Sampled By:	SSH

MW-11

Test Description	Result	Unit	Reporting Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Copper (ICAP)	0.057	mg/L	0.005	SW-846 Mtd. 6010	08/23/1995 MC
Lead (GFAA)	0.026	mg/L	0.002	SW-846 Mtd. 7421	08/23/1995 GCP
Magnesium (ICAP)	150	mg/L	0.04	SW-846 Mtd. 6010	08/23/1995 MC
Sodium (ICAP)	930	mg/L	1	"	08/24/1995 MC

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported: 08/30/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
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ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	54889-0323	Matrix:	Water
Client Sample:	W-5397-950817-SSH-104B	Location:	
COLLECTED:	08/17/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	08/18/1995 15:26	Sampled By:	SSH

MW-14

Test Description	Result	Unit	Reporting Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Copper (ICAP)	0.14	mg/L	0.005	SW-846 Mtd. 6010	08/23/1995 MC
Lead (GFAA)	0.31	mg/L	0.02	SW-846 Mtd. 7421	08/23/1995 GCP
Magnesium (ICAP)	16	mg/L	0.04	SW-846 Mtd. 6010	08/23/1995 MC
Sodium (ICAP)	19	mg/L	1	"	08/23/1995 MC

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 08/30/1995

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ANATECH
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CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	54889-0317	Matrix:	Water
Client Sample:	W-5397-950817-SSH-103B	Location:	
COLLECTED:	08/17/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	08/18/1995 15:26	Sampled By:	SSH

MW-15

Test Description	Result	Unit	Reporting Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Copper (ICAP)	ND	mg/L	0.005	SW-846 Mtd. 6010	08/23/1995 MC
Lead (GFAA)	ND	mg/L	0.002	SW-846 Mtd. 7421	08/23/1995 GCP
Magnesium (ICAP)	43	mg/L	0.04	SW-846 Mtd. 6010	08/23/1995 MC
Sodium (ICAP)	200	mg/L	1	"	08/23/1995 MC
NON-METALLIC INORGANIC ANALYSIS					
Chloride	500	mg/L	10	Standard Mtd. 4500 CL-	08/25/1995 LS
Total Phosphorus	0.058 *	mg/L	0.004	EPA 365.2	08/29/1995 EL
			* Analysis was performed on non-preserved sample.		
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/L	1	SW-846 Mtd. 8260	08/22/1995 RJW
Toluene	ND	ug/L	1	"	08/22/1995 RJW
Ethylbenzene	ND	ug/L	1	"	08/22/1995 RJW
Xylenes (Total)	ND	ug/L	3	"	08/22/1995 RJW
GC/MS VOLATILE ORGANIC					
Methyl Tertiary Butyl Ether	ND	ug/L	50	SW-846 Mtd. 8260	08/22/1995 RJW
1,2-Dichloroethane	ND	ug/L	1	"	08/22/1995 RJW
1,2-Dibromoethane	ND	ug/L	1	"	08/22/1995 RJW

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 08/30/1995

Lab # 54589

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): Anatech

REFERENCE NUMBER: 5397

PROJECT NAME: GMPT - Metal Castings

SAMPLER'S SIGNATURE: Steven S. Hoewemeyer PRINTED NAME: Steven S. Hoewemeyer

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	MTBE	1,2-dichloroethane	ethylene bromide	copper	phosphorus	chloride	sodium	magnesium	lead	REMARKS
315 1	8/16/95		W-5397-950816-SSH-101B	water	3	X	X	X	X							totals + dissolved
316 2	8/16/95		W-5397-950816-SSH-102B	water	3	X	X	X	X			~~total~~ Diss				metals
317 3	8/17/95	*	W-5397-950817-SSH-103B	water	5	X	X	X	X	X	X	X	X	X	X	Tried to contact client
318 4	8/17/95		W-5397-950817-SSH-104B	water	5	X	X	X	X	X	X	X	X	X	X	About 250 mL containers
319 5	8/17/95		W-5397-950817-SSH-105B	water	4	X	X	X	X	X	X	X	X	X	X	★ No total metals
320 6	8/17/95		W-5397-950817-SSH-106B	water	5	X	X	X	X	X	X	X	X	X	X	
321 7	8/17/95		Trip blank	water	1	X	X	X	X							
												~~Dissolved~~ Total				
322	8/17/95	*	W-5397-950817-SSH-103B													Note: glass bottle
323	"		W-5397-950817-SSH-104B													for sample -106B
324			W-5397-950817-SSH-106B													is unpreserved -
																for total metals
		*	Analyze TP on non-Preserved [illegible] client	CAH												

TOTAL NUMBER OF CONTAINERS: 26

RELINQUISHED BY: 1. Steven S. Hoewemeyer	DATE: 8/17/95 TIME: 1700	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. 8679724913

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: SSH, SE

RECEIVED FOR LABORATORY BY:

DATE: _____ TIME: _____

NO 2209

(MS)-APRIL 29, 93-REV.0-(C)(F-01)

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
File Name: 8TUN22A
Batch: H22AUG95A

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0-40.0% of mass 95	17.2
75	30.0-60.0% of mass 95	45.1
95	Base peak, 100% relative abundance	100.0
96	5.0-9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	93.6
175	5.0-9.0% of mass 174	7.1
176	Greater than 95.0%, but less than 101.0% of mass 174	98.4
177	5.0-9.0% of mass 176	6.3

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spike level: 50 ug/L

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
File Name: 8CC22A
Batch: H22AUG95A

Compound	AvgRRF	CCRRF	%D	MIN RRF	MAX %D
Dichlorodifluoromethane	0.153	0.149	2.6%		
Chloromethane	0.104	0.119	-14.4%	0.1	
Vinyl chloride	0.137	0.128	6.6%		20
Bromomethane	0.029	0.035	-20.7%		
Chloroethane	0.033	0.043	-30.3%		
Trichlorofluoromethane	0.268	0.338	-26.1%		
1,1-Dichloroethene	0.246	0.251	-2.0%		20
Methylene chloride	0.345	0.255	26.1%		
t-1,2-Dichloroethene	0.280	0.272	2.9%		
MTBE	0.581	0.523	10.0%		
1,1-Dichloroethane	0.448	0.408	8.9%	0.1	
2,2-Dichloropropane	0.427	0.472	-10.5%		
c-1,2-Dichloroethene	0.302	0.284	6.0%		
Bromochloromethane	0.144	0.151	-4.9%		
Chloroform	0.555	0.576	-3.8%		20
1,1,1-Trichloroethane	0.467	0.529	-13.3%		
2-Chloroethylvinylether	0.116	0.107	7.8%		
Carbon tetrachloride	0.377	0.419	-11.1%		
1,1-Dichloropropene	0.364	0.348	4.4%		
Benzene	0.879	0.752	14.4%		
1,2-Dichloroethane	0.360	0.395	-9.7%		
Trichloroethene	0.367	0.347	2.8%		
1,2-Dichloropropane	0.240	0.196	18.3%		20
Dibromomethane	0.239	0.228	4.8%		
Bromodichloromethane	0.472	0.485	-2.8%		
c-1,3-Dichloropropene	0.416	0.386	7.2%		
Toluene	0.651	0.616	5.4%		20
t-1,3-Dichloropropene	0.416	0.386	7.2%		
1,1,2-Trichloroethane	0.206	0.188	8.7%		
1,2-Dibromoethane	0.330	0.332	-0.6%		
Tetrachloroethene	0.780	0.730	6.4%		
1,3-Dichloropropane	0.431	0.379	12.1%		
Dibromochloromethane	0.406	0.416	-2.5%		
Chlorobenzene	0.949	0.944	0.5%	0.3	
1,1,1,2-Tetrachloroethane	0.330	0.338	-2.4%		

ANATECH Laboratories a div. of CT and E Environmental Services

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spiked sample ID: 54889-0315

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
Batch: H22AUG95A

MS File Name: 0315MS
MSD File Name: 0315MSD

Compound	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	#	QC LIMITS REC.
1,1-Dichloroethene	50	0	52	104%		D-234
Benzene	50	0	46	90%		37-151
Trichloroethene	50	0	48	96%		71-157
Toluene	50	0	48	96%		47-150
Chlorobenzene	50	0	51	102%		37-160

Compound	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	#	% RPD	#	QC LIMITS RPD	REC.
1,1-Dichloroethene	50	56	112%		7%		22	D-234
Benzene	50	50	100%		11%		24	37-151
Trichloroethene	50	53	106%		10%		21	71-157
Toluene	50	52	104%		8%		21	47-150
Chlorobenzene	50	54	108%		6%		21	37-160

Values outside of QC limits

QC limits taken from method 8240.

Comments:

6/1/95

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spike level: 50 ug/L

Analyst: RJW
Date Analyzed: 08/23/95
Date Reported: 09/22/95
File Name: 8CC23A
Batch: H23AUG95A

Compound	AvgRRF	CCRRF	%D	MIN RRF	MAX %D
Dichlorodifluoromethane	0.153	0.138	9.8%		
Chloromethane	0.104	0.128	-23.1%	0.1	
Vinyl chloride	0.137	0.138	-0.7%		20
Bromomethane	0.029	0.037	-27.6%		
Chloroethane	0.033	0.057	-72.7%		
Trichlorofluoromethane	0.268	0.357	-33.2%		
1,1-Dichloroethene	0.246	0.268	-8.9%		20
Methylene chloride	0.345	0.279	19.1%		
t-1,2-Dichloroethene	0.280	0.293	-4.6%		
MTBE	0.681	0.564	2.9%		
1,1-Dichloroethane	0.418	0.440	1.6%	0.1	
2,2-Dichloropropane	0.427	0.508	-19.0%		
c-1,2-Dichloroethene	0.302	0.310	-2.6%		
Bromochloromethane	0.144	0.164	-13.9%		
Chloroform	0.555	0.613	-10.5%		20
1,1,1-Trichloroethane	0.467	0.564	-20.8%		
2-Chloroethylvinylether	0.116	0.107	7.8%		
Carbon tetrachloride	0.377	0.446	-18.3%		
1,1-Dichloropropene	0.364	0.382	-4.9%		
Benzene	0.879	0.829	5.7%		
1,2-Dichloroethane	0.360	0.420	-16.7%		
Trichloroethene	0.357	0.376	-5.3%		
1,2-Dichloropropane	0.240	0.212	11.7%		20
Dibromomethane	0.239	0.242	-1.3%		
Bromodichloromethane	0.472	0.521	-10.4%		
c-1,3-Dichloropropene	0.416	0.416	0.0%		
Toluene	0.651	0.670	-3.0%		20
t-1,3-Dichloropropene	0.416	0.416	0.0%		
1,1,2-Trichloroethene	0.206	0.201	2.4%		
1,2-Dibromoethane	0.330	0.350	-6.1%		
Tetrachloroethene	0.780	0.796	-2.1%		
1,3-Dichloropropane	0.431	0.405	6.0%		
Dibromochloromethane	0.406	0.435	-7.1%		
Chlorobenzene	0.949	1.005	-5.9%	0.3	
1,1,1,2-Tetrachloroethane	0.330	0.359	-8.8%		

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE METHOD BLANK SUMMARY

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8250A
Instrument: HP 5972 GC/MS - H

Analyst: RJW
Date Analyzed: 08/23/95
Date Reported: 09/22/95
File Name: 8BLK23A
Batch: H23AUG95A

Compound	Amount (ug/L)	DL (ug/L)
Dichlorodifluoromethane	ND	1
Chloromethane	ND	1
Vinyl chloride	ND	1
Bromomethane	ND	1
Chloroethane	ND	1
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene chloride	1	1
t-1,2-Dichloroethene	ND	1
MTBE	ND	1
1,1-Dichloroethane	ND	1
2,2-Dichloropropane	ND	1
c-1,2-Dichloroethene	ND	1
Bromochloromethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
2-Chloroethylvinylether	ND	1
Carbon tetrachloride	ND	1
1,1-Dichloropropene	ND	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Dibromomethane	ND	1
Bromodichloromethane	ND	1
c-1,3-Dichloropropene	ND	1
Toluene	ND	1
t-1,3-Dichloropropene	ND	1
1,1,2-Trichloroetnane	ND	1
1,2-Dibromoethane	ND	1
Tetrachloroethene	ND	1
1,3-Dichloropropane	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
1,1,1,2-Tetrachloroethane	ND	1

Compound	Amount (ug/L)	DL (ug/L)
Ethylbenzene	ND	1
p&m-Xylene	ND	2
o-Xylene	ND	1
Styrene	ND	1
Bromoform	ND	1
Isapropylbenzene	ND	1
Bromobenzene	ND	1
1,1,2 2-Tetrachloroethane	ND	1
1,2,3-Trichloropropane	ND	1
n-Propylbenzene	ND	1
2-Chlorotoluene	ND	1
4-Chlorotoluene	ND	1
1,3,5-Trimethylbenzene	ND	1
tert-Butylbenzene	ND	1
1,2,4-Trimethylbenzene	ND	1
sec-Butylbenzene	ND	1
1,3-Dichlorobenzene	ND	1
4-Isopropyltoluene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
n-Butylbenzene	ND	1
1,2-Dibromo-3-chloropropane	ND	1
1,2,4-Trichlorobenzene	ND	1
Hexachlorobutadiene	ND	1
Naphthalene	1	1
1,2,3-Trichlorobenzene	ND	1
Ethyl Ether	ND	1
Benzyl chloride	ND	50
2-Butanone (MEK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
2-Hexanone	ND	50

Comments:

6/1/95

ICP

Anatech QC Report
Inorganic Data Package

Project # 5487

Client Sample Identifier	Anatech Sample Number

Comments: _____

Approval: _____ Date: 9-25-95

Anatech QC Report
Inorganic Data Package

Calibration Verification Report

Project # 54889 Source :_____

Units: PERCENT RECOVERY

Control Limits: ICV/CCV 90-110%

Analyte	Run #	True(ug/L)	ICV	CCV 1	CCV 2	CCV 3	CCV 4	CCV 5	C
Al									
Sb									
As									
Ba									
Be									
Cd									
Ca									
Cr									
Co									
Cu	1178	10,000	98% 98%	101%	99%				
Fe									
Pb									
Mg	1178	10,000	97%	101%	104%				
Mn									
Hg									
Ni									
K									
Se									
Ag									
Na	1178	10,000	103%	104%	105%				
Tl									
V									
Zn									

Comments:

Anatech QC Report
Inorganic Data Package

Digestion Log

Project # 54889

Batch #	Date	ANALYTES																								
		AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN
M5428	8/23										X			X							X				

Anatech QC Report
Inorganic Data Package

Matrix Spike Recovery Report

Sample # 54859 Batch # M5428

Matrix (soil/water): Water Units (ug/L or mg/kg): ug/L

Control Limits: +/- 15%

Analyte	Run #	Spiked Sample Recovery (SSR)	Sample Result (SR)	Spike Added (SA)	% Recovery	C
Al						
Sb						
As						
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu	1178	9524	ND	10,000	95%	
Fe						
Pb						
Mg	1178	16,620	7389	10,000	92%	
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na	1178	28,800	20,210	10,000	86%	
Tl						
V						
Zn						

Comments:

6FAA

ANATECH QC REPORT

ANALYTE: Pb
RUN DATE: 9/21/95
INSTRUMENT: PE
BATCH NO: MS480
ANALYST: DEP
UNITS: ug/L

REPORT DATE: 9-25-95
METHOD: 7421
RUN NO.: PM03
DIGESTION DATE: 9/18/95
REVIEW(Init/Date):
PROJECT NO: 54889

BLANKS	CONCENTRATION	LOD	Q
Prep Blank	ND	2	
ICB	ND	↓	
CCB	ND		
CCB	ND		
CCB	ND		
CCB			
CCB			

Control Limits < ± 1 * LOD

CALIBRATION VERIFICATIONS	TRUE	FOUND	% RECOVERY	Q
ICV	40	40.9	102	
CCV	↓	35.9	90	
CCV		40.1	100	
CCV		35.4	88	
CCV				
CCV				

ICV ± 10%; CCV ± 15%

SPIKES	SPIKE ADDED	SAMPLE CONC.	SPIKE CONC.	% RECOVERY	% RPD
Prep Spike MS480	10	—	11.2	112	
54889-0317 MS	↓	ND	9.7	97	4
MSD		↓	9.3	93	

Matrix spike % recovery 85% - 115%; % RPD < 20%

ANATECH QC REPORT

ANALYTE: Chloride
RUN DATE: 8.25.95
INSTRUMENT: —
BATCH NO: —
ANALYST: LS
UNITS: mg/L

REPORT DATE: 8-25
METHOD: 4500 Cl⁻ B
RUN NO.: —
DIGESTION DATE: —
REVIEW(Init/Date): CJ 9-25
PROJECT NO: 54889

BLANKS	CONCENTRATION	LOD	Q
Prep Blank	N/A	1	
ICB	ND	1	
CCB	ND	✓	
CCB			
CCB			
CCB			
CCB			

Control Limits < ± 1 * LOD

CALIBRATION VERIFICATIONS	TRUE	FOUND	% RECOVERY	Q
ICV	2.5	2.47	99	
CCV	✓	2.47	99	
CCV				
CCV				
CCV				
CCV				

ICV ± 10%; CCV ± 15%

SPIKES	SPIKE ADDED	SAMPLE CONC.	SPIKE CONC.	% RECOVERY	% RPD
Prep Spike	N/A				
* MS	20	42.6	61.8	101	
* MSD	✓	✓	66.3	95	6%

Matrix spike % recovery 85% - 115%; % RPD <20%

* Sample not of Anatech origin

Attachment C
Data Validation

MEMO

TO: Mike Tomka REFERENCE NO: 5397

FROM: Lou Almeida/dm/2 DATE: February 3, 1995

RE: Data Quality Assurance Evaluation
Soil and Groundwater Samples
General Motors Power Train Division Site
Saginaw, Michigan

1.0 OVERVIEW

Eleven soil samples and four groundwater samples were collected from the General Motors Power Train Division Site (Site) in Saginaw, Michigan between December 13, 1994 and December 20, 1994. The samples were submitted for the analysis of benzene, toluene, ethylbenzene, xylenes (BTEX); polynuclear aromatics (PNAs); copper; phosphorous chloride; sodium; magnesium; lead and volatile organic compounds (VOCs).

This memo presents an analytical assessment and validation of results obtained by Anatech Laboratories (Anatech) from the analysis of these soil and water samples. Analytical results were received in a report provided by Anatech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Anatech's quality control criteria.

Anatech completed sample analyses in accordance with the analytical methods, as outlined in the United States Environmental Protection Agency (USEPA) documents entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992, and "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, Revised March 1983. The documents entitled, "National Functional Guidelines for Organic Data Review", (Revised 1994) and "National, Functional Guidelines for Inorganics Data Review", (Revised 1994), were used in the assessment and validation of the data.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

Analytical results for sample 106B (MW-11) for total metals (copper, lead, magnesium and sodium) are qualified as J, estimated, because the sample was submitted without preservative in a glass sample container. Samples submitted for metals analyses should be collected in plastic containers as metals will adhere to glass.

2.1 SAMPLE HOLDING TIME

Sample holding time criteria, as specified in the applicable methods, were used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample extraction/analysis dates reported by Anatech. Sample holding time criteria, as outlined in the methods, are outlined in Table 1.

Samples submitted for analysis were extracted and analyzed prior to expiration of the holding time criteria with the following exception. Sample 103B (MW-15), submitted for total phosphorus analysis, was not preserved. The holding time for an unpreserved sample is 48 hours. This sample was analyzed twelve days after collection. Therefore, the sample result must be qualified as R, unusable.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples analyzed for VOCs and BTEX were spiked with dibromfluorobenzene, toluene-d8 and 4-bromofluorobenzene.

Reported surrogate recoveries fell within laboratory-established control limits. Therefore, data qualifications were not required.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the soil and water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the soil and water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike/matrix spike duplicate (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 these data alone do not give a complete indication of overall precision or accuracy. However, in conjunction with other QC data, the need for qualifications can be assessed.

Reported MS/MSD recoveries fell within laboratory-established control limits, indicating acceptable accuracy.

The precision of a method is reflected by the reproducibility of the MS and MSD recoveries. The relative percent difference (RPD) was calculated for the MS/MSD results, and the RPD values fell below laboratory-established control maximums, demonstrating acceptable method precision.

No qualifications were necessary based on the MS/MSD recoveries or the RPD values.

2.5 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. LCS samples were analyzed in conjunction with the soil and water samples.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIME CRITERIA GENERAL MOTORS POWER TRAIN DIVISION SITE SAGINAW, MICHIGAN

Analysis	*Analytical Method*	*Holding Time Criteria Water Matrix (days)*
VOCs, BTEX	SW-846 8260	14
Copper	SW-846 6010	6 months
Lead	SW-846 7421	6 months
Magnesium	SW-846 6010	6 months
Sodium	SW-846 6010	6 months
Chloride	SW-846 9250	28
Total Phosphorous	EPA 365.2	28

Notes:

BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
VOCs - Volatile Organic Compounds
SW-846 - USEPA's document entitled: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Revision 1, 1st Update, November 1990.
EPA - "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, Revised March 1983.

APPENDIX 9.3

D.18 Former G.I. Oil House USTs (G.I. #2 and G.I. #3)

Closure Status Information

GM POWERTRAIN

June 23, 1993

Receipt No. P 409 235 213
CERTIFIED MAIL
Return Receipt Requested

Michigan State Police
Fire Marshal Division
Hazardous Materials Section
Enforcement Unit
Box 30157
Lansing, MI 48909

RE: Tanks #2 and #3 Site Assessment, Post Removal

Dear Madame or Sir:

Enclosed is a site assessment report documenting the recent removal of underground storage tank numbers 2 and 3, at the General Motors Powertrain Group, Saginaw Grey Iron Plant. Proper 30 day notice was given of intent to remove the UST systems on or after April 19, 1993, at facility #0-010581. The site assessment was performed per Michigan Underground Storage Tank Rules.

Based upon observations at the time of the tank system removals and results of the analytical tests conducted on samples collected at the excavation site, it is determined that tank systems #2 and #3 did not leak. (See attached analytical results dated 6-4-93.)

If you have any questions regarding this information, please contact S.K. Harringa at 517-757-1474, or myself at 517-757-1642.

Sincerely,

K.A. Leikert

K.A. Leikert, Superintendent
Environmental Activities

attachments

POWERTRAIN

June 23, 1993

Michigan State Police
Fire Marshal Division
Hazardous Materials Section
Enforcement Unit
Box 30157
Lansing, MI 48909

RE: GMPT Saginaw Grey Iron Plant Site Assessment Report
Underground Storage Tanks #2 and #3

Background

Tank #2, a cathodically protected 10,000 gallon capacity steel tank used for the storage of no. 2 diesel fuel, was located outside the Oil House at the General Motors Powertrain Group Saginaw Grey Iron Plant. The tank was approximately 12 years old and had contained no. 2 diesel fuel during its entire service life.

Tank #3 , a cathodically protected 10,000 gallon capacity steel tank used for the storage of mineral oil (Pattern Spray), was located outside the Oil House and immediately adjacent to tank #2 at the General Motors Powertrain Group Saginaw Grey Iron Plant. The tank was approximately 12 years old and had contained mineral oil during its entire service life.

Because the tank systems were located immediately adjacent to each other, one excavation was required to remove both of the tanks.

Prior to the tank removal, Bierlein Environmental Services, Inc., the tank removal contractor, transferred the remaining tank contents to properly labeled drums, removed the concrete above the systems, purged and cut the piping leads, removed the soil from above and around the tank systems, then removed the tank systems.

Observations

The soil around the tanks was inspected for the presence of any contamination. No indications of contamination were found at the tank sites.

Bierlein Environmental Services, Inc. removed the tank systems. The excavated soils were stockpiled in a protected area. A composite sample of the stockpiled soils was collected and analyzed for PNA components.

All aspects of each tank system appeared to be in good condition. No holes or damage were noted. The contractor rendered the tanks unusable by cutting a large opening in one end of each tank. The

SAMTEST Inc.

BOX 1444 MIDLAND, MI 48641-1444
(517) 496-3610
FAX (517) 496-3190

June 4, 1993

Bierlein Environmental Services, Inc.
2903 South Graham
P. O. Box 8078
Saginaw, Michigan 48708-8078

Attn: Marve Towns

Re: ***SOIL SAMPLING - GREY IRON FOUNDRY OIL HOUSE, 1629 NORTH WASHINGTON AVENUE, SAGINAW, MI. PO #2E102, FILE #93-471***

SAMTEST, INC. was retained by Bierlein Inc. to provide sampling and analysis of soils following the excavation of two ten thousand gallon underground storage tanks from the above referenced site. One tank had contained diesel fuel and the other mineral oil.

On June 2, 1993 a *SAMTEST* environmental technician was on site monitoring the excavation of the tanks with an HNU device. Soil samples were taken from the walls and bottom of the area surrounding the south tank. Since the tanks were resting on concrete slabs, bottom samples were taken from the soil at the edge of each end of the slab.

The excavation required more time to complete than had been proposed. A *SAMTEST* technician was not requested during the remainder of the excavation. Bierlein obtained the remaining samples and brought them to *SAMTEST*'s laboratory on June 3, 1993. The transfer line composite sample was received by *SAMTEST* on June 4, 1993.

Per the request of Steve Harringa from GM, the wall samples were composited and analyzed for PNA components. Four bottom samples, two under each tank, were analyzed for PNA components. A composite sample of soil from under the transfer lines and a composite sample of stockpiled soil were also analyzed for PNA components. The analyses are enclosed as well as a site diagram.

If you have any questions please contact our office.

Respectfully submitted,

Leslie Oberts

Leslie Oberts
Lab Manager
SAMTEST, INC.

LO/vm

c:\analy\93-471

cc: Grey Iron Foundry
Oil House
1629 N. Washington Ave.
Saginaw, MI 48708

PROJECT:
BIERLEIN ENVIRONMENTAL SERVICE
2903 SOUTH GRAHAM
P. O. BOX 8078
SAGINAW, MI 48708-8078

DATE RECEIVED: 6-2-93
DATE ANALYZED: 6-3-93
JOB #: 93-471
REPORT DATED: 6-4-93

LAB ID: SOIL SAMPLES - GREY IRON FOUNDRY OIL HOUSE, SAGINAW

LAB #: 93-0736-50

Poly-Nuclear Aromatics (PNA)
EPA Method 8310

Parameter	BOTTOM #2	DL
Naphthalene	<0.33 ppm	.33 ppm
Acenaphthylene	<0.33 ppm	.33 ppm
Acenaphthene	<0.33 ppm	.33 ppm
Fluorene	<0.33 ppm	.33 ppm
Phenanthrene	<0.33 ppm	.33 ppm
Anthracene	<0.33 ppm	.33 ppm
Fluoranthene	<0.33 ppm	.33 ppm
Pyrene	<0.33 ppm	.33 ppm
Benzo(a)anthracene	<0.33 ppm	.33 ppm
Chrysene	<0.33 ppm	.33 ppm
Benzo(b)fluoranthene	<0.33 ppm	.33 ppm
Benzo(k)fluoranthene	<0.33 ppm	.33 ppm
Benzo(a)pyrene	<0.33 ppm	.33 ppm
Dibenzo(a,h)anthracene	<0.33 ppm	.33 ppm
Benzo(ghi)perylene	<0.33 ppm	.33 ppm
Indeno(1,2,3-cd)pyrene	<0.33 ppm	.33 ppm

< = Less Than
DL = Detection Limit

Leslie Oberts
Lab Manager
SAMTEST, INC.

PROJECT:
BIERLEIN ENVIRONMENTAL SERVICE
2903 SOUTH GRAHAM
P. O. BOX 8078
SAGINAW, MI 48708-8078

DATE RECEIVED: 6-3-93
DATE ANALYZED: 6-3-93
JOB #: 93-471
REPORT DATED: 6-4-93

LAB ID: SOIL SAMPLES - GREY IRON FOUNDRY OIL HOUSE, SAGINAW

LAB #: 93-0736-50

Poly-Nuclear Aromatics (PNA)
EPA Method 8310

Parameter	BOTTOM #8	DL
Naphthalene	<0.33 ppm	.33 ppm
Acenaphthylene	<0.33 ppm	.33 ppm
Acenaphthene	<0.33 ppm	.33 ppm
Fluorene	<0.33 ppm	.33 ppm
Phenanthrene	<0.33 ppm	.33 ppm
Anthracene	<0.33 ppm	.33 ppm
Fluoranthene	<0.33 ppm	.33 ppm
Pyrene	<0.33 ppm	.33 ppm
Benzo(a)anthracene	<0.33 ppm	.33 ppm
Chrysene	<0.33 ppm	.33 ppm
Benzo(b)fluoranthene	<0.33 ppm	.33 ppm
Benzo(k)fluoranthene	<0.33 ppm	.33 ppm
Benzo(a)pyrene	<0.33 ppm	.33 ppm
Dibenzo(a,h)anthracene	<0.33 ppm	.33 ppm
Benzo(ghi)perylene	<0.33 ppm	.33 ppm
Indeno(1,2,3-cd)pyrene	<0.33 ppm	.33 ppm

< = Less Than
DL = Detection Limit

Leslie Oberts
Lab Manager
SAMTEST, INC.

PROJECT:
BIERLEIN ENVIRONMENTAL SERVICE
2903 SOUTH GRAHAM
P. O. BOX 8078
SAGINAW, MI 48708-8078

DATE RECEIVED: 6-2/3-93
DATE ANALYZED: 6-3-93
JOB #: 93-471
REPORT DATED: 6-4-93

LAB ID: SOIL SAMPLES - GREY IRON FOUNDRY OIL HOUSE, SAGINAW

LAB #: 93-0736-50

Poly-Nuclear Aromatics (PNA)
EPA Method 8310

Parameter	COMPOSITE WALLS	DL
Naphthalene	<0.33 ppm	.33 ppm
Acenaphthylene	<0.33 ppm	.33 ppm
Acenaphthene	<0.33 ppm	.33 ppm
Fluorene	<0.33 ppm	.33 ppm
Phenanthrene	<0.33 ppm	.33 ppm
Anthracene	<0.33 ppm	.33 ppm
Fluoranthene	<0.33 ppm	.33 ppm
Pyrene	<0.33 ppm	.33 ppm
Benzo(a)anthracene	<0.33 ppm	.33 ppm
Chrysene	<0.33 ppm	.33 ppm
Benzo(b)fluoranthene	<0.33 ppm	.33 ppm
Benzo(k)fluoranthene	<0.33 ppm	.33 ppm
Benzo(a)pyrene	<0.33 ppm	.33 ppm
Dibenzo(a,h)anthracene	<0.33 ppm	.33 ppm
Benzo(ghi)perylene	<0.33 ppm	.33 ppm
Indeno(1,2,3-cd)pyrene	<0.33 ppm	.33 ppm

< = Less Than
DL = Detection Limit

Leslie Oberts
Lab Manager
SAMTEST, INC.

PROJECT:
BIERLEIN ENVIRONMENTAL SERVICE
2903 SOUTH GRAHAM
P. O. BOX 8078
SAGINAW, MI 48708-8078

DATE RECEIVED: 6-3-93
DATE ANALYZED: 6-3-93
JOB #: 93-471
REPORT DATED: 6-4-93

LAB ID: SOIL SAMPLES - GREY IRON FOUNDRY OIL HOUSE, SAGINAW

LAB #: 93-0750

Poly-Nuclear Aromatics (PNA)
EPA Method 8310

Parameter	STOCKPILE COMPOSITE	DL
Naphthalene	<0.33 ppm	.33 ppm
Acenaphthylene	<0.33 ppm	.33 ppm
Acenaphthene	<0.33 ppm	.33 ppm
Fluorene	<0.33 ppm	.33 ppm
Phenanthrene	<0.33 ppm	.33 ppm
Anthracene	<0.33 ppm	.33 ppm
Fluoranthene	<0.33 ppm	.33 ppm
Pyrene	<0.33 ppm	.33 ppm
Benzo(a)anthracene	<0.33 ppm	.33 ppm
Chrysene	<0.33 ppm	.33 ppm
Benzo(b)fluoranthene	<0.33 ppm	.33 ppm
Benzo(k)fluoranthene	<0.33 ppm	.33 ppm
Benzo(a)pyrene	<0.33 ppm	.33 ppm
Dibenzo(a,h)anthracene	<0.33 ppm	.33 ppm
Benzo(ghi)perylene	<0.33 ppm	.33 ppm
Indeno(1,2,3-cd)pyrene	<0.33 ppm	.33 ppm

< = Less Than
DL = Detection Limit

Leslie Oberts
Lab Manager
SAMTEST, INC.

FM-80 (5-92)
MICHIGAN DEPARTMENT OF STATE POLICE

UNDERGROUND STORAGE TANK SITE ASSESSMENT REPORT FORM

(PLEASE TYPE OR PRINT) SEE REVERSE SIDE FOR INSTRUCTIONS

Implementing Agency: Michigan State Police, Fire Marshal Division Hazardous Materials Section P.O. Box 30157 Lansing, Michigan 48909	Facility Number 0-010581

I. OWNERSHIP OF TANKS Owner Name (corporation/individual, etc.)
GM POWERTRAIN - SAGINAW GREY IRON PLANT

Mailing Address	City	State	Zip Code
1629 N. WASHINGTON AVENUE	SAGINAW	MI	48605

County	Township	Telephone (including area code)
SAGINAW		(517) 757-1474

Contact Person for Location
STEVE HARRINGA

Rum 5/20/93

II. LOCATION OF TANKS ☒ PLEASE CHECK, IF SAME AS SECTION I Facility Name

2

Street Address (P.O. Box not acceptable)	City	State	Zip Code

County	Township	Telephone (including area code)
		( )

TANK INFORMATION: Substance Stored in Tank(s)	Tank Number(s)	Test Methodology Used
* No. 2 DIESEL FUEL - ** MINERAL OIL	8 2 - ** 3	US EPA SW-846 METHOD 8310

Test Methodology Level of Detection
0.33 PPM

Holding Time of Sample(s)	Date Sample(s) Taken	Was Water Found in the Excavation?
24 HOURS	6/2/93, 6/3/93 & 6/4/93	☐ Yes ☒ No

The site assessment report must be received by State Fire Marshal within 45 days of sample being taken.

Information Submitted By	Company	
STEVE HARRINGA	GM POWERTRAIN-SAGINAW GREY IRON	
Signature: Steve Harringa	Date: 6/22/93	Telephone (including area code): (517) 757-1474

YOU MUST ATTACH TEST SAMPLE RESULTS AND PROVIDE A SITE SKETCH WHICH INDICATES THE LOCATIONS OF TANKS AND PIPING AND WHICH IDENTIFIES THE DEPTHS AND LOCATIONS OF THE SAMPLES TAKEN. MAIL TO FIRE MARSHAL DIVISION AT ABOVE ADDRESS.

DO NOT WRITE BELOW THIS LINE

SITE ASSESSMENT REVIEW REPORT

Your site assessment report has been reviewed by Fire Marshal Division staff and the following determination made:

- ☐ Test methodology or level of detection of the methodology is faulty. The data submitted is not considered valid. Please perform another site assessment, and forward a copy of the results to this office within 45 days.
- ☒ The contaminant concentrations are below the threshold detection levels and there is no evidence of a confirmed release.
- ☐ The soils excavated and removed from the site or contaminant concentrations were greater than the threshold detection levels and there was evidence of a confirmed release. The confirmed release was not reported to this office within 24 hours, per the Michigan Underground Storage Tank Rules (MUSTR), prior to excavation of contaminated soil. To complete your reporting requirements, per (MUSTR), a confirmed release report is being generated A confirmed release report is being sent to the Department of Natural Resources, to ensure proper cleanup and testing were utilized.
- ☐ The contaminant concentrations are greater than the threshold detection levels and there is evidence of a confirmed release. To determine if a Type A, B, or C cleanup may be performed, please refer to Part 6 and Part 7 Rules under the Michigan Environmental Response Act to determine the nature and scope of cleanup requirements. A confirmed release report is being sent to the Department of Natural Resources.
- ☐ The number of sampling points analyzed are considered inadequate to make a determination on the cleanliness of the site. Please perform another site assessment and forward a copy of the results within 45 days.

Signature of Reviewer	Date of Review
M.T. Kadri	7/6/93

Facility Number

AUTHORITY: 1984 PA 423, as amended
COMPLIANCE: Required
PENALTIES: Any owner/operator who fails to notify is subject to a misdemeanor and civil penalties not to exceed $5,000 per day for each tank

DISTRIBUTION:
1. ORIGINAL, CANARY COPY, AND ATTACHMENTS TO FIRE MARSHAL DIVISION AT ABOVE ADDRESS
2. PINK COPY FOR YOUR RECORDS

FM-30 (5-92)
MICHIGAN DEPARTMENT OF STATE POLICE

UNDERGROUND STORAGE TANK SITE ASSESSMENT REPORT FORM

(PLEASE TYPE OR PRINT) SEE REVERSE SIDE FOR INSTRUCTIONS

Implementing Agency:		Facility Number
Michigan State Police Fire Marshal Division	Hazardous Materials Section P.O. Box 30157 Lansing, Michigan 48909	0-010581

I. OWNERSHIP OF TANKS Owner Name (corporation/individual, etc.)
GM POWERTRAIN - SAGINAW GREY IRON PLANT

Mailing Address	City	State	Zip Code
1629 N. WASHINGTON AVENUE	SAGINAW	MI	48605

County	Township	Telephone (including area code)
SAGINAW		(517) 757-1474

Contact Person for Location
STEVE HARRINGA

II. LOCATION OF TANKS ☒ PLEASE CHECK, IF SAME AS SECTION I Facility Name

Street Address (P.O. Box not acceptable)	City	State	Zip Code

County	Township	Telephone (including area code)
		( )

TANK INFORMATION: Substance Stored in Tank(s)	Tank Number(s)	Test Methodology Used
* No. 2 DIESEL FUEL - ** MINERAL OIL	* 2 - ** 3	US EPA SW-846 METHOD 8310

Test Methodology Level of Detection
0.33 PPM

Holding Time of Sample(s)	Date Sample(s) Taken	Was Water Found in the Excavation?
24 HOURS	6/2/93, 6/3/93 & 6/4/93	☐ Yes ☒ No

The site assessment report must be received by State Fire Marshal within 45 days of sample being taken.

Information Submitted By	Company	
STEVE HARRINGA	GM POWERTRAIN-SAGINAW GREY IRON	
Signature: Steve Harringa	Date: 6/22/93	Telephone (including area code): (517) 757-1474

YOU MUST ATTACH TEST SAMPLE RESULTS AND PROVIDE A SITE SKETCH WHICH INDICATES THE LOCATIONS OF TANKS AND PIPING AND WHICH IDENTIFIES THE DEPTHS AND LOCATIONS OF THE SAMPLES TAKEN. MAIL TO FIRE MARSHAL DIVISION AT ABOVE ADDRESS.

DO NOT WRITE BELOW THIS LINE

SITE ASSESSMENT REVIEW REPORT

Your site assessment report has been reviewed by Fire Marshal Division staff and the following determination made:

- ☐ Test methodology or level of detection of the methodology is faulty. The data submitted is not considered valid. Please perform another site assessment, and forward a copy of the results to this office within 45 days.
- ☐ The contaminant concentrations are below the threshold detection levels and there is no evidence of a confirmed release.
- ☐ The soils excavated and removed from the site or contaminant concentrations were greater than the threshold detection levels and there was evidence of a confirmed release. The confirmed release was not reported to this office within 24 hours, per the Michigan Underground Storage Tank Rules (MUSTR), prior to excavation of contaminated soil. To complete your reporting requirements, per (MUSTR), a confirmed release report is being generated. A confirmed release report is being sent to the Department of Natural Resources, to ensure proper cleanup and testing were utilized.
- ☐ The contaminant concentrations are greater than the threshold detection levels and there is evidence of a confirmed release. To determine if a Type A, B, or C cleanup may be performed, please refer to Part 6 and Part 7 Rules under the Michigan Environmental Response Act to determine the nature and scope of cleanup requirements. A confirmed release report is being sent to the Department of Natural Resources.
- ☐ The number of sampling points analyzed are considered inadequate to make a determination on the cleanliness of the site. Please perform another site assessment and forward a copy of the results within 45 days.

Signature of Reviewer	Date of Review

Facility Number

AUTHORITY: 1984 PA 423, as amended
COMPLIANCE: Required
PENALTIES: Any owner/operator who fails to notify is subject to a misdemeanor and civil penalties not to exceed $5,000 per day for each tank

DISTRIBUTION:
1. ORIGINAL, CANARY COPY, AND ATTACHMENTS TO FIRE MARSHAL DIVISION AT ABOVE ADDRESS
2. PINK COPY FOR YOUR RECORDS

APPENDIX 9.4

D.28 10/23/87 #8 Mold Line PCB Release

STATE OF MICHIGAN

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973
RUSSELL J. HARDING, Director

REPLY TO:

ENVIRONMENTAL RESPONSE DIVISION
SAGINAW BAY DISTRICT OFFICE
503 N. EUCLID AVENUE
BAY CITY, MI 48706-2965

December 4, 1995

J. S. Toth
Environmental Activities
GM Powertrain Division
Casting Operations
P.O. Box 5073
Saginaw, Michigan 48605-5073

Re: General Motors Powertrain Saginaw Metal Casting Operations (Grey Iron)
Pump and Treat System

Dear Mr. Toth:

This letter is in regards to your request to discontinue the operation of the purge system pending the results of the current site wide RFI/CMS. You indicate in your request that the system has been ineffective and the PCB's are not migrating away from the area due to the nature of the clay soil. If GM believes data shows the system to be ineffective, GM can make modifications based upon the monitoring data until the results of the RFI/CMS have been evaluated and the USEPA and GM have agreed upon a final remediation.

Please be aware, however, that MDEQ's comments regarding this request will not impact any future determination made by the USEPA in relation to the Order, the RFI/CMS, or the need for further remediation.

If you have any questions, please contact me at the number below.

Sincerely,

Rhonda Klann
Environmental Quality Analyst
Environmental Response Division
517-684-9141 Extension 8302

cc: Mirtha Capiro, USEPA
Ray Illka, GM

RC ASSOCIATES, INC.
ENGINEERING ❖ ARCHITECTURAL ❖ ENVIRONMENTAL ❖ SURVEYING
CONSTRUCTION TESTING ❖ GEOTECHNICAL

December 7, 1995

Mr. Tony Nestro
General Motors Worldwide Purchasing
6750 Chicago Road
Warren, Michigan 48090

RE: **PROPOSAL TO PROVIDE EQUIPMENT INSPECTION, MAINTENANCE AND SAMPLING SERVICES**
GROUNDWATER PCB SYSTEM FOR # 8 MOLD LINE BASEMENT
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN
RC REFERENCE NO. W-000954-3A

Dear Mr. Nestro:

Pursuant to recent conversations, RC Associates, Inc. (RC) respectfully submits the following proposal to provide equipment inspection, maintenance and sampling services for the groundwater remediation system.

RC will provide an Environmental Specialist to inspect and ensure continued proper operation of the remediation system. RC proposes to inspect the system twice each month. The observations from these inspections and actions necessary to correct any problems encountered will be documented. Included in the quarterly monitoring report will be a summary of these inspections. RC will sample the groundwater remediation system and the two monitoring wells on a quarterly basis. The analytical results from the quarterly sampling will also be included in the monitoring reports.

We understand that the samples will be submitted to an analytical laboratory contracted by Saginaw Metal Casting Operations. Based on the unit prices shown on the enclosed fee schedule, we have attached at Table of Estimated Services and Fees for providing the scope of services outlined herein. Our invoices will be determined in accordance with the actual scope of services authorized and performed and the unit prices shown on the attached Fee Schedule for Site Development Services performed by RC Associates, Inc. This cost estimate covers a three year time frame with 24 inspections per year (for a total of 72 inspections) and four sampling events per year (for a total of 12 sampling events).

We appreciate your consideration of our firm to continue to provide these services and look forward to the opportunity of continuing to work with you. If you have any questions concerning this proposal, or if you need additional information, please contact us.

Very truly yours,

Daryl J. Gotham, E.I.T.
Environmental Project Engineer

James F. Cuthbertson, P.E.
Environmental Services Manager

Attachments: Table of Estimated Services and Fees
Fee Schedule for Site Development Services performed by RC Associates, Inc
General Conditions for the Provision of Limited Professional Services by RC Associates, Inc.

Enclosure: Proposal to Provide Equipment Inspection, Maintenance and Sampling Services

cc: Mr. Ray Illka; Saginaw Metal Casting Operations

DJG/mdi; H:\EJOBS\E954B\W954-3A.PPL (12-95)

PROPOSAL TO PROVIDE EQUIPMENT INSPECTION, MAINTENANCE AND SAMPLING SERVICES
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN
RC REFERENCE NO. W-000954-3A
December 7, 1995

TABLE OF ESTIMATED SERVICES AND FEES

Description	Estimated Quantity	Unit Price	Estimated Amount
Environmental Specialist to Perform Inspection, Maintenance, Sampling and Sample Handling	50 hours	$ 47.00/hr	$ 2,350
Decontamination Supplies	24 days	$ 15.00/day	$ 360
Travel Expenses (No charge within 30 mile radius of RC)	>30 mi	$ 0.35/mile	$ If Necessary
Sample Shipping	4 samplings	$ 50.00/ea	$ 200
Replacement Parts and Miscellaneous Expenses	At Cost +15%.		If Required
REPORT PREPARATION AND PROJECT MANAGEMENT			
A. Project Consultant	6 hours	$ 100.00/hr	$ 600
B. Environmental Project Engineer	30 hours	$ 75.00/hr	$ 2,250
C. Clerical/Draftsperson/Tech. Editor	6 hours	$ 30.00/hr	$ 180
	ESTIMATED PROJECT TOTAL		**$ 17,820**

FEE SCHEDULE FOR SITE DEVELOPMENT SERVICES PERFORMED BY RC ASSOCIATES, INC.

Effective January 1, 1995

PERSONNEL

* Engineering Technician	$ 28.00/HR
* Senior Engineering Technician/Laboratory Technician/Survey Crew Assistant	$ 32.00/HR
* Construction Inspector/Environmental Technician/Specialty Technician	$ 40.00/HR
* Senior Environmental Technician/Senior Construction Inspector (MDOT)	$ 45.00/HR
* Survey Crew Chief	$ 48.00/HR
* Environmental Specialist/Operations Manager	$ 47.00/HR
* Staff Engineer/Staff Geologist/Wetland Scientist/Project Architect	$ 55.00/HR
Project Engineer/Project Manager	$ 65.00/HR
Senior Engineer/Environmental Project Engineer/Environmental Project Geologist/Principal Architect	$ 75.00/HR
Professional Surveyor/Senior Environmental Engineer/Senior Environmental Geologist	$ 85.00/HR
Project Consultant	$ 100.00/HR
Senior Consultant	$ 120.00/HR
* Technical Editor	$ 45.00/HR
* CADD Technician	$ 42.00/HR
* Clerical/Draftsperson	$ 30.00/HR

* An overtime factor of 1.3 times the hourly rate will apply for services over 8 hours/day, or on Saturdays, Sundays or holidays. When field services are requested, a 2 hour minimum will apply.

NOTE: **A factor of 1.3 times the hourly rate will apply for Expert Witness Testimony and Depositions, including preparation and briefing.**

TRAVEL/EXPENSES

Vehicle Charge (Car or Pickup Truck)	$ 0.35/MI
Facsimile Transmittal	$ 0.50/SHEET
Per Diem	QUOTED PER PROJECT
Outside Services and Incidental Expenses (Permits, Special Supplies, etc.)	AT COST + 15%

EQUIPMENT

Routine Decontamination Supplies	$ 15.00/DAY
Hot Water Power Washer	$100.00/DAY
Diamond Bit Coring Machine (Concrete Coring - Add $0.75/inch diameter/lineal inch)	$ 75.00/DAY
Generator	$ 75.00/DAY
Nuclear Density Meter	$ 40.00/DAY
Penetrometer (DCP or Housel)	$ 20.00/DAY
Photoionization Detector (PID Meter)	$ 75.00/DAY
pH/Conductivity Meter	$ 20.00/DAY
Static Water Level Indicator	$ 20.00/DAY
Magnetometer	$ 50.00/DAY
Free Product Level Indicator	$ 40.00/DAY
2" Submersible Pump	$100.00/DAY

DRILLING SERVICES

Geotechnical Drilling

Round Trip Mobilization of Truck-Mounted Rig and 2-Person Crew	$ 1.65/MI
Minimum Charge $	165.00

Geotechnical Project Drilling - Auger Drilling and Sampling with Standard Penetration Tests (SPT) @ 2½' Intervals to 10' Depth and @ 5' Intervals Thereafter (ASTM D-1586):

Depth	Easy Drilling (N < 50 Blows/Ft.)	Hard Drilling (N > 50 Blows/Ft.)	Additional SPT	
0' - 30'	$ 8.00/LF	$ 9.00/LF	$15.00 EA	
30' - 60'	$ 8.75/LF	$10.25/LF	$20.00 EA	
60' - 90'	$ 9.50/LF	$11.75/LF	$25.00 EA	
Over 90' - 120'		$10.25/LF	$13.50/LF	$30.00 EA
Over 120'		On Request	On Request	On Request

NOTE: **Add $2.00/LF to above unit prices for rotary drilling to advance bore hole.**

Install Casing $	7.00/LF
Rock Coring - NX Diamond Bit (ASTM D-2113) PLUS $75.00 PER HOLE	$ 32.00/LF

FEE SCHEDULE FOR SITE DEVELOPMENT SERVICES PERFORMED BY RC ASSOCIATES, INC.

Effective January 1, 1995

DRILLING SERVICES (continued)

Thin-Wall Tube Samples (ASTM D-1587);		
2" O.D.	$	20.00 EA
3" O.D.	$	25.00 EA
Profile Drilling with Sampling from Auger Flights (0-25')	$	5.50 LF

Environmental Drilling

Hourly Rate for Truck-Mounted Drilling Equipment and 2-Person Crew to Perform Environmental Project Drilling with Split-Spoon Sampling Semi-Continuously to 10' Depth and @ 5' Intervals, thereafter; Installation of Monitoring Wells; Equipment Decontamination; Boring Layout; or Stand-By Time Due to Access or Client Delays	$	125.00/HR
Cost of Special Equipment for Access, Special Permits, Monitoring Wells or Drilling Supplies	AT COST + 15%	
Round Trip Mobilization of Simco Earthprobe 200 (Including Operator)	$	1.00/MI
Minimum Charge	$	100.00
Hourly Rate for Simco Earthprobe 200 (Including Operator)	$	100.00/HR

NOTE: **Rates for special drilling services not listed above can be quoted upon request. Unit prices for drilling services include labor and material incidental to use of the drilling equipment. Support services such as engineering site reconnaissance, utility clearance, boring layout, elevation or location surveys, delayed water level readings, monitoring well development/sampling and special backfilling of bore holes (other than with auger cuttings) will be charged at the appropriate staff member hourly rate.**

SOIL LABORATORY SERVICES

Visual Sample Classification (ASTM D-2488)	$	3.50 EA
Moisture Content (ASTM D-2216)	$	4.00 EA
Calibrated Hand Penetrometer (Qp)	$	2.50 EA
Torvane Shear (c)	$	2.50 EA
Unit Weight of Soil	$	7.50 EA
Loss-On-Ignition	$	30.00 EA
Specific Gravity of Soil (ASTM D-854)	$	40.00 EA
Atterberg Limits (ASTM D-4318)	$	60.00 EA
If done in Conjunction with Hydrometer Analysis	$	40.00 EA
Particle Size Analysis - Hydrometer and Sieve (ASTM D-422)	$	120.00 EA
Unconfined Compressive Strength (ASTM D-2166)	$	15.00 EA
With Stress Strain Curve	$	40.00 EA
Laboratory Proctor (ASTM D-1557 or D-698) Granular Soil (4" mold)	$	95.00 EA
Cohesive Soil (4" mold) or Granular Soil (6" mold)	$	125.00 EA
Laboratory One-Point Maximum Density Determination (Michigan Cone, ASTM D-1557 or D-698)	$	40.00 EA
Relative Density of Soil (ASTM D-4254)	$	50.00 EA
Hydraulic Conductivity by Flexible Wall Permeameter Method - Undisturbed Sample (ASTM D-5084)	$	175.00 EA
Permeability of Granular Soil by Constant Head Method (ASTM D-2434)	$	325.00 EA
Consolidation Test - 2½" Diameter Sample (ASTM D-2435)	$	300.00 EA
Preparation of Thin-Wall Tube Sample	$	20.00 EA
Sample Preparation	$	32.00/HR

OUTSIDE ANALYTICAL LABORATORY SERVICES

Analytical Laboratory Fees ..... RC LIST PRICE + 15%

NOTE: **Unit prices for analytical laboratory tests are available upon request. Rush analysis may be available with prior approval from the analytical laboratory director. Rush analysis will be surcharged according to the following schedule:**

24-48 hour rush	2 TIMES STANDARD PRICE
5 business days	1½ TIMES STANDARD PRICE
More than 5, but less than 10, business days	1¼ TIMES STANDARD PRICE

ENVIRONMENTAL SITE ASSESSMENTS AND WETLAND EVALUATIONS

Fees for Environmental Site Assessments (ESA's) or wetland evaluations for real estate property transactions and/or development activities are charged on an hourly basis in accordance with the appropriate staff member hourly rate. For more information, please contact us.

GENERAL CONDITIONS FOR THE PROVISION OF LIMITED PROFESSIONAL SERVICES BY RC ASSOCIATES, INC.

1. *THE AGREEMENT* - This AGREEMENT is made by and between RC Associates, Inc., hereinafter referred to as RC, and the acceptor of the attached proposal, hereinafter referred to as CLIENT. The AGREEMENT between the parties consists of these GENERAL CONDITIONS, the attached PROPOSAL, and any exhibits or attachments noted in the PROPOSAL. Together, these elements will constitute the entire AGREEMENT superseding any and all prior negotiations, correspondence, or agreements either written or oral. Any changes to this AGREEMENT must be mutually agreed to in the form of a written AMENDMENT to this AGREEMENT.

2. *INSURANCE* - RC maintains Worker's Compensation and Employer's Liability Insurance in accordance with state law. In addition, RC maintains Comprehensive General Liability, Automobile Liability and Professional Liability Insurance under such coverage that RC considers appropriate. Certificates of insurance for these policies can be provided upon request, with a clause which provides that a minimum of ten (10) days written notice be given CLIENT prior to cancellation or reduction of coverage limits. The costs of coverages indicated above are included in RC's quoted fees. If additional or increased limits of coverage are deemed necessary by CLIENT, RC will attempt to obtain the additional requested insurance and will invoice CLIENT separately for any costs associated with the increased coverage.

3. *STANDARD OF CARE* - RC will *strive* to perform services under this AGREEMENT in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, express or implied, and no warranty or guarantee is included or intended in this AGREEMENT, or in any report, opinion, document, or otherwise. Furthermore, it shall be agreed that RC shall not be required to execute any document that would result in their certifying, guaranteeing or warranting the existence of conditions whose existence RC cannot ascertain.

4. *SITE ACCESS AND SITE SAFETY* - CLIENT will grant or obtain free access to the site for all equipment and personnel necessary for RC to perform the work set forth in this AGREEMENT. CLIENT will notify any and all possessors of the project site that CLIENT has granted RC free access to the site. RC will take reasonable precautions to minimize damage to the site, but it is understood by CLIENT that, in the normal course of our work, some damage may occur and the cost for restoration of such damage is not part of this AGREEMENT unless specified in the PROPOSAL.

CLIENT is responsible for accurately delineating the locations of all subterranean structures and utilities. RC will take reasonable precautions to avoid known subterranean structures, and CLIENT waives any claim against RC, and agrees to defend, indemnify, and hold RC harmless from any claim or liability for injury or loss, including costs of defense, arising from damage done to subterranean structures and utilities not identified or accurately located. In addition, CLIENT agrees to compensate RC for any time spent or expenses incurred by RC in defense of any such claim, with compensation to be based upon RC's prevailing fee schedule and expense reimbursement policy.

It is understood and agreed that RC has no constructive use of CLIENT's or OWNER's site; has no control or authority over the means, methods, and sequences of construction; and therefore has no ongoing responsibility whatsoever for construction site safety, a responsibility that has been wholly vested in the general contractor. Notwithstanding the above, RC has a duty to preserve and protect public health, safety, and welfare. Accordingly, it is RC's professional responsibility to take what RC believes are prudent measures should RC encounter situations that RC believes create a danger to public health, safety, or welfare. CLIENT understands this situation and agrees to defend RC and hold RC harmless from claims arising from RC's exercise of professional responsibility in this regard.

5. *DISCOVERY OF UNANTICIPATED HAZARDOUS MATERIALS* - Hazardous materials may exist at a site where there is no reason to believe they could or should be present. RC and CLIENT agree that the discovery of unanticipated hazardous materials constitutes a changed condition mandating a renegotiation of the scope of work or termination of services. RC and CLIENT also agree that the discovery of unanticipated hazardous materials may make it necessary for RC to take immediate measures to protect health and safety. CLIENT agrees to compensate RC for any equipment decontamination or other costs incidental to the discovery of unanticipated hazardous materials.

RC agrees to notify CLIENT when unanticipated hazardous materials or suspected hazardous materials are encountered. CLIENT agrees to make any disclosures required by law to the appropriate governing agencies. CLIENT also agrees to hold RC harmless for any and all consequences of disclosure made by RC which are required by governing law. In the event the project site is not owned by CLIENT, CLIENT recognizes that it is CLIENT's responsibility to inform the property owner of the discovery of unanticipated hazardous materials or suspected hazardous materials.

Notwithstanding any other provision of the AGREEMENT, CLIENT waives any claim against RC and, to the maximum extent permitted by law agrees to defend, indemnify, and save RC harmless from any claim, liability, and/or defense costs for injury or loss arising from RC's discovery of unanticipated hazardous materials or suspected hazardous materials, including, but not limited to, any costs created by delay of the project and any cost associated with possible reduction of the property's value.

CLIENT acknowledges that RC has neither created nor contributed to the creation or existence of any type of hazardous or toxic waste, material, chemical, compound, or substance, or any other type of environmental hazard, contamination, or pollution, whether latent or patent, or the release thereof or the violation of any law or regulation relating thereto, at the site of the project, and it is understood that RC shall have no liability for any such condition, and CLIENT shall indemnify RC for any and all loss, cost, or damage actually sustained and incurred by RC in connection therewith. CLIENT further agrees to be responsible for ultimate disposal of any samples secured by RC which are found to be contaminated.

6. *DRILL CUTTINGS AND FLUIDS* - CLIENT recognizes that, when it is known, assumed or suspected that hazardous materials exist beneath the surface of the project site, certain waste materials, such as drill cuttings, drilling fluids and decontamination fluids, should be handled as if contaminated. Accordingly, to protect human health and safety as well as the environment, RC will appropriately contain and label such materials; will promptly inform CLIENT that such containerization and labelling has been performed, and will leave the containers on site for proper, lawful removal, transport and disposal by CLIENT. CLIENT waives any claim against RC, and agrees to defend, indemnify and hold RC harmless from any claim or liability for injury or loss which may arise as a result

of the drill cuttings, drilling fluids and decontamination fluid or other assumedly hazardous materials being left on site after their containerization by RC. CLIENT also agrees to compensate RC for any time spent and expenses incurred by RC in defense of any such claim, with such compensation to be based upon RC's prevailing fee schedule and expense reimbursement policy.

7. DISPOSAL OF SAMPLES - Soil, rock, water and/or other samples obtained from the project site are the property of CLIENT. RC may preserve such selected samples for no longer than ninety (90) calendar days after the issuance of any document(s) that includes the data obtained from them, unless other arrangements are mutually agreed upon in writing. Should any of these samples be contaminated by hazardous substances or suspected hazardous substances, it is CLIENT's responsibility to select and arrange for lawful disposal procedures, that is, procedures which encompass removing the contaminated samples from RC's custody and transporting them to a disposal site. CLIENT is advised that, in all cases, prudence and good judgement should be applied in selecting and arranging for lawful disposal procedures. Accordingly, unless CLIENT indicates otherwise within the ninety (90) day period referenced above, CLIENT hereby instructs RC to make arrangements, as CLIENT's agent, for proper transportation and disposal of samples with appropriate licensed parties. Due to the risks to which RC is exposed, CLIENT agrees to waive any claim against RC, and to defend, indemnify and hold RC harmless from any claim or liability for injury or loss arising from RC's service as CLIENT's agent in arranging for proper transportation and disposal of contaminated samples, as well as any claim or liability for injury or loss arising from RC's containing, labelling, transporting, testing, storing or other handling of contaminated samples. CLIENT also agrees to compensate RC for any time spent and expenses incurred by RC in defense of any such claim, with such compensation to be based upon RC's prevailing fee schedule and expense reimbursement policy.

8. OWNERSHIP OF DOCUMENTS - All reports, drawings, field data, field notes, laboratory test data, calculations, estimates, and other documents, including those on electronic media, prepared by RC as instruments of service under this AGREEMENT shall remain the property of RC. The CLIENT shall not revise or modify any such documents without the prior written consent of RC.

9. BILLING AND PAYMENT - CLIENT will pay RC in accordance with the procedures indicated in the PROPOSAL and its attachments. Invoices for RC's services shall be submitted to CLIENT, at RC's option, either upon completion of such services or on a monthly basis. All invoices will be due and payable upon receipt of invoice. If CLIENT objects to all or any portion of any invoice, CLIENT will so notify RC in writing within seven (7) calendar days of the invoice date, identify the cause of disagreement, and pay that portion of the invoice not in dispute. The parties will immediately make every effort to settle the disputed portion of the invoice. In the absence of written notification described above, the balance as stated on the invoice will be paid.

Invoices are delinquent if payment has not been received within thirty (30) days from date of invoice. CLIENT will pay an additional charge of one-and-one-half (1-1/2) percent per month (or the maximum percentage allowed by law, whichever is lower) on any delinquent amount, excepting any portion of the invoice amount in dispute and resolved in favor of CLIENT. Payment thereafter will first be applied to accrued interest and then to the principal unpaid amount. In the event CLIENT fails to pay RC within ninety (90) days after invoices are rendered, CLIENT agrees that RC will have the right to consider the failure to pay RC's invoices as a breach of this AGREEMENT. All time spent and expenses incurred (including any attorneys' fees) in connection with collection of any delinquent amount will be paid by CLIENT to RC in accordance with RC's current fee schedules.

10. TERMINATION - This AGREEMENT may be terminated by either party seven (7) days after written notice in the event of any breach of any provision of this AGREEMENT or in the event of substantial failure of performance by the other party, or if CLIENT suspends the work for more than three (3) months. In the event of termination, RC will be paid for services performed prior to the date of termination plus reasonable termination expenses, including, but not limited to the cost of completing analyses, records, and reports necessary to document job status at the time of termination.

11. RISK ALLOCATION - Many risks potentially affect RC by virtue of entering into this AGREEMENT to perform professional and/or consulting services on behalf of CLIENT. The principal risk is the potential for human error by RC. For CLIENT to obtain the benefit of a fee which includes a nominal allowance for dealing with RC's liability, CLIENT agrees to limit RC's liability to CLIENT and to all other parties for claims arising out of RC's performance of the services described in this AGREEMENT. The aggregate liability of RC will not exceed $50,000 or RC's total fee for the services rendered on the project, whichever is greater, for negligent professional acts, errors, or omissions, and CLIENT agrees to indemnify and hold harmless RC from and against all liabilities in excess of the monetary limit established above. If CLIENT wishes, RC will be pleased to discuss higher limits and the associated charges involved.

Limitations on liability and indemnities in this AGREEMENT are business understandings between the parties voluntarily and knowingly entered into, and shall apply to all theories of recovery including, but not limited to, breach of contract, warranty, tort (including negligence), strict or statutory liability, or any other cause of action, except for willful misconduct or gross negligence. The parties also agree that CLIENT will not seek damages in excess of the limitations indirectly through suits with other parties who may join RC as a third-party defendant. Parties means CLIENT and RC and their officers, employees, agents, affiliates, and subcontractors. Both CLIENT and RC agree that they will not be liable to each other, under any circumstances, for special, indirect, consequential, or punitive damages arising out of or related to this AGREEMENT.

12. DISPUTES RESOLUTION - All claims, disputes, and other matters in controversy between RC and CLIENT arising out of or in any way related to this AGREEMENT will be submitted to nonbinding mediation before and as a condition precedent to other remedies provided by law. CLIENT and RC agree to include a similar mediation agreement with all contractors, sub-contractors, sub-consultants, suppliers and fabricators, thereby providing for mediation as the primary method for dispute resolution between all parties. If a dispute at law arises from matters related to the services provided under this AGREEMENT and that dispute requires litigation, then the claim will be brought and tried in judicial jurisdiction of the court of Saginaw County and the CLIENT waives the right to remove the action to any other county or judicial jurisdiction.

13. GOVERNING LAW AND SURVIVAL - The law of the State of Michigan will govern the validity of these GENERAL CONDITIONS, as well as its interpretation and performance. If any of the provisions contained in this AGREEMENT are held illegal, invalid, or unenforceable, the enforceability of the remaining provisions will not be impaired. Limitations of liability and indemnities will survive termination of this AGREEMENT for any cause.

RC ASSOCIATES, INC.
ENGINEERING ✣ ARCHITECTURAL ✣ ENVIRONMENTAL ✣ SURVEYING
5859 SHERMAN ROAD ✣ SAGINAW, MI 48604

FAX

Date: December 11, 1995

Number of pages including cover sheet: 4

TO:
Mr. Tony Nestro / Mr. Ray Illig
GM Worldwide Purch / Sag. Metal Casting Op.

Phone: (810) 947-4129 / (517) 757-1473
Fax Phone: (810) 947-7093 / (517) 757-1652
Copy To:

FROM:
Jim Cuthbertson

Phone: 517-752-6500
Main Fax: 517-752-6600
Survey/Mort. Fax: 517-755-6574
RE: Proposal

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please comment

Please call if you have any questions.

...intended solely for the use of the person(s) to whom addressed. This transmission

RC ASSOCIATES, INC.
ENGINEERING ❖ ARCHITECTURAL ❖ ENVIRONMENTAL ❖ SURVEYING
CONSTRUCTION TESTING ❖ GEOTECHNICAL

December 11, 1995

Mr. Tony Nestro
General Motors Worldwide Purchasing
6750 Chicago Road
Warren, Michigan 48090

RE: **PROPOSAL TO PROVIDE EQUIPMENT INSPECTION, MAINTENANCE AND SAMPLING SERVICES**
GROUNDWATER PCB SYSTEM FOR # 8 MOLD LINE BASEMENT
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN
RC REFERENCE NO. W-000954-3A

Dear Mr. Nestro:

RC Associates, Inc. (RC) has considered your request for a reduction in the rates proposed for the referenced project. RC has implemented periodic increases in our rates since 1992 when the contract for this project was last awarded, however, due to our familiarity with the operation of this system we have been able to maintain the estimated annual cost at $5,940 per year through 1998. The hourly rate included in the proposal for the Environmental Specialist to perform the field activities reflects a 6% reduction from our 1995 Fee Schedule. The "Decontamination Supplies" and the "Mileage" line items reflect concessions negotiated in 1992. RC intends to implement an increase in our hourly rates on January 1, 1996, however, we are willing to maintain our 1995 rates for the next three years for this project.

In regards to the 15% markup on "Replacement Parts and Miscellaneous Expenses", this markup is standard in our industry. RC will not provide any services which are "Replacement Parts and Miscellaneous Expenses" without prior authorization from the GM Project Manager.

Attached is a revised Table of Estimated Services and Fees which indicates the estimated annual cost and the Table of Estimated Services and Fees from our 1992 Proposal with the estimated annual cost.

Very truly yours,

James F. Cuthbertson, P.E.
Environmental Services Manager

Attachments: Table of Estimated Services and Fees (1995)
Table of Estimated Services and Fees (1992)

cc: Mr. Ray Illka; Saginaw Metal Casting Operations

JfC/jfc; E954B\W954-3A.LTR (12-95)

5859 Sherman Road • Saginaw, Michigan 48604 • Phone: (517) 752-6500 • Fax: (517) 752-6600

12/11/95 MON 11:13 [TX/RX NO 9980]

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

ANALYTICAL DIVISION

Laboratory Analysis

Report(s) #619391

Client: NAO DISB Powertrain Casting Operations

Attn: Ray Ilkka

Project: 300534

Sample(s) Received: December 15, 1995
Order Received: December 15, 1995

Data Due: December 26, 1995
Data Reported: December 26, 1995

This report is "PROPRIETARY AND CONFIDENTIAL" and delivered to, and intended for the exclusive use of the above named client only. OHM Remediation Services Corp., Analytical Division, assumes no responsibility or liability for the reliance hereon or use hereof by anyone other than the above named client.

Reviewed and Approved by: *Thomas E. Gran, Ph.D., Vice President*

Date: *January 5, 1996*

16406 U.S. Route 224 East ■ P.O. Box 551 ■ Findlay, OH 45839-0551 ■ 419-423-3526

Equipment Inspection and Maintenance Proposal
Groundwater PCB Remediation System for
#8 Mold Line Basement
Saginaw Grey Iron Plant
Saginaw, Michigan
GM RFQ No. D9911
GTL Proposal No. W-0949-II
December 17, 1992

TABLE OF ESTIMATED SERVICES AND FEES

Description	Estimated Quantity	Unit Price	Estimated Amount
Senior Environmental Technician to Perform Inspection, Maintenance, Sampling and Sample Handling	70 hours	$ 35.00/hr	$ 2,450
Decontamination Supplies	24 days	$ 12.50/day	$ 300
Static Water Level Meter	24 days	No Charge	$ 0
Travel Expenses (No charge within 30 mile radius of GTL office)	Additional Mileage	$ 0.35/mile	$ If Necessary
Replacement Parts and Miscellaneous Expenses	As Required	At Cost + 15%	
Report Preparation and Project Management			
A. Project Consultant	20 hours	$ 80.00/hour	$ 1,600
B. Staff Engineer	30 hours	$ 45.00/hour	$ 1,350
C. Typist	12 hours	$ 20.00/hour	$ 240
ESTIMATED TOTAL			**$ 5,940**

12/11/95 MON 11:13 [TX/RX NO 9980]

SAMPLE INFORMATION SUMMARY

Sample Id	Lab Id	Sample Date	Matrix	Method	QC Batch #	Prep Date	Analysis Date	Hold Met	Run #	Analyst
MW-1	JP1477	12/14/95	Aqueous	608	P1P51912	12/19/95	12/19/95	YES	UF1697	DeLong W.
MW-2	JP1478	12/14/95	Aqueous	608	P1P51912	12/19/95	12/20/95	YES	UF1718	DeLong W.
STAGEI-INF	JP1479	12/14/95	Aqueous	608	P1P51912	12/19/95	12/20/95	YES	UF1719	DeLong W.
STGEII-INF	JP1480	12/14/95	Aqueous	608	P1P51912	12/19/95	12/20/95	YES	UF1720	DeLong W.
STGEII-EFF	JP1481	12/14/95	Aqueous	608	P1P51912	12/19/95	12/19/95	YES	UF1701	DeLong W.

PROJECT NARRATIVE

The following items relate to the samples and analytical data contained in this report.

- o Note any comments at the bottom of the tables in Appendices B and C.
- o Insufficient sample volume was available to perform matrix spikes for Batch #P1P51912. Batch acceptance is based on method spike recoveries which are within QC limits.
- o Surrogate recoveries are not available for Sample(s) #MW-2 and #STAGEI-INF due to dilution as a result of high levels of target analytes present in the sample(s).
- o Elevated detection limits have been reported for Sample(s) #STGEII-INF due to sample matrix interferences.

The following relate to the timeliness and completeness of the analytical data reported:

- o All data was reported within the required time frame. Data was reported to Mr. Daryl Gotham on Tuesday, December 26, 1995.

DATA SUMMARY REPORT

Company: NAO DISB POWERTRAIN CASTING OPER

DATE: 12/26/95

PAGE: 1

Parameters	Units	MW-1	MW-2	STAGEI-INF	STGEII-INF	STGEII-EFF
Sample Point ID:		MW-1	MW-2	STAGEI-INF	STGEII-INF	STGEII-EFF
ASC Sample Number:		JP1477	JP1478	JP1479	JP1480	JP1481
Sample Date:		951214	951214	951214	951214	951214
Facility Code:		300534	300534	300534	300534	300534
Priority Pollutant PCB Analysis, GC, (GS13)						
Aroclor 1016	mg/L	<.00005	<.052	<.051	<.001	<.00005
Aroclor 1221	mg/L	<.00005	<.052	<.051	<.001	<.00005
Aroclor 1232	mg/L	<.00005	<.052	<.051	<.001	<.00005
Aroclor 1242	mg/L	.0001	.277	.504	<.001	.00006
Aroclor 1248	mg/L	<.00005	<.052	<.051	<.001	<.00005
Aroclor 1254	mg/L	<.00005	<.052	<.051	<.001	<.00005
Aroclor 1260	mg/L	<.00005	<.052	<.051	<.001	<.00005

APPENDIX A

DATA SUMMARY REPORT

PRIORITY POLLUTANT PCB ANALYSIS, GC, (GS13)

Company Name	Facility	Sample Point	ASC Sample No.
NAO DISB POWERTRAIN CASTING OPER	300534	MW-1	JP1477

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Aroclor 1016	ND	.00005	ND	P1P51912
Aroclor 1221	ND	.00005	ND	P1P51912
Aroclor 1232	ND	.00005	ND	P1P51912
Aroclor 1242	.0001	.00005	ND	P1P51912
Aroclor 1248	ND	.00005	ND	P1P51912
Aroclor 1254	ND	.00005	ND	P1P51912
Aroclor 1260	ND	.00005	ND	P1P51912

APPENDIX B

QUANTITATIVE RESULTS

PRIORITY POLLUTANT PCB ANALYSIS, GC, (GS13)

Company Name	Facility	Sample Point	ASC Sample No.
NAO DISB POWERTRAIN CASTING OPER	300534	STAGEI-INF	JP1479

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Aroclor 1016	ND	.051	ND	P1P51912
Aroclor 1221	ND	.051	ND	P1P51912
Aroclor 1232	ND	.051	ND	P1P51912
Aroclor 1242	.504	.051	ND	P1P51912
Aroclor 1248	ND	.051	ND	P1P51912
Aroclor 1254	ND	.051	ND	P1P51912
Aroclor 1260	ND	.051	ND	P1P51912

PRIORITY POLLUTANT PCB ANALYSIS, GC, (GS13)

Company Name	Facility	Sample Point	ASC Sample No.
NAO DISB POWERTRAIN CASTING OPER	300534	MW-2	JP1478

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Aroclor 1016	ND	.052	ND	P1P51912
Aroclor 1221	ND	.052	ND	P1P51912
Aroclor 1232	ND	.052	ND	P1P51912
Aroclor 1242	.277	.052	ND	P1P51912
Aroclor 1248	ND	.052	ND	P1P51912
Aroclor 1254	ND	.052	ND	P1P51912
Aroclor 1260	ND	.052	ND	P1P51912

PRIORITY POLLUTANT PCB ANALYSIS, GC, (GS13)

Company Name	Facility	Sample Point	ASC Sample No.
NAO DISB POWERTRAIN CASTING OPER	300534	STGEII-EFF	JP1481

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Aroclor 1016	ND	.00005	ND	P1P51912
Aroclor 1221	ND	.00005	ND	P1P51912
Aroclor 1232	ND	.00005	ND	P1P51912
Aroclor 1242	.00006	.00005	ND	P1P51912
Aroclor 1248	ND	.00005	ND	P1P51912
Aroclor 1254	ND	.00005	ND	P1P51912
Aroclor 1260	ND	.00005	ND	P1P51912

PRIORITY POLLUTANT PCB ANALYSIS, GC, (GS13)

Company Name	Facility	Sample Point	ASC Sample No.
NAO DISB POWERTRAIN CASTING OPER	300534	STGEII-INF	JP1480

Compounds	Sample Results mg/L	Detection Limits mg/L	Blank Results mg/L	Batch Number
Aroclor 1016	ND	.001	ND	P1P51912
Aroclor 1221	ND	.001	ND	P1P51912
Aroclor 1232	ND	.001	ND	P1P51912
Aroclor 1242	ND	.001	ND	P1P51912
Aroclor 1248	ND	.001	ND	P1P51912
Aroclor 1254	ND	.001	ND	P1P51912
Aroclor 1260	ND	.001	ND	P1P51912

These reporting limits are higher than usual due to matrix interferences.

Joblink: 619391

QUALITY ASSURANCE REPORT

Compound(s)		METHOD SPIKE					MATRIX SPIKE						SPIKE DUPLICATE					% COMPLETE	
		Blank Conc.	Added Conc.	Spiked Conc.	% Rec.	Rec. Limits	Spiked Sample Id.	Unspk Conc.	Added Conc.	Spiked Conc.	% Rec.	Rec. Limits	Added Conc.	Spiked Conc.	% Rec.	RPD	RPD Limit	Batch #	%
Aroclor 1260	mg/l	0	.00114	.00114	100	30-130L 8-127M												P1P51912	100L 100M

APPENDIX C

QUALITY ASSURANCE DATA

SUMMARY OF ANALYTICAL METHODOLOGY

Joblink # 619391

	REFERENCE	TITLE
608	EPA-600	Organochlorine Pesticides and/or PCBs

SURROGATE SUMMARY REPORT

QC BATCH: P1P51912 Aqueous (Pesticide compounds by GC)

SURROGATE ID	F048	F096	# OUT
SAMPLE ID			
BLANK	77	54	0
BLANK SPIKE	74	61	0
MW-1	65	54	0
MW-2	0 D	0 D	0
STAGEI-INF	0 D	0 D	0
STGEII-EFF	49	59	0
STGEII-INF	75	50	0
QC LIMITS	(30-130)	(30-130)	

SURROGATE ID

F048 = Decachlorobiphenyl (PCB)
F096 = 2,4,5,6-TCMX (PCB)

* Values outside of method quality control limits
D Sample was diluted, however, some surrogates may be reported if results were observed.

It is laboratory policy to allow one surrogate per sample fraction (acid, base-neutral or pesticide) to exceed the stated QC limits. This policy is based upon the USEPA SOW for the Contract Laboratory Program (CLP).

Laboratory Certifications

State	Agency	Certification #
Alabama	ADEM	40830
California	CADOH	1178
Colorado	CODOH	OH113
Connecticut	CDPH & AS	PH-0154
Delaware	DEHSS	OH113
Kansas	KSDHE	E-202 & E-1173
Louisiana	LADOHH	92-10
Maryland	MDDHMH	210
Massachusetts	MADEP	M-OH113
New Jersey	NJDEPE	74603
New York	NYDOH	10712
North Carolina	NCDEM	392
Ohio	OHEPA	OH113
Oklahoma	OKDEQ	9216
Pennsylvania	PADER	68-450
Rhode Island	RIDOH	214/142
South Carolina	SCDEHNR	92002
Tennessee	TNDOH/TNDEC	2978
Virginia	VADGS	00011
Washington	WADOE	C154
Wisconsin	WIDNR	999037160

Validated by:

- US Army Corps of Engineers . . . . . Chemical Analysis in Various Matrices

Approvals:

- Envirosafe . . . . . Waste Characterization Analysis
- USDA . . . . . Permit for Importing Soils
- Florida DEP . . . . . Quality Assurance Plan #930034G
- Naval Facilities Engineering Service Center . . . . . Chemical Analysis in Various Matrices

METHODOLOGY REFERENCES

ASTM	*American Society for Testing and Materials*, 1985 edition.
MCAWW	*Methods for Chemical Analysis of Water and Wastes*, April 1979 and Updated #1 March 1983.
CLP	*USEPA Contract Laboratory Program*, Document #OLMO3.0, update August 1994 #OLMO3.1 and Document #ILMO4.0.
EPA-500	*USEPA Methods for the Determination of Organic Compounds in Drinking Water,* EPA-600/4-88/039 December 1988.
EPA-600	*USEPA Test Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater*, EPA-600/4-82-057 July 1982.
NIOSH	*National Institute for Occupational Safety and Health*, 3rd edition, 1984.
SMEWW	*Standard Methods for the Examination of Water and Wastewater*, 17th edition, 1989.
STOA	*Spot Tests In Organic Analysis*, 7th edition, 1966.
SW-846	*Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods*, 3rd edition, September 1986 and Update #1 July 1992.
(1)	This method was modified to incorporate the use of Boron Trifluoride (BF3) as the derivatizing reagent according to Method 6640 in *SMEWW*, 17th edition, 1989.
Title 22	*Waste Extraction Test*, Title 22, Section 66261.126 Appendix 2 of the California Administrative Code, May 1991.

APPENDIX D

CHAIN-OF-CUSTODY RECORD(S)

REPORT KEY

mg/kg	= milligram per kilogram (ppm)
Mg/m^3	= milligram per cubic meter
ug/kg	= microgram per kilogram (ppb)
mg/L	= milligram per liter (ppm)
ug/L	= microgram per liter (ppb)
mg/W	= milligram per wipe
ug/W	= microgram per wipe
mg/SMP	= milligram per sample
ug/SMP	= microgram per sample (Tedlar Bag)
ug/smp	= microgram per sample
um/cm	= microMho per centimeter
pCi/l	= picocurie per liter
gm/cc	= grams per cubic centimeter
ppm	= parts per million
ppb	= parts per billion
ND	= Not detected at or above stated detection limit
<	= less than
>	= greater than
%	= percent
BTU/lb	= British Thermal Units per pound
Deg. C	= Degrees Celsius
n/a	= not applicable
Unk	= unknown
std	= result is relative to standard pH units
CV	= Conventionals
IR	= Infrared Spectrophotometric
GC	= Gas Chromatograph Instrument
GC/MS	= Gas Chromatography/Mass Spectrometer Instrument
GRO	= Gasoline Range Organics
DRO	= Diesel Range Organics
PCB	= Polychlorinated Biphenyls (PCBs)
EP TOX	= Extraction Procedure Toxicity
TCLP	= Toxicity Characteristic Leaching Procedure
RCRA	= Resource Conservation and Recovery Act
SOW	= Statement of Work

RC ENGINEERING & ENVIRONMENTAL, INC
GEO TEST, LTD

RC ENGINEERING & ENVIRONMENTAL, INC.
5859 SHERMAN ROAD • SAGINAW, MI 48604
PHONE: (517) 752-6500
FAX: (517) 752-6600

CUSTODY RECORD

REPORT PAGE: 1 OF 1

RECORD NUMBER: 2170

RCEE JOB NO.: E-954B

SAMPLED BY: Mike McAdams

REPORT TO: Daryl Gotham

DESTINATION: Analytical Services Corp 16406 US Route 224 East Findlay Ohio

RESULTS NEEDED WITHIN: _____ WEEKS _____ DAYS _____ HOURS

METAL SAMPLES FILTERED? ☐ YES ☐ NO

ITEM NO.	SAMPLE IDENTIFICATION	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE	NUMBER/TYPE CONTAINER	REQUESTED ANALYSES
1	MW-1	12-14-95	11:05 AM	water	1-1,000ml	PCB
2	MW-2	12-14-95	11:20 AM	water	1-1,000 ml	PCB
3	Stage I Influent	12-14-95	11:50	water	1-1,000 ml	PCB
4	Stage II Influent	12-14-95	12:10 P	water	1-1,000 ml	PCB
5	Stage II Effluent	12-14-95	12:20 P	water	1-1,000 ml	PCB

TRANSFER NO.	RELINQUISHED BY	DATE	TIME	ACCEPTED BY	DATE	TIME	CONDITION
1	Mike McAdams	12-14-95	5:00 PM	Shipped Via Fed EX			
1-5	Fedex Id 8940 6113	12-15-95	1037	Christina Bakley			Temp - 1.0°C CVB

ADDITIONAL COMMENTS (PLEASE RECORD SPECIAL HANDLING / HAZARD INFORMATION):

RC ENGINEERING & ENVIRONMENTAL, INC.
GEO-TEST, LTD.

GEOENVIRONMENTAL DAILY FIELD REPORT

Project PCB System (Frac Tank water Filtration) RCEE Job No. E-9542B

Location Saginaw Date 4-3-96

Client GMPT-SMCO Contractor Schrader Environmental

Arrival Time 930 Departure Time _____ Weather N/A

Observations/Tests Performed: ☐ UST Removal ☐ Site Reconnaisance ☐ Soil Boring Investigation

☐ Soil / Groundwater Sampling ☐ Site Maintenance and Repairs ☐ Surveying / Well Development

☐ Supervision / Monitoring ☒ Other Water Filtration

Equipment: ☐ PID Meter (060) ☐ Free Product Probe (072) ☐ ph/SC Meter (062) ☐ Coring Machine (020)
☐ Generator (014) ☐ DTGW Meter (064) ☐ Power Washer (050) ☐ Metal Detector (068)
☐ Submersible Pump (067) ☐ Peristaltic Pump (066) ☐ Survey Equip. (052) ☐ Tri-Gas Meter (079)
☐ Air Sampling Pump (080) ☐ ____Bailers (074) ☐ ____Filters (076) ☐ ____Barrels (078)
☐ ____Locks ☐ ____Tyvek Suits (073) ☒ Routine Decon. Supplies (070)
Compressor

Condition of Work Area Upon Arrival to Jobsite : Acceptable

Personnel on Site: MDM

Soil and Groundwater Description (Profile and Excavation Dimensions): _____

Observations and Important Conversations: 930 prepared the Butler Building
And the old set of carbon Filters
10^00 met Schrader And unloaded the filters
11^00 used compressed Air to push (dewater) the old
GAC Filters, this water went into the new carbon
filters, then switched over the plumbing And sample
ports to the new GAC Filters, began circulating the
from Drum # 1 , each drum of water was circulated
thru the GAC Filters for ≈ 40 minutes before Sampling

OVER

Observations and Important Conversations (cont.):

Sample Times

Drum #1 11 50A
" #3 12 30P
" #4 1 15P

After Sampling Drum #1 the drum was ≈ 1/2 full due to filling the voids of the new GAC drums, After circulating drum #3 for 40 minutes @ 2½ PSI, drum #3 was sampled and closed up

Opened drum #4 to circulate & Filter it was ≈ 2/3 full Circulated #4 thru the GAC Filters for 40 minutes & sampled. used compressed Air to de-water the new GAC Filters. De watering effluent was placed into drum #1

Cleaned up the area, labled the old GAC Filters and Asked both DAN and Jim to place them in the Oil House for disposal

prepared the Chain of Custody and packaged the samples for shipment

Condition of Work Area Upon Departure from Site: Good

Parties Notified of our Observation / Test Results: ☐ Project Manager ☐ Owner ☐ Contractor
☐ Other

Follow-up Work, Repairs or Maintenance Required? ☐ Yes ☐ No
Project Manager Notified? ☐ Yes ☐ No

Type of Follow-up Work Needed:

Reported By: Mike McClain

CT&E Environmental Services Inc.

Anatech Division
Analytical Report

Lab I.D. :	72976
Report Date :	06/17/1997
Project :	Misc. Sampling
Client :	Saginaw Metal Casting Operations
	1629 N. Washington Ave.
	P.O. Box 5073 Saginaw, MI 48605
Attention :	Lynn Porath

4 pages including cover sheet

Anatech Division
1200 Conrad Ind. Dr.
Ludington, MI 49431

616-843-1877 - Phone
616-845-9942 - Fax

CT&E Environmental Services Inc.

Saginaw Metal Casting Operations

Sample:	72976-0616	Matrix:	Water / Grab
Client Sample:	Influent	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result		Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)						
Aroclor Extraction	-		-	-	EPA 608	06/12/1997 LMS
Aroclor-1016	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1221	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1232	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1242	3700	D	ug/L	40	"	06/16/1997 SM
Aroclor-1248	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1254	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1260	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1262	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1268	ND	D	ug/L	40	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Saginaw Metal Casting Operations

Sample:	72976-0617	Matrix:	Water / Grab
Client Sample:	MW-1	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result	Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor Extraction	-	-	-	EPA 608	06/12/1997 LMS
Aroclor-1016	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1221	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1232	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1242	0.3	ug/L	0.1	"	06/16/1997 SM
Aroclor-1248	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1254	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1260	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1262	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1268	ND	ug/L	0.1	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Saginaw Metal Casting Operations

Sample:	72976-0618	Matrix:	Water / Grab
Client Sample:	MW-2	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result		Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)						
Aroclor Extraction	-		-	-	EPA 608	06/12/1997 FM
Aroclor-1016	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1221	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1232	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1242	460	D	ug/L	5	"	06/16/1997 SM
Aroclor-1248	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1254	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1260	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1262	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1268	ND	D	ug/L	5	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Chain of Custody

CT&E Environmental Services Inc.

Anatech Division, 1200 Conrad Industrial Dr., Ludington, MI 49431-2681

Phone: 616-843-1877 FAX: 616-845-9942

Lab ID# 72976

Page

Results To: SAGINAW METAL CASTINGS
1629 N. WASHINGTON AVE.
SAGINAW MI. 48605

Attention: RAY ILKKA

Telephone # 517-757-1473

FAX ? (Yes) No FAX # 517-757-1652

Invoice To: SAME

Telephone #

Project Name: PCB SAMPLING

Project Number:

State in which samples were collected: MI

REQUIRED COMPLETION DATE:

Sampled by: D. GOTHAM

Work Authorization Signature: L.M. Porath

This signature authorizes CT&E to perform the work requested on this form and acknowledges the terms and conditions of payment which are listed on the reverse side of this form.

Test Methods: PCB's

Comment/Notes: Quote #

Attn: R.P.

Sample ID	Client Sample ID	Sampling Location	Date	Time am / pm	Comp Grab C / G	Sample Matrix	Drinking Water Y / N	Field Filtered Y / N	PCB's	VOC	Glass	O&G	250m Pl	500m Pl	1L Pl	Other	pH Check
0616	INFLUENT		06/05/97	AM	G	Liquid	N	N	✓		1						
	~~INTERMEDIATE~~ LMP		~~06/05/97~~	~~AM~~	~~G~~	~~Liquid~~	~~N~~	~~N~~	~~✓~~								
	~~EFFLUENT~~ LMP		~~06/05/97~~	~~AM~~	~~G~~	~~Liquid~~	~~N~~	~~N~~	~~✓~~								
0617	MW-1		06/05/97	AM	G	Liquid	N	N	✓		1						
0618	MW-2		06/05/97	AM	G	Liquid	N	N	✓		1						

Relinquished by	Date / Time (am / pm)	Relinquished by	Date / Time (am / pm)	Relinquished by	Date / Time (am / pm)
L.M. Porath	6-5-97 / 12:00				
Received by	**Date / Time (am / pm)**	**Received by**	**Date / Time (am / pm)**	**Received by**	**Date / Time (am / pm)**
					6/6/97
Cooler Temp #1	**Cooler Temp #2**	**Cooler Temp #3**	**Cooler Temp #4**		
11°C					

CT&E Environmental Services Inc., Anatech Division

TERMS AND CONDITIONS

PAYMENT TERMS:

CT&E ESI shall submit invoices to the client on a monthly basis for any and all work completed during the previous month. Client shall pay such invoices within thirty (30) days of invoice date. Past due invoices shall be subject to a delinquency charge of one and one-half percent (1.5%) per month [eighteen percent (18%) per annum] unless a lower rate is required under applicable law, in which case the lower rate shall apply. Client agrees to pay any and all costs and expenses incurred by CT&E ESI, including attorney fees and court costs, to collect any past due amounts that arise out of this contract.

TURNAROUND TIME (TAT):

TAT is measured in business days (weekends and holidays excluded) and begins the day after the sample arrives at the laboratory. CT&E ESI's typical TAT is 10 business days. Expedited service, while available with advance consultation, is dependent upon sample numbers and instrument availability.

STANDARD FEES:

Fees are per CT&E ESI's current price list and are subject to change without prior notice. All analyses are per EPA or other appropriate protocol. Fees include sample bottles and shipping containers/coolers. CT&E ESI requires at least 3 business days notice in order to properly prepare and ship sample bottles and containers. Non-expedited shipping costs to the client are assumed by CT&E ESI. Rush delivery shipping charges are assumed by the client. Results can be delivered by mail and may be provided with special arrangements verbally, by fax or computer disk.

EXPEDITED FEES:

Typical surcharges for rush analysis (based upon a 10 day TAT) are as follows:

1 - 2 Day TAT = 2 x Standard Fee

3 - 5 Day TAT = 1.5 x Standard Fee

DISCLAIMER and ASSUMED CLIENT RESPONSIBILITY:

CT&E ESI shall perform all services with reasonable care and diligence normal to the environmental testing laboratory industry. CT&E ESI's sole obligation hereunder shall be to re-perform services which are materially deficient because failure to perform said services in accordance with this Agreement and the standards of the industry, so long as such deficiencies are reported in writing to CT&E ESI within thirty (30) days after the discovery thereof, but in no event later than one (1) year from the performance of the services by CT&E ESI.

EXCEPT AS HEREINBEFORE PROVIDED, CT&E ESI MAKES NO EXPRESS OR IMPLIED WARRANTY OF MERCHANT ABILITY OF FITNESS FOR A PARTICULAR PURPOSE ON THE SERVICES AND/OR RELATED MATERIALS TO BE FURNISHED BY CT&E ESI. IN NO EVENT SHALL CT&E ESI BE LIABLE FOR ANY INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, NOR SHALL CT&E ESI BE LIABLE IN ANY EVENT, INCLUDING ITS OBLIGATION TO RE-PERFORM, FOR ANY LOSSES, DAMAGES OR CLAIMS IN EXCESS OF THE AMOUNT PAID TO CT&E ESI FOR THE SERVICES HEREUNDER.

EXPLANATION OF TERMS AND QUALIFIERS

TERMS / QUALIFIERS	DESCRIPTIONS
Result	The value calculated from the analytical test.
Reporting Detection Limit	The lowest detection level that can be reliabiy achieved during routine laboratory operating conditions. Federal or state agencies may specify the reporting level for select tests.
Method Detection Limit - MDL	The minimum concentration of an analyte that can be determined with 99% confidence that the true value is greater than zero. MDL studies are usually performed on pure reagent water or contaminate-free soil.
Surrogates	Organic compounds that are added to the sample prior to testing to monitor the efficiency of the sample preparation and potential matrix interferences.
Matrix Interference	Conditions in the sample itself which cause a positive or negative bias in the result or which prevent accurate quantitation.
Blanks	Contaminate-free samples that are analyzed to monitor potential bias to the sample results due to sample preparation or instrument contamination.
Qualifiers	Flags which indicate problems or issues that could affect the result.
R	The data should be considered suspect because some aspect of the test did not meet method requirements.
B	The analyte was found in the associated blanks as well as in the sample.
J	The result should be considered estimated.
M	A matrix interference affected the analysis.
F	The analyte was detected but the result was between the normal reporting level and the MDL. The result should be considered estimated.
D	The sample required a dilution.

CT&E Environmental Services Inc.

Anatech Division
Analytical Report

Lab I.D. :	72976
Report Date :	06/17/1997
Project :	Misc. Sampling
Client :	Saginaw Metal Casting Operations
	1629 N. Washington Ave.
	P.O. Box 5073 Saginaw, MI 48605
Attention :	Lynn Porath

4 pages including cover sheet

Anatech Division
1200 Conrad Ind. Dr.
Ludington, MI 49431

616-843-1877 - Phone
616-845-9942 - Fax

CT&E Environmental Services Inc.

Saginaw Metal Casting Operations

Sample:	72976-0616	Matrix:	Water / Grab
Client Sample:	Influent	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result		Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)						
Aroclor Extraction	-		-	-	EPA 608	06/12/1997 LMS
Aroclor-1016	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1221	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1232	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1242	3700	D	ug/L	40	"	06/16/1997 SM
Aroclor-1248	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1254	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1260	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1262	ND	D	ug/L	40	"	06/16/1997 SM
Aroclor-1268	ND	D	ug/L	40	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Saginaw Metal Casting Operations

Sample:	72976-0617	Matrix:	Water / Grab
Client Sample:	MW-1	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result	Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)					
Aroclor Extraction	-	-	-	EPA 608	06/12/1997 LMS
Aroclor-1016	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1221	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1232	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1242	0.3	ug/L	0.1	"	06/16/1997 SM
Aroclor-1248	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1254	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1260	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1262	ND	ug/L	0.1	"	06/16/1997 SM
Aroclor-1268	ND	ug/L	0.1	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Saginaw Metal Casting Operations

Sample:	72976-0618	Matrix:	Water / Grab
Client Sample:	MW-2	Location:	
COLLECTED:	06/05/1997 :	Project:	Misc. Sampling
RECEIVED:	06/06/1997 14:26	Sampled By:	DG

Test Description	Result		Unit	Reporting Detection Limit	Method	Date/Analyst
POLYCHLORINATED BIPHENYLS (PCBs)						
Aroclor Extraction	-		-	-	EPA 608	06/12/1997 FM
Aroclor-1016	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1221	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1232	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1242	460	D	ug/L	5	"	06/16/1997 SM
Aroclor-1248	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1254	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1260	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1262	ND	D	ug/L	5	"	06/16/1997 SM
Aroclor-1268	ND	D	ug/L	5	"	06/16/1997 SM

ND = Non Detectable

All Solid/Soil samples are reported on dry weight basis unless otherwise noted.

Senior Project Manager

Kelly Wilson for
Maria G. Bissell

Reported : 06/17/1997

Chain of Custody

Lab ID# 72976

CT&E Environmental Services Inc.
Anatech Division, 1200 Conrad Industrial Dr., Ludington, MI 49431-2681

Page

Phone: 616-843-1877 FAX: 616-845-9942

Results To: SAGINAW METAL CASTINGS
1629 N. WASHINGTON AVE.
SAGINAW MI. 48605

Attention: RAY ILKKA

Telephone # 517-757-1473

FAX ? (Yes) No FAX # 517-757-1652

Invoice To: SAME

Telephone #

Project Name: PCB SAMPLING

Project Number:

State in which samples were collected: MI

REQUIRED COMPLETION DATE:

Sampled by: D. GOTHAM

Work Authorization Signature: L.M. Porath

This signature authorizes CT&E to perform the work requested on this form and acknowledges the terms and conditions of payment which are listed on the reverse side of this form.

Test Methods: PCB's

Comment/Notes: Quote #

Ann Arbor V.P.

Sample ID	Client Sample ID	Sampling Location	Date	Time am / pm	Comp Grab C / G	Sample Matrix	Drinking Water Y / N	Field Filtered Y / N	PCB's	VOC	Glass	O&G	250m Pl	500m Pl	1L Pl	Other	pH Check
0616	INFLUENT		06/05/97	AM	G	Liquid	N	N	✓		1						
	~~INTERMEDIATE~~ LMP		~~06/05/97~~	~~AM~~	~~G~~	~~Liquid~~	~~N~~	~~N~~	~~✓~~								
	~~EFFLUENT~~ LMP		~~06/05/97~~	~~AM~~	~~G~~	~~Liquid~~	~~N~~	~~N~~	~~✓~~								
0617	MW-1		06/05/97	AM	G	Liquid	N	N	✓		1						
0618	MW-2		06/05/97	AM	G	Liquid	N	N	✓		1						

Relinquished by	Date / Time (am / pm)	Relinquished by	Date / Time (am / pm)	Relinquished by	Date / Time (am / pm)
L.M. Porath	6-5-97 / 12:00				
Received by	Date / Time (am / pm)	Received by	Date / Time (am / pm)	Received by	Date / Time (am / pm)

APPENDIX 9.5

D.32 Contamination in Railroad Tracks West of the Cupola Cooling Tower

Release Remediation Information

GM POWERTRAIN

Receipt No. Z 237 708 671
CERTIFIED MAIL
Return Receipt Requested

October 15, 1996

Ms. Rhonda Klann
Environmental Engineer
Environmental Response Division
Michigan Department of Environmental Quality
503 N. Euclid Ave.
Bay City, MI 48706

Re: General Motors Powertrain Group - Saginaw Metal Casting Operations (SMCO)
Railroad Track area west of Cupola Cooling Water Towers

Dear Ms. Klann:

SMCO is submitting a proposed Supplemental Investigation Workplan for the Railroad Track area west of the Cupola Cooling Water Towers. SMCO will begin this project as soon as approval on the investigation workplan is received from Michigan Department of Environmental Quality.

Please contact me at (517) 757-2686 or Ray Ilkka at (517) 757-1473 if you have any questions or comments.

Sincerely yours,

J S Toth

J. S. Toth, Superintendent
Environmental Activities

Attachment

bc: C. Curtin, Emcon
R. Ilkka
D. Kwasny
M. Tomka, CRA (w/o attachment)
L. Tucker

SUPPLEMENTAL INVESTIGATION WORK PLAN FOR THE RAILROAD TRACK AREA WEST OF CUPOLA COOLING TOWERS

General Motors Powertrain Group
Saginaw Metal Casting Operations
Saginaw, Michigan

OCTOBER 1996
REF. NO. 5838 (1)
This report is printed on recycled paper.

CONESTOGA-ROVERS & ASSOCIATES

TABLE OF CONTENTS

		Page
1.0	INTRODUCTION	1
	1.1 STATEMENT OF PURPOSE	1
2.0	RAILROAD AREA - SUMMARY OF INFORMATION AND PREVIOUS WORK	2
	2.1 SITE CONDITIONS	2
	2.1.1 Site Background	2
	2.2 ADDITIONAL SOIL INVESTIGATION	2
	2.3 GROUNDWATER INVESTIGATION	3
3.0	RAILROAD AREA - PROPOSED INVESTIGATION	5
	3.1 SOIL INVESTIGATION	5
	3.2 GROUNDWATER INVESTIGATION	5
4.0	REPORTING	7
	4.1 SUPPLEMENTAL INVESTIGATION	7
	4.2 REMEDIAL ACTION PLAN	7
5.0	SCHEDULE	8

LIST OF FIGURES

		Following Page
FIGURE 1.1	SITE LOCATION	1
FIGURE 1.2	SITE PLAN	1
FIGURE 2.1	PREVIOUS SOIL & GROUNDWATER INVESTIGATION - RAILROAD AREA	2
FIGURE 3.1	PROPOSED SOIL AND GROUNDWATER INVESTIGATION - RAILROAD AREA	5
FIGURE 5.1	PROJECT SCHEDULE - RAILROAD AREA	8

LIST OF TABLES

TABLE 2.1	SOIL SAMPLE SUMMARY - RAILROAD AREA INVESTIGATION	2

LIST OF APPENDICES

APPENDIX A	MINUTES FROM APRIL 29, 1994 MEETING WITH MDEQ
APPENDIX B	SOIL BORINGS AND WELL LOGS - RAILROAD AREA
APPENDIX C	ANALYTICAL RESULTS - RAILROAD AREA
APPENDIX D	MONITORING WELL DETAILS - RAILROAD AREA

1.0 INTRODUCTION

General Motors Corporation has retained Conestoga-Rovers & Associates (CRA) to conduct a Supplemental Investigation for the railroad track area west of the cupola cooling towers (Railroad Area) and to prepare a remedial action plan (RAP) for closure of the area at the General Motors Powertrain (GMPT) Group, Saginaw Metal Casting Operations (Site), located in Saginaw, Michigan. The Site location is presented on Figure 1.1. The Site plan is presented on Figure 1.2.

1.1 STATEMENT OF PURPOSE

This Supplemental Investigation Work Plan has been prepared to address comments received from MDEQ (formerly MDNR) at a meeting on April 29, 1994. The MDEQ's meeting minutes are presented in Appendix A. This document has also been revised to reflect the change in legislation from former Act 307 to Act 451 (Part 201).

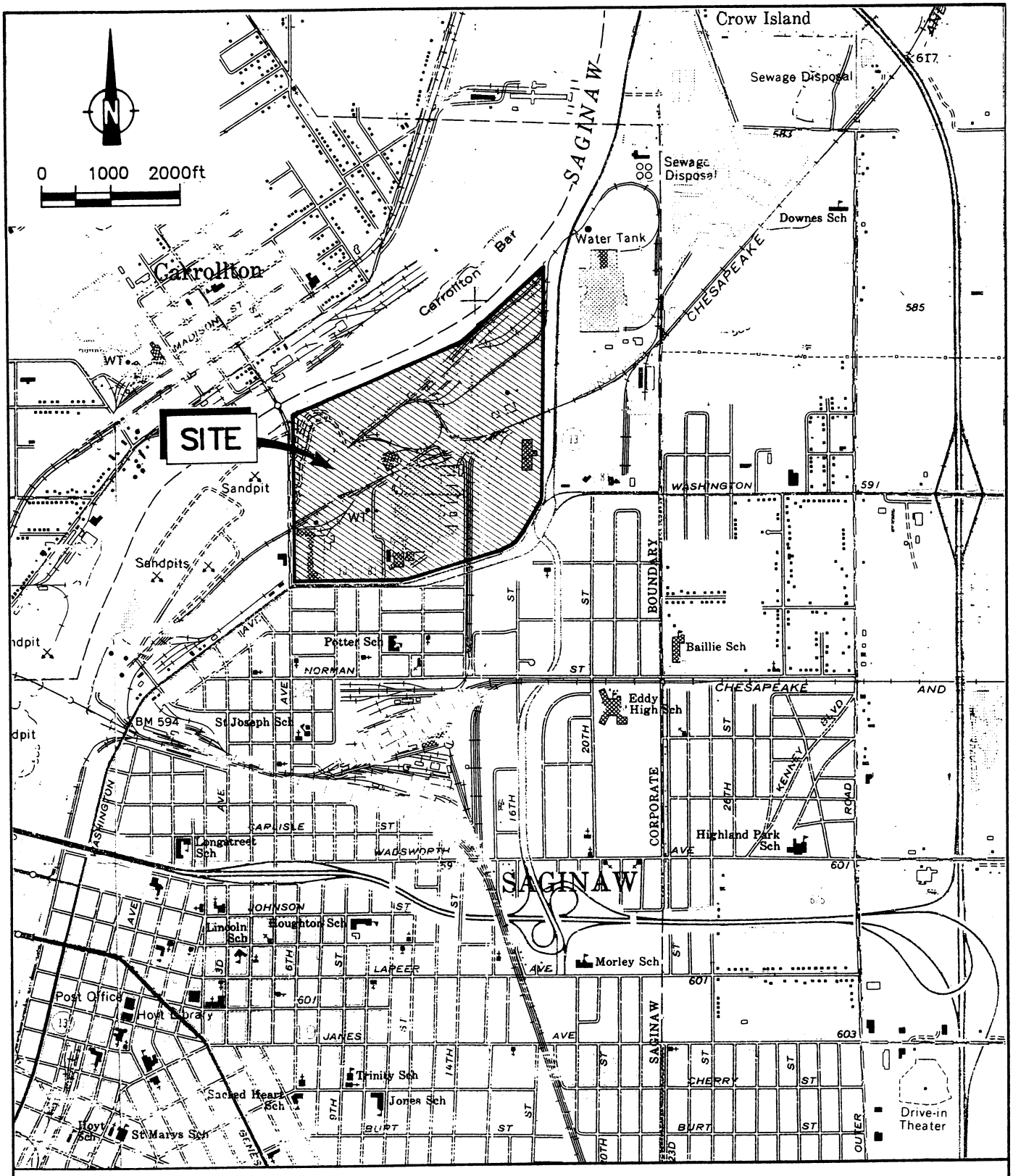
The objectives of this Supplemental Work Plan for the Railroad Area are as follows:

1. compile and evaluate all of the information and data that are available for the Railroad Area including the past investigative activities;

2. conduct a supplemental investigation to finish determining the nature and extent of the release or, threatened release, if any, of contaminants at the Railroad Area;

3. address Michigan Department of Environmental Quality (MDEQ) comments discussed in the April 29, 1994 meeting; and

4. develop a schedule for a remedial action plan (RAP), if necessary, to obtain closure for the Railroad Area.



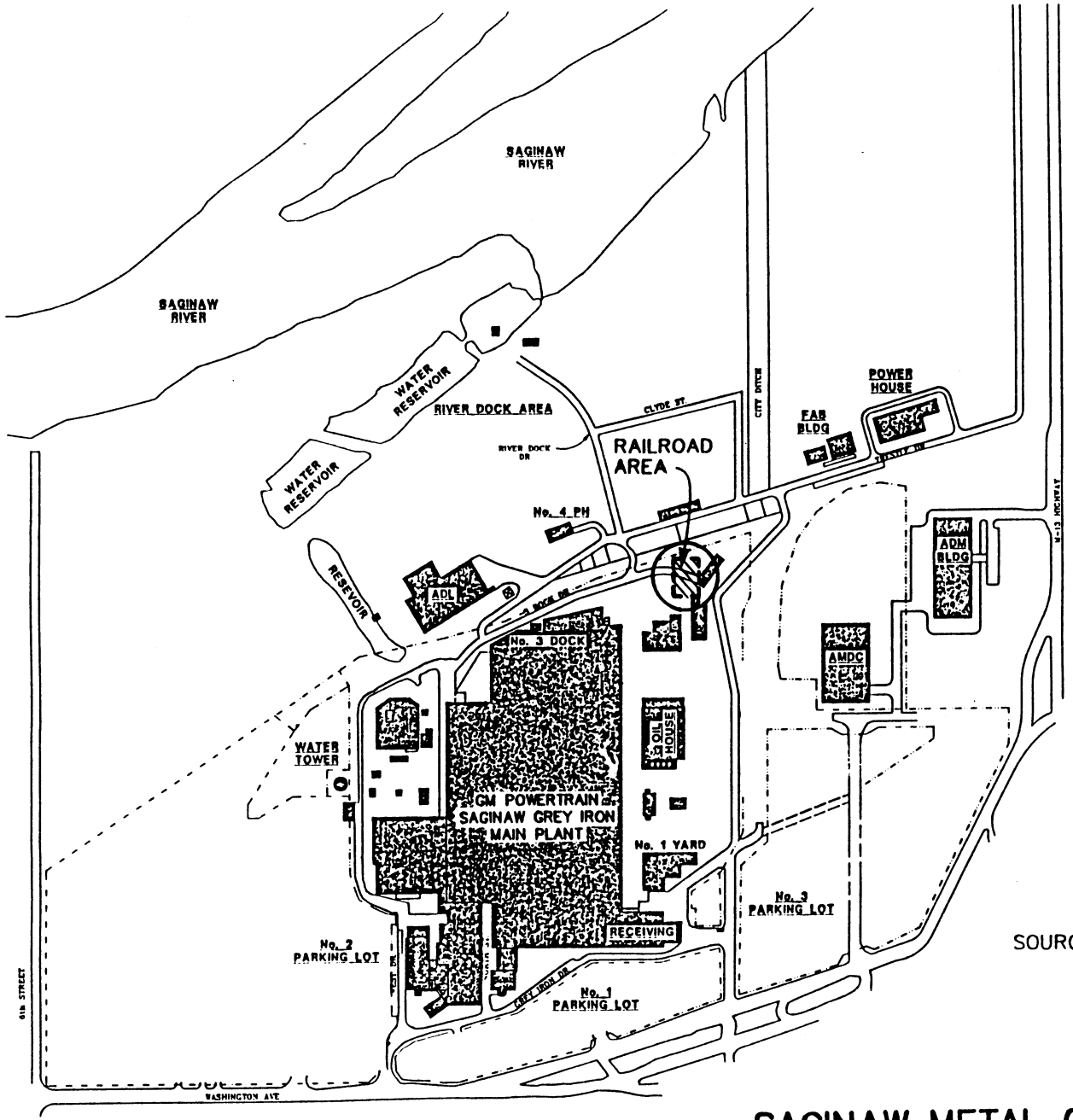
SOURCE: USGS QUADRANGLE MAP, SAGINAW, MICH.

CRA

figure 1.1

SITE LOCATION
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

5838 (1) MAY 09/95 (W) REV.0



N

N.T.S.

SOURCE: WILLIAM A. KIBBE & ASSOC. INC. JUNE 15, 1993.

figure 1.2

SITE PLAN
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 MAY 09/95 (W) REV.0

2.0 RAILROAD AREA - SUMMARY OF INFORMATION AND PREVIOUS WORK

2.1 SITE CONDITIONS

This section presents a compilation of Site-specific data on the conditions at the Railroad Area west of the cupola cooling towers presented on Figure 2.1. The Railroad Area data has been compiled by reviewing the findings from the initial investigation, which was completed in December 1993 as a result of parameters identified above former Act 307 Type C levels in the vicinity of the railroad tracks during the Tank 10 Area subsurface investigation.

2.1.1 Site Background

On December 3, 1993, four soil borings were completed to investigate the Tank 10 area. The results indicated the presence of polynuclear aromatics (PNAs) west of Tank 10, outside the foundation containment isolating the Tank 10 area. The results from soil borings 1, 2 and 4 installed to investigate Tank 10 are expected to be a result of activities in the Railroad Area. Soil boring locations are presented on Figure 2.1. The results from the December 3, 1993 investigation are summarized in Table 2.1. Appendix B presents the soil boring logs and Appendix C presents the analytical data reports.

2.2 ADDITIONAL SOIL INVESTIGATION

On March 16-17, 1994, four additional soil borings were completed at the locations presented on Figure 2.1 in order to further investigate the vertical and horizontal extent of PNAs in the Railroad Area. Soil borings were advanced through the upper fill layer to native clay which was encountered at a depth of approximately 12 feet below ground surface. Soil boring logs are presented in Appendix B.

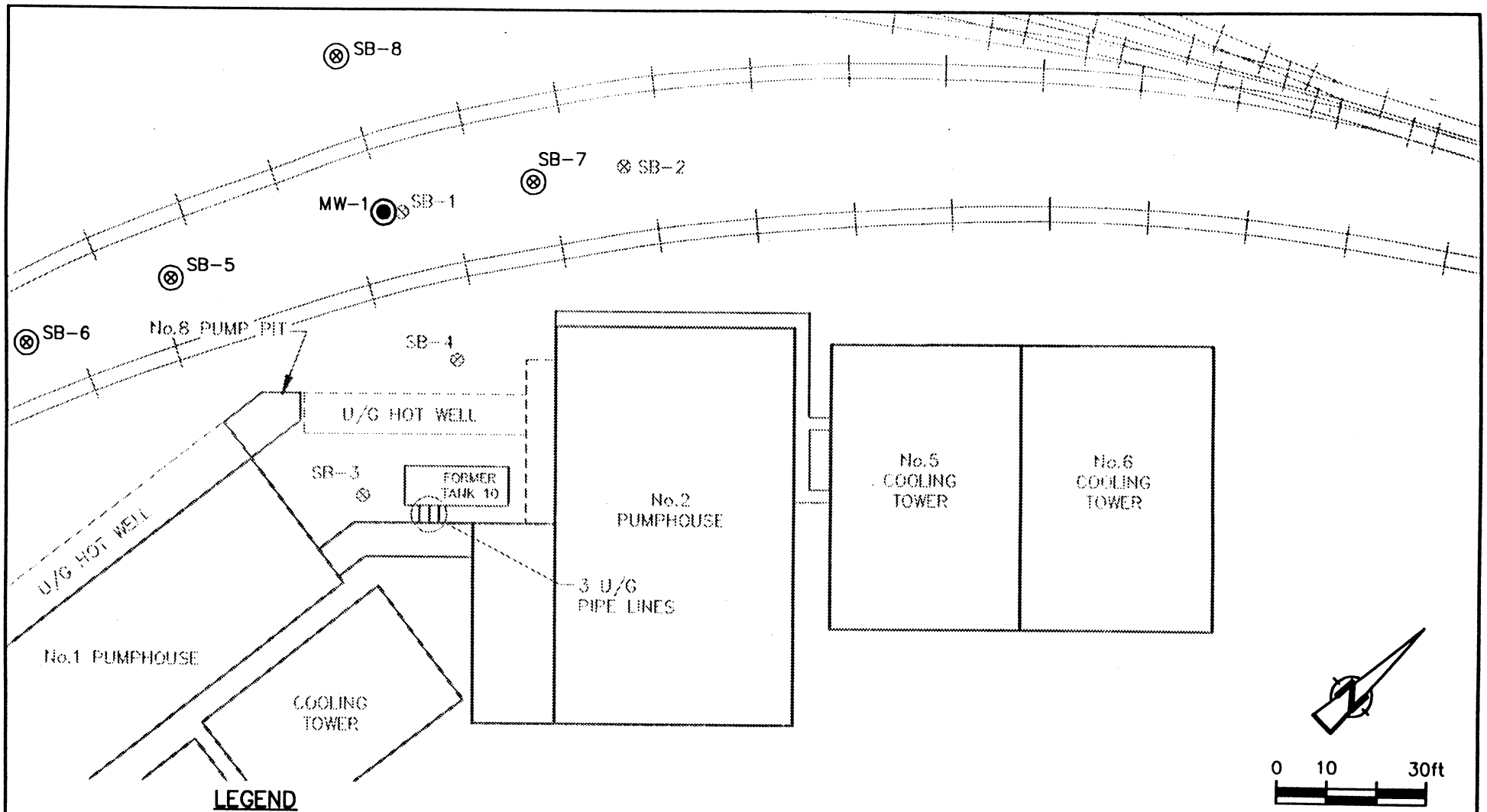


figure 2.1

PREVIOUS SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (1) MAY 09/95(W) REV.0 (P-04)

TABLE 2.1

SOIL SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	Units	December 3, 1993				March 16-17, 1994				Acceptable MDL	MDEQ Act 451 Generic Residential DCV	MDEQ Act 451 Generic Industrial DCV	MDEQ Act 451 Generic Residential 20xDW	MDEQ Act 451 Generic Industrial 20xDW
		SB-1 (6-8')	SB-2 (6-8')	SB-3 (6-8')	SB-4 (4-6')	SB-5 (6-8')	SB-6 (2-4')	SB-7 (3.5-5')	SB-8 (2-4')					
Benzene	(µg/kg)	<10	<10	13	<10						8.8E+4	8.5E+5	100	100
Toluene	(µg/kg)	14	<10	32	<10						2.4E+7	1.6E+8	16,000	20,000
Ethylbenzene	(µg/kg)	<10	<10	<10	<10						1.1E+7	7.2E+7	1,500	14,000
Xylenes	(µg/kg)	<30	<30	<30	<30						2.0E+8	1.0E+9	5,600	200,000
Benzo(a)Anthracene	(µg/kg)	8,900	1,400	<330	2,600	<330	<330	430	<830	<330	1.4E+4	2.1E+5	--	--
Benzo(a)Pyrene	(µg/kg)	6,500	<330	<330	1,500	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	--	--
Benzo(b)Fluoranthene	(µg/kg)	5,800	870	<330	1,800	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	--	--
Benzo(g,h,i)Perylene	(µg/kg)	4,400	600	<330	1,100	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	--	--
Benzo(k)Fluoranthene	(µg/kg)	5,800	1,200	<330	1,700	<330	<330	<330	<830	<330	1.4E+5	2.1E+6	--	--
Dibenzo(a,h)Anthracene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	--	--
Indeno(1,2,3-cd)Pyrene	(µg/kg)	4,400	700	<330	1,200	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	--	--
Naphthalene	(µg/kg)	<3,300	<330	<330	360	<330	<330	<330	<830	<330	1.5E+7	1.6E+8	5.2E+3	15,000
Acenaphthene	(µg/kg)	<3,300	<330	<330	540	<330	<330	<330	<830	<330	7.6E+7	8.1E+8	26,000	76,000
Acenaphthylene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	520	1,500
Fluorene	(µg/kg)	<3,300	<330	<330	580	<330	<330	<330	<830	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Phenanthrene	(µg/kg)	8,400	1,000	<330	5,300	<330	<330	570	1,000	<330	1.5E+6	1.6E+7	5.2E+2	1,500
Anthracene	(µg/kg)	5,600	<330	<330	1,200	<330	<330	<330	<830	<330	4.2E+8	1.0E+9	1.5E+5	420,000
Fluoranthene	(µg/kg)	23,000	2,400	<330	4,600	<330	<330	600	1,200	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Pyrene	(µg/kg)	21,000	5,500	<330	8,700	<330	<330	580	980	<330	3.2E+7	3.4E+8	1.1E+4	32,000
Chrysene	(µg/kg)	8,600	1,200	<330	2,000	<330	<330	530	<830	<330	1.4E+6	2.1E+7	--	--

Notes:

-- Compound not expected to leach to groundwater under most conditions.

Above Act 451 Generic Residential 20x Drinking Water Criteria.

Above Act 451 Generic Industrial 20x Drinking Water Criteria.

Above Act 451 Generic Residential Direct Contact Values Criteria.

Continuous soil samples were collected from each borehole. One sample was selected at each of the four locations based on visual, olfactory and/or photoionization detector (PID) readings. Samples were analyzed for PNAs. The sample results are presented in Table 2.1. Analytical data reports are presented in Appendix C.

Soil borings 7 and 8 contained phenanthrene above Act 451 Generic Residential values. In addition, soil boring 8 had a detection limit of acenaphthylene above the Act 451 Generic Residential values and exhibited elevated detection limits due to matrix interference. Soil borings 5 and 6 contained no parameters above detection limits.

Analytical results from soil borings 1 and 4 completed in December 1993 indicate soil contamination above Act 451 Generic Industrial values at a depth of 4 to 8 feet. The results from soil boring 2 completed in December 1993 indicate soil contamination above Act 451 Generic Residential values at a depth of 6 to 8 feet. The results from soil borings 7 and 8 completed in March 1994 indicate soil contamination above Act 451 Generic Residential values at a depth of 2 to 5 feet.

2.3 GROUNDWATER INVESTIGATION

On March 16, 1994 a monitoring well was completed to 12 feet below ground surface at the location of highest PNA concentrations (SB-1) from the December 3, 1993 investigation. Monitoring well details are presented in Appendix D.

Groundwater was sampled on March 17, 1994 at well MW-1 and contained no PNAs above the detection limits. The analytical data report is presented in Appendix C.

Groundwater was encountered at approximately 6 feet below ground surface during the December 3, 1993 soil boring investigation and between 7 and 12 feet on the March 16-17, 1994 soil boring investigation.

Groundwater at monitoring well MW-1 was 6 feet below ground surface 24 hours after development.

3.0 RAILROAD AREA - PROPOSED INVESTIGATION

3.1 SOIL INVESTIGATION

Additional chemical analyses are necessary in this area to delineate the area of soil affected. Four soil borings will be completed at the locations presented on Figure 3.1. The soil borings will continue to a depth of two feet below the water table. Soil samples will be collected by continuous split-spoon sampling. It should be noted that the proposed soil boring locations may be adjusted in the field to some degree to account for obstacles such as structures and buried utilities.

One discrete soil sample will be collected from each soil boring. The soil sample will be selected based on visible staining or having elevated PID readings.

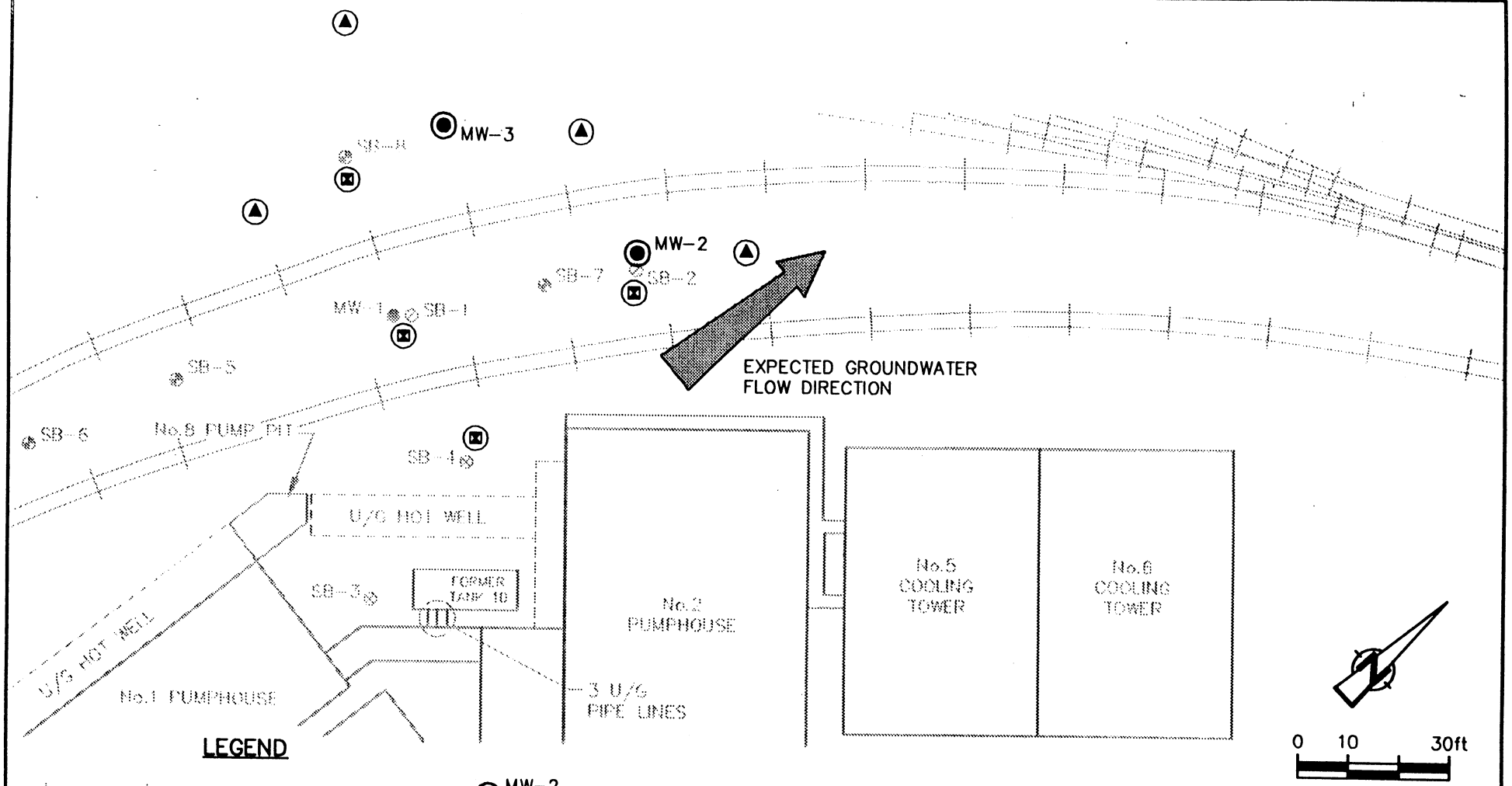
Soil samples will be analyzed for PNAs.

If needed, additional soil borings may be added to define the horizontal and vertical extent of affected soils based on visual inspection of soil samples and PNA results.

In addition, four surficial soil samples will be collected. Surficial soil samples will be analyzed for PNAs. The proposed locations of the surficial soil samples are presented on Figure 3.1. The surficial soil samples will be compared to the direct contact exposure criteria.

3.2 GROUNDWATER INVESTIGATION

A groundwater monitoring network has been proposed for the Railroad Area. The monitoring network will consist of two proposed monitoring wells, MW-2 and MW-3, and the existing well MW-1. The monitoring well network will be used to determine the hydrogeologic characteristics of the Railroad Area. Figure 3.1 presents the location of the proposed monitoring wells. It should be noted that the proposed monitoring



LEGEND

- RAILWAY
- SB-1 — SOIL BORING LOCATION (DECEMBER 3, 1993)
- SB-5 — SOIL BORING LOCATION (MARCH 16-17, 1994)
- MW-1 — MONITORING WELL LOCATION
- MW-2 — PROPOSED MONITORING WELL LOCATION
- PROPOSED SOIL BORING LOCATION
- PROPOSED SURFICIAL SOIL SAMPLE LOCATION

figure 3.1

PROPOSED SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (1) JUNE 27/95(W) REV.1 (P-05)

well locations may be adjusted in the field to some degree to account for obstacles such as structures and utilities. The monitoring wells will be stainless-steel wells with 5-foot screens and will be screened across the water table.

All existing and proposed monitoring wells will be surveyed to the USGS datum.

One round of groundwater samples will be taken from each of the wells in the monitoring network. An additional round of groundwater samples from the downgradient monitoring well(s) will be analyzed once the groundwater flow direction has been determined. The sample(s) will be analyzed for PNAs.

In addition, four rounds of static water levels will be recorded on a quarterly basis to define groundwater flow directions over a period of one year.

The need for additional downgradient wells will be determined based on the results of groundwater samples and the confirmed groundwater flow direction.

4.0 REPORTING

4.1 SUPPLEMENTAL INVESTIGATION

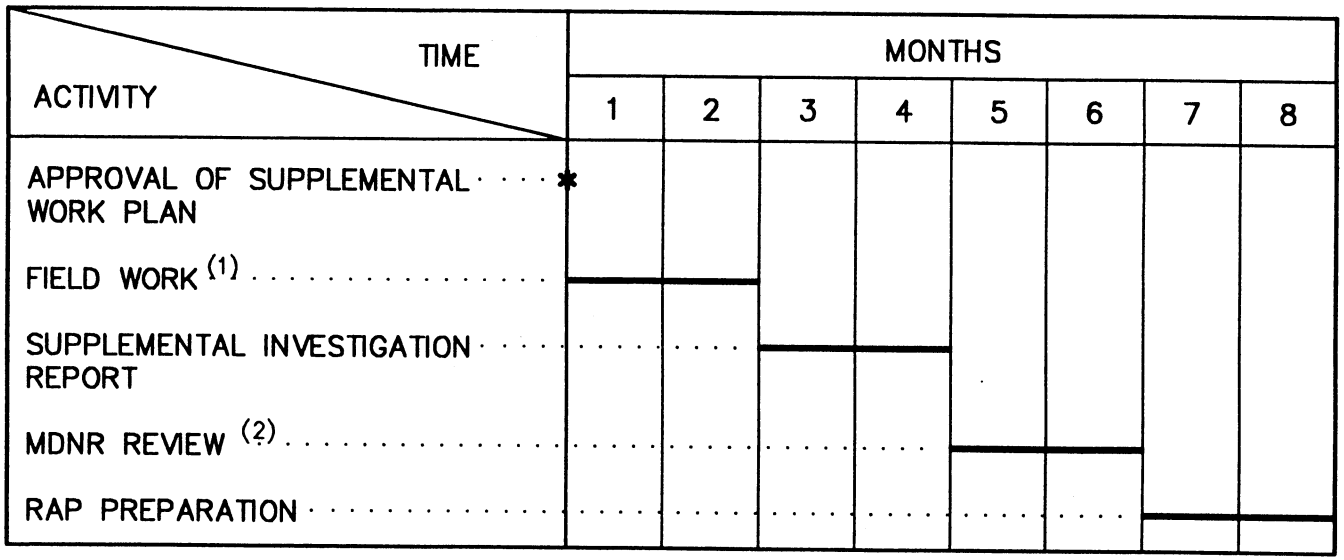
A supplemental investigation report will present the results of the supplemental work.

4.2 REMEDIAL ACTION PLAN

A RAP will be prepared and submitted to the MDEQ after the MDEQ approves the supplemental investigation report.

5.0 SCHEDULE

Figure 5.1 presents the schedule to complete the work in the Railroad Area.



LEGEND

✱ MILESTONE EVENT

——— CONTINUOUS ACTIVITY

NOTES: (1) SCHEDULE MAY BE ADJUSTED DUE TO WEATHER

(2) RAP PREPARATION MAY BE DELAYED BASED ON MDNR REVIEW AND COMMENTS.

figure 5.1

RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (1) OCT 10/96(W) REV.1 (S-01)

APPENDIX A

MINUTES FROM APRIL 29, 1994 MEETING WITH MDNR

5838

GM GREY IRON
RAILROAD TRACKS WEST OF CUPOLA COOLING TOWERS

Meeting held: April 29, 1994, 1:00 PM, MDNR Saginaw District Offices

Participants: See attached sheet

Purpose: To discuss needed investigation, remediation, and type C options for the area around the railroad tracks west of cupola cooling towers.

The investigations have found elevated levels of PNAs in the railroad track area. We discussed a type C RAP for this area due to the presence of carcinogenic PNAs and the difficulty of remediation in the railroad area.

Soil: They must determine if there is a direct contact hazard in the top 2 feet of soil. The existing sampling is predominately 6 - 8 feet below ground level. If so, the type C RAP must provide protection from exposure to these soils. They must also consider if the soils would act as a source for groundwater contamination.

Groundwater: They must determine hydrogeological characteristics with a minimum of 3 wells. The 1 existing well did not have detectable levels of PNAs in the one sampling episode. If contamination of the groundwater is found, GM would need to prevent further migration of that plume. The 307 Rules do allow the Director to grant an exemption from this requirement. If this plume were to cross property lines or discharge into a surface water body, GM would need to comply with either Type B or GSI, respectively, at those points.

We also discussed options for long term monitoring if the wells do not show contamination. Monitoring would be needed, but GM could propose a monitoring plan for a limited time with an evaluation period to determine future monitoring needs.

GM also asked about using a leach test to show the soil won't leach. Could GM combine that information with the 3 monitor wells to eliminate the need for groundwater monitoring? I indicated that DNR staff would have to discuss that proposal.

GM will submit a workplan for the investigation needed to prepare a Type C Rap.

cc: Kathy Leikert, GM
Mike Tomka, Conastoga Rovers and Associates

Rhonda Klamm

1:00 PM

Name	Agency	Telephone #
Rhonda Klarr	MDNR	517 684-9141 x83
Ray Ilkka	CMPT-SGI	517-757-1473
Ed Petersen	EM	(313) 556-C&E
Ted Sobczynski	GM	(313) 556-7994
Michael Touska	CRA	(519) 725-3313
Joyce Brake	MDNR (LOST unit)	517-684-9141 x83
Kathy Leight	GIRT-SGI/SIM	517-757-2626

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME RR Track Inv
PROJECT NUMBER 5838
CLIENT GM
LOCATION Saginaw, MI

DRILLING CONTRACTOR Mateco
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (a.m.) 28°F clear
(p.m.)

HOLE DESIGNATION SB-8
DATE STARTED Mar 17, 1994
DATE COMPLETED Mar 17, 1994
DRILLING METHOD 4¼" HSA
CRA SUPERVISOR M Tomka

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
										CONCRETE 7"	
0		2	1	SS	8	10	12	20	24"	SAND (FILL) - black, loose to compact, tr. gravel, brick, tr. silt, slag	microtip: 29
2		4	2	SS	20	40	25	25	18"	same, concrete, brick, slag, glass, tr. clay	microtip: 52
4		6	3	SS	12	4	5	5	15"	same, loose to compact	microtip: 18
6		8	4	SS	2	3	4	6	9"	same, wet,	microtip: 33
	8									CLAY, brown, soft.	
8		10	5	SS	3	4	2	2	9"	SAND (FILL), wet, black sand, loose to compact	microtip: 25
10		12	6	SS	3	3	3	3	17"	same	microtip: 7
	11									CLAY, grey, soft	
12		14	7	SS	2	3	4	6	15"	same, tr. stone	microtip: 25
										water table 8 ft bgs	

2/05/85

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME RR Track Inv
PROJECT NUMBER 5838
CLIENT GM
LOCATION Saginaw, MI

DRILLING CONTRACTOR Mateco
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (a.m.) am 29°F clear
(p.m.) " "

HOLE DESIGNATION SB-6
DATE STARTED Mar 16, 1994
DATE COMPLETED Mar 16, 1994
DRILLING METHOD 4¼" HSA
CRA SUPERVISOR M Tomka

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0		2	1	SS	4	4	5	5	24"	SAND (FILL) - brown, loose to compact, slag, fine to coarse.	microtip = 5.4
2		4	2	SS	4	5	4	3	19"	same, rust colour, broken glass, ~~sand~~ tr. silt	microtip = 14
4		6	3	SS	3	4	4	3	24"	same, moist, brown sand	microtip = 7
6		8	4	SS	3	2	1	1	18"	same, grey ~~to black~~ sand, loose	microtip = 7.4
	~~8~~									~~CLAY, gray moist, soft~~	
8		10	5	SS	3		4			same, saturated, brown sand, loose, tr gravel	microtip = 5
		~~9.5~~ 10								CLAY, gray, trace stone	
10		12	6	SS	3	5	10	13	18"	SAND, loose, gray, wet, tr gravel	microtip = 0
	11.5									CLAY, grey, hard, wet	
12		14			4	5	10	20		same, wet	microtip = 0
										water table 7 ft bgs	

2/05/

S.031694.MRT.002

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME RR Track Iuv
PROJECT NUMBER 5838
CLIENT GM
LOCATION Saginaw, MI

DRILLING CONTRACTOR Mateco
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (a.m.) 29°F Clear
(p.m.) " "

HOLE DESIGNATION SB-5
DATE STARTED Mar 16, 1994
DATE COMPLETED Mar 16, 1994
DRILLING METHOD 4¼" HSA
CRA SUPERVISOR M Tomka

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
										SAND	
0		2	1	SS	2	3	4	4	21"	(FILL) - brown sand, trace silt, debris, black, some fine stone	microtip = 0
2		4	2	SS	4	2	1	1	16"	same, brown to black, coarse to fine, moist	microtip = 0
4		6	3	SS	2	2	2	2	21"	same, wet, some brown clay, glass, rust colour, slag	microtip = 0
6		8	4	SS	3	4	5	5	24"	same, grey to black sand, wet, tr. silt, wood fragment, mucky black	microtip = 0
8		10	5	SS	1	1	1	1	21"	same, gray clay, black sand, wet, brown sand	microtip = 0
10		12	6	SS	3		3		24	same	microtip = 0
	11									CLAY, gray moist	
12		14	7	SS	4	5	10	10		same.	microtip = 0
										water table 12 ft bgs	

2/05/85

S.031. 1. MAT. 001

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 2 OF 2

PROJECT NAME CAS IRON
PROJECT NUMBER 5142
CLIENT CM RICHTRAK
LOCATION SACHAK, MT

DRILLING CONTRACTOR MATEC
DRILLER BOB DREGER
SURFACE ELEVATION
WEATHER (a.m.)
(p.m.) WARM CLOUDY, CALM

HOLE DESIGNATION SB-4 cont'd
DATE STARTED DEC 3, 1993
DATE COMPLETED DEC 3, 1993
DRILLING METHOD 4 1/4" HSA/SS
CRA SUPERVISOR M. TOMKA

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
12		14	7	SS	2	4	5	7	24"	- same,	Mostly - clean
	12-2"									SAND, some silt and clay, loose, fine grained, poorly graded, brown, wet	
	12-4"									clay, some silt and gravel, soft, firm, grey-brown, V. sl. moist; organics	

2/05

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 2

PROJECT NAME CREE TOWN
PROJECT NUMBER SC-12
CLIENT GM REMEDIATION
LOCATION SAGUENAY, PQ

DRILLING CONTRACTOR MATECO
DRILLER B. Dreger
SURFACE ELEVATION
WEATHER (a.m.) SUNNY, CLEAR, COOL
(p.m.)

HOLE DESIGNATION SB-4
DATE STARTED Dec. 3, 1993
DATE COMPLETED Dec. 3, 1993
DRILLING METHOD 4-1/4" HSA/SS
CRA SUPERVISOR M. TOMKA

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0		2	1	SS	11	11	11		10"	CONCRETE (12")	
										SAND, little silt, tr. gravel, loose to compact, medium grained, dark brown, v. sl. moist; slag at top, stone, odor	Microtip = 10.5 ppm
2		4	2	SS	4	5	7	8	12"	SAND (fill), tr. silt, loose, medium gravel, red-brown, v. sl moist, glass, fine clay, wood, odor	Microtip = 7.0 ppm
4		6	3	SS	6	5	6	6	14"	SILT, little clay and sand, loose, mostly sorted, seam of brick, gravel, silt and cemented sand; v. sl. moist, odor, samples collected.	Microtip = 8.6 ppm
6		8	4	SS	7	3	3	5	4"	clay, some sand, little gravel, stone, ~~sand~~, fine gravel, plastic, moist to wet, brick fragment	Microtip = 5.0 ppm
8		10	5	SS	4	4	4	4	18"	SILT, some to little clay, tr. gravel, loose, fine grained, grey-brown to grey, sl. moist; coal, brick fragments	Microtip = 10.0 ppm
10		12	6	SS	3	3	3	4	24"	-some, dark clay, moist.	Microtip = 6.5 ppm
	10'6"									clay, little silt, tr. sand, soft, plastic, grey brown, sl moist, thin sand seam at 11'0"	

2/05/89

CRA

STRATIGRAPHY L (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME Corey Lake
PROJECT NUMBER 5242
CLIENT CMI Refractories
LOCATION Salvador, MI

DRILLING CONTRACTOR Mobile
DRILLER Bob Dreger
SURFACE ELEVATION
WEATHER (a.m.) sunny, clear, cool
(p.m.)

HOLE DESIGNATION SB-3
DATE STARTED Dec 3 1993 13:
DATE COMPLETED Dec 3, 1993
DRILLING METHOD 4 1/4" HSA/SS
CRA SUPERVISOR M. TOMKA

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0		2	1	SS	2	3	5	7	16"	concrete (9")	
										SAND (fill), fine gravel, loose,	Micrtip=0.0 ppm
										relatively uniform, fine to medium	
2		4	2	SS	5	7	10	23	20"	gravel, red brown to dark brown, v. sl. moist (Sandy sand)	
										- some silt at tip	Micrtip: 0.0 ppm
4	5'4"	6	3	SS	22	32	18	22	24"	- some, compact, sl. moist to moist	
										SAND, fine silt, dense, fine gravel,	Micrtip: 0.0 ppm
										relatively uniform, black, sl. moist.	
6		8	4	SS	4	6	10	15	18"	- some, moist to wet; sample collected	Micrtip = 1.0 ppm
8		10	5	SS	5	6	6	8	24"	- some, saturated, interbedding silt with	Micrtip = 0.2 ppm
										depth	
10		12	6	SS	4	5	8	16+	16"	- some, fine silt and clay, some	Micrtip = 0.0 ppm
										gravel at tip	
12		14	-	-	-	-	-	-	0"	- no recovery, metal and slag in spoon	—
13		15	-	—	40+	-	-	-	0"	- auger refusal, no recovery, slag	—
										on tip; refusal at 13' in q.s.	

2/05

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME Grey Iron
PROJECT NUMBER 1042
CLIENT CM Robertson
LOCATION Chemong, ON

DRILLING CONTRACTOR Matec
DRILLER B.P. Dreger
SURFACE ELEVATION
WEATHER (a.m.) Sunny, clear, cool
(p.m.)

HOLE DESIGNATION SB-2
DATE STARTED Dec 3, 1993 11:
DATE COMPLETED Dec 3, 1993
DRILLING METHOD 4 1/4" HSA/SS
CRA SUPERVISOR M. Temka

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERED LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0		2	1	SS	8	10	22	30	12"	SAND (FILL) little to some gravel, some silt at top, subangular stone, clay, loose to compact, medium to coarse gravel, dark brown and grey, sl. moist	Microtip - 0.0 ppm
2		4	2	SS	6	9	9	9	6"	- same, some gravel, coal, loose, coarse gravel, brown, black, tan, sl. moist	Microtip = 0.0 ppm
4		6	3	SS	-	-	-	-	0"	- no recovery	—
6		8	4	SS	9	1	7	6	8"	- same, little silt, tr. gravel, subangular stone, loose, black, wet, odour present, wet	Microtip = 0.0 ppm (sample collected)
8		10	5	SS	9	8	4	4	11"	- same, some gravel, tr. silt, concrete chips and fragment, dark brown, saturated	Microtip = 0.0 ppm
10	10'6"	12	6	SS	1	1	1	1	12"	- some clay and silt at tip, grey - same, some silt and clay, brown-grey, moist SILT, little sand and clay, loose, organics (wood and roots); fine grained, brown/grey	Microtip - 0.0 ppm
12		14	7	SS	3	3	4	6	18"	moist; increasing clay content with depth, clay, little silt, trace gravel and organics, soft, plastic, grey, v. sl. moist; shiffle with depth; blue grey and tan	thin sand seam Microtip 0.0 ppm

water at 6.0' bgs. after augers pulled

2/05/85

CRA

STRATIGRAPHY LOG (OVERBURDEN)

SHEET NO. 1 OF 1

PROJECT NAME [illegible]
PROJECT NUMBER [illegible]
CLIENT [illegible]
LOCATION [illegible]

DRILLING CONTRACTOR [illegible]
DRILLER [illegible]
SURFACE ELEVATION
WEATHER (a.m.) [illegible]
(p.m.)

HOLE DESIGNATION SB-1
DATE STARTED Dec 3, 1993 CG
DATE COMPLETED Dec 3, 1993
DRILLING METHOD 4¼" HSA/SS
CRA SUPERVISOR M. TOMKA

DEPTH OR ELEVATION (ft/m) FROM	AT	TO	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	RECOVERY LENGTH	SAMPLE DESCRIPTION (COMPONENTS, COLOUR, MOISTURE, NATIVE/FILL)	NOTES (STRUCTURES, DRILLER'S COMMENTS, GEOLOGIC CLASSIFICATION)
0		2	1	SS	2	10	11	12	16"	SAND (FILL), with some gravel, trace silt, subangular stone, loose, medium to coarse grained, dark grey brown to light brown, sl. moist, no odour	Micro tip = 0.0 ppm
2		4	2	SS	6	12	13	15	24"	-same, dark brown, grey white specks, 1" slag at tip	Lost retention - moved 4 feet off hole Micro tip = 0.0 ppm
4		6	3	SS	2	10	11	16	6"	-same, little silt, brown	Micro tip = 0.0 ppm
6		8	4	SS	6	6	2	4	9"	-same, little silt, trace gravel, wood fragments, soil odour (coal) chips, weak oily odour	Micro tip = 0.0 ppm chemical sample collected
8		10	5	SS	1	1	2	1	7"	sandy, little silt, tr. coal, very soft, plastic, brown-grey, moist	Micro tip = 0.0
10		12	6	SS	—	1	1	—	16"	-same, little gravel, tr. coal, cinders, brown-grey, dry, sl. moist thin coal seam	Micro tip = 0.0
12		13	7	SS	2	3	4	—	12"	sandy, tr. gravel, tr. sandy silt, soft, plastic-med stiff, grey, v. sl. moist, tr. cinders, shale @ tip	Micro tip = 0.0

Note: at 6'-3½" bgs

2/0

CRA

APPENDIX B

SOIL BORINGS AND WELL LOGS - RAILROAD AREA

APPENDIX C

ANALYTICAL RESULTS - RAILROAD AREA

Attachment C-1

December 3, 1993

ANATECH

Analytical Laboratories

Revised Report

Lab I.D. :	35568
Report Date :	12/15/1993
Project :	SG1 Tank 10 #5672
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario N2V IC2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

ANATECH
Analytical Laboratories

SB-1

Conestoga Rovers & Associates

Sample:	35568-3246	Matrix:	Soil / Grab
Client Sample:	5.120393-MRT-001	Location:	
COLLECTED:	12/03/1993 :	Project:	SG1 Tank 10 #5672
RECEIVED:	12/06/1993 17:46	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	12/10/1993 EE
Toluene	14	ug/kg	10	"	12/10/1993 EE
Ethylbenzene	ND	ug/kg	10	"	12/10/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	12/10/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	8900	ug/kg	3300	SW-846 Mtd. 8270	12/12/1993 RJW
Benzo (a) Pyrene	6500	ug/kg	3300	"	12/12/1993 RJW
Benzo (b) Fluoranthene	5800	ug/kg	3300	"	12/12/1993 RJW
Benzo (g,h,i) Perylene	4400	ug/kg	3300	"	12/12/1993 RJW
Benzo (k) Fluoranthene	5800	ug/kg	3300	"	12/12/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	3300	"	12/12/1993 RJW
Indeno (1,2,3-cd) Pyrene	4400	ug/kg	3300	"	12/12/1993 RJW
Naphthalene	ND	ug/kg	3300	"	12/12/1993 RJW
Acenaphthene	ND	ug/kg	3300	"	12/12/1993 RJW
Acenaphthylene	ND	ug/kg	3300	"	12/12/1993 RJW
Fluorene	ND	ug/kg	3300	"	12/12/1993 RJW
Phenanthrene	8400	ug/kg	3300	"	12/12/1993 RJW
Anthracene	5600	ug/kg	3300	"	12/12/1993 RJW
Fluoranthene	23,000	ug/kg	3300	"	12/12/1993 RJW
Pyrene	21,000	ug/kg	3300	"	12/12/1993 RJW
Chrysene	8600	ug/kg	3300	"	12/12/1993 RJW
Semi Volatile Extraction	-	-	-	"	12/09/1993 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 12/13/1993
Revised : 12/15/1993

Conestoga Rovers & Associates

SB-2

Sample:	35568-3247	Matrix:	Soil / Grab
Client Sample:	5.120393-MRT-002	Location:	
COLLECTED:	12/03/1993 :	Project:	SG1 Tank 10 #5672
RECEIVED:	12/06/1993 17:46	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	12/10/1993 EE
Toluene	ND	ug/kg	10	"	12/10/1993 EE
Ethylbenzene	ND	ug/kg	10	"	12/10/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	12/10/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	1400	ug/kg	330	SW-846 Mtd. 8270	12/14/1993 JA
Benzo (a) Pyrene	ND	ug/kg	330	"	12/14/1993 JA
Benzo (b) Fluoranthene	870	ug/kg	330	"	12/14/1993 JA
Benzo (g,h,i) Perylene	600	ug/kg	330	"	12/14/1993 JA
Benzo (k) Fluoranthene	1200	ug/kg	330	"	12/14/1993 JA
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	12/14/1993 JA
Indeno (1,2,3-cd) Pyrene	700	ug/kg	330	"	12/14/1993 JA
Naphthalene	ND	ug/kg	330	"	12/14/1993 JA
Acenaphthene	ND	ug/kg	330	"	12/14/1993 JA
Acenaphthylene	ND	ug/kg	330	"	12/14/1993 JA
Fluorene	ND	ug/kg	330	"	12/14/1993 JA
Phenanthrene	1000	ug/kg	330	"	12/14/1993 JA
Anthracene	ND	ug/kg	330	"	12/14/1993 JA
Fluoranthene	2400	ug/kg	330	"	12/14/1993 JA
Pyrene	5500	ug/kg	330	"	12/14/1993 JA
Chrysene	1200	ug/kg	330	"	12/14/1993 JA
Semi Volatile Extraction	-	-	-	"	12/09/1993 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 12/13/1993
Revised : 12/15/1993

SB-3

Conestoga Rovers & Associates

Sample:	35568-3248	Matrix:	Soil / Grab
Client Sample:	5.120393-MRT-003	Location:	
COLLECTED:	12/03/1993 :	Project:	SG1 Tank 10 #5672
RECEIVED:	12/06/1993 17:46	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
VOLATILE AROMATIC HYDRO.					
Benzene	13	ug/kg	10	SW-846 Mtd. 8020	12/10/1993 EE
Toluene	32	ug/kg	10	"	12/10/1993 EE
Ethylbenzene	ND	ug/kg	10	"	12/10/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	12/10/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	12/12/1993 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	12/12/1993 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	12/12/1993 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	12/12/1993 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	12/12/1993 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	12/12/1993 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	12/12/1993 RJW
Naphthalene	ND	ug/kg	330	"	12/12/1993 RJW
Acenaphthene	ND	ug/kg	330	"	12/12/1993 RJW
Acenaphthylene	ND	ug/kg	330	"	12/12/1993 RJW
Fluorene	ND	ug/kg	330	"	12/12/1993 RJW
Phenanthrene	ND	ug/kg	330	"	12/12/1993 RJW
Anthracene	ND	ug/kg	330	"	12/12/1993 RJW
Fluoranthene	ND	ug/kg	330	"	12/12/1993 RJW
Pyrene	ND	ug/kg	330	"	12/12/1993 RJW
Chrysene	ND	ug/kg	330	"	12/12/1993 RJW
Semi Volatile Extraction	-	-	-	"	12/09/1993 SJ

ND = Non Detectable

Laboratory Manager
C. David Hainer
C. David Hainer

Reported : 12/13/1993
Revised : 12/15/1993

ANATECH
Analytical Laboratories

SB-4

Conestoga Rovers & Associates

Sample:	35568-3249	Matrix:	Soil / Grab
Client Sample:	5.120393-MRT-004	Location:	
COLLECTED:	12/03/1993 :	Project:	SG1 Tank 10 #5672
RECEIVED:	12/06/1993 17:46	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	12/10/1993 EE
Toluene	ND	ug/kg	10	"	12/10/1993 EE
Ethylbenzene	ND	ug/kg	10	"	12/10/1993 EE
Xylenes (Total)	ND	ug/kg	30	"	12/10/1993 EE
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	2600	ug/kg	330	SW-846 Mtd. 8270	12/14/1993 JA
Benzo (a) Pyrene	1500	ug/kg	330	"	12/14/1993 JA
Benzo (b) Fluoranthene	1800	ug/kg	330	"	12/14/1993 JA
Benzo (g,h,i) Perylene	1100	ug/kg	330	"	12/14/1993 JA
Benzo (k) Fluoranthene	1700	ug/kg	330	"	12/14/1993 JA
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	12/14/1993 JA
Indeno (1,2,3-cd) Pyrene	1200	ug/kg	330	"	12/14/1993 JA
Naphthalene	360	ug/kg	330	"	12/14/1993 JA
Acenaphthene	540	ug/kg	330	"	12/14/1993 JA
Acenaphthylene	ND	ug/kg	330	"	12/14/1993 JA
Fluorene	580	ug/kg	330	"	12/14/1993 JA
Phenanthrene	5300	ug/kg	330	"	12/14/1993 JA
Anthracene	1200	ug/kg	330	"	12/14/1993 JA
Fluoranthene	4600	ug/kg	330	"	12/14/1993 JA
Pyrene	8700	ug/kg	330	"	12/14/1993 JA
Chrysene	2000	ug/kg	330	"	12/14/1993 JA
Semi Volatile Extraction	-	-	-	"	12/09/1993 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 12/13/1993
Revised : 12/15/1993

ANATECH

Analytical Laboratories

RCRA DRA

APR - 6

Analytical Report

Lab I.D. :	41275
Report Date :	03/28/1994
Project :	Railroad Track #5838
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario N2V IC2
Attention :	Mr. Michael Tomka

6 pages including cover sheet

Attachment C-2

March 16-17, 1994

ANATECH
Analytical Laboratories

Conestoga Rovers & Associates

SB-5

Sample:	41275-4751	Matrix:	Soil / Grab
Client Sample:	S-031694-MRT.001	Location:	
COLLECTED:	03/16/1994 :	Project:	Railroad Track #5838
RECEIVED:	03/18/1994 12:57	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	03/25/1994 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Naphthalene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthylene	ND	ug/kg	330	"	03/25/1994 RJW
Fluorene	ND	ug/kg	330	"	03/25/1994 RJW
Phenanthrene	ND	ug/kg	330	"	03/25/1994 RJW
Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Chrysene	ND	ug/kg	330	"	03/25/1994 RJW
Semi Volatile Extraction	-	-	-	"	03/22/1994 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/28/1994

Conestoga Rovers & Associates

SB-6

Sample:	41275-4752	Matrix:	Soil / Grab
Client Sample:	S-031694-MRT.002	Location:	
COLLECTED:	03/16/1994 :	Project:	Railroad Track #5838
RECEIVED:	03/18/1994 12:57	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	03/25/1994 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Naphthalene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthylene	ND	ug/kg	330	"	03/25/1994 RJW
Fluorene	ND	ug/kg	330	"	03/25/1994 RJW
Phenanthrene	ND	ug/kg	330	"	03/25/1994 RJW
Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Chrysene	ND	ug/kg	330	"	03/25/1994 RJW
Semi Volatile Extraction	-	-	-	"	03/22/1994 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/28/1994

Conestoga Rovers & Associates

SB-7

Sample:	41275-4753	Matrix:	Soil / Grab
Client Sample:	S-031794-MRT.003	Location:	
COLLECTED:	03/17/1994 :	Project:	Railroad Track #5838
RECEIVED:	03/18/1994 12:57	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	430	ug/kg	330	SW-846 Mtd. 8270	03/25/1994 RJW
Benzo (a) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (b) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	03/25/1994 RJW
Benzo (k) Fluoranthene	ND	ug/kg	330	"	03/25/1994 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	03/25/1994 RJW
Naphthalene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthene	ND	ug/kg	330	"	03/25/1994 RJW
Acenaphthylene	ND	ug/kg	330	"	03/25/1994 RJW
Fluorene	ND	ug/kg	330	"	03/25/1994 RJW
Phenanthrene	570	ug/kg	330	"	03/25/1994 RJW
Anthracene	ND	ug/kg	330	"	03/25/1994 RJW
Fluoranthene	600	ug/kg	330	"	03/25/1994 RJW
Pyrene	580	ug/kg	330	"	03/25/1994 RJW
Chrysene	530	ug/kg	330	"	03/25/1994 RJW
Semi Volatile Extraction	-	-	-	"	03/22/1994 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/28/1994

SB-8

Conestoga Rovers & Associates

Sample:	41275-4754	Matrix:	Soil / Grab
Client Sample:	S-031794-MRT.004	Location:	
COLLECTED:	03/17/1994 :	Project:	Railroad Track #5838
RECEIVED:	03/18/1994 12:57	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	830	SW-846 Mtd. 8270	03/25/1994 RJW
Benzo (a) Pyrene	ND	ug/kg	830	"	03/25/1994 RJW
Benzo (b) Fluoranthene	ND	ug/kg	830	"	03/25/1994 RJW
Benzo (g,h,i) Perylene	ND	ug/kg	830	"	03/25/1994 RJW
Benzo (k) Fluoranthene	ND	ug/kg	830	"	03/25/1994 RJW
Dibenzo (a,h) Anthracene	ND	ug/kg	830	"	03/25/1994 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	830	"	03/25/1994 RJW
Naphthalene	ND	ug/kg	830	"	03/25/1994 RJW
Acenaphthene	ND	ug/kg	830	"	03/25/1994 RJW
Acenaphthylene	ND	ug/kg	830	"	03/25/1994 RJW
Fluorene	ND	ug/kg	830	"	03/25/1994 RJW
Phenanthrene	1000	ug/kg	830	"	03/25/1994 RJW
Anthracene	ND	ug/kg	830	"	03/25/1994 RJW
Fluoranthene	1200	ug/kg	830	"	03/25/1994 RJW
Pyrene	980	ug/kg	830	"	03/25/1994 RJW
Chrysene	ND	ug/kg	830	"	03/25/1994 RJW
Semi Volatile Extraction	-	-	-	"	03/22/1994 SJ

LODs are elevated because of the presence of other compounds.

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/28/1994

ANATECH
Analytical Laboratories

MW-1

Conestoga Rovers & Associates

Sample:	41275-4755	Matrix:	Water / Grab
Client Sample:	W-031394-MRT.005	Location:	
COLLECTED:	03/13/1994 :	Project:	Railroad Track #5838
RECEIVED:	03/18/1994 12:57	Sampled By:	M Tomka

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/L	5	SW-846 Mtd. 8270	03/23/1994 RJW
Benzo (a) Pyrene	ND	ug/L	5	"	03/23/1994 RJW
Benzo (b) Fluoranthene	ND	ug/L	5	"	03/23/1994 RJW
Benzo (g,h,i) Perylene	ND	ug/L	5	"	03/23/1994 RJW
Benzo (k) Fluoranthene	ND	ug/L	5	"	03/23/1994 RJW
Dibenzo (a,h) Anthracene	ND	ug/L	5	"	03/23/1994 RJW
Indeno (1,2,3-cd) Pyrene	ND	ug/L	5	"	03/23/1994 RJW
Naphthalene	ND	ug/L	5	"	03/23/1994 RJW
Acenaphthene	ND	ug/L	5	"	03/23/1994 RJW
Acenaphthylene	ND	ug/L	5	"	03/23/1994 RJW
Fluorene	ND	ug/L	5	"	03/23/1994 RJW
Phenanthrene	ND	ug/L	5	"	03/23/1994 RJW
Anthracene	ND	ug/L	5	"	03/23/1994 RJW
Fluoranthene	ND	ug/L	5	"	03/23/1994 RJW
Pyrene	ND	ug/L	5	"	03/23/1994 RJW
Chrysene	ND	ug/L	5	"	03/23/1994 RJW
Semi Volatile Extraction	-	-	-	"	03/18/1994 SJ

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/28/1994

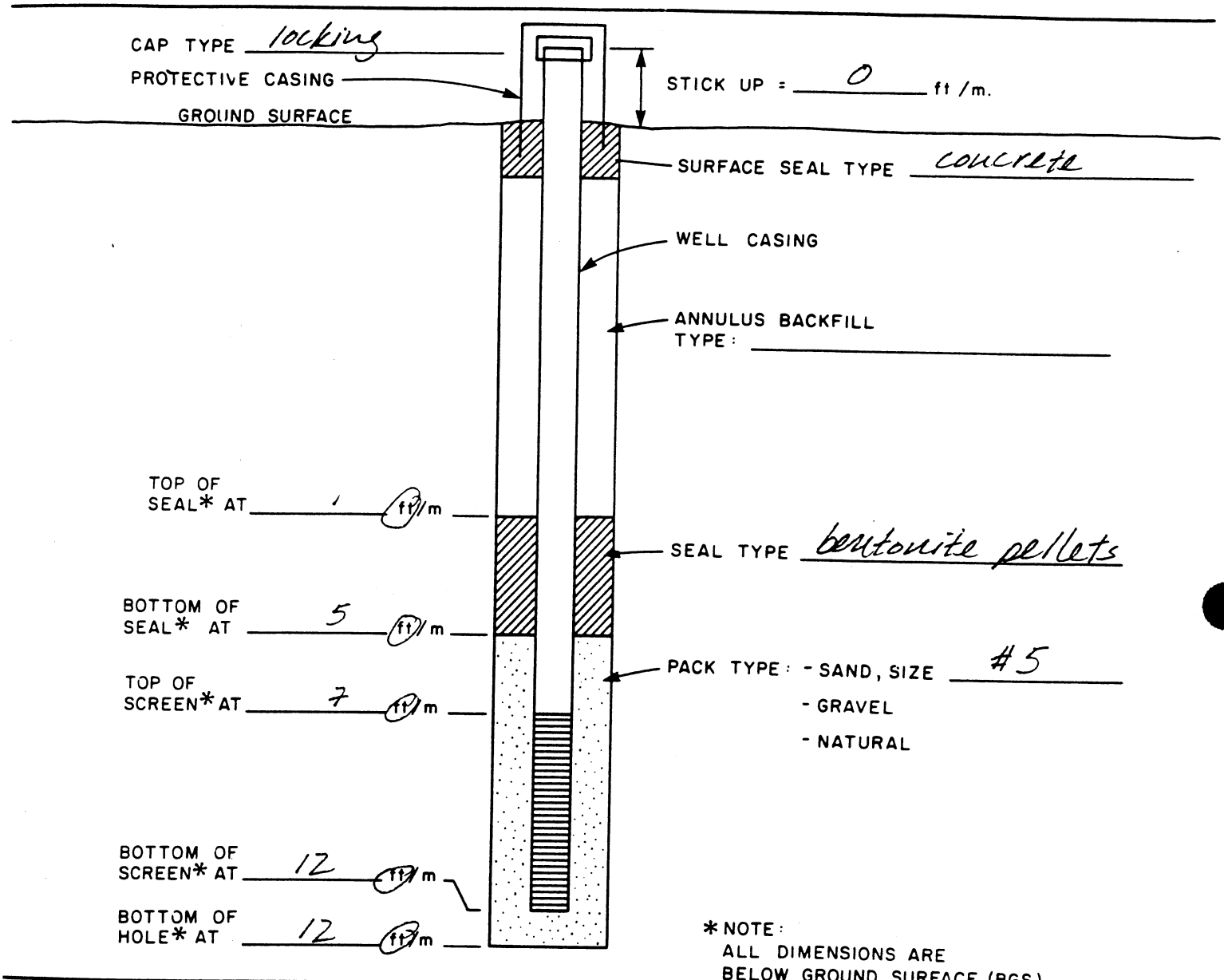
APPENDIX D

MONITORING WELL DETAILS - RAILROAD AREA

WELL INSTRUMENTATION LOG

PROJECT NAME: Railroad Tracks Inv
PROJECT Nº: 5838
ENT: General Motors
LOCATION: Saginaw, MI

HOLE DESIGNATION: MW-1 (SB-1)
DATE COMPLETED: Mar 16, 1994
DRILLING METHOD: HSA 6¼"
CRA SUPERVISOR: M. Tomka



SCREEN TYPE: ☒ continuous slot ☐ perforated ☐ louvre ☐ other:

SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other:

SCREEN LENGTH: 5 ft/m SCREEN DIAMETER: 2 in/cm SCREEN SLOT SIZE: 10

WELL CASING MATERIAL: WELL CASING DIAMETER: ~~in~~/cm

E DIAMETER: 6¼" SS riser 304

EVELOPMENT: METHOD: bailer DURATION:

/05/85

CRA

CRA

CONESTOGA-ROVERS & ASSOCIATES
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

February 24, 1997 Reference No. 5838

Ms. Rhonda Klann
Michigan Department of Environmental Quality
Environmental Response Division
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Klann:

Re: Revisions to Supplemental Investigation Work Plan
for the Railroad Track Area West of the Cupola Cooling Towers
Saginaw Metal Casting Operations, Saginaw, Michigan

As discussed during our meeting on February 13, 1997, this letter presents revisions to the Supplemental Investigation Work Plan for the Railroad Track Area West of the Cupola Cooling Towers at the Saginaw Metal Casing Operations Facility in Saginaw, Michigan. The Work Plan submitted to the MDEQ was dated October 11, 1996.

Based on the February 13, 1997 meeting, only surface soils (top six inches) require additional characterization for polynuclear aromatic hydrocarbons (PNAs), and should be sampled using the MDEQ Guidance Document - Verification of Soil Remediation, April 1994, Revision 1. The sampling will verify whether industrial direct contact criteria are exceeded.

Therefore, the four soil borings, four soil samples from the borings and the four surficial soil samples proposed in the Work Plan will not be completed. However, based on an area of approximately 3,600 square feet, the Site meets the guidance document definition of a small site. Therefore, six surficial soil samples will be collected from 0 to 6 inches in accordance with the MDEQ document referenced above. The soil samples will be analyzed for PNAs. Figure 1 presents the proposed sample locations.

The groundwater program proposed in the Work Plan will be completed as presented in the Work Plan.

February 24, 1997 Reference No. 5838

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka

MRT/cf/1
Encl.

c.c. Jackie James, GM
Dave Kwasny, GM
Ray Ilkka, GM
Ian Richardson, CRA

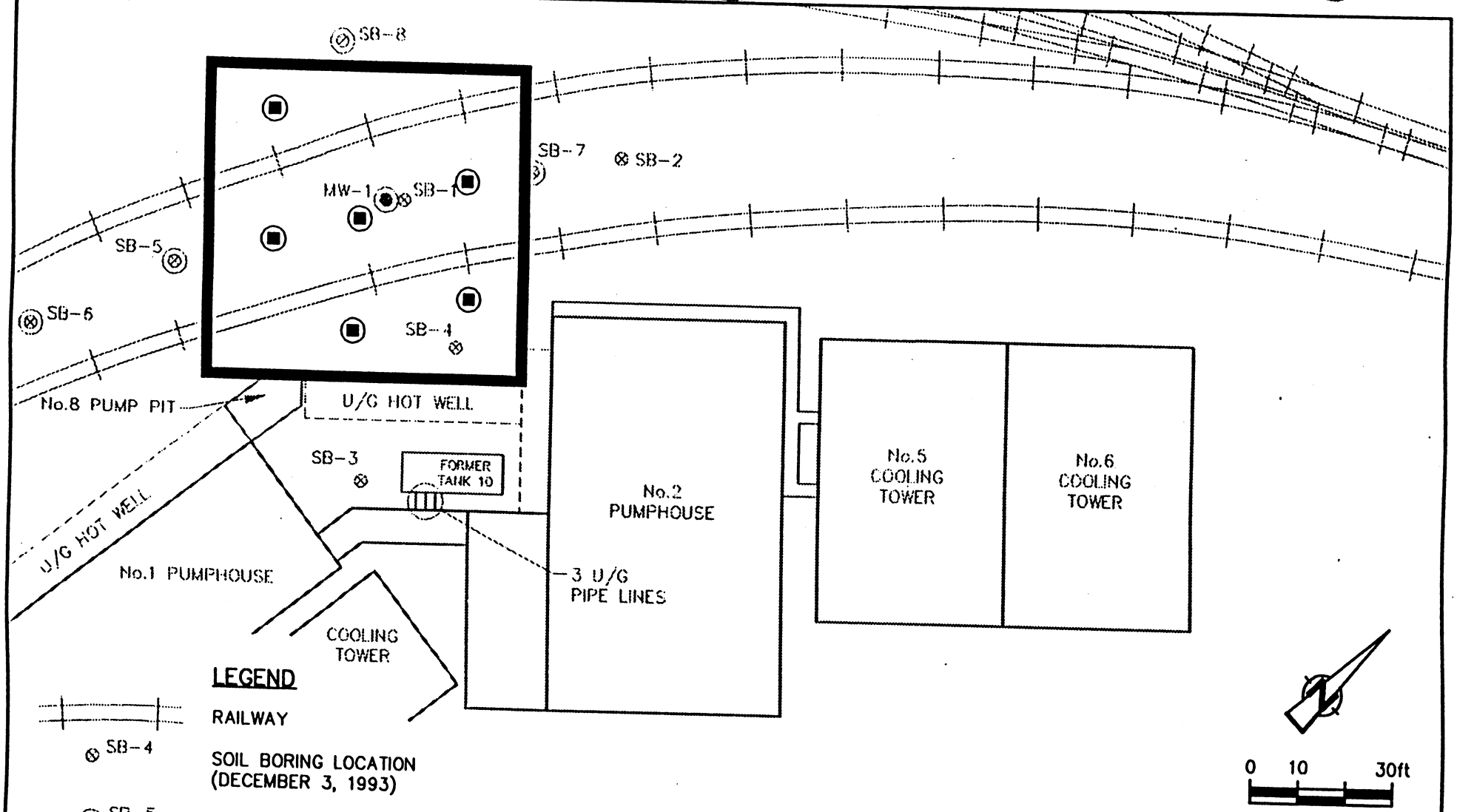


figure 1

PROPOSED SOIL INVESTIGATION RAILROAD AREA SAGINAW METAL CASTING OPERATIONS

Saginaw, Michigan

CRA

5838 (L) FEB 17/97(W) REV.0 (P-08)

STATE OF MICHIGAN

JOHN ENGLER, Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: http://www.deq.state.mi.us

RUSSELL J. HARDING, Director

REPLY TO:

SAGINAW BAY DISTRICT OFFICE
SUITE 1
503 N. EUCLID AVE.
BAY CITY, MI 48706-2965

February 27, 1997

Mr. Ray Illka
Environmental Activities
Saginaw Metal Casting Operations
General Motors
P.O. Box 5073
Saginaw, MI 48605-5073

Subject: GM-SMCO workplan for the Railroad Track area west of Cupola Cooling Water Towers

Dear Mr. Illka:

The Michigan Department of Environmental Quality (MDEQ) has reviewed the workplan dated October 10, 1996, and the revisions dated February 24, 1997, for the Railroad Track area west of the Cupola Cooling Water Towers. The workplan with the February 24, 1997 revision is approved.

The MDEQ should be notified three weeks prior to field work to allow time for staff to arrange to observe or split-sample.

If you have any questions, please contact me at the number below.

Sincerely,

Rhonda Klann
Environmental Quality Analyst
Environmental Response Division
517-684-9141 Extension 8302

cc: Michael Tomka, CRA

August 7, 1997 **- PRELIMINARY DRAFT -** Reference No. 5838

Ms. Rhonda Klann
Michigan Department of Environmental Quality
Environmental Response Division
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Klann:

Re: Investigation for Railroad Tracks
West of Cupola Cooling Towers
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the findings from the investigation of the Railroad Tracks west of the Cupola Cooling Towers at the Saginaw Metal Casting Operations in Saginaw, Michigan. This investigation was completed as a result of chemicals identified above Act 451 Generic Residential and Industrial criteria in the vicinity of the railroad tracks during the investigation of this area in December 1993 and March 1994 and in accordance with the MDEQ approved Work Plan dated October 15, 1996. The railroad area west of the Cupola Cooling Towers is presented on Figure 1.

SUMMARY OF PREVIOUS SOIL INVESTIGATIONS

On December 3, 1993, four soil borings (SB-1 to SB-4) were completed to investigate the Tank 10 area. The results indicated the presence of polynuclear aromatic hydrocarbons (PNAs) west of Tank 10, outside the foundation containment isolating the Tank 10 area. The results from soil borings 1, 2 and 4 installed to investigate Tank 10 are expected to be a result of activities in the railroad area. Soil boring locations are presented on Figure 2. The results from the December 3, 1993 investigation are summarized in Table 1.

On March 16 and 17, 1994, four additional soil borings (SB-4 to SB-8) were completed at the locations presented on Figure 2 in order to further investigate the vertical and horizontal extent of PNAs in the railroad area. Soil borings were advanced through the upper fill layer to native clay which was encountered at a depth of approximately 12 feet below ground surface (bgs). Continuous soil samples were collected from each borehole. One sample was selected at each of the four locations based on visual, olfactory and/or photoionization detector (PID) readings. Samples were analyzed for PNAs. The sample results are presented in Table 1.

Analytical results from soil borings 1 and 4 completed in December 1993 indicate soil contamination above Act 451 Residential Direct Contact Values, Generic Industrial 20x Drinking Water Values and Generic Residential 20x Drinking Water Values at a depth of 4 to 8 feet. The results from soil boring 2 completed in December 1993 indicate soil contamination above Act 451 Generic Residential 20x Drinking Water Values at a depth of 6 to 8 feet. The results from soil borings 7 and 8 completed in March 1994 indicate soil contamination above Act 451 Generic Residential 20x Drinking Water Values at a depth of 2 to 5 feet.

SUMMARY OF PREVIOUS GROUNDWATER INVESTIGATIONS

Groundwater was encountered at approximately 6 feet bgs during the December 3, 1993 soil boring investigation and between 7 and 12 feet during the March 16 and 17, 1994 soil boring investigation. On March 16, 1994 a monitoring well was completed to 12 bgs at the location of highest PNA concentrations (SB-1) from the December 3, 1993 investigation. Monitoring well details are presented in Attachment A. Groundwater at monitoring well MW-1 was 6 feet bgs 24 hours after development. Groundwater was sampled on March 17, 1994 at well MW-1 and contained no PNAs above the detection limits. The sample results are presented in Table 2.

SUPPLEMENTAL INVESTIGATION WORK PLAN

Based on the results of the soil borings, a Supplemental Investigation Work Plan was submitted to MDEQ on October 15, 1996. This work plan was revised on February 24, 1997 in accordance with MDEQ comments. The work plan with revisions was approved in a MDEQ letter dated February 27, 1997. The proposed scope of the investigation included the collection of six surface soil samples from 0 to 6 inches to be analyzed for PNAs, at the locations presented on Figure 3. The proposed investigation also included the installation of two downgradient monitoring wells. One round of groundwater samples from all three wells in the area and one round of groundwater samples from the two downgradient wells (based on measured groundwater elevations) were to be collected and analyzed for PNAs. The groundwater elevations were to be recorded on a quarterly basis for one year to confirm the groundwater flow direction.

SUPPLEMENTAL SOIL INVESTIGATION

On March 7, 1997, six surface soil samples were collected from the locations presented on Figure 3. The soil samples were analyzed for PNAs and sample results are presented in Table 3. All of the surface soil sample results were below Act 451 Generic Residential Direct Contact Values, and Generic Residential 20x Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

SUPPLEMENTAL GROUNDWATER QUALITY INVESTIGATION

On March 7, 1997, two monitoring wells (MW2-97 and MW3-97) were installed at the locations presented on Figure 3. Stratigraphic logs and monitoring well installation details are presented in Attachment A. The existing well (MW-1) was not located. An undetermined thickness of fill had been placed on top of this well to create a temporary roadway. Wells MW2-97 and MW3-97 were developed and sampled on March 19, 1997. A sheen was noted during development of both wells. Samples were analyzed for PNAs and sample results are presented in Table 2. All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

Monitoring well MW-1 was located during the week of April 7, 1997. The riser was damaged during excavation to find the well and was repaired on April 16, 1997. MW-1 was sampled on April 23, 1997. The sample was analyzed for PNAs and sample results are presented in Table 2. All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

SUPPLEMENTAL GROUNDWATER FLOW INVESTIGATION

On March 19, 1997, groundwater levels were measured at wells MW2-97 and MW3-97. On April 23, 1997, the groundwater level was measured at MW1. On July 29, 1997, the groundwater level was measured at all 3 wells. Groundwater elevations are presented in Table 4 and groundwater contours are presented on Figure 4. The groundwater flow

August 7, 1997 Reference No. 5838

direction based on the July 29, 1997 groundwater elevations is to the south. The expected groundwater flow direction was to the northwest, towards the Saginaw River. The groundwater flow direction will be confirmed with quarterly groundwater elevation measurement for one year (i.e. three additional rounds).

CONCLUSIONS

All of the surface soil sample results were below Act 451 Generic Residential Direct Contact Values, and Generic Residential 20x Drinking Water Values. Therefore, no action is required for soil in this area.

All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Quarterly groundwater level measurements will be performed for one year. One additional round of downgradient well sampling will be performed once groundwater flow directions are confirmed.

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka

MRT/cf/2
Encl.

c.c. Jackie James, GM
Dave Kwasny, GM
Ray Ilkka, GM
Ian Richardson, CRA

TABLE 1

HISTORICAL SOIL SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	Units	December 3, 1993				March 16-17, 1994				Acceptable MDL	MDEQ Act 451 Generic Residential DCV	MDEQ Act 451 Generic Industrial DCV	MDEQ Act 451 Generic Residential 20xDW	MDEQ Act 451 Generic Industrial 20xDW
		SB-1 (6-8')	SB-2 (6-8')	SB-3 (6-8')	SB-4 (4-6')	SB-5 (6-8')	SB-6 (2-4')	SB-7 (3.5-5')	SB-8 (2-4')					
Benzene	(µg/kg)	<10	<10	13	<10						8.8E+4	8.5E+5	100	100
Toluene	(µg/kg)	14	<10	32	<10						2.4E+7	1.6E+8	16,000	20,000
Ethylbenzene	(µg/kg)	<10	<10	<10	<10						1.1E+7	7.2E+7	1,500	14,000
Xylenes	(µg/kg)	<30	<30	<30	<30						2.0E+8	1.0E+9	5,600	200,000
Benzo(a)Anthracene	(µg/kg)	8,900	1,400	<330	2,600	<330	<330	430	<830	<330	1.4E+4	2.1E+5	–	–
Benzo(a)Pyrene	(µg/kg)	6,500	<330	<330	1,500	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	–	–
Benzo(b)Fluoranthene	(µg/kg)	5,800	870	<330	1,800	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	–	–
Benzo(g,h,i)Perylene	(µg/kg)	4,400	600	<330	1,100	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	–	–
Benzo(k)Fluoranthene	(µg/kg)	5,800	1,200	<330	1,700	<330	<330	<330	<830	<330	1.4E+5	2.1E+6	–	–
Dibenzo(a,h)Anthracene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	–	–
Indeno(1,2,3-cd)Pyrene	(µg/kg)	4,400	700	<330	1,200	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	–	–
Naphthalene	(µg/kg)	<3,300	<330	<330	360	<330	<330	<330	<830	<330	1.5E+7	1.6E+8	5.2E+3	15,000
Acenaphthene	(µg/kg)	<3,300	<330	<330	540	<330	<330	<330	<830	<330	7.6E+7	8.1E+8	26,000	76,000
Acenaphthylene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	520	1,500
Fluorene	(µg/kg)	<3,300	<330	<330	580	<330	<330	<330	<830	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Phenanthrene	(µg/kg)	8,400	1,000	<330	5,300	<330	<330	370	1,000	<330	1.5E+6	1.6E+7	5.2E+2	1,500
Anthracene	(µg/kg)	5,600	<330	<330	1,200	<330	<330	<330	<830	<330	4.2E+8	1.0E+9	1.5E+5	420,000
Fluoranthene	(µg/kg)	23,000	2,400	<330	4,600	<330	<330	600	1,200	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Pyrene	(µg/kg)	21,000	5,500	<330	8,700	<330	<330	580	980	<330	3.2E+7	3.4E+8	1.1E+4	32,000
Chrysene	(µg/kg)	8,600	1,200	<330	2,000	<330	<330	330	<830	<330	1.4E+6	2.1E+7	–	–

Notes:

– Compound not expected to leach to groundwater under most conditions.
Above Act 451 Generic Residential 20x Drinking Water Criteria.
Above Act 451 Generic Industrial 20x Drinking Water Criteria.
Above Act 451 Generic Residential Direct Contact Values Criteria.

TABLE 2

GROUNDWATER SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	*March 17, 1994* MW-1	*March 19, 1997* MW-2 SSH-001	MW-2 (dup) SSH-002	MW-3 SSH-004	*April 23, 1997* MW-1 SSH-005	*Acceptable MDL*	*MDEQ Act 451 Generic Residential DW*	*MDEQ Act 451 Generic Industrial DW*
Polynuclear Aromatic Hydrocarbons (µg/L)								
Acenaphthene	<5	2.3	2.4	<1.1	1.2	5	1,300	3,800
Acenaphthylene	<5	<1.2	<1.2	<1.2	<1.2	5	26	75
Anthracene	<5	<1.6	<1.6	<1.6	<1.6	5	7,300	21,000
Benzo(a)anthracene	<5	<1.2	<1.2	<1.2	<1.2	5	1.2	4.8
Benzo(a)pyrene	<5	<1.2	<1.2	<1.2	<1.2	5	0.2	0.2
Benzo(b)fluoranthene	<5	<2.5	<2.5	<2.5	<2.5	5	1.2	4.8
Benzo(g,h,i)perylene	<5	<1.5	<1.5	<1.5	<1.5	5	26	75
Benzo(k)fluoranthene	<5	<1.8	<1.8	<1.8	<1.8	5	12	48
Benzo(k)perylene	<5	--	--	--	--	5	--	--
Chrysene	<5	<0.83	<0.83	<0.83	<0.83	5	120	480
Dibenzo(a,h)anthracene	<5	<1.4	<1.4	<1.4	<1.4	5	0.12	0.48
Fluoranthene	<5	<1.3	<1.3	<1.3	<1.3	5	880	2,500
Fluorene	<5	<1.2	<1.2	<1.2	<1.2	5	880	2,500
Indeno(1,2,3-cd)pyrene	<5	<1.7	<1.7	<1.7	<1.7	5	1.2	4.8
Naphthalene	<5	6.0	6.2	1.8	<1.6	5	260	750
Phenanthrene	<5	<2.1	<2.1	<2.1	<2.1	5	26	75
Pyrene	<5	<1.6	<1.6	<1.6	<1.6	5	550	1,600

Notes:

Above Act 451 Generic Residential Drinking Water Criteria

Above Act 451 Generic Industrial Drinking Water Criteria

[redacted]

TABLE 3

SURFACE SOIL SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	March 7, 1997 SS-1 SE-001	SS-1 (dup) SE-002	SS-2 SE-003	SS-3 SE-004	SS-4 SE-005	SS-5 SE-006	SS-6 SE-007	Acceptable MDL	MDEQ Act 451 Generic Residential DCV	MDEQ Act 451 Generic Industrial DCV	MDEQ Act 451 Generic Residential 20xDW	MDEQ Act 451 Generic Industrial 20xDW
Polynuclear Aromatic Hydrocarbons (µg/kg)												
Acenaphthene	34.3 J	<44	80.8	41.8 J	133	<44	<45	330	7.6E+7	8.1E+8	26,000	76,000
Acenaphthylene	48.6	<44	77.7	<43	<44	<44	<45	330	1.5E+6	1.6E+7	520	1,500
Anthracene	117	<44	187	42.6 J	61.6	<44	<45	330	4.2E+8	1.0E+9	146,000	420,000
Benzo(a)anthracene	389	253	275	78.3	154	43.4	137	330	1.4E+4	2.1E+5	--	--
Benzo(a)pyrene	530	366	279 J	63.8	144	52.9	98.3	330	1.4E+3	2.1E+4	--	--
Benzo(b)fluoranthene	559	406	322	82.2	158	53.6	114	330	1.4E+4	2.1E+5	--	--
Benzo(g,h,i)perylene	269	181	126	<28	<29	<29	<30	330	1.5E+6	1.6E+7	--	--
Benzo(k)fluoranthene	371	291	257	46 J	110	64.7 J	81.6 J	330	1.4E+5	2.1E+6	--	--
Chrysene	640	448	478	132	241	76.7	179	330	1.4E+6	2.1E+7	--	--
Dibenzo(a,h)anthracene	124	<41	<41	<40	<40	<40	<41	330	1.4E+3	2.1E+4	--	--
Fluoranthene	702	397	597	118	338	64.7	260	330	5.1E+7	5.4E+8	17,600	50,000
Fluorene	37 J	<41	<41	70.3	164	<40	<41	330	5.1E+7	5.4E+8	17,600	50,000
Indeno(1,2,3-cd)pyrene	255	173	112	<20	<20	<20	<20	330	1.4E+4	2.1E+5	--	--
Naphthalene	206	172	447	384	444	<59	<60	330	1.5E+7	1.6E+8	5,200	15,000
Phenanthrene	427	177	295	164	235	<26	131	330	1.5E+6	1.6E+7	520	1,500
Pyrene	526	364	494	151	337	81.5	234	330	3.2E+7	3.4E+8	11,000	32,000

Notes:

-- Not available, or not expected to leach to groundwater under most conditions.

Above Act 451 Generic Residential 20x Drinking Water Criteria

Above Act 451 Generic Industrial 20x Drinking Water Criteria

Above Act 451 Generic Residential Direct Contact Value

Above Act 451 Generic Industrial Direct Contact Value

TABLE 4

MONITORING WELL DETAILS AND GROUNDWATER ELEVATIONS
INVESTIGATION OF RAILROAD TRACK AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

				March 19, 1997		April 23, 1997		July 29, 1997	
Location	*Top of Casing Elevation (1)*	*Bottom Depth (feet btoc)*	*Bottom Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*
MW1	591.14	16.82	574.32	--	--	8.77	582.37	6.07	585.07
MW2	591.68	11.45	580.23	4.84	586.84	--	--	6.46	585.22
MW3	590.83	11.63	579.20	5.93	584.90	--	--	5.42	585.41

Notes:
(1) Elevation is given based on the oil house floor elevation of 592.00 feet AMSL.

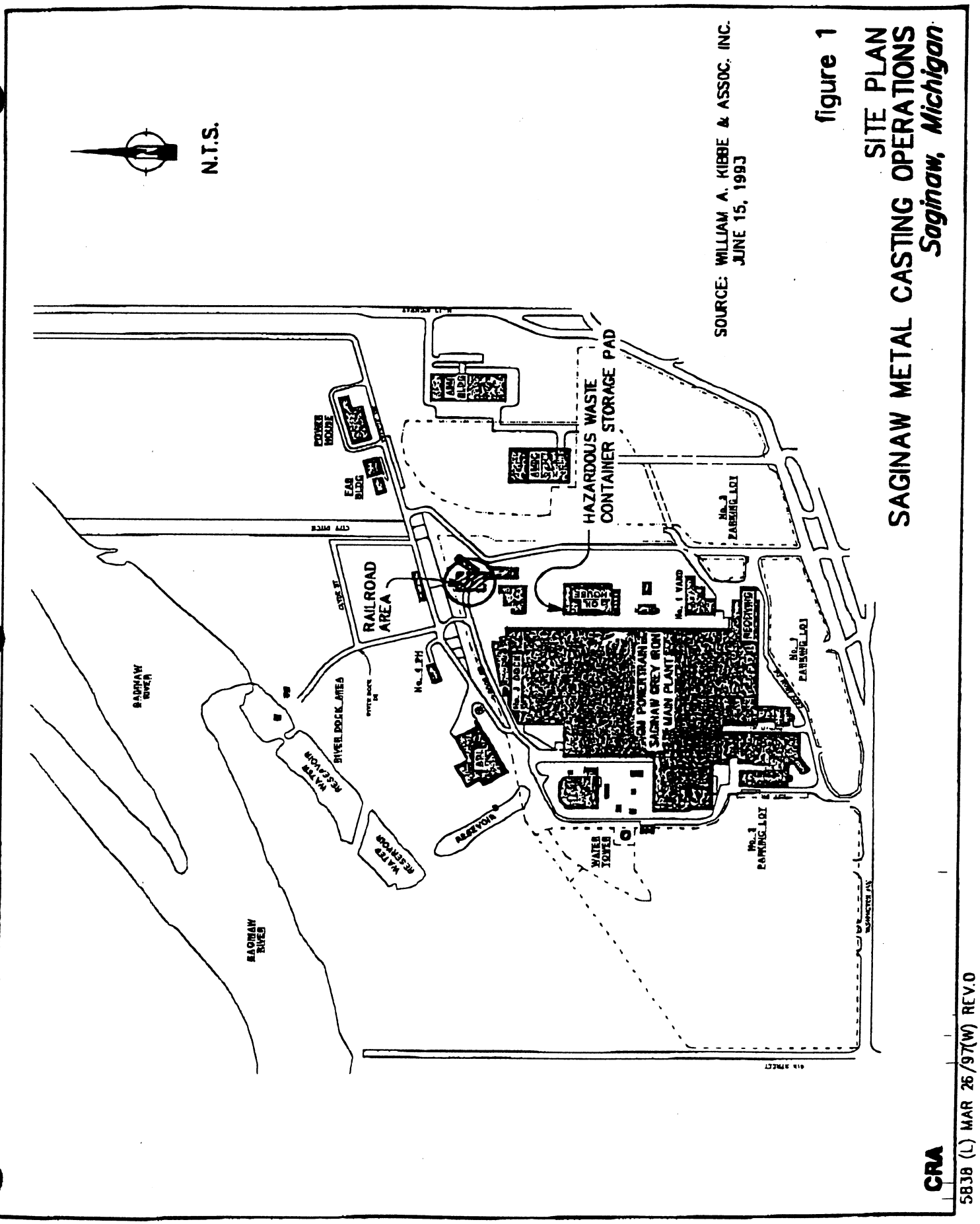


figure 1

SITE PLAN

SAGINAW METAL CASTING OPERATIONS

Saginaw, Michigan

CRA

5838 (L) MAR 26/97(W) REV.0

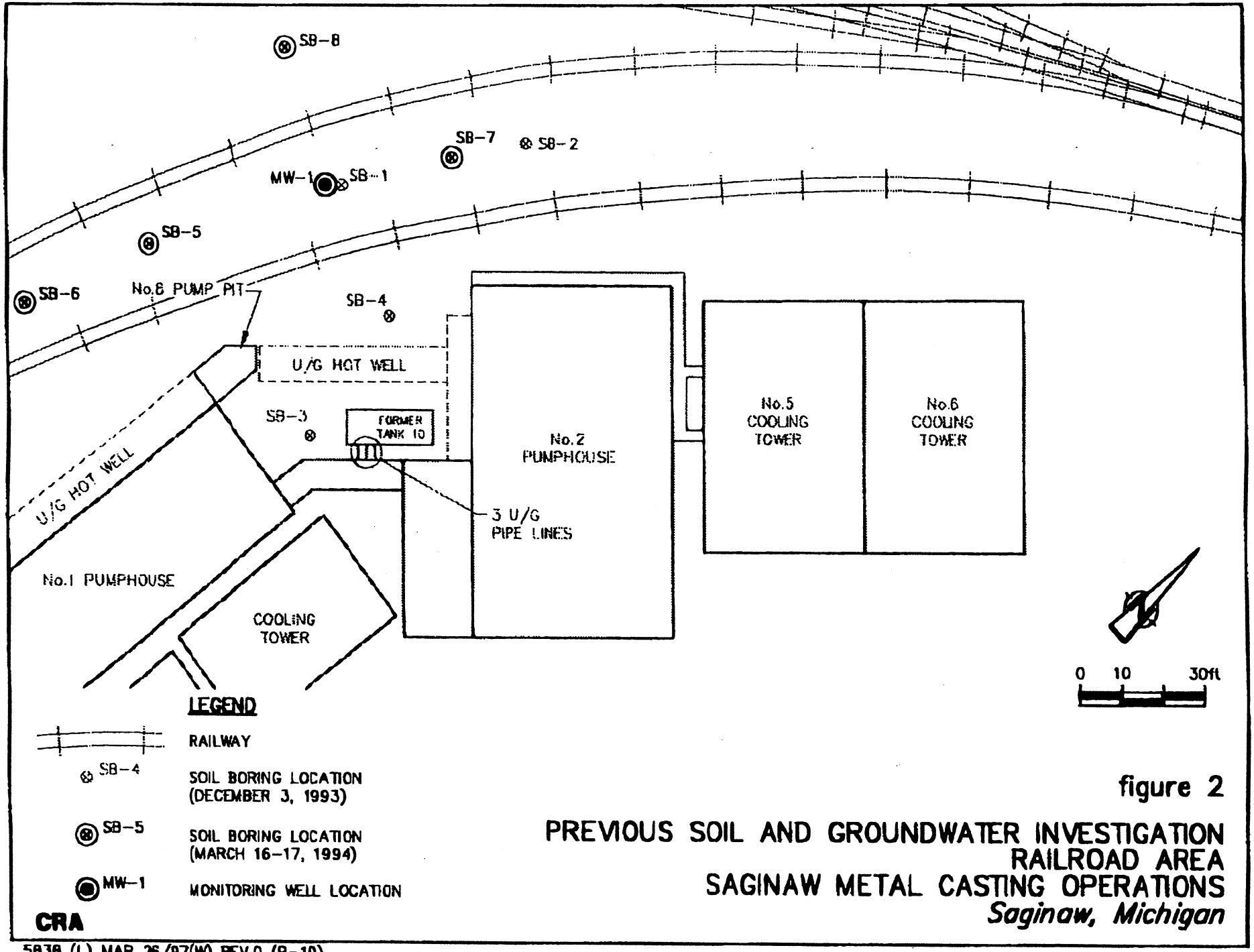


figure 2

PREVIOUS SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

5838 (L) MAR 26/97(W) REV.0 (P-10)

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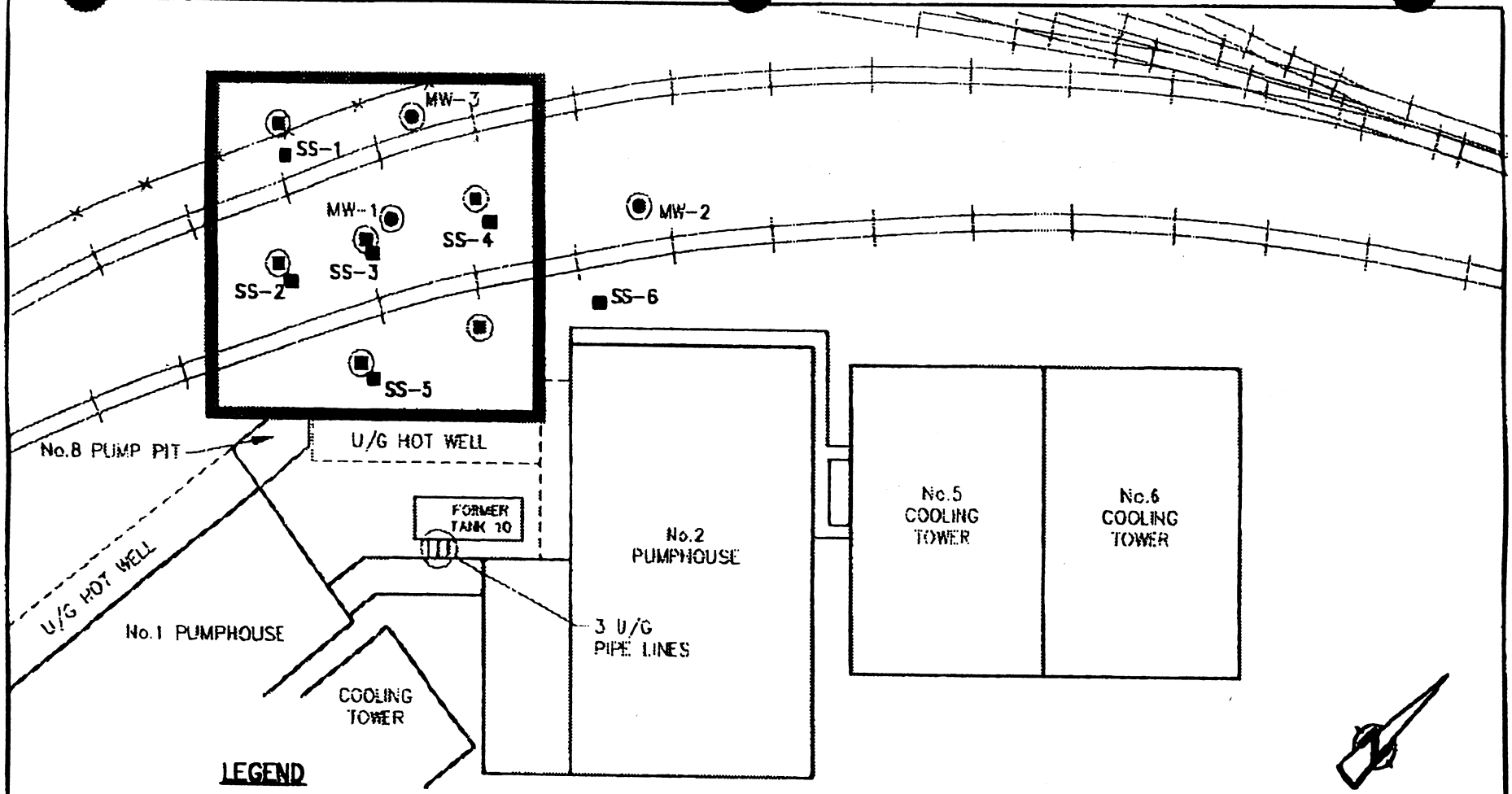


LEGEND

- RAILWAY
- FENCELINE
- EXTENT OF SURFACE SOIL INVESTIGATION
- MW-1 MONITORING WELL LOCATION
- PROPOSED SURFACE SOIL SAMPLE LOCATION
- SS-6 ACTUAL SURFACE SOIL SAMPLE LOCATION

figure 3

SURFACE SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (L) MAR 26/97(W) REV.0 (P-09)

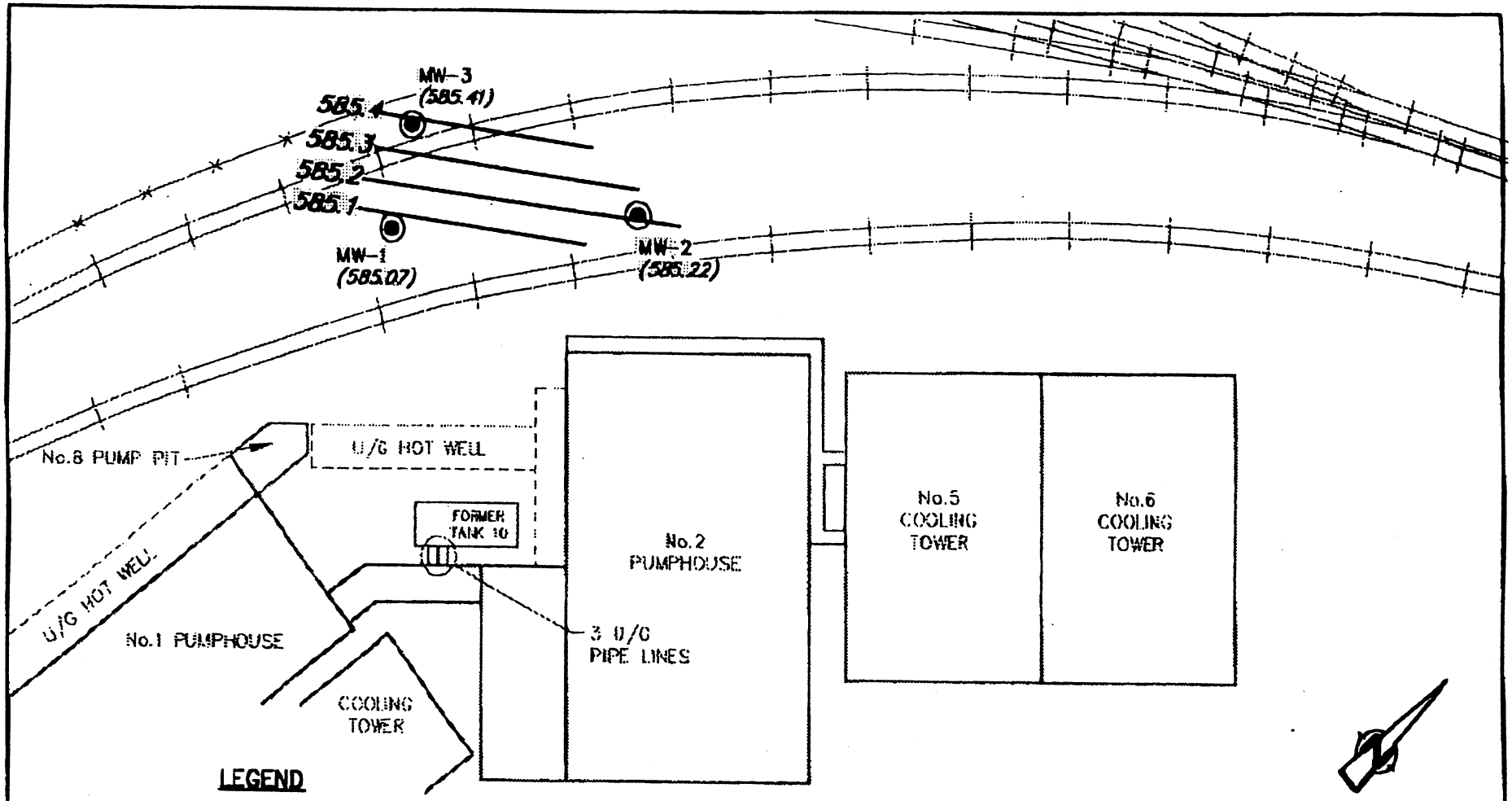


figure 4

GROUNDWATER CONTOURS RAILROAD AREA - JULY 1997 SAGINAW METAL CASTING OPERATIONS

Saginaw, Michigan

CRA

5838I (L) AUG 07/97(M) REV.0 (P-11)

August 22, 1997 - **DRAFT** - Reference No. 5838

Ms. Rhonda Klann
Michigan Department of Environmental Quality
Environmental Response Division
503 North Euclid Avenue
Bay City, Michigan 48706

RECEIVED
APPROVED
APPROVED AS NOTED
REVIEWED
RETN'D FOR CORRECTION
DATE 9/3/97
JOSEPH B. MEDVED, P.E.

Dear Ms. Klann:

Re: Investigation for Railroad Tracks
West of Cupola Cooling Towers
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the findings from the investigation of the Railroad Tracks west of the Cupola Cooling Towers at the Saginaw Metal Casting Operations in Saginaw, Michigan. This investigation was completed as a result of chemicals identified above Act 451 Generic Residential and Industrial criteria in the vicinity of the railroad tracks during the investigation of this area in December 1993 and March 1994 and in accordance with the MDEQ approved Work Plan dated October 15, 1996. The railroad area west of the Cupola Cooling Towers is presented on Figure 1.

SUMMARY OF PREVIOUS SOIL INVESTIGATIONS

On December 3, 1993, four soil borings (SB-1 to SB-4) were completed to investigate the Tank 10 area. The results indicated the presence of polynuclear aromatic hydrocarbons (PNAs) west of Tank 10, outside the foundation containment isolating the Tank 10 area. The results from soil borings 1, 2 and 4 installed to investigate Tank 10 are expected to be a result of activities in the railroad area. Soil boring locations are presented on Figure 2. The results from the December 3, 1993 investigation are summarized in Table 1.

On March 16 and 17, 1994, four additional soil borings (SB-4 to SB-8) were completed at the locations presented on Figure 2 in order to further investigate the vertical and horizontal extent of PNAs in the railroad area. Soil borings were advanced through the upper fill layer to native clay which was encountered at a depth of approximately 12 feet below ground surface (bgs). Continuous soil samples were collected from each borehole. One sample was selected at each of the four locations based on visual, olfactory and/or photoionization detector (PID) readings. Samples were analyzed for PNAs. The sample results are presented in Table 1.

Analytical results from soil borings 1 and 4 completed in December 1993 indicate soil contamination above Act 451 Residential Direct Contact Values, Generic Industrial 20x Drinking Water Values and Generic Residential 20x Drinking Water Values at a depth of 4 to 8 feet. The results from soil boring 2 completed in December 1993 indicate soil contamination above Act 451 Generic Residential 20x Drinking Water Values at a depth of 6 to 8 feet. The results from soil borings 7 and 8 completed in March 1994 indicate soil contamination above Act 451 Generic Residential 20x Drinking Water Values at a depth of 2 to 5 feet.

SUMMARY OF PREVIOUS GROUNDWATER INVESTIGATIONS

Groundwater was encountered at approximately 6 feet bgs during the December 3, 1993 soil boring investigation and between 7 and 12 feet during the March 16 and 17, 1994 soil boring investigation. On March 16, 1994 a monitoring well was completed to 12 bgs at the location of highest PNA concentrations (SB-1) from the December 3, 1993 investigation. Monitoring well details are presented in Attachment A. Groundwater at monitoring well MW-1 was 6 feet bgs 24 hours after development. Groundwater was sampled on March 17, 1994 at well MW-1 and contained no PNAs above the detection limits. The sample results are presented in Table 2.

SUPPLEMENTAL INVESTIGATION WORK PLAN

Based on the results of the soil borings, a Supplemental Investigation Work Plan was submitted to MDEQ on October 15, 1996. This work plan was revised on February 24, 1997 in accordance with MDEQ comments. The work plan with revisions was approved in a MDEQ letter dated February 27, 1997. The proposed scope of the investigation included the collection of six surface soil samples from 0 to 6 inches to be analyzed for PNAs, at the locations presented on Figure 3. The proposed investigation also included the installation of two downgradient monitoring wells. One round of groundwater samples from all three wells in the area and one round of groundwater samples from the two downgradient wells (based on measured groundwater elevations) were to be collected and analyzed for PNAs. The groundwater elevations were to be recorded on a quarterly basis for one year to confirm the groundwater flow direction.

SUPPLEMENTAL SOIL INVESTIGATION

On March 7, 1997, six surface soil samples were collected from the locations presented on Figure 3. The soil samples were analyzed for PNAs and sample results are presented in Table 3. All of the surface soil sample results were below Act 451 Generic Residential Direct Contact Values, and Generic Residential 20x Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

SUPPLEMENTAL GROUNDWATER QUALITY INVESTIGATION

On March 7, 1997, two monitoring wells (MW2-97 and MW3-97) were installed at the locations presented on Figure 3. Stratigraphic logs and monitoring well installation details are presented in Attachment A. The existing well (MW-1) was not located. An undetermined thickness of fill had been placed on top of this well to create a temporary roadway. Wells MW2-97 and MW3-97 were developed and sampled on March 19, 1997. A sheen was noted during development of both wells. Samples were analyzed for PNAs and sample results are presented in Table 2. All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

Monitoring well MW-1 was located during the week of April 7, 1997. The riser was damaged during excavation to find the well and was repaired on April 16, 1997. MW-1 was sampled on April 23, 1997. The sample was analyzed for PNAs and sample results are presented in Table 2. All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Laboratory reports are presented in Attachment B. The data validation report is presented in Attachment C.

SUPPLEMENTAL GROUNDWATER FLOW INVESTIGATION

On March 19, 1997, groundwater levels were measured at wells MW2-97 and MW3-97. On April 23, 1997, the groundwater level was measured at MW1. On July 29, 1997, the groundwater level was measured at all 3 wells. Groundwater elevations are presented in Table 4 and groundwater contours are presented on Figure 4. The groundwater flow

direction based on the July 29, 1997 groundwater elevations is to the south. The expected groundwater flow direction was to the northwest, towards the Saginaw River. The groundwater flow direction will be confirmed with quarterly groundwater elevation measurement for one year (i.e. three additional rounds).

CONCLUSIONS

All of the surface soil sample results were below Act 451 Generic Residential Direct Contact Values, and Generic Residential 20x Drinking Water Values. Therefore, no action is required for soil in this area.

All of the groundwater sample results were below Act 451 Generic Residential Drinking Water Values. Quarterly groundwater level measurements will be performed for one year. One additional round of downgradient well sampling will be performed once groundwater flow directions are confirmed.

Should you have any questions, please do not hesitate to contact our office.

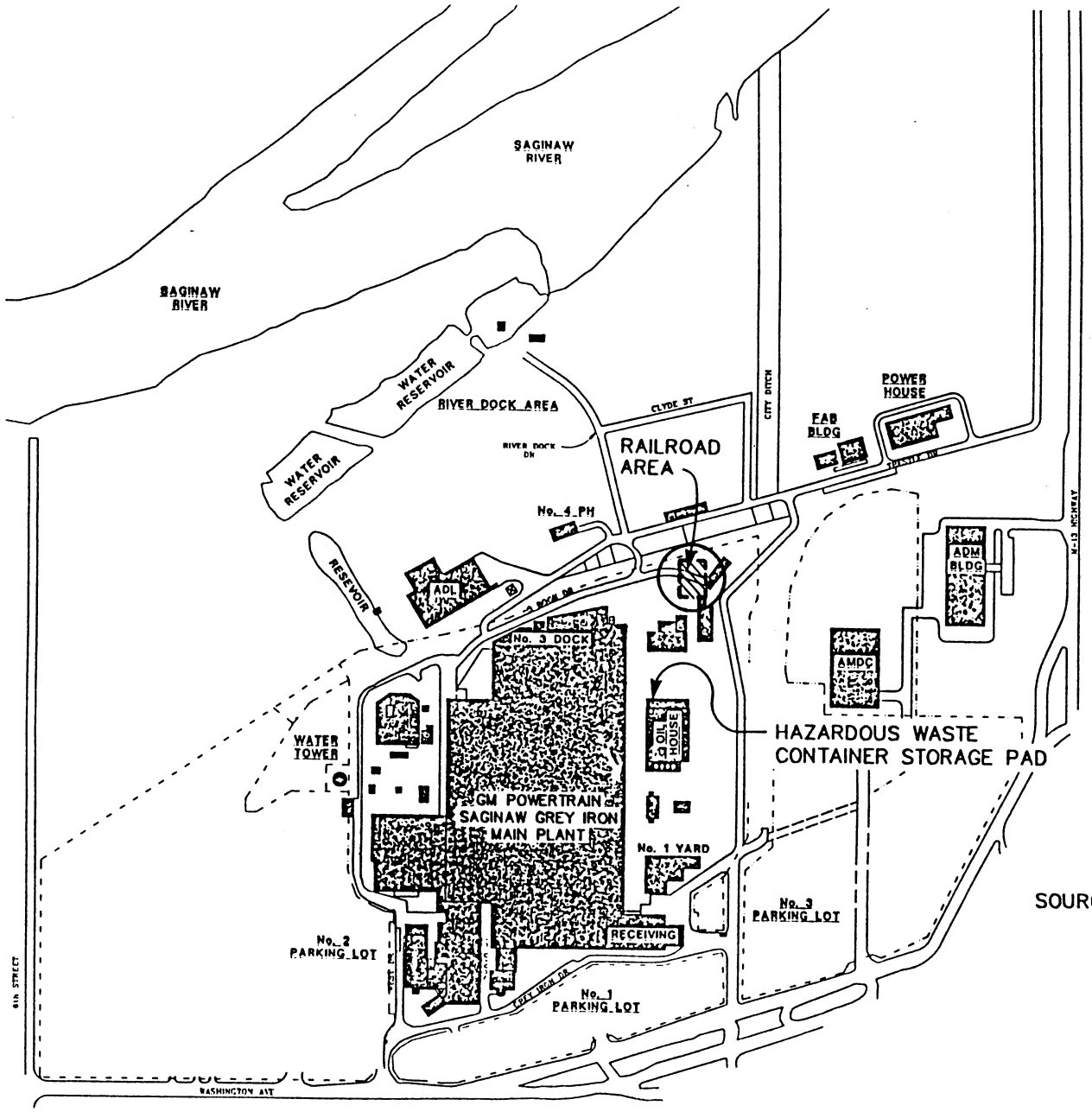
Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka

MRT/cf/2
Encl.

c.c. Jackie James, GM
Dave Kwasny, GM
Ray Ilkka, GM
Ian Richardson, CRA



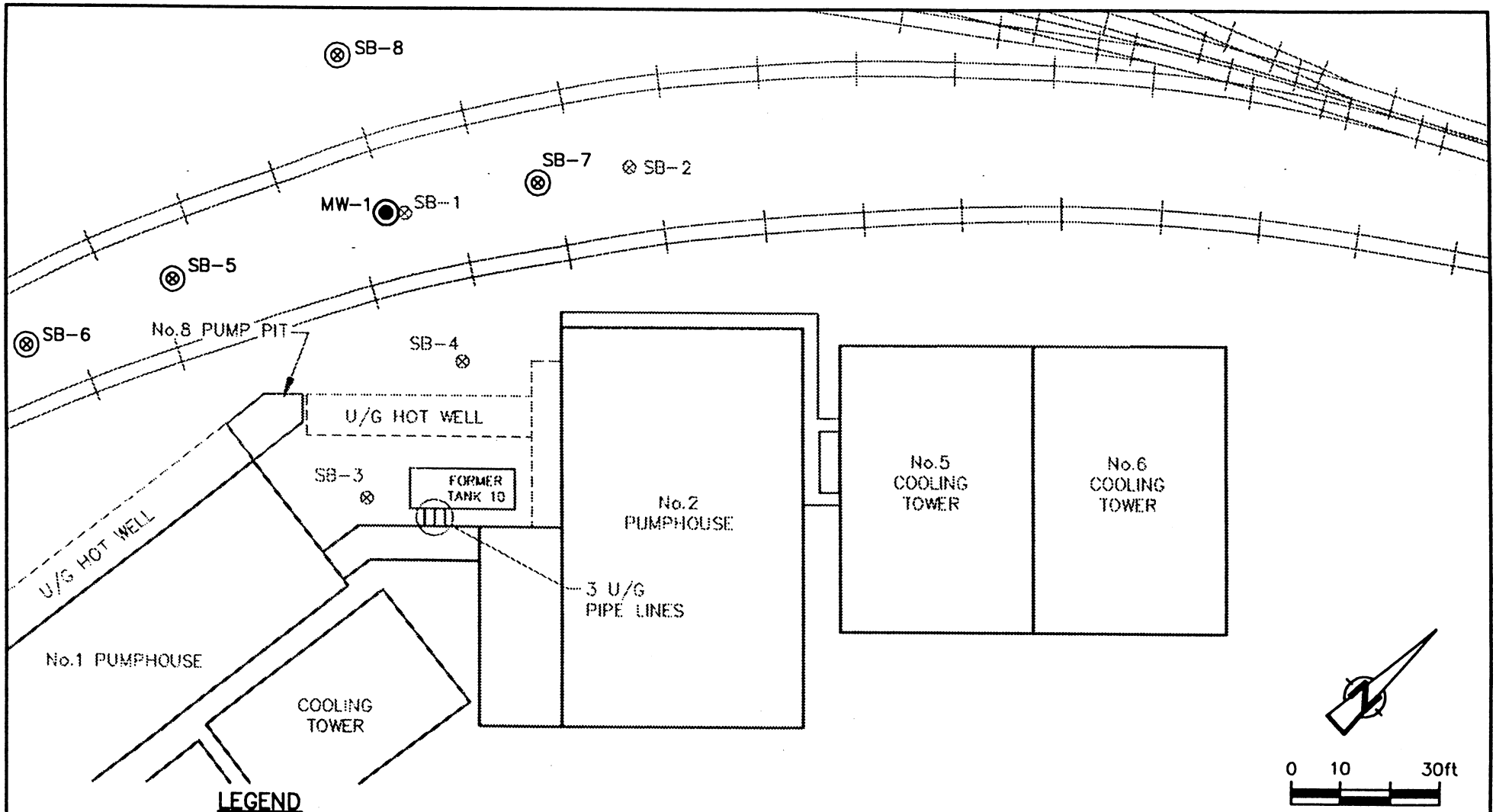
SOURCE: WILLIAM A. KIBBE & ASSOC. INC. JUNE 15, 1993

figure 1

SITE PLAN
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (L) MAR 26/97(W) REV.0



CRA

figure 2

PREVIOUS SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

5838 (L) MAR 26/97(W) REV.0 (P-10)

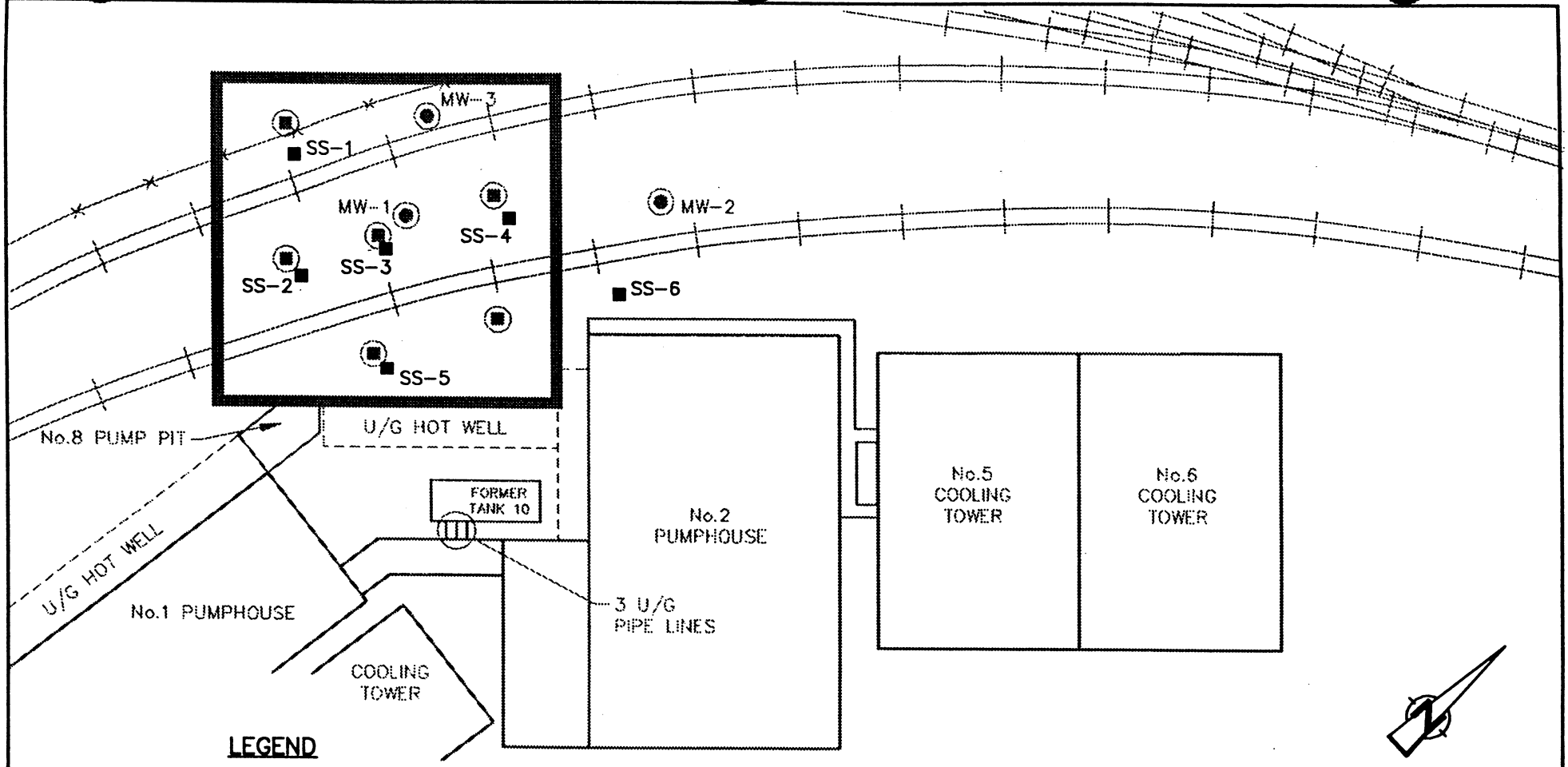


figure 3

SURFACE SOIL AND GROUNDWATER INVESTIGATION
RAILROAD AREA
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (L) MAR 26/97(W) REV.0 (P-09)

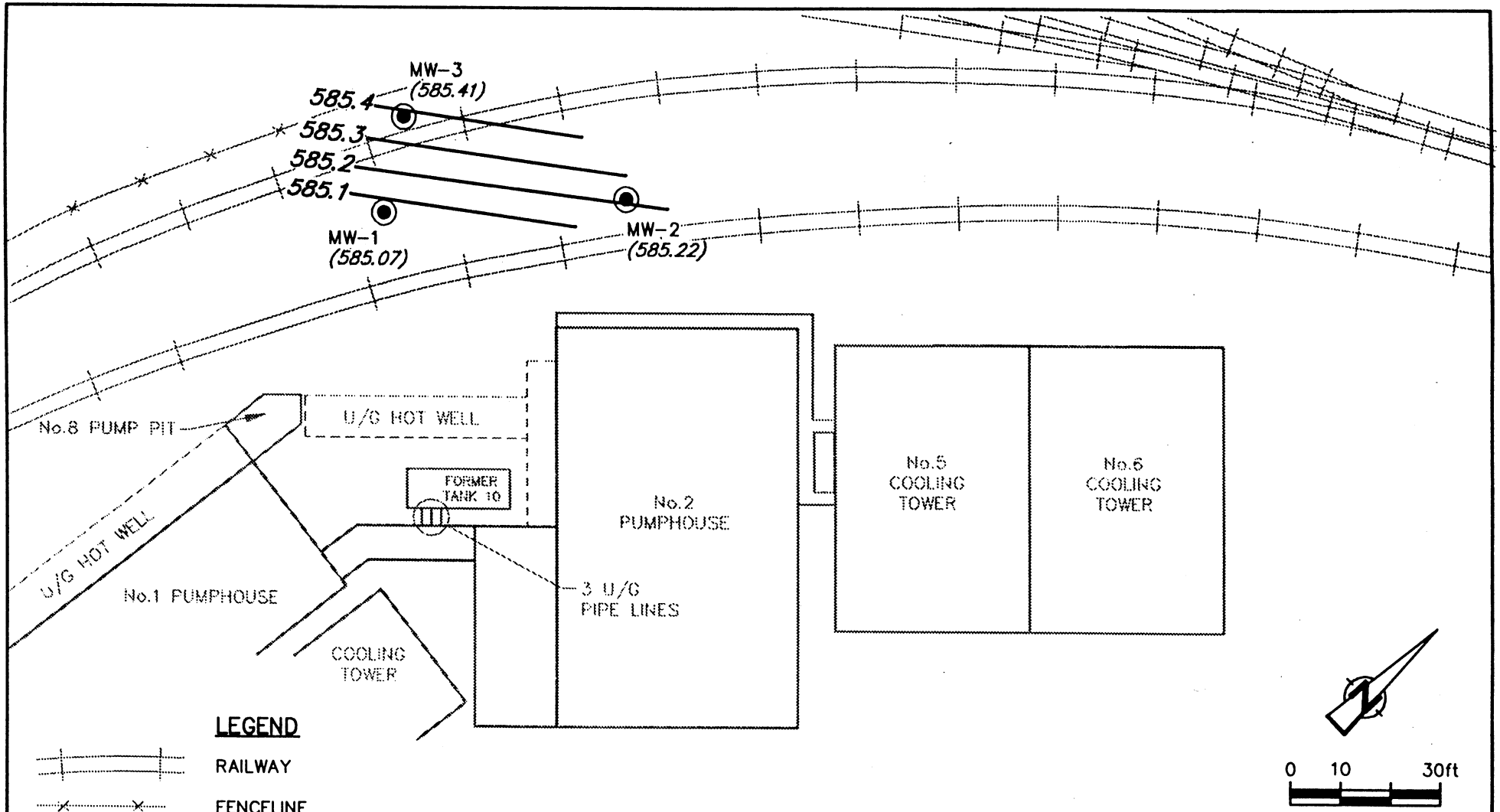


figure 4

GROUNDWATER CONTOURS
RAILROAD AREA – JULY 1997
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5838 (L) AUG 07/97(W) REV.0 (P-11)

TABLE 1

HISTORICAL SOIL SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	Units	December 3, 1993 SB-1 (6-8')	SB-2 (6-8')	SB-3 (6-8')	SB-4 (4-6')	March 16-17, 1994 SB-5 (6-8')	SB-6 (2-4')	SB-7 (3.5-5')	SB-8 (2-4')	Acceptable MDL	MDEQ Act 451 Generic Residential DCV	MDEQ Act 451 Generic Industrial DCV	MDEQ Act 451 Generic Residential 20xDW	MDEQ Act 451 Generic Industrial 20xDW
Benzene	(µg/kg)	<10	<10	13	<10						8.8E+4	8.5E+5	100	100
Toluene	(µg/kg)	14	<10	32	<10						2.4E+7	1.6E+8	16,000	20,000
Ethylbenzene	(µg/kg)	<10	<10	<10	<10						1.1E+7	7.2E+7	1,500	14,000
Xylenes	(µg/kg)	<30	<30	<30	<30						2.0E+8	1.0E+9	5,600	200,000
Benzo(a)Anthracene	(µg/kg)	8,900	1,400	<330	2,600	<330	<330	430	<830	<330	1.4E+4	2.1E+5	--	--
Benzo(a)Pyrene	(µg/kg)	6,500	<330	<330	1,500	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	--	--
Benzo(b)Fluoranthene	(µg/kg)	5,800	870	<330	1,800	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	--	--
Benzo(g,h,i)Perylene	(µg/kg)	4,400	600	<330	1,100	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	--	--
Benzo(k)Fluoranthene	(µg/kg)	5,800	1,200	<330	1,700	<330	<330	<330	<830	<330	1.4E+5	2.1E+6	--	--
Dibenzo(a,h)Anthracene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.4E+3	2.1E+4	--	--
Indeno(1,2,3-cd)Pyrene	(µg/kg)	4,400	700	<330	1,200	<330	<330	<330	<830	<330	1.4E+4	2.1E+5	--	--
Naphthalene	(µg/kg)	<3,300	<330	<330	360	<330	<330	<330	<830	<330	1.5E+7	1.6E+8	5.2E+3	15,000
Acenaphthene	(µg/kg)	<3,300	<330	<330	540	<330	<330	<330	<830	<330	7.6E+7	8.1E+8	26,000	76,000
Acenaphthylene	(µg/kg)	<3,300	<330	<330	<330	<330	<330	<330	<830	<330	1.5E+6	1.6E+7	520	1,500
Fluorene	(µg/kg)	<3,300	<330	<330	580	<330	<330	<330	<830	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Phenanthrene	(µg/kg)	8,400	1,000	<330	5,300	<330	<330	570	1,000	<330	1.5E+6	1.6E+7	5.2E+2	1,500
Anthracene	(µg/kg)	5,600	<330	<330	1,200	<330	<330	<330	<830	<330	4.2E+8	1.0E+9	1.5E+5	420,000
Fluoranthene	(µg/kg)	23,000	2,400	<330	4,600	<330	<330	600	1,200	<330	5.1E+7	5.4E+8	1.8E+4	50,000
Pyrene	(µg/kg)	21,000	5,500	<330	8,700	<330	<330	580	980	<330	3.2E+7	3.4E+8	1.1E+4	32,000
Chrysene	(µg/kg)	8,600	1,200	<330	2,000	<330	<330	530	<830	<330	1.4E+6	2.1E+7	--	--

Notes:

-- Compound not expected to leach to groundwater under most conditions.
Above Act 451 Generic Residential 20x Drinking Water Criteria.
Above Act 451 Generic Industrial 20x Drinking Water Criteria.
Above Act 451 Generic Residential Direct Contact Values Criteria.

TABLE 2

GROUNDWATER SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	*March 17, 1994*	*March 19, 1997*			*April 23, 1997*	*Acceptable*	*MDEQ Act 451 Generic Residential*	*MDEQ Act 451 Generic Industrial*
	MW-1	*MW-2*	*MW-2 (dup)*	*MW-3*	*MW-1*	*MDL*	*DW*	*DW*
		SSH-001	*SSH-002*	*SSH-004*	*SSH-005*			
Polynuclear Aromatic Hydrocarbons (µg/L)								
Acenaphthene	<5	**2.3**	**2.4**	<1.1	**1.2**	5	1,300	3,800
Acenaphthylene	<5	<1.2	<1.2	<1.2	<1.2	5	26	75
Anthracene	<5	<1.6	<1.6	<1.6	<1.6	5	7,300	21,000
Benzo(a)anthracene	<5	<1.2	<1.2	<1.2	<1.2	5	1.2	4.8
Benzo(a)pyrene	<5	<1.2	<1.2	<1.2	<1.2	5	0.2	0.2
Benzo(b)fluoranthene	<5	<2.5	<2.5	<2.5	<2.5	5	1.2	4.8
Benzo(g,h,i)perylene	<5	<1.5	<1.5	<1.5	<1.5	5	26	75
Benzo(k)fluoranthene	<5	<1.8	<1.8	<1.8	<1.8	5	12	48
Benzo(k)perylene	<5	--	--	--	--	5	--	--
Chrysene	<5	<0.83	<0.83	<0.83	<0.83	5	120	480
Dibenzo(a,h)anthracene	<5	<1.4	<1.4	<1.4	<1.4	5	0.12	0.48
Fluoranthene	<5	<1.3	<1.3	<1.3	<1.3	5	880	2,500
Fluorene	<5	<1.2	<1.2	<1.2	<1.2	5	880	2,500
Indeno(1,2,3-cd)pyrene	<5	<1.7	<1.7	<1.7	<1.7	5	1.2	4.8
Naphthalene	<5	**6.0**	**6.2**	**1.8**	<1.6	5	260	750
Phenanthrene	<5	<2.1	<2.1	<2.1	<2.1	5	26	75
Pyrene	<5	<1.6	<1.6	<1.6	<1.6	5	550	1,600

Notes:

Above Act 451 Generic Residential Drinking Water Criteria

Above Act 451 Generic Industrial Drinking Water Criteria

TABLE 3

SURFACE SOIL SAMPLE SUMMARY
RAILROAD AREA INVESTIGATION
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

	March 7, 1997											
Parameter	*SS-1 SE-001*	*SS-1 (dup) SE-002*	*SS-2 SE-003*	*SS-3 SE-004*	*SS-4 SE-005*	*SS-5 SE-006*	*SS-6 SE-007*	*Acceptable MDL*	*MDEQ Act 451 Generic Residential DCV*	*MDEQ Act 451 Generic Industrial DCV*	*MDEQ Act 451 Generic Residential 20xDW*	*MDEQ Act 451 Generic Industrial 20xDW*
Polynuclear Aromatic Hydrocarbons (µg/kg)												
Acenaphthene	34.3 J	<44	80.8	41.8 J	133	<44	<45	330	7.6E+7	8.1E+8	26,000	76,000
Acenaphthylene	48.6	<44	77.7	<43	<44	<44	<45	330	1.5E+6	1.6E+7	520	1,500
Anthracene	117	<44	187	42.6 J	61.6	<44	<45	330	4.2E+8	1.0E+9	146,000	420,000
Benzo(a)anthracene	389	253	275	78.3	154	43.4	137	330	1.4E+4	2.1E+5	--	--
Benzo(a)pyrene	530	366	279 J	63.8	144	52.9	98.3	330	1.4E+3	2.1E+4	--	--
Benzo(b)fluoranthene	559	406	322	82.2	158	53.6	114	330	1.4E+4	2.1E+5	--	--
Benzo(g,h,i)perylene	269	181	126	<28	<29	<29	<30	330	1.5E+6	1.6E+7	--	--
Benzo(k)fluoranthene	371	291	257	46 J	110	64.7 J	81.6 J	330	1.4E+5	2.1E+6	--	--
Chrysene	640	448	478	132	241	76.7	179	330	1.4E+6	2.1E+7	--	--
Dibenzo(a,h)anthracene	124	<41	<41	<40	<40	<40	<41	330	1.4E+3	2.1E+4	--	--
Fluoranthene	702	397	597	118	338	64.7	260	330	5.1E+7	5.4E+8	17,600	50,000
Fluorene	37 J	<41	<41	70.3	164	<40	<41	330	5.1E+7	5.4E+8	17,600	50,000
Indeno(1,2,3-cd)pyrene	255	173	112	<20	<20	<20	<20	330	1.4E+4	2.1E+5	--	--
Naphthalene	206	172	447	384	444	<59	<60	330	1.5E+7	1.6E+8	5,200	15,000
Phenanthrene	427	177	295	164	235	<26	131	330	1.5E+6	1.6E+7	520	1,500
Pyrene	526	364	494	151	337	81.5	234	330	3.2E+7	3.4E+8	11,000	32,000

Notes:

-- Not available, or not expected to leach to groundwater under most conditions.

Above Act 451 Generic Residential 20x Drinking Water Criteria

Above Act 451 Generic Industrial 20x Drinking Water Criteria

Above Act 451 Generic Residential Direct Contact Value

Above Act 451 Generic Industrial Direct Contact Value

TABLE 4

MONITORING WELL DETAILS AND GROUNDWATER ELEVATIONS
INVESTIGATION OF RAILROAD TRACK AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

				March 19, 1997		*April 23, 1997*		*July 29, 1997*	
Location	*Top of Casing Elevation (1)*	*Bottom Depth (feet btoc)*	*Bottom Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*	*Depth to Water (feet btoc)*	*Groundwater Elevation (1)*
MW1	591.14	16.82	574.32	--	--	8.77	582.37	6.07	585.07
MW2	591.68	11.45	580.23	4.84	586.84	--	--	6.46	585.22
MW3	590.83	11.63	579.20	5.93	584.90	--	--	5.42	585.41

Notes:
(1) Elevation is given based on the oil house floor elevation of 592.00 feet AMSL.

ATTACHMENT A

SURFACE SOIL LOGS, SOIL BORING LOGS AND WELL COMPLETION DETAILS

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ___

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM SMCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER ---
SURFACE ELEVATION ---
WEATHER (A.M.) ___
(P.M.) Sunny, ≈0°C

HOLE DESIGNATION SS1-97
DATE STARTED Nov 7/97
DATE COMPLETED ___
DRILLING METHOD ---
CRA SUPERVISOR Sylvie Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		6"	SW, sand with gravel, med sand	CO1	-Hand								
			Coarse gravel dk brown	W2									
			note: could not remove large										
			rock at bottom, so dug around it.										
			also metal bits.										
			~~Recorded~~										
			area = 1 sq ft.										

NOTES AND COMMENTS

CRA FORM SP-17

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ____

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM&MCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER ____
SURFACE ELEVATION ____
WEATHER (A.M.) ____
(P.M.) ____

HOLE DESIGNATION SS2-97
DATE STARTED ____
DATE COMPLETED ____
DRILLING METHOD ____
CRA SUPERVISOR Sylvia Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		3"	SW, sand, gravel, Incl fine sand, coarse gravel, cinder, brown, damp. also fragments of sand pieces. Note: only went to 3" because could not dig further. this area is being used as a road and is compacted. area = 6" x 6".	C03									

NOTES AND COMMENTS

CRA FORM SB-17

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ___

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM/GMCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER ___
SURFACE ELEVATION ___
WEATHER (A.M.) ___
(P.M.) ___

HOLE DESIGNATION SS3-97
DATE STARTED ___
DATE COMPLETED ___
DRILLING METHOD ___
CRA SUPERVISOR Sylvia Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		3"	GW, gravel and sand, med to coarse, angular, lt brownish grey, damp to wet.	001									
			Note due to compaction by traffic, could only excavate 3".										
			Area = 6" x 6"										

NOTES AND COMMENTS

CRA FORM SB-17

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM SMCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER ____
SURFACE ELEVATION ____
WEATHER (A.M.) ____
(P.M.) ____

HOLE DESIGNATION SS4-97
DATE STARTED ____
DATE COMPLETED ____
DRILLING METHOD ____
CRA SUPERVISOR Sylvia Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		6"	SP, Sand, uniform ~~steel~~ fine Sand brown, wet.	005									
			Note: only went 1' depth due to hitting concrete pad										
			Area = 6" x 6"										

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ___

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM/GMCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER ___
SURFACE ELEVATION ___
WEATHER (A.M.) ___
(P.M.) ___

HOLE DESIGNATION SS5-97
DATE STARTED ___
DATE COMPLETED ___
DRILLING METHOD ___
CRA SUPERVISOR Sylvie Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		6"	SP Sand with gravel, ~~sand~~ fine sand and coarse gravel angular gravel, reddish brown, sand, damp to wet.	cob									
			Note: 6" x 6"										

NOTES AND COMMENTS

CRA FORM SB-17

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ____

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM&MCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SS6-97
DATE STARTED
DATE COMPLETED
DRILLING METHOD
CRA SUPERVISOR Sylvia Eastman

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		6"	SP, Sand, fine, uniform reddish brown, clamps at 1" depth, 1" layer of stiffer, cohesive, black sand. also some yellow sand at 5-6". area = 6" x 6"	C07									

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF ___

PROJECT NAME Railroad Area
PROJECT NUMEER 5838
CLIENT GM SMC
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER N. BM / Jim
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.) Sunny ~ 0°C

HOLE DESIGNATION MW2-97
DATE STARTED Nov 7/97
DATE COMPLETED Nov 7/97
DRILLING METHOD 3.25" ID HSA
CRA SUPERVISOR Sylvie Eastman

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		2	SW, sand w/ gravel, loose - med dense, fine to coarse, angular, dk brown - dk gray, damp			5	9	4	16				
2		4	Same, some reddish brown, cover gravel.			10	10	12	13				
4		6	Same			11	7	7	7				
6		8	no recovery			3	2	5	6				
8		10	Same as 4-6, some wood, saturated			3	5	6	5				
			EOB, well set at 12'										

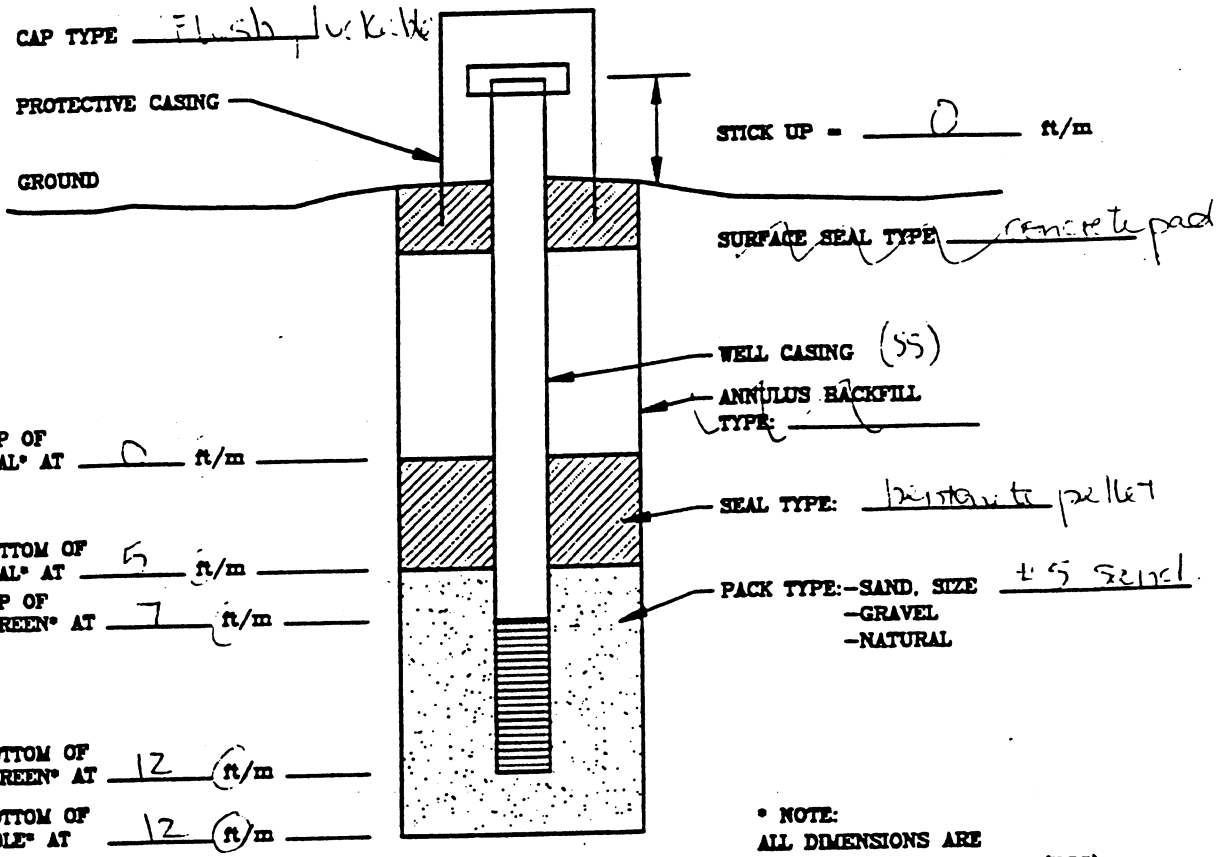
NOTES AND COMMENTS

CRA FORM SP-17

OVERBURDEN INSTRUMENTATION LOG

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM SMCO
LOCATION Saginaw MI

HOLE DESIGNATION MW2-97
DATE COMPLETED Mar. 7, 1997
DRILLING METHOD 3.25" ID HSA
CRA SUPERVISOR Sylvia Eastman



SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other: _____

SCREEN LENGTH: 5 (ft)/m SCREEN DIAMETER: 2 (in)/cm SCREEN SLOT SIZE: #10

WELL CASING MATERIAL: SS WELL CASING DIAMETER: 2 (in)/cm

HOLE DIAMETER: 8" 11

DEVELOPMENT: METHOD: _____ DURATION: _____

STRATIGRAPHY LOG (OVERBURDEN)

PAGE 1 OF 1

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT BMSMCO
LOCATION Saginaw

DRILLING CONTRACTOR Hatco
DRILLER Norm / Jim
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.) Sunny, ≈ 0°C

HOLE DESIGNATION MW3-97
DATE STARTED
DATE COMPLETED
DRILLING METHOD
CRA SUPERVISOR Sylvie Eastman.

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		2	Sm. Sand + gravel, med sand + coarse gravel, med. dense, angular, H.gray, dk gray, some red sand clumps			11	12	14	23				
						8	12	18	24				
2		4	some also some yellow sand and gray coarse gravel.										
4		6	no recovery			3	5	4	4				
6		8	Some, also some black sand + some lt brown coarse. sand.			7	7	6	5				
						7	7	6	5				
8		10	Some saturated, shen metred on the water. FCB will set at 12'										

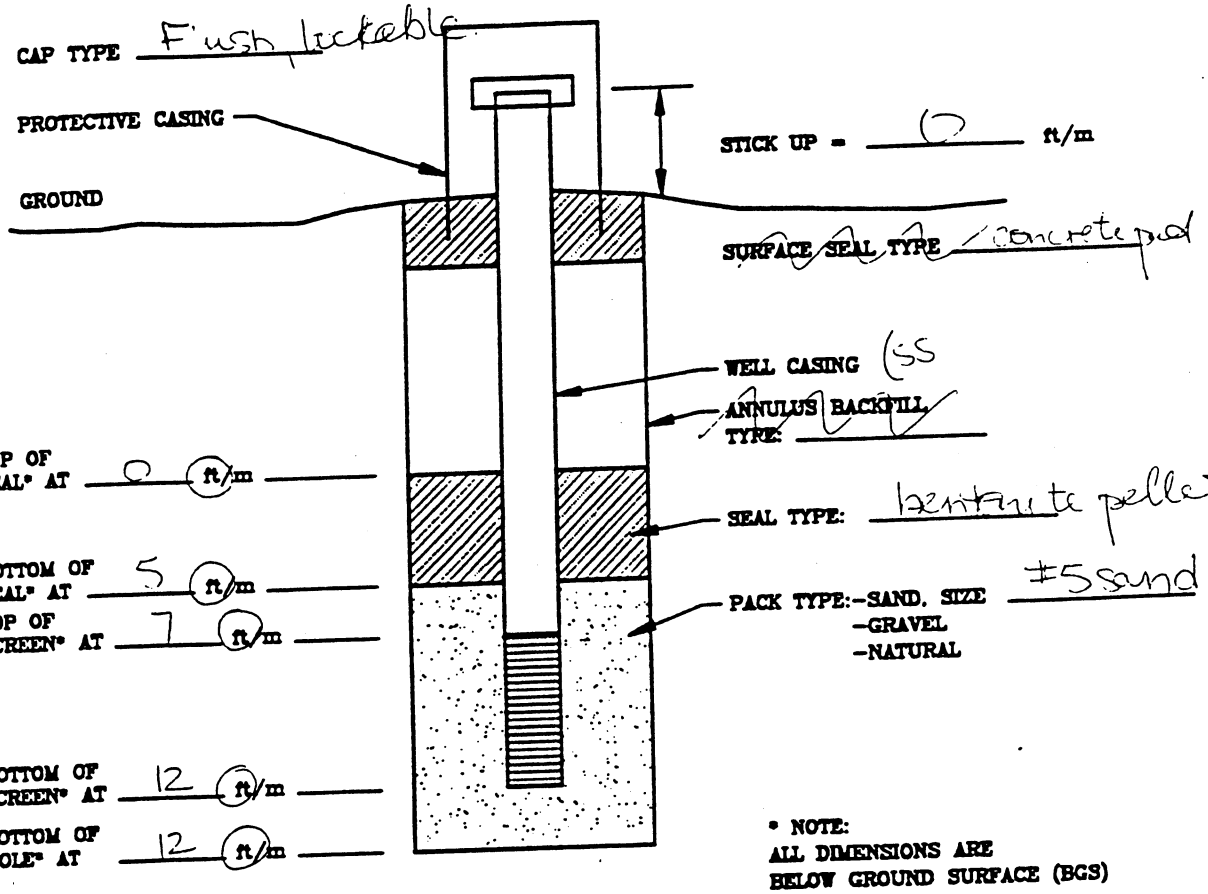
NOTES AND COMMENTS

CRA FORM SB-17

OVERBURDEN INSTRUMENTATION LOG

PROJECT NAME Railroad Area
PROJECT NUMBER 5838
CLIENT GM Stice
LOCATION Saginaw, MI

HOLE DESIGNATION MW3-97
DATE COMPLETED Nov 7 1997
DRILLING METHOD 3.25" ID HSA
CRA SUPERVISOR Sylvie Eastman



SCREEN TYPE: ☐ continuous slot ☐ perforated ☐ louvre ☐ other: _____

SCREEN MATERIAL: ☒ stainless steel ☐ plastic ☐ other: _____

SCREEN LENGTH: 5 ft/m SCREEN DIAMETER: 2 in/cm SCREEN SLOT SIZE: #10

WELL CASING MATERIAL: SS WELL CASING DIAMETER: 2 in/cm

HOLE DIAMETER: 8"

DEVELOPMENT: METHOD: _____ DURATION: _____

ATTACHMENT B

ANALYTICAL REPORTS

ACCUTEST.

03/21/97

Technical Report for

Conestoga Rovers & Associates

Saginaw Metals Castings, Railroad Area, Saginaw, MI

5838

Accutest Job Number: E19299

ORIGINAL ANALYTICAL REPORT

Project#: 5838 Lab #: E19299

Name: GM Saco

Description

Event:

Samples: 7 soil, 1 water

Analysis: PAH

TAT: 2 wk

Lab: Accutest

Checked Against Preliminary Data:

Date: May 1, 97 Init.: MBC

Date of Validation Memo: May 1, 97

Invoice Approval Date: April 23, 97

Comments:

Report to:

Conestoga Rovers & Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

ATTN: Paul Wiseman

Total number of pages in report: 22

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CT, DE, FL, KS, MA, MD, NC, PA, RI, SC, VA

Results relate only to the items tested.

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.

ACCUTEST.

Sample Summary

Conestoga Rovers & Associates

Date: 03/21/97
Job No: E19299

Saginaw Metals Castings, Railroad Area, Saginaw, MI
Project No: 5838

Sample Number	Collected Date	Time By	Received	Matrix Code	Matrix Type	Client Sample ID	
E19299-1	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-001	SS-1
E19299-2	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-002	SS-1 DUP
E19299-3	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-004	SS-3
E19299-4	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-005	SS-4
E19299-5	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-006	SS-5
E19299-6	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-007	SS-6
E19299-7	03/07/97	00:00 SE	03/08/97	AQ	Field Blank Soil	W-5838-970307-SE-001	Rinse Blank
E19299-8	03/07/97	00:00 SE	03/08/97	SO	Soil	S-5838-970307-SE-003	SS-2

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ACCUTEST

Report of Analysis

Client Sample ID:	S-5838-970307-SE-001 SS-1		
Lab Sample ID:	E19299-1	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	90.0
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H10401.D	1	03/10/97	GTT	03/10/97	OP1943	EH351
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	34.3	44	ug/kg	J
208-96-8	Acenaphthylene	48.6	44	ug/kg	
120-12-7	Anthracene	117	44	ug/kg	
56-55-3	Benzo(a)anthracene	389	32	ug/kg	
50-32-8	Benzo(a)pyrene	530	40	ug/kg	
205-99-2	Benzo(b)fluoranthene	559	44	ug/kg	
191-24-2	Benzo(g,h,i)perylene	269	29	ug/kg	
207-08-9	Benzo(k)fluoranthene	371	88	ug/kg	
218-01-9	Chrysene	640	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	124	40	ug/kg	
206-44-0	Fluoranthene	702	29	ug/kg	
86-73-7	Fluorene	37.0	40	ug/kg	J
193-39-5	Indeno(1,2,3-cd)pyrene	255	20	ug/kg	
91-20-3	Naphthalene	206	59	ug/kg	
85-01-8	Phenanthrene	427	26	ug/kg	
129-00-0	Pyrene	526	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	84%		23-120%
321-60-8	2-Fluorobiphenyl	84%		30-115%
1718-51-0	Terphenyl-d14	69%		18-137%

2

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	S-5838-970307-SE-002 SS-1 DUP		
Lab Sample ID:	E19299-2	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	89.7
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H10402.D	1	03/10/97	GTT	03/10/97	OP1943	EH351
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	44	ug/kg	
208-96-8	Acenaphthylene	ND	44	ug/kg	
120-12-7	Anthracene	ND	44	ug/kg	
56-55-3	Benzo(a)anthracene	253	32	ug/kg	
50-32-8	Benzo(a)pyrene	366	41	ug/kg	
205-99-2	Benzo(b)fluoranthene	406	44	ug/kg	
191-24-2	Benzo(g,h,i)perylene	181	29	ug/kg	
207-08-9	Benzo(k)fluoranthene	291	89	ug/kg	
218-01-9	Chrysene	448	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	ug/kg	
206-44-0	Fluoranthene	397	29	ug/kg	
86-73-7	Fluorene	ND	41	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	173	20	ug/kg	
91-20-3	Naphthalene	172	59	ug/kg	
85-01-8	Phenanthrene	177	26	ug/kg	
129-00-0	Pyrene	364	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	82%		23-120%
321-60-8	2-Fluorobiphenyl	86%		30-115%
1718-51-0	Terphenyl-d14	69%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST

Report of Analysis

Client Sample ID:	S-5838-970307-SE-004 SS-3		
Lab Sample ID:	E19299-3	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	91.3
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F8362.D	1	03/10/97	GTT	03/10/97	OP1943	EF1066
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	41.8	43	ug/kg	J
208-96-8	Acenaphthylene	ND	43	ug/kg	
120-12-7	Anthracene	42.6	43	ug/kg	J
56-55-3	Benzo(a)anthracene	78.3	32	ug/kg	
50-32-8	Benzo(a)pyrene	63.8	40	ug/kg	
205-99-2	Benzo(b)fluoranthene	82.2	43	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	28	ug/kg	
207-08-9	Benzo(k)fluoranthene	46.0	87	ug/kg	J
218-01-9	Chrysene	132	24	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	40	ug/kg	
206-44-0	Fluoranthene	118	28	ug/kg	
86-73-7	Fluorene	70.3	40	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	20	ug/kg	
91-20-3	Naphthalene	384	58	ug/kg	
85-01-8	Phenanthrene	164	25	ug/kg	
129-00-0	Pyrene	151	21	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	75%		23-120%
321-60-8	2-Fluorobiphenyl	78%		30-115%
1718-51-0	Terphenyl-d14	85%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST.

Report of Analysis

Client Sample ID:	S-5838-970307-SE-005 SS-4		
Lab Sample ID:	E19299-4	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	89.9
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F8363.D	1	03/10/97	GTT	03/10/97	OP1943	EF1066
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	133	44	ug/kg	
208-96-8	Acenaphthylene	ND	44	ug/kg	
120-12-7	Anthracene	61.6	44	ug/kg	
56-55-3	Benzo(a)anthracene	154	32	ug/kg	
50-32-8	Benzo(a)pyrene	144	40	ug/kg	
205-99-2	Benzo(b)fluoranthene	158	44	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	29	ug/kg	
207-08-9	Benzo(k)fluoranthene	110	88	ug/kg	
218-01-9	Chrysene	241	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	40	ug/kg	
206-44-0	Fluoranthene	338	29	ug/kg	
86-73-7	Fluorene	164	40	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	20	ug/kg	
91-20-3	Naphthalene	444	59	ug/kg	
85-01-8	Phenanthrene	235	26	ug/kg	
129-00-0	Pyrene	337	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	76%		23-120%
321-60-8	2-Fluorobiphenyl	84%		30-115%
1718-51-0	Terphenyl-d14	92%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST.

Report of Analysis

Client Sample ID:	S-5838-970307-SE-006 SS-5		
Lab Sample ID:	E19299-5	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	89.9
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F8364.D	1	03/10/97	GTT	03/10/97	OP1943	EF1066
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	44	ug/kg	
208-96-8	Acenaphthylene	ND	44	ug/kg	
120-12-7	Anthracene	ND	44	ug/kg	
56-55-3	Benzo(a)anthracene	43.4	32	ug/kg	
50-32-8	Benzo(a)pyrene	52.9	40	ug/kg	
205-99-2	Benzo(b)fluoranthene	53.6	44	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	29	ug/kg	
207-08-9	Benzo(k)fluoranthene	64.7	88	ug/kg	J
218-01-9	Chrysene	76.7	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	40	ug/kg	
206-44-0	Fluoranthene	64.7	29	ug/kg	
86-73-7	Fluorene	ND	40	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	20	ug/kg	
91-20-3	Naphthalene	ND	59	ug/kg	
85-01-8	Phenanthrene	ND	26	ug/kg	
129-00-0	Pyrene	81.5	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	58%		23-120%
321-60-8	2-Fluorobiphenyl	67%		30-115%
1718-51-0	Terphenyl-d14	90%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	S-5838-970307-SE-007 SS-6		
Lab Sample ID:	E19299-6	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	88.4
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	F8365.D	1	03/10/97	GTT	03/10/97	OP1943	EF1066
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	45	ug/kg	
208-96-8	Acenaphthylene	ND	45	ug/kg	
120-12-7	Anthracene	ND	45	ug/kg	
56-55-3	Benzo(a)anthracene	137	33	ug/kg	
50-32-8	Benzo(a)pyrene	98.3	41	ug/kg	
205-99-2	Benzo(b)fluoranthene	114	45	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	30	ug/kg	
207-08-9	Benzo(k)fluoranthene	81.6	90	ug/kg	J
218-01-9	Chrysene	179	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	ug/kg	
206-44-0	Fluoranthene	260	30	ug/kg	
86-73-7	Fluorene	ND	41	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	20	ug/kg	
91-20-3	Naphthalene	ND	60	ug/kg	
85-01-8	Phenanthrene	131	26	ug/kg	
129-00-0	Pyrene	234	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	69%		23-120%
321-60-8	2-Fluorobiphenyl	74%		30-115%
1718-51-0	Terphenyl-d14	93%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST.

Report of Analysis

Client Sample ID:	W-5838-970307-SE-001 Rinse Blank		
Lab Sample ID:	E19299-7	**Date Sampled:**	03/07/97
Matrix:	AQ - Field Blank Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H10392.D	1	03/10/97	GTT	03/10/97	OP1923	EH351
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	92%		35-114%
321-60-8	2-Fluorobiphenyl	85%		43-116%
1718-51-0	Terphenyl-d14	82%		33-141%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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ACCUTEST

Report of Analysis

Client Sample ID:	S-5838-970307-SE-003 SS-2		
Lab Sample ID:	E19299-8	**Date Sampled:**	03/07/97
Matrix:	SO - Soil	**Date Received:**	03/08/97
Method:	SW846 8270	**Percent Solids:**	89.5
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H10403.D	1	03/10/97	GTT	03/10/97	OP1943	EH351
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	80.8	44	ug/kg	
208-96-8	Acenaphthylene	77.7	44	ug/kg	
120-12-7	Anthracene	187	44	ug/kg	
56-55-3	Benzo(a)anthracene	275	32	ug/kg	
50-32-8	Benzo(a)pyrene	279	41	ug/kg	
205-99-2	Benzo(b)fluoranthene	322	44	ug/kg	
191-24-2	Benzo(g,h,i)perylene	126	29	ug/kg	
207-08-9	Benzo(k)fluoranthene	257	89	ug/kg	
218-01-9	Chrysene	478	25	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	41	ug/kg	
206-44-0	Fluoranthene	597	29	ug/kg	
86-73-7	Fluorene	ND	41	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	112	20	ug/kg	
91-20-3	Naphthalene	447	59	ug/kg	
85-01-8	Phenanthrene	295	26	ug/kg	
129-00-0	Pyrene	494	22	ug/kg	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	91%		23-120%
321-60-8	2-Fluorobiphenyl	89%		30-115%
1718-51-0	Terphenyl-d14	69%		18-137%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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GC/MS

SUPPORT DATA SUMMARY

ACCUTEST.

GC/MS METHODOLOGY SUMMARY FOR WATER MATRIX

All method used for GC/MS are referenced from EPA Methods 624 and 625, 40 CFR Part 136, 10/26/84 and /or "Test Methods For Evaluating Solid Wastes", SW846, 3rd Edition, November, 1986.

VOLATILE ORGANIC BY EPA 624/SW846 8240

This method can be summarized as follows: An inert gas is bubbled through a sample aliquot to transfer the purgeables from the aqueous phase to the vapor phase. The vapor phase is swept through a specially designed sorbent trap where the purgeables are trapped. After an eleven minute purge time the trap is heated to 180 C and backflushed with the inert gas to desorb the purgeables onto the gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected by a mass spectrometer.

BASE NEUTRAL EXTRACTABLES BY EPA 625/SW846 8270

This method can be summarized as follows: A measured Volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph greater then 11 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/Ms utilizing direct injection.

ACID EXTRACTABLE BY EPA 625/SW846 8270

This method can be summarized as follows: A measured volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph less than 2 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/MS.

For all fraction analyzed by gas chromatography/ mass spectrometry, a computer system is used to compare any detected peaks by the retention time and the relative abundance of three characteristic masses for qualitative identification. Quantitative analysis is performed using internal standard techniques with a single characteristic mass. All results are then reviewed by trained analysts to further validate the data.

For fractions requiring a library search, the unidentified mass spectra is compared to a computer NBS library of approximately 30,000 compounds. These unknown peaks are then qualified for an estimated concentration by external standard technique comparing unknown peak response to an internal standard response of known concentration.

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2D
SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	OP1943-MB1	*	*	87	90	*	97	~~3~~ 0
02	E19299-3	*	*	75	78	*	85	~~3~~
03	E19299-4	*	*	76	84	*	92	~~3~~
04	E19299-5	*	*	58	67	*	90	~~3~~
05	E19299-6	*	*	69	74	*	94	~~3~~
06	E19220-2R	*	*	85	90	*	100	~~3~~
07	E18779-4R	*	*	~~105~~ 21*	~~118~~ 24*	TM 3/10/97 *	125*	~~5~~ 2
08	E18779-6R	*	*	100	86	*	109	~~3~~ 0

TM 3/10/97

			QC LIMITS
S1	=	2-Fluorophenol	(25-121)
S2	=	Phenol-d5	(24-113)
S3	=	Nitrobenzene-d5	(23-120)
S4	=	2-Fluorobiphenyl	(30-115)
S5	=	2,4,6-Tribromophenol	(19-122)
S6	=	Terphenyl-d14	(18-137)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

	A SAMPLE SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	OP1923-MB1	*	*	82	93	*	85	3 0
02	E19113-1	*	*	79	88	*	87	3 0
03	OP1923-BS1	*	*	84	93	*	94	3 0
04	OP1923-MS	*	*	81	90	*	91	3 0
05	OP1923-MSD	*	*	84	94	*	95	3 0

Grace 3/6/91

			QC LIMITS
S1	=	2-Fluorophenol	(21-100)
S2	=	Phenol-d5	(10-94)
S3	=	Nitrobenzene-d5	(35-114)
S4	=	2-Fluorobiphenyl	(43-116)
S5	=	2,4,6-Tribromophenol	(10-123)
S6	=	Terphenyl-d14	(33-141)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

	ACCUTEST SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	OP1923-MB3	*	*	102	88	*	89	3
02	E19276-1	*	*	96	86	*	81	3
03	E19299-7	*	*	92	85	*	81	3
04	OP1930-MB2	69	56	100	99	108	76	0
05	E19306-1	69	64	106	101	114	80	0

Water 7/21/93

			QC LIMITS
S1	=	2-Fluorophenol	(21-100)
S2	=	Phenol-d5	(10-94)
S3	=	Nitrobenzene-d5	(35-114)
S4	=	2-Fluorobiphenyl	(43-116)
S5	=	2,4,6-Tribromophenol	(10-123)
S6	=	Terphenyl-d14	(33-141)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

Level: (low/med) LOW

	ACCUTEST SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	E19202-1	*	*	291 *	283 *	*	278 *	~~3~~ 3
02	OP1943-MB1	*	*	92	88	*	75	~~3~~ 2
03	OP1943-BS1	*	*	105	97	*	79	~~3~~ 2
04	E19299-1	*	*	84	84	*	69	~~3~~ 2
05	E19299-2	*	*	82	86	*	69	~~3~~ 2
06	E19299-8	*	*	91	89	*	69	~~3~~ 2
07	OP1943-MS	*	*	97	95	*	73	~~3~~ 2
08	OP1943-MSD	*	*	96	95	*	72	~~3~~ 2

LLHS 7/12/97

			QC LIMITS
S1	=	2-Fluorophenol	(25-121)
S2	=	Phenol-d5	(24-113)
S3	=	Nitrobenzene-d5	(23-120)
S4	=	2-Fluorobiphenyl	(30-115)
S5	=	2,4,6-Tribromophenol	(19-122)
S6	=	Terphenyl-d14	(18-137)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1923-MS	H10333.D	1	03/05/97	GTT	03/05/97	OP1923	EH348
OP1923-MSD	H10334.D	1	03/05/97	GTT	03/05/97	OP1923	EH348
E19113-1	H10331.D	1	03/05/97	GTT	03/05/97	OP1923	EH348

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-7

CAS No.	Compound	E19113-1 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		200	151	76	154	77	2	49-120/20
208-96-8	Acenaphthylene	ND		200	143	72	145	72	1	47-110/20
120-12-7	Anthracene	ND		200	152	76	166	83	9	54-121/21
56-55-3	Benzo(a)anthracene	ND		200	159	80	161	80	1	51-127/39
50-32-8	Benzo(a)pyrene	ND		200	135	68	142	71	5	48-126/28
205-99-2	Benzo(b)fluoranthene	ND		200	130	65	133	66	2	53-131/26
191-24-2	Benzo(g,h,i)perylene	ND		200	143	72	143	72	0	39-140/29
207-08-9	Benzo(k)fluoranthene	ND		200	146	73	150	75	3	44-138/35
218-01-9	Chrysene	ND		200	175	88	178	89	2	54-126/23
53-70-3	Dibenzo(a,h)anthracene	ND		200	143	72	145	72	1	46-138/28
206-44-0	Fluoranthene	ND		200	156	78	159	80	2	54-123/22
86-73-7	Fluorene	ND		200	148	74	150	75	1	49-124/20
193-39-5	Indeno(1,2,3-cd)pyrene	ND		200	137	68	140	70	2	37-143/30
91-20-3	Naphthalene	ND		200	143	72	143	72	0	23-138/21
85-01-8	Phenanthrene	ND		200	158	79	161	80	2	55-119/21
129-00-0	Pyrene	ND		200	159	80	163	82	2	58-123/23

CAS No.	Surrogate Recoveries	MS	MSD	E19113-1	Limits
4165-60-0	Nitrobenzene-d5	81%	84%	79%	35-114%
321-60-8	2-Fluorobiphenyl	90%	94%	88%	43-116%
1718-51-0	Terphenyl-d14	91%	96%	87%	33-141%

Blank Spike Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1923-BS1	H10332.D	1	03/05/97	GTT	03/05/97	OP1923	EH348

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
83-32-9	Acenaphthene	100	76.3	76	49-120
208-96-8	Acenaphthylene	100	71.0	71	47-110
120-12-7	Anthracene	100	76.6	77	54-121
56-55-3	Benzo(a)anthracene	100	78.6	79	51-127
50-32-8	Benzo(a)pyrene	100	67.8	68	48-126
205-99-2	Benzo(b)fluoranthene	100	65.7	66	53-131
191-24-2	Benzo(g,h,i)perylene	100	70.3	70	39-140
207-08-9	Benzo(k)fluoranthene	100	68.5	68	44-138
218-01-9	Chrysene	100	86.3	86	54-126
53-70-3	Dibenzo(a,h)anthracene	100	70.6	71	46-138
206-44-0	Fluoranthene	100	79.2	79	54-123
86-73-7	Fluorene	100	73.7	74	49-124
193-39-5	Indeno(1,2,3-cd)pyrene	100	68.8	69	37-143
91-20-3	Naphthalene	100	72.6	73	23-138
85-01-8	Phenanthrene	100	78.5	78	55-119
129-00-0	Pyrene	100	77.2	77	58-123

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	84%	35-114%
321-60-8	2-Fluorobiphenyl	93%	43-116%
1718-51-0	Terphenyl-d14	94%	33-141%

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1943-MS	H10404.D	1	03/10/97	GTT	03/10/97	OP1943	EH351
OP1943-MSD	H10405.D	1	03/10/97	GTT	03/10/97	OP1943	EH351
E19299-8	H10403.D	1	03/10/97	GTT	03/10/97	OP1943	EH351

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-1, E19299-2, E19299-3, E19299-4, E19299-5, E19299-6, E19299-8

CAS No.	Compound	E19299-8 ug/kg	Q	Spike ug/kg	MS ug/kg	MS %	MSD ug/kg	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	80.8		3700	3090	81	3010	79	3	33-139/25
208-96-8	Acenaphthylene	77.7		3700	2930	77	2850	75	3	53-100/25
120-12-7	Anthracene	187		3700	3190	81	3190	81	0	44-132/26
56-55-3	Benzo(a)anthracene	275		3700	3280	81	3110	77	5	61-118/28
50-32-8	Benzo(a)pyrene	279		3700	258	0*	186	-2*	32	49-110/33
205-99-2	Benzo(b)fluoranthene	322		3700	3480	85	3070	74	12	30-148/38
191-24-2	Benzo(g,h,i)perylene	126		3700	1810	45	1800	45	0	35-117/39
207-08-9	Benzo(k)fluoranthene	257		3700	2680	65	2590	63	3	52-125/32
218-01-9	Chrysene	478		3700	3870	92	3590	84	8	58-119/27
53-70-3	Dibenzo(a,h)anthracene	ND		3700	2140	58	2130	58	0	41-115/26
206-44-0	Fluoranthene	597		3700	3570	80	3420	76	4	31-147/31
86-73-7	Fluorene	ND		3700	2970	80	2900	78	2	41-132/24
193-39-5	Indeno(1,2,3-cd)pyrene	112		3700	2020	52	2030	52	0	40-116/33
91-20-3	Naphthalene	447		3700	2900	66	2860	65	1	52-109/28
85-01-8	Phenanthrene	295		3700	3250	80	3190	78	2	57-116/26
129-00-0	Pyrene	494		3700	2790	62	2680	59	4	24-160/35

CAS No.	Surrogate Recoveries	MS	MSD	E19299-8	Limits
4165-60-0	Nitrobenzene-d5	98%	96%	91%	23-120%
321-60-8	2-Fluorobiphenyl	95%	95%	89%	30-115%
1718-51-0	Terphenyl-d14	73%	72%	69%	18-137%

Blank Spike Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1943-BS1	H10399.D	1	03/10/97	GTT	03/10/97	OP1943	EH351

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-1, E19299-2, E19299-3, E19299-4, E19299-5, E19299-6, E19299-8

CAS No.	Compound	Spike ug/kg	BSP ug/kg	BSP %	Limits
83-32-9	Acenaphthene	3330	2790	84	33-139
208-96-8	Acenaphthylene	3330	2610	78	53-100
120-12-7	Anthracene	3330	2990	90	44-132
56-55-3	Benzo(a)anthracene	3330	2860	86	61-118
50-32-8	Benzo(a)pyrene	3330	2560	77	49-110
205-99-2	Benzo(b)fluoranthene	3330	2570	77	30-148
191-24-2	Benzo(g,h,i)perylene	3330	1840	55	35-117
207-08-9	Benzo(k)fluoranthene	3330	2480	74	52-125
218-01-9	Chrysene	3330	3190	96	58-119
53-70-3	Dibenzo(a,h)anthracene	3330	2160	65	41-115
206-44-0	Fluoranthene	3330	3020	91	31-147
86-73-7	Fluorene	3330	2700	81	41-132
193-39-5	Indeno(1,2,3-cd)pyrene	3330	2020	61	40-116
91-20-3	Naphthalene	3330	2580	77	52-109
85-01-8	Phenanthrene	3330	2890	87	57-116
129-00-0	Pyrene	3330	2450	74	24-160

CAS No.	Surrogate Recoveries	BSP	Limits
4165-60-0	Nitrobenzene-d5	105%	23-120%
321-60-8	2-Fluorobiphenyl	97%	30-115%
1718-51-0	Terphenyl-d14	79%	18-137%

Method Blank Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1943-MB1	F8361.D	1	03/10/97	GTT	03/10/97	OP1943	EF1066

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-1, E19299-2, E19299-3, E19299-4, E19299-5, E19299-6, E19299-8

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	40	ug/kg	
208-96-8	Acenaphthylene	ND	40	ug/kg	
120-12-7	Anthracene	ND	40	ug/kg	
56-55-3	Benzo(a)anthracene	ND	29	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	40	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	26	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	80	ug/kg	
218-01-9	Chrysene	ND	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	ug/kg	
206-44-0	Fluoranthene	ND	26	ug/kg	
86-73-7	Fluorene	ND	37	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	18	ug/kg	
91-20-3	Naphthalene	ND	53	ug/kg	
85-01-8	Phenanthrene	ND	23	ug/kg	
129-00-0	Pyrene	ND	20	ug/kg	

CAS No.	Surrogate Recoveries		Limits
4165-60-0	Nitrobenzene-d5	87%	23-120%
321-60-8	2-Fluorobiphenyl	90%	30-115%
1718-51-0	Terphenyl-d14	98%	18-137%

Method Blank Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1923-MB3	H10390.D	1	03/10/97	GTT	03/10/97	OP1923	EH351

The QC reported here applies to the following samples: Method: SW846 8270

E19299-7

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries		Limits
4165-60-0	Nitrobenzene-d5	102%	35-114%
321-60-8	2-Fluorobiphenyl	88%	43-116%
1718-51-0	Terphenyl-d14	89%	33-141%

CAS No.	Tentatively Identified Compounds	R.T.	Est. Conc.	Units	Q
	Total TIC, Semi-Volatile		0	ug/l	

Method Blank Summary

Job Number: E19299
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1943-MB1	H10398.D	1	03/10/97	GTT	03/10/97	OP1943	EH351

The QC reported here applies to the following samples: **Method:** SW846 8270

E19299-1, E19299-2, E19299-3, E19299-4, E19299-5, E19299-6, E19299-8

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	40	ug/kg	
208-96-8	Acenaphthylene	ND	40	ug/kg	
120-12-7	Anthracene	ND	40	ug/kg	
56-55-3	Benzo(a)anthracene	ND	29	ug/kg	
50-32-8	Benzo(a)pyrene	ND	37	ug/kg	
205-99-2	Benzo(b)fluoranthene	ND	40	ug/kg	
191-24-2	Benzo(g,h,i)perylene	ND	26	ug/kg	
207-08-9	Benzo(k)fluoranthene	ND	80	ug/kg	
218-01-9	Chrysene	ND	22	ug/kg	
53-70-3	Dibenzo(a,h)anthracene	ND	37	ug/kg	
206-44-0	Fluoranthene	ND	26	ug/kg	
86-73-7	Fluorene	ND	37	ug/kg	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	18	ug/kg	
91-20-3	Naphthalene	ND	53	ug/kg	
85-01-8	Phenanthrene	ND	23	ug/kg	
129-00-0	Pyrene	ND	20	ug/kg	

CAS No.	Surrogate Recoveries		Limits
4165-60-0	Nitrobenzene-d5	92%	23-120%
321-60-8	2-Fluorobiphenyl	88%	30-115%
1718-51-0	Terphenyl-d14	75%	18-137%

ACCUTEST

(FB)

CHAIN OF CUSTODY

FRESH PONDS CORPORATE VILLAGE, BUILDING B
2235 ROUTE 130, DAYTON, NJ 08810
908-329-0200 FAX: 908-329-3499/3480

ACCUTEST JOB #:

ACCUTEST QUOTE #:

CLIENT INFORMATION

NAME: CRA

ADDRESS: 651 COLBY DR

CITY, STATE ZIP: WATERLOO ONTARIO N2V 1C2

SEND REPORT TO: MIKE TOMKA

PHONE #: (519) 725 3313

FACILITY INFORMATION

PROJECT NAME: RAILROAD AREA

LOCATION: SAGINAW METAL CASTINGS

PROJECT NO.: 5838

FAX #:

ANALYTICAL INFORMATION

PAHs (8270 PA w pm pg 2/10/97)

MATRIX CODES

DW - DRINKING WATER
GW - GROUND WATER
WW - WASTE WATER
SO - SOIL
SL - SLUDGE
OI - OIL
LIQ - OTHER LIQUID
SOL - OTHER SOLID

ACCUTEST SAMPLE #	FIELD ID / POINT OF COLLECTION	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	# OF BOTTLES	PRESERVATION HCl	NaOH	HNO3	H2SO4	NONE	ANALYSIS	LAB USE ONLY
219299-1	S-5838-970307-SE-001	Mar 7/97		SE	SO	1					X	X	
-2	S-5838-970307-SE-002												
-8	S-5838-970307-SE-003 ~~REP~~												
	S-5838-970307-SE-003 MS/MSD												
-3	S-5838-970307-SE-004												
-4	S-5838-970307-SE-005												
-5	S-5838-970307-SE-006												
-6	S-5838-970307-SE-007												
-7	W-5838-970307-SE-001					2							

DATA TURNAROUND INFORMATION

- [X] 21 DAYS STANDARD
- [ ] 14 DAYS *RUSH*
- [ ] 7 DAYS *EMERGENCY*
- [ ] OTHER

APPROVED BY:

21 DAY TURNAROUND HARDCOPY. EMERGENCY OR RUSH IS FAX DATA UNLESS PREVIOUSLY APPROVED

DATA DELIVERABLE INFORMATION

- [ ] NJ REDUCED
- [ ] NJ Full
- [ ] FULL CLP
- [ ] DISK DELIVERABLE
- [ ] OTHER (SPECIFY)
- [ ] COMMERCIAL "A"
- [ ] COMMERCIAL "B"
- [ ] STATE FORMS

COMM C

COMMENTS/REMARKS

SAMPLE CUSTODY MUST BE DOCUMENTED BELOW EACH TIME SAMPLES CHANGE POSSESION, INCLUDING COURIER DELIVERY

RELINQUISHED BY SAMPLER:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
1. [signature]	Mar 7/97	1. FED EX	2. FED EX	3-8-97 0935	2. [signature] 3-8-97 0935
RELINQUISHED BY:	DATE TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE TIME:	RECEIVED BY:
3.		3.	4.		4.
RELINQUISHED BY:	DATE TIME:	RECEIVED BY:	SEAL #	PRESERVE WHERE APPLICABLE	ON ICE
5.		5.			TEMPERATURE

ACCUTEST.

REC'D CRA
APR - 4 1997

04/01/97

Technical Report for

Conestoga Rovers & Associates

Saginaw Metals Castings, Railroad Area, Saginaw, MI

5838

Accutest Job Number: E19656

ORIGINAL ANALYTICAL REPORT

Project#: 5838 Lab #: E19656

Name: GM SMCO

Description

Report to:

Conestoga Rovers & Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

ATTN: Paul Wiseman

Event:

Samples: 4- water

Analysis: PAH

TAT: 2wk

Lab: Accutest

Checked Against Preliminary Data:

Date: NA Init.:

Date of Validation Memo: May 1, 97

Invoice Approval Date: April 23, 97

Comments:

Total number of pages in report: 13

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CT, DE, FL, KS, MA, MD, NC, PA, RI, SC, VA

Results relate only to the items tested.

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Sample Summary

Conestoga Rovers & Associates

Date: 04/01/97
Job No: E19656

Saginaw Metals Castings, Railroad Area, Saginaw, MI
Project No: 5838

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID	
E19656-1	03/19/97	00:00	SSH	03/20/97	AQ	Water	W-5838-970319-SSH-001	MW2-97
E19656-2	03/19/97	00:00	SSH	03/20/97	AQ	Water	W-5838-970319-SSH-002	MW2-97 DUP
E19656-3	03/19/97	00:00	SSH	03/20/97	AQ	Water	W-5838-970319-SSH-003	Rinse Blank
E19656-4	03/19/97	00:00	SSH	03/20/97	AQ	Water	W-5838-970319-SSH-004	MW3-97

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Report of Analysis

Client Sample ID:	W-5838-970319-SSH-001 MW2-97		
Lab Sample ID:	E19656-1	**Date Sampled:**	03/19/97
Matrix:	AQ - Water	**Date Received:**	03/20/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C7867.D	1	03/24/97	WHS	03/20/97	OP1930	EC1188
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	2.3	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	6.0	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	73%		35-114%
321-60-8	2-Fluorobiphenyl	70%		43-116%
1718-51-0	Terphenyl-d14	85%		33-141%

2

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

ACCUTEST.

Report of Analysis

Client Sample ID:	W-5838-970319-SSH-002 MW2-97 DUP		
Lab Sample ID:	E19656-2	**Date Sampled:**	03/19/97
Matrix:	AQ - Water	**Date Received:**	03/20/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C7868.D	1	03/24/97	WHS	03/20/97	OP1930	EC1188
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	2.4	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	6.2	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	76%		35-114%
321-60-8	2-Fluorobiphenyl	72%		43-116%
1718-51-0	Terphenyl-d14	80%		33-141%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	W-5838-970319-SSH-003 Rinse Blank		
Lab Sample ID:	E19656-3	**Date Sampled:**	03/19/97
Matrix:	AQ - Water	**Date Received:**	03/20/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C7869.D	1	03/24/97	WHS	03/20/97	OP1930	EC1188
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	74%		35-114%
321-60-8	2-Fluorobiphenyl	73%		43-116%
1718-51-0	Terphenyl-d14	83%		33-141%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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Report of Analysis

Client Sample ID:	W-5838-970319-SSH-004 MW2-97		
Lab Sample ID:	E19656-4	**Date Sampled:**	03/19/97
Matrix:	AQ - Water	**Date Received:**	03/20/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	C7870.D	1	03/24/97	WHS	03/20/97	OP1930	EC1188
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	1.8	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	78%		35-114%
321-60-8	2-Fluorobiphenyl	75%		43-116%
1718-51-0	Terphenyl-d14	82%		33-141%

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

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GC/MS

SUPPORT DATA SUMMARY

GC/MS METHODOLOGY SUMMARY FOR WATER MATRIX

All method used for GC/MS are referenced from EPA Methods 624 and 625, 40 CFR Part 136, 10/26/84 and /or "Test Methods For Evaluating Solid Wastes", SW846, 3rd Edition, November, 1986.

VOLATILE ORGANIC BY EPA 624/SW846 8240

This method can be summarized as follows: An inert gas is bubbled through a sample aliquot to transfer the purgeables from the aqueous phase to the vapor phase. The vapor phase is swept through a specially designed sorbent trap where the purgeables are trapped. After an eleven minute purge time the trap is heated to 180 C and backflushed with the inert gas to desorb the purgeables onto the gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected by a mass spectrometer.

BASE NEUTRAL EXTRACTABLES BY EPA 625/SW846 8270

This method can be summarized as follows: A measured Volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph greater then 11 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/Ms utilizing direct injection.

ACID EXTRACTABLE BY EPA 625/SW846 8270

This method can be summarized as follows: A measured volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph less than 2 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/MS.

For all fraction analyzed by gas chromatography/ mass spectrometry, a computer system is used to compare any detected peaks by the retention time and the relative abundance of three characteristic masses for qualitative identification. Quantitative analysis is performed using internal standard techniques with a single characteristic mass. All results are then reviewed by trained analysts to further validate the data.

For fractions requiring a library search, the unidentified mass spectra is compared to a computer NBS library of approximately 30,000 compounds. These unknown peaks are then qualified for an estimated concentration by external standard technique comparing unknown peak response to an internal standard response of known concentration.

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GC/MS Analysis Case Narrative/Conformance/Non-Conformance Summary

Fraction: SEMIVOLATILE

	NO	YES
1. Chromatograms Labeled/Compounds Identified. *(Field Samples and Method Blanks)*	[ ]	[✓]
2. GC/MS Tune Meet Criteria.	[ ]	[N/A]
3. GC/MS Tuning Frequency - Performed every 24 hours for 600 series and 12 hours for 8000 series.	[ ]	[N/A]
4. GC/MS Calibration - Initial Calibration performed within 30 days before sample analysis and continuing calibration performed within 24 hours of samples analysis for 600 series and 12 hours for 8000 series.	[ ]	[N/A]
5. GC/MS Calibration Requirements		
a. Calibration Check Compounds	[ ]	[N/A]
b. System Performance Check Compounds	[ ]	[N/A]
6. Blank Contamination	[✓]	[ ]

If yes, list compounds and in each blank: _____

_____

7. Surrogate Recoveries Meets Criteria.	[ ]	[✓]

If not met, list those samples which fall outside the acceptable range and confirmed by reanalysis: _____

_____

8. Matrix Spike/Matrix Spike Duplicate Recoveries Meet Criteria.	[ ]	[✓]

If not met, refer to MS/MSD and blank spike summaries: _____

_____

9. Internal Standard Area/Retention Time Shift Meet Criteria	[ ]	[N/A]

If not met, list those samples which fall outside the acceptable range and confirmed by reanalysis: _____

_____

10. Extraction Holding Time Met	[ ]	[✓]

If not met, list number of days exceeded for each samples: _____

_____

11. Analysis Holding Time Met	[ ]	[✓]

If not met, list number of days exceed for each sample: _____

_____

Additional Comments: _____

_____

_____

_____

QC Review Signature: Benedetta Pagano Date: 4/1/97

7

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

	EPA SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	E19011-4	*	*	95	95	*	100	~~3~~
02	OP1931-MB1	80	87	81	83	86	89	0
03	OP1931-BS1	51	40	81	81	99	93	0
04	E19126-1	52	39	105	80	99	89	0
05	E19126-2	53	39	84	78	91	80	0
06	OP1931-MS	~~50 10*~~	~~40 8*~~	~~105 21*~~	~~85 17*~~	~~105 21~~	~~95 19~~	~~4~~
07	OP1931-MSD	~~55 11*~~	~~43 9*~~	~~95 19*~~	~~80 16*~~	~~100 20~~	~~85 17*~~	~~5~~
08	OP1923-MB2	*	*	86	82	*	90	~~3~~
09	E19219-1	*	*	51	53	*	72	~~3~~
10	E19219-2	*	*	79	81	*	90	~~3~~
11	OP1930-BS1	45	35	81	84	92	92	0
12	OP1930-MB1	69	78	84	85	75	94	0
13	OP1930-MS	52	45	73	79	94	89	0
14	OP1930-MSD	55	52	77	81	95	88	0
15	E19181-1	46	34	74	79	91	84	0
16	E19181-2	50	37	85	91	104	92	0
17	E19181-3	49	38	81	86	98	91	0
18	E19181-4	50	39	84	87	100	90	0
19	E19181-5	50	36	86	90	102	89	0
20	E19181-6	45	36	76	75	95	92	0
21	E19181-7	47	37	80	79	101	92	0

			QC LIMITS
S1	=	2-Fluorophenol	(21-100)
S2	=	Phenol-d5	(10-94)
S3	=	Nitrobenzene-d5	(35-114)
S4	=	2-Fluorobiphenyl	(43-116)
S5	=	2,4,6-Tribromophenol	(10-123)
S6	=	Terphenyl-d14	(33-141)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

	EPA SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	OP1976-LB3	43	30	75	70	85	92	0
02	OP1976-LB4	32	20	71	71	79	91	0
03	E19412-1	40	27	69	69	84	90	0
04	E19412-2	42	29	68	66	88	89	0
05	E19394-1	40	29	72	70	88	89	0
06	E19393-1	41	31	79	73	86	91	0
07	OP1976-LS3	44	35	86	77	94	96	0
08	E19738-1	*	*	90	86	*	97	30
09	E19738-2	*	*	81	83	*	91	30
10	OP1930-MB4	*	*	81	77	*	81	20
11	E19656-1	*	*	73	70	*	85	30
12	E19656-2	*	*	76	72	*	81	30
13	E19656-3	*	*	74	73	*	83	30
14	E19656-4	*	*	78	75	*	82	30

Ltr 3/25/97

			QC LIMITS
S1	=	2-Fluorophenol	(21-100)
S2	=	Phenol-d5	(10-94)
S3	=	Nitrobenzene-d5	(35-114)
S4	=	2-Fluorobiphenyl	(43-116)
S5	=	2,4,6-Tribromophenol	(10-123)
S6	=	Terphenyl-d14	(33-141)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: E19656
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1930-MS	B6258.D	1	03/07/97	WHS	03/06/97	OP1930	EB213
OP1930-MSD	B6259.D	1	03/07/97	WHS	03/06/97	OP1930	EB213
E19181-2	B6263.D	1	03/07/97	WHS	03/06/97	OP1930	EB213

The QC reported here applies to the following samples: Method: SW846 8270

E19656-1, E19656-2, E19656-3, E19656-4

CAS No.	Compound	E19181-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		200	148	74	147	74	1	49-120/20
208-96-8	Acenaphthylene	ND		200	138	69	139	70	1	47-110/20
120-12-7	Anthracene	ND		200	160	80	156	78	2	54-121/21
56-55-3	Benzo(a)anthracene	ND		200	160	80	162	81	1	51-127/39
50-32-8	Benzo(a)pyrene	ND		200	151	76	154	77	2	48-126/28
205-99-2	Benzo(b)fluoranthene	ND		200	154	77	146	73	5	53-131/26
191-24-2	Benzo(g,h,i)perylene	ND		200	182	91	192	96	5	39-140/29
207-08-9	Benzo(k)fluoranthene	ND		200	144	72	164	82	13	44-138/35
218-01-9	Chrysene	ND		200	180	90	184	92	2	54-126/23
53-70-3	Dibenzo(a,h)anthracene	ND		200	177	88	182	91	3	46-138/28
206-44-0	Fluoranthene	ND		200	161	80	162	81	1	54-123/22
86-73-7	Fluorene	ND		200	162	81	166	83	2	49-124
193-39-5	Indeno(1,2,3-cd)pyrene	ND		200	169	84	172	86	2	37-143
91-20-3	Naphthalene	ND		200	139	70	147	74	6	23-138/21
85-01-8	Phenanthrene	ND		200	159	80	160	80	1	55-119/21
129-00-0	Pyrene	ND		200	163	82	163	82	0	58-123/23

CAS No.	Surrogate Recoveries	MS	MSD	E19181-2	Limits
367-12-4	2-Fluorophenol	52%	56%	50%	21-100%
4165-62-2	Phenol-d5	45%	52%	37%	10-94%
118-79-6	2,4,6-Tribromophenol	94%	95%	104%	10-123%
4165-60-0	Nitrobenzene-d5	74%	77%	85%	35-114%
321-60-8	2-Fluorobiphenyl	79%	82%	91%	43-116%
1718-51-0	Terphenyl-d14	89%	88%	92%	33-141%

Blank Spike Summary

Job Number: E19656
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1930-BS1	B6256.D	1	03/07/97	WHS	03/06/97	OP1930	EB213

The QC reported here applies to the following samples: **Method:** SW846 8270

E19656-1, E19656-2, E19656-3, E19656-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
83-32-9	Acenaphthene	100	76.5	76	49-120
208-96-8	Acenaphthylene	100	71.2	71	47-110
120-12-7	Anthracene	100	80.4	80	54-121
56-55-3	Benzo(a)anthracene	100	82.3	82	51-127
50-32-8	Benzo(a)pyrene	100	77.6	78	48-126
205-99-2	Benzo(b)fluoranthene	100	70.2	70	53-131
191-24-2	Benzo(g,h,i)perylene	100	91.4	91	39-140
207-08-9	Benzo(k)fluoranthene	100	81.2	81	44-138
218-01-9	Chrysene	100	90.4	90	54-126
53-70-3	Dibenzo(a,h)anthracene	100	86.9	87	46-138
206-44-0	Fluoranthene	100	82.2	82	54-123
86-73-7	Fluorene	100	84.0	84	49-124
193-39-5	Indeno(1,2,3-cd)pyrene	100	85.5	86	37-143
91-20-3	Naphthalene	100	75.2	75	23-138
85-01-8	Phenanthrene	100	81.4	81	55-119
129-00-0	Pyrene	100	82.2	82	58-123

CAS No.	Surrogate Recoveries	BSP	Limits
367-12-4	2-Fluorophenol	45%	21-100%
4165-62-2	Phenol-d5	35%	10-94%
118-79-6	2,4,6-Tribromophenol	92%	10-123%
4165-60-0	Nitrobenzene-d5	81%	35-114%
321-60-8	2-Fluorobiphenyl	84%	43-116%
1718-51-0	Terphenyl-d14	92%	33-141%

Method Blank Summary

Job Number: E19656
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP1930-MB4	C7866.D	1	03/24/97	WHS	03/20/97	OP1930	EC1188

The QC reported here applies to the following samples: **Method:** SW846 8270

E19656-1, E19656-2, E19656-3, E19656-4

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries		Limits
367-12-4	2-Fluorophenol	0%*	21-100%
4165-62-2	Phenol-d5	0%*	10-94%
118-79-6	2,4,6-Tribromophenol	0%*	10-123%
4165-60-0	Nitrobenzene-d5	81%	35-114%
321-60-8	2-Fluorobiphenyl	77%	43-116%
1718-51-0	Terphenyl-d14	81%	33-141%

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): Accutest Labs

REFERENCE NUMBER: 5838

PROJECT NAME: SMCO Railroad Area

SAMPLER'S SIGNATURE: Steven S. Hoewemeyer PRINTED NAME: Steven S. Hoewemeyer

SEQ. No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: PAHs (PNAs)								REMARKS
1	3/19/97		W-5838-970319-SSH-001	water	2	X		E1	5656	-1				TAT - Standard
2	"		" " -002	"	2	X				-2				
3	"		" " -003	"	2	X				-3				
4	"		W-5838-970319-SSH-004	"	2	X				-4				

CONT'D

TOTAL NUMBER OF CONTAINERS: 8

RELINQUISHED BY: 1. Steven S. Hoewemeyer	DATE: 3/19/97 TIME: 1500	RECEIVED BY: 1. FedEx	DATE: TIME:
RELINQUISHED BY: 2. FedEx	DATE: 3.20.97 TIME: 0820	RECEIVED BY: 2.	DATE: 3-20-97 TIME: 0820
RELINQUISHED BY: 3.	DATE: TIME:	RECEIVED BY: 1.	DATE: TIME:

METHOD OF SHIPMENT: FedEx AIR BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

No 3781

SAMPLE TEAM: SSH

RECEIVED FOR LABORATORY BY:

DATE: TIME:

1001 (FORMS)-APRIL 29, 93-REV.0-(C)(F-01)

ACCUTEST.

REC'D CRA
MAY 12 1997
SDG # 3

05/08/97

Technical Report for

Conestoga Rovers & Associates

Saginaw Metals Castings, Railroad Area, Saginaw, MI

5838

Accutest Job Number: E20850

Report to:

Conestoga Rovers & Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

ATTN: Paul Wiseman

ORIGINAL ANALYTICAL REPORT

Project#: 5838 Lab #: E20850

Name: GM - SMCO

Description

Event:

Samples: 1-water

Analysis: PNA

TAT: 2 wk = data

Lab: Accutest

Checked Against Preliminary Data:

Date: Init.:

Date of Validation Memo:

Invoice Approval Date:

Comments:

Vincent J. Pugliese
President

Total number of pages in report: 9

Certifications: NJ(12129), NY(10983), CT, DE, FL, KS, MA, MD, NC, PA, RI, SC, VA

Results relate only to the items tested.

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ACCUTEST.

REC'D CRA
MAY 12 1997

05/08/97

Technical Report for

Conestoga Rovers & Associates

Saginaw Metals Castings, Railroad Area, Saginaw, MI

5838

Accutest Job Number: E20850

Report to:

Conestoga Rovers & Associates
11100 Metro Airport Center Drive
Suite 160
Romulus, MI 48174

ATTN: Paul Wiseman

Total number of pages in report: 9

Vincent J. Pugliese
President

Certifications: NJ(12129), NY(10983), CT, DE, FL, KS, MA, MD, NC, PA, RI, SC, VA

Results relate only to the items tested.

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Sample Summary

Conestoga Rovers & Associates

Date: 05/08/97
Job No: E20850

Saginaw Metals Castings, Railroad Area, Saginaw, MI
Project No: 5838

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
E20850-1	04/23/97	00:00	SH	04/25/97	AQ	Water	W-5838-970423-SSH-005

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Report of Analysis

Client Sample ID:	W-5838-970423-SSH-005		
Lab Sample ID:	E20850-1	**Date Sampled:**	04/23/97
Matrix:	AQ - Water	**Date Received:**	04/25/97
Method:	SW846 8270	**Percent Solids:**	n/a
Project:	Saginaw Metals Castings, Railroad Area, Saginaw, MI		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	H11265.D	1	05/01/97	GTT	04/25/97	OP2094	EH386
Run #2							

BN PAH List

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	1.2	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
4165-60-0	Nitrobenzene-d5	77%		35-114%
321-60-8	2-Fluorobiphenyl	76%		43-116%
1718-51-0	Terphenyl-d14	79%		33-141%

2

ND = Not detected
RDL = Reported Detection Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates that analyte is found in associated method blank
N = Indicates presumptive evidence of a compound

GC/MS

SUPPORT DATA SUMMARY

ACCUTEST.

GC/MS METHODOLOGY SUMMARY FOR WATER MATRIX

All method used for GC/MS are referenced from EPA Methods 624 and 625, 40 CFR Part 136, 10/26/84 and /or "Test Methods For Evaluating Solid Wastes", SW846, 3rd Edition, November, 1986.

VOLATILE ORGANIC BY EPA 624/SW846 8240

This method can be summarized as follows: An inert gas is bubbled through a sample aliquot to transfer the purgeables from the aqueous phase to the vapor phase. The vapor phase is swept through a specially designed sorbent trap where the purgeables are trapped. After an eleven minute purge time the trap is heated to 180 C and backflushed with the inert gas to desorb the purgeables onto the gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected by a mass spectrometer.

BASE NEUTRAL EXTRACTABLES BY EPA 625/SW846 8270

This method can be summarized as follows: A measured Volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph greater then 11 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/Ms utilizing direct injection.

ACID EXTRACTABLE BY EPA 625/SW846 8270

This method can be summarized as follows: A measured volume of sample approximately 1-liter, is serially extracted with methylene chloride at a ph less than 2 using a separatory funnel. The resulting extract is then concentrated to 1ml and analyzed by GC/MS.

For all fraction analyzed by gas chromatography/ mass spectrometry, a computer system is used to compare any detected peaks by the retention time and the relative abundance of three characteristic masses for qualitative identification. Quantitative analysis is performed using internal standard techniques with a single characteristic mass. All results are then reviewed by trained analysts to further validate the data.

For fractions requiring a library search, the unidentified mass spectra is compared to a computer NBS library of approximately 30,000 compounds. These unknown peaks are then qualified for an estimated concentration by external standard technique comparing unknown peak response to an internal standard response of known concentration.

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GC/MS Analysis Case Narrative/Conformance/Non-Conformance Summary

Fraction: SEMIVOLATILE

	NO	YES
1. Chromatograms Labeled/Compounds Identified. *(Field Samples and Method Blanks)*	[ ]	[✓]
2. GC/MS Tune Meet Criteria.	[ ]	[✓]
3. GC/MS Tuning Frequency - Performed every 24 hours for 600 series and 12 hours for 8000 series.	[ ]	[✓]
4. GC/MS Calibration - Initial Calibration performed within 30 days before sample analysis and continuing calibration performed within 24 hours of samples analysis for 600 series and 12 hours for 8000 series.	[ ]	[✓]
5. GC/MS Calibration Requirements		
a. Calibration Check Compounds	[ ]	[✓]
b. System Performance Check Compounds	[ ]	[✓]
6. Blank Contamination	[✓]	[ ]

If yes, list compounds and in each blank: _____

_____

7. Surrogate Recoveries Meets Criteria. [ ] [✓]

If not met, list those samples which fall outside the acceptable range and confirmed by reanalysis: _____

_____

8. Matrix Spike/Matrix Spike Duplicate Recoveries Meet Criteria. [ ] [✓]

If not met, refer to MS/MSD and blank spike summaries: _____

_____

9. Internal Standard Area/Retention Time Shift Meet Criteria [ ] [✓]

If not met, list those samples which fall outside the acceptable range and confirmed by reanalysis: _____

_____

10. Extraction Holding Time Met [ ] [✓]

If not met, list number of days exceeded for each samples: _____

_____

11. Analysis Holding Time Met [ ] [✓]

If not met, list number of days exceed for each sample: _____

_____

Additional Comments: _____

_____

_____

_____

QC Review Signature: Maureen Coyle Date: 5/8/97

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2C
WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: ACCUTEST Contract: NA

Lab Code: NA Case No.: NA SAS No.: NA SDG No.: NA

	A SAMPLE SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	TOT OUT
01	OP2094-BS1	46	30	76	72	81	78	0
02	OP2094-MS	71	49	92	82	93	87	0
03	OP2094-MSD	68	47	88	80	92	83	0
04	E20839-2	40	29	82	90	88	79	0
05	E20839-7	56	48	76	78	82	86	0
06	OP2094-MB1	78	91	71	72	61	70	0
07	E20850-1	*	*	77	76	*	79	3 0

Grace 5/5/99

			QC LIMITS
S1	=	2-Fluorophenol	(21-100)
S2	=	Phenol-d5	(10-94)
S3	=	Nitrobenzene-d5	(35-114)
S4	=	2-Fluorobiphenyl	(43-116)
S5	=	2,4,6-Tribromophenol	(10-123)
S6	=	Terphenyl-d14	(33-141)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D Surrogate diluted out

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: E20850
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2094-MS	H11260.D	1	05/01/97	GTT	04/25/97	OP2094	EH386
OP2094-MSD	H11261.D	1	05/01/97	GTT	04/25/97	OP2094	EH386
E20839-2	H11262.D	1	05/01/97	GTT	04/25/97	OP2094	EH386
E20839-2	H11291.D	5	05/02/97	GTT	04/25/97	OP2094	EH387

The QC reported here applies to the following samples: **Method:** SW846 8270

E20850-1

CAS No.	Compound	E20839-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	MSD ug/l	MSD %	RPD	Limits Rec/RPD
83-32-9	Acenaphthene	ND		200	128	64	107	54	18	49-120/20
208-96-8	Acenaphthylene	ND		200	110	55	103	52	6	47-110/20
120-12-7	Anthracene	ND		200	140	70	135	68	4	54-121/21
56-55-3	Benzo(a)anthracene	ND		200	138	69	134	67	3	51-127/39
50-32-8	Benzo(a)pyrene	ND		200	122	61	114	57	7	48-126/28
205-99-2	Benzo(b)fluoranthene	ND		200	132	66	117	58	12	53-131/26
191-24-2	Benzo(g,h,i)perylene	ND		200	133	66	126	63	5	39-140/29
207-08-9	Benzo(k)fluoranthene	ND		200	116	58	118	59	2	44-138/35
218-01-9	Chrysene	ND		200	148	74	145	72	2	54-126/23
53-70-3	Dibenzo(a,h)anthracene	ND		200	137	68	132	66	4	46-138/28
206-44-0	Fluoranthene	ND		200	151	76	143	72	5	54-123/
86-73-7	Fluorene	ND		200	131	66	120	60	9	49-124
193-39-5	Indeno(1,2,3-cd)pyrene	ND		200	131	66	126	63	4	37-143/30
91-20-3	Naphthalene	ND		200	131	66	131	66	0	23-138/21
85-01-8	Phenanthrene	ND		200	147	74	147	74	0	55-119/21
129-00-0	Pyrene	ND		200	139	70	131	66	6	58-123/23

CAS No.	Surrogate Recoveries	MS	MSD	E20839-2	E20839-2	Limits
367-12-4	2-Fluorophenol	71%	68%	40%	62%	21-100%
4165-62-2	Phenol-d5	49%	47%	29%	48%	10-94%
118-79-6	2,4,6-Tribromophenol	93%	92%	88%	114%	10-123%
4165-60-0	Nitrobenzene-d5	92%	88%	82%	120%* a	35-114%
321-60-8	2-Fluorobiphenyl	82%	80%	90%	127%* a	43-116%
1718-51-0	Terphenyl-d14	87%	83%	79%	124%	33-141%

(a) Outside control limits due to dilution.

Blank Spike Summary

Job Number: E20850
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2094-BS1	H11259.D	1	05/01/97	GTT	04/25/97	OP2094	EH386

The QC reported here applies to the following samples: **Method:** SW846 8270

E20850-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
83-32-9	Acenaphthene	100	58.6	59	49-120
208-96-8	Acenaphthylene	100	55.3	55	47-110
120-12-7	Anthracene	100	60.5	60	54-121
56-55-3	Benzo(a)anthracene	100	60.3	60	51-127
50-32-8	Benzo(a)pyrene	100	53.5	54	48-126
205-99-2	Benzo(b)fluoranthene	100	54.0	54	53-131
191-24-2	Benzo(g,h,i)perylene	100	57.6	58	39-140
207-08-9	Benzo(k)fluoranthene	100	58.4	58	44-138
218-01-9	Chrysene	100	64.7	65	54-126
53-70-3	Dibenzo(a,h)anthracene	100	58.8	59	46-138
206-44-0	Fluoranthene	100	63.9	64	54-123
86-73-7	Fluorene	100	58.1	58	49-124
193-39-5	Indeno(1,2,3-cd)pyrene	100	56.4	56	37-143
91-20-3	Naphthalene	100	56.1	56	23-138
85-01-8	Phenanthrene	100	61.8	62	55-119
129-00-0	Pyrene	100	61.8	62	58-123

CAS No.	Surrogate Recoveries	BSP	Limits
367-12-4	2-Fluorophenol	46%	21-100%
4165-62-2	Phenol-d5	30%	10-94%
118-79-6	2,4,6-Tribromophenol	80%	10-123%
4165-60-0	Nitrobenzene-d5	76%	35-114%
321-60-8	2-Fluorobiphenyl	72%	43-116%
1718-51-0	Terphenyl-d14	78%	33-141%

Method Blank Summary

Job Number: E20850
Account: CRAMI Conestoga Rovers & Associates
Project: Saginaw Metals Castings, Railroad Area, Saginaw, MI

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP2094-MB1	H11264.D	1	05/01/97	GTT	04/25/97	OP2094	EH386

The QC reported here applies to the following samples: **Method:** SW846 8270

E20850-1

CAS No.	Compound	Result	RDL	Units	Q
83-32-9	Acenaphthene	ND	1.1	ug/l	
208-96-8	Acenaphthylene	ND	1.2	ug/l	
120-12-7	Anthracene	ND	1.6	ug/l	
56-55-3	Benzo(a)anthracene	ND	1.2	ug/l	
50-32-8	Benzo(a)pyrene	ND	1.2	ug/l	
205-99-2	Benzo(b)fluoranthene	ND	2.5	ug/l	
191-24-2	Benzo(g,h,i)perylene	ND	1.5	ug/l	
207-08-9	Benzo(k)fluoranthene	ND	1.8	ug/l	
218-01-9	Chrysene	ND	0.83	ug/l	
53-70-3	Dibenzo(a,h)anthracene	ND	1.4	ug/l	
206-44-0	Fluoranthene	ND	1.3	ug/l	
86-73-7	Fluorene	ND	1.2	ug/l	
193-39-5	Indeno(1,2,3-cd)pyrene	ND	1.7	ug/l	
91-20-3	Naphthalene	ND	1.6	ug/l	
85-01-8	Phenanthrene	ND	2.1	ug/l	
129-00-0	Pyrene	ND	1.6	ug/l	

CAS No.	Surrogate Recoveries		Limits
367-12-4	2-Fluorophenol	78%	21-100%
4165-62-2	Phenol-d5	91%	10-94%
118-79-6	2,4,6-Tribromophenol	61%	10-123%
4165-60-0	Nitrobenzene-d5	71%	35-114%
321-60-8	2-Fluorobiphenyl	72%	43-116%
1718-51-0	Terphenyl-d14	70%	33-141%

APPENDIX 9.6

Grey Iron Garage Annex UST (G.I. #5)

Closure Status Information

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

October 3, 1995 Reference No. 5397

Ms. Ann Smolarz
Underground Storage Tank Division
Michigan Department of Natural Resources
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Smolarz:

Re: Supplemental Investigation
for Former UST in the Annex Building Area
Saginaw Metal Casting Operations, Saginaw, Michigan

This letter presents the results of a supplemental investigation of a former UST in the Annex Building area at the Saginaw Metal Casting Operations, Saginaw, Michigan. This supplemental investigation was completed in accordance with a work plan dated October 7, 1994 which was submitted to MDNR. The supplemental investigation field work was completed between December 13, 1994 and August 16, 1995.

1.0 BACKGROUND

A 10,000 gallon gasoline UST was removed from the Annex Building area in December of 1989. The tank was originally installed in 1965. No replacement tank was installed.

After excavating the gasoline UST in 1989, a total of five samples were collected from the side walls and floor of the excavation. The four sidewall samples were soil samples. The excavation floor sample was a water sample since the excavation encountered the water table. In addition, one soil sample was collected from the dispensing pump area.

The UST excavation wall samples were analyzed for purgeable aromatics and lead. The only reported compound was lead in one sample at 35 mg/kg. The excavation floor sample was a water sample and was also analyzed for purgeable aromatics and lead. The excavation water sample contained 160 µg/L of benzene, 250 µg/L of toluene, 18 µg/L of ethylbenzene, 44 µg/L of p-xylene, 150 µg/L of m-xylene, 160 µg/L of o-xylene and 0.032 mg/L of lead.

The soil sample from the dispensing pump area was analyzed for purgeable aromatics and lead. The only constituent reported above detection limits was lead at 24 mg/kg. Benzene from the floor water sample was the only

parameter reported above Tier I Residential criteria as specified in PA 451, as amended (former Act 307).

GM submitted the analytical data and a groundwater investigation and remediation work plan to MDNR on January 21, 1990. The investigation and remediation was required due to groundwater concentrations for benzene and xylenes in the excavation floor water sample above former Act 307 Type B criteria. Benzene was the only parameter above Tier I Residential criteria under Act 451 as amended.

In February 1990, three monitoring wells were installed in the Annex Building area near the former UST location. The purge well in the Annex Building area was installed in March 1990 and pumping was initiated when it was connected to the plant's wastewater treatment system in July 1990. The purge well was located at the former UST location. In November 1991 the purge system was terminated because three consecutive groundwater samples showed consistent non-detect reports for purgeable aromatics. The purge system operated at approximately 5 gallons per minute and had purged a total of 156,460 gallons by November 1991.

GM informed MDNR of the decision to terminate pumping in a letter dated October 5, 1992. In a letter dated March 12, 1993, the MDNR requested additional downgradient groundwater monitoring, additional stratigraphic definition and additional soil data for lead in order to determine a site-specific background value.

A supplemental investigation work plan was prepared to address the MDNR concerns. The final work plan was submitted to the MDNR on October 7, 1994.

2.0 SUPPLEMENTAL INVESTIGATION

The following presents the results of the supplemental investigation based on the October 7, 1994 Work Plan.

2.1 SOIL INVESTIGATION

On December 14, 1994, additional stratigraphic definition was conducted in the Annex Building area. One deep (27 feet) soil boring was completed (BH1-94). Continuous samples were collected from the

soil boring. The location of the soil boring is presented on Figure 1. The soil boring log is presented in Attachment A. One soil sample was collected based on highest PID reading from the soil boring at a depth of 5 to 7 feet below ground surface and analyzed for benzene, toluene, ethylbenzene and xylenes (BTEX). All BTEX parameters were non-detect. The soil sample results are presented on Table 1. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C.

In addition, four soil samples were collected from four shallow boreholes from the southeast portion of the Site and analyzed for lead in order to determine the Site-specific background value for lead. An additional four soil samples were collected to verify the results of the initial four samples. The soil sample locations are presented on Figures 4 and 5. In accordance with MDNR Guidance Document, Verification of Soil Remediation, April 1994, Revision 1, the Site specific background value for lead was calculated to be 185 mg/kg.

The background value for lead was determined in order to identify whether UST excavation verification samples from 1989 containing lead were above site-specific background values. The results of the UST excavation verification samples are all below the calculated site-specific background value for lead. Therefore, no additional work is required to address lead.

2.2 GROUNDWATER INVESTIGATION

A groundwater monitoring network consisting of three wells, was established in the Annex Building area during 1990. On December 14, 1994, one additional downgradient monitoring well (MW16) was installed downgradient of the former Annex Building UST. Figure 1 presents the well locations. The recent monitoring well is a stainless steel well with a 5-foot screen and is screened at the water table. The monitoring well log and completion details, are presented in Attachment A.

All existing monitoring wells in the vicinity of the Annex Building area have been surveyed to the USGS datum.

No pump test was conducted at the purge well (as proposed by the October 1994 Work Plan) since it was previously abandoned when purging was discontinued in 1991.

MW16 was developed on December 19, 1994. A groundwater sample from the downgradient monitoring well (MW16) was collected on December 19, 1994 and analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane, ethylene bromide, and total values for chloride, copper, lead, magnesium, phosphorus and sodium. The results are presented on Table 1. Toluene was detected at 6 µg/L. All other organic parameters were non-detect. Total lead was reported above the Tier I Residential value at 390 µg/L.

Based on these results, an additional groundwater sample was collected from MW16 on February 7, 1995 and analyzed for total and dissolved metals (chloride, copper, lead, magnesium, phosphorus and sodium). Total lead was reported above Tier I Residential value at 56 µg/L. However, the dissolved lead value was non-detect indicating that the total lead data was due to suspended solids in the groundwater sample. The results are presented on Table 1. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C. All groundwater results are below Tier I Residential values, therefore, a Tier I Residential closure is applicable.

In addition, one groundwater sample was collected from MW-16 on August 16, 1995. This sample was analyzed for BTEX, methyl-tertiary-butyl-ether, 1,2-dichloroethane and ethylene bromide. All parameters were reported non-detect. The results are presented in Table 1. The analytical reports are presented in Attachment B. The data validation is presented in Attachment C. All groundwater results are below Tier I Residential values, therefore, a Tier I Residential closure is applicable.

In addition, three of the four rounds of static water levels required by work plan were measured on December 19, 1994, April 13, 1995 and August 16, 1995. The groundwater contours are presented on Figure 1, Figure 2 and Figure 3. The groundwater elevations are presented on Table 2. Groundwater elevations will be measured during the upcoming final quarter to define groundwater flow directions over a period of one year.

October 3, 1995 Reference No. 5397

3.0 CONCLUSIONS

The Site-specific background value for lead of 185 mg/kg indicates that lead results in the original excavation are within calculated background concentrations.

Toluene was the only organic parameter detected in well MW-16 for the December 19, 1994 sampling and was detected below Tier I Residential groundwater values. No parameters were reported in the groundwater sample from MW-16 on August 16, 1995.

GM will submit groundwater elevation data from the remaining quarter by December 1995.

GM believes that Act 451 requirements have been satisfied and the Annex Building Area is closed.

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael R. Tomka, P. Eng.

MRT/cf/2
Encl.

c.c.: Laura Tucker, GM
Joe Toth, GM
Reg Sobczynski, GM
Ray Ilkka, GM
Jim McGuigan, Emcon
Ian Richardson, CRA

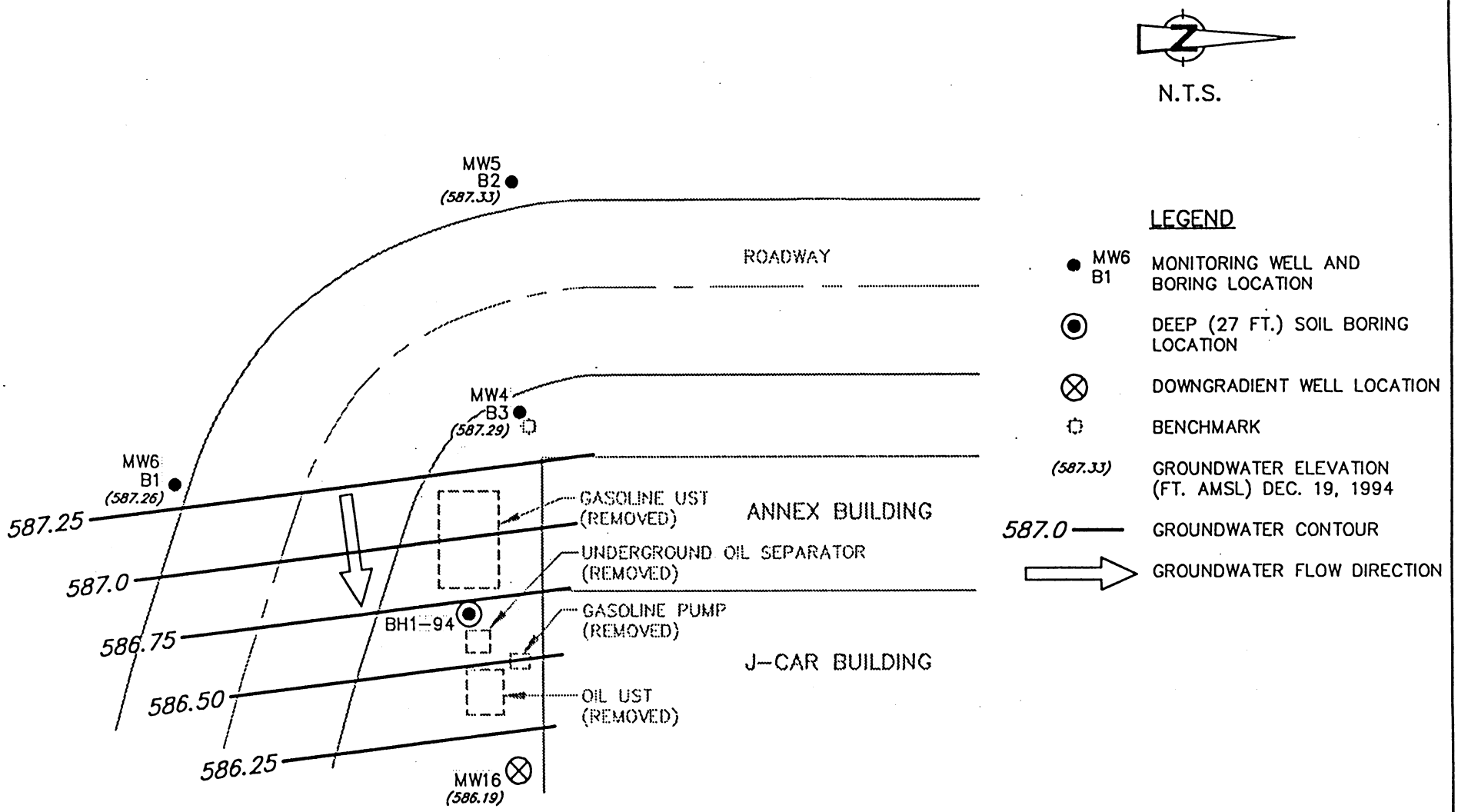


figure 1

SOIL AND GROUNDWATER INVESTIGATION
ANNEX BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-25)

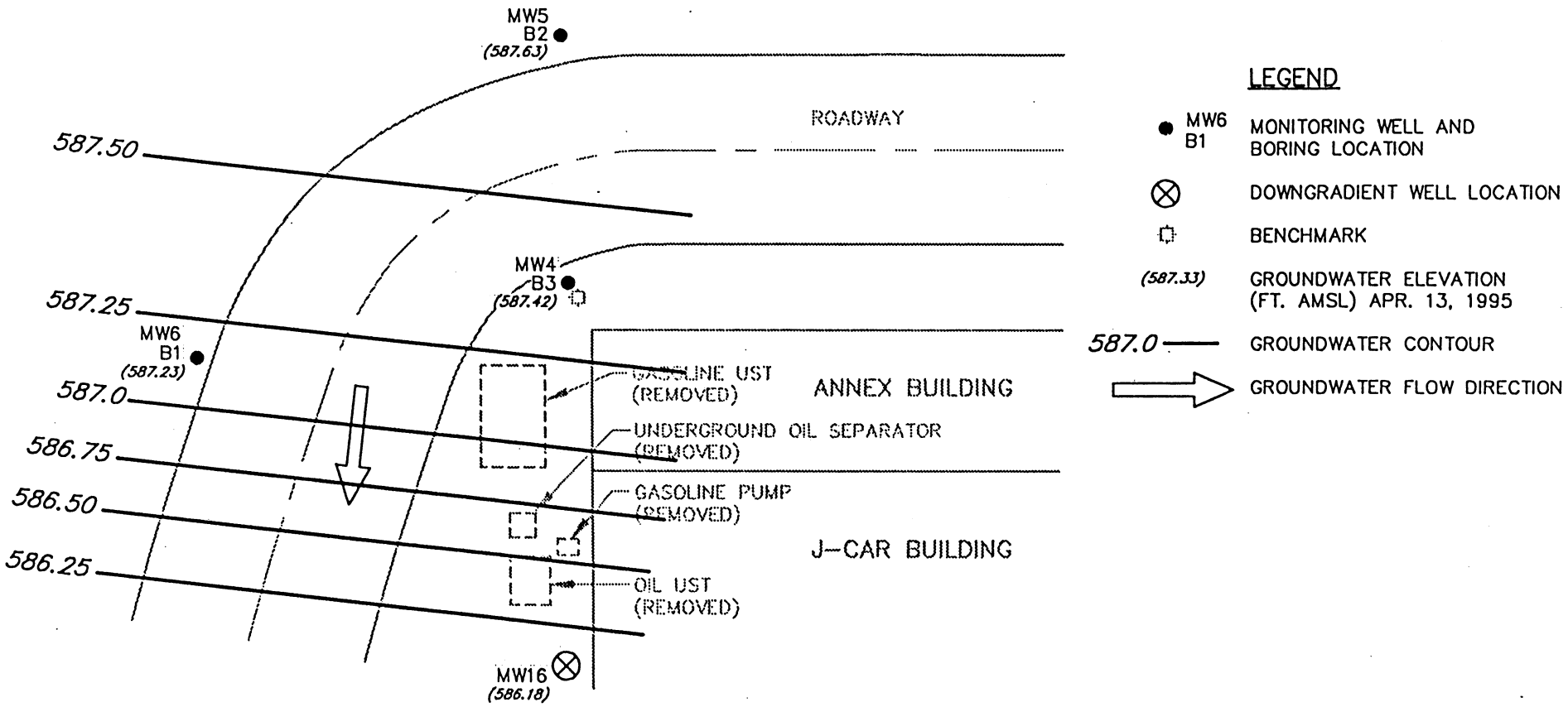


figure 2

GROUNDWATER CONTOURS – APRIL 13, 1995
ANNEX BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-26)

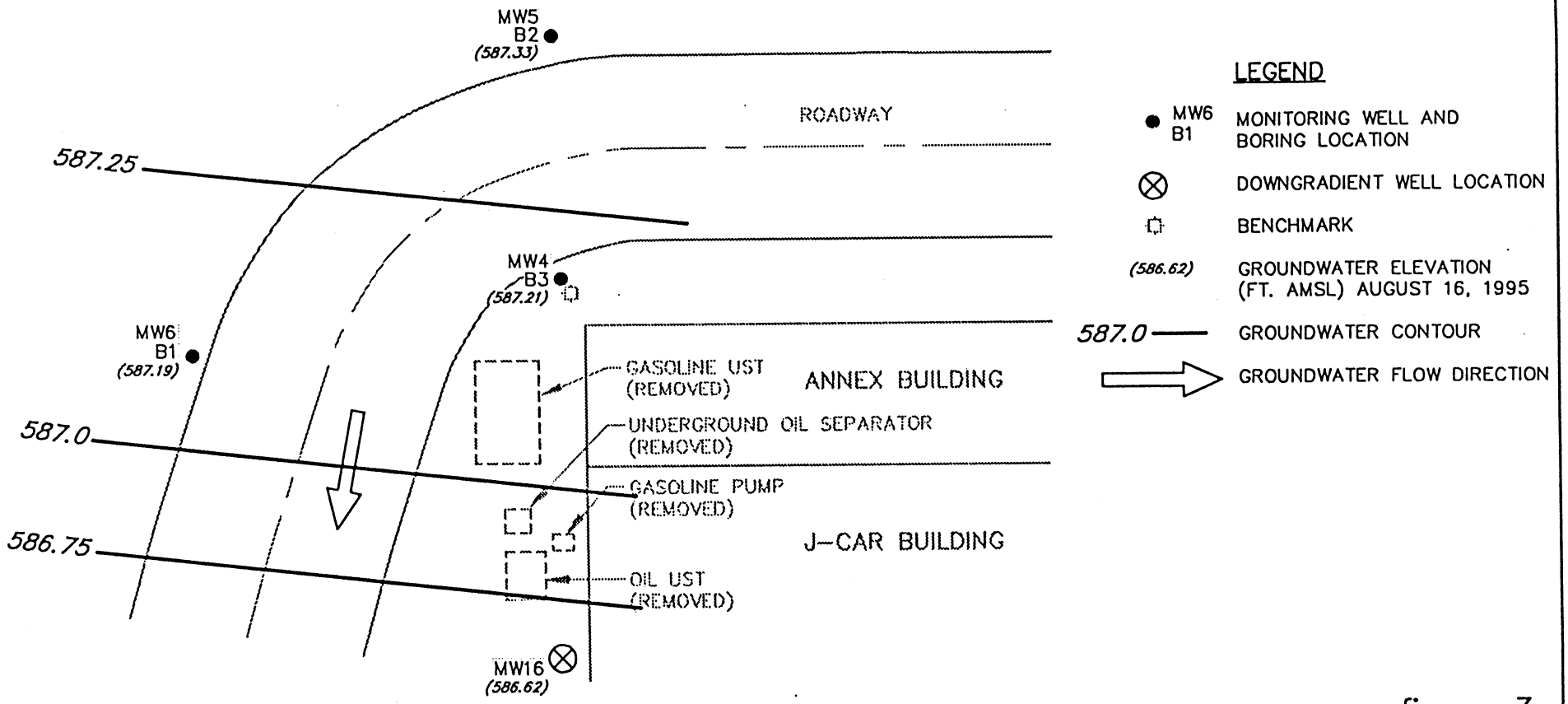
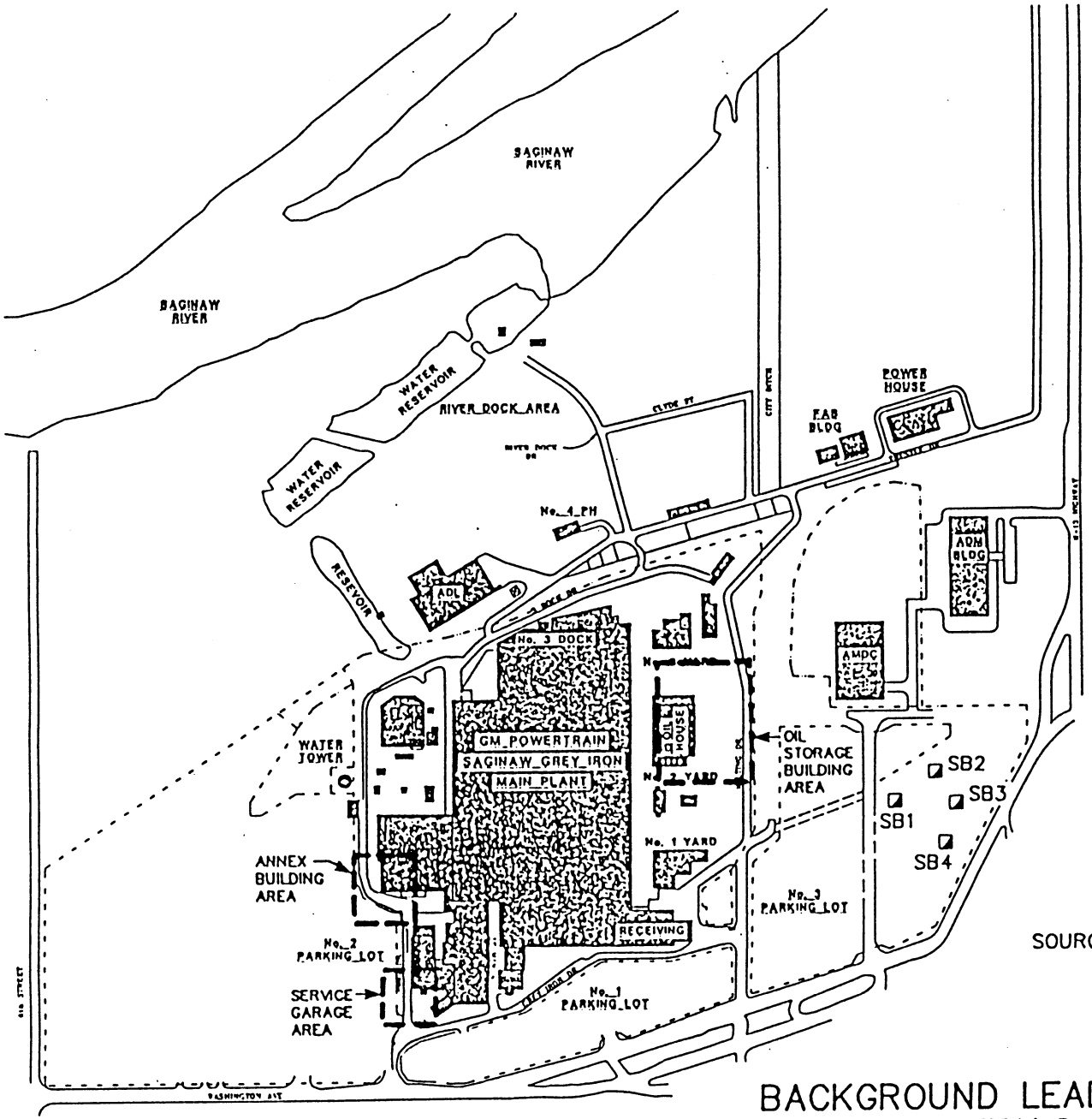


figure 3

GROUNDWATER CONTOURS – AUGUST 16, 1995
ANNEX BUILDING
SAGINAW METAL CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEPT 07/95(W) REV.0 (P-27)



N.T.S.

LEGEND

SOIL SAMPLE LOCATION
(S-5397-121394-SSH-SB1)

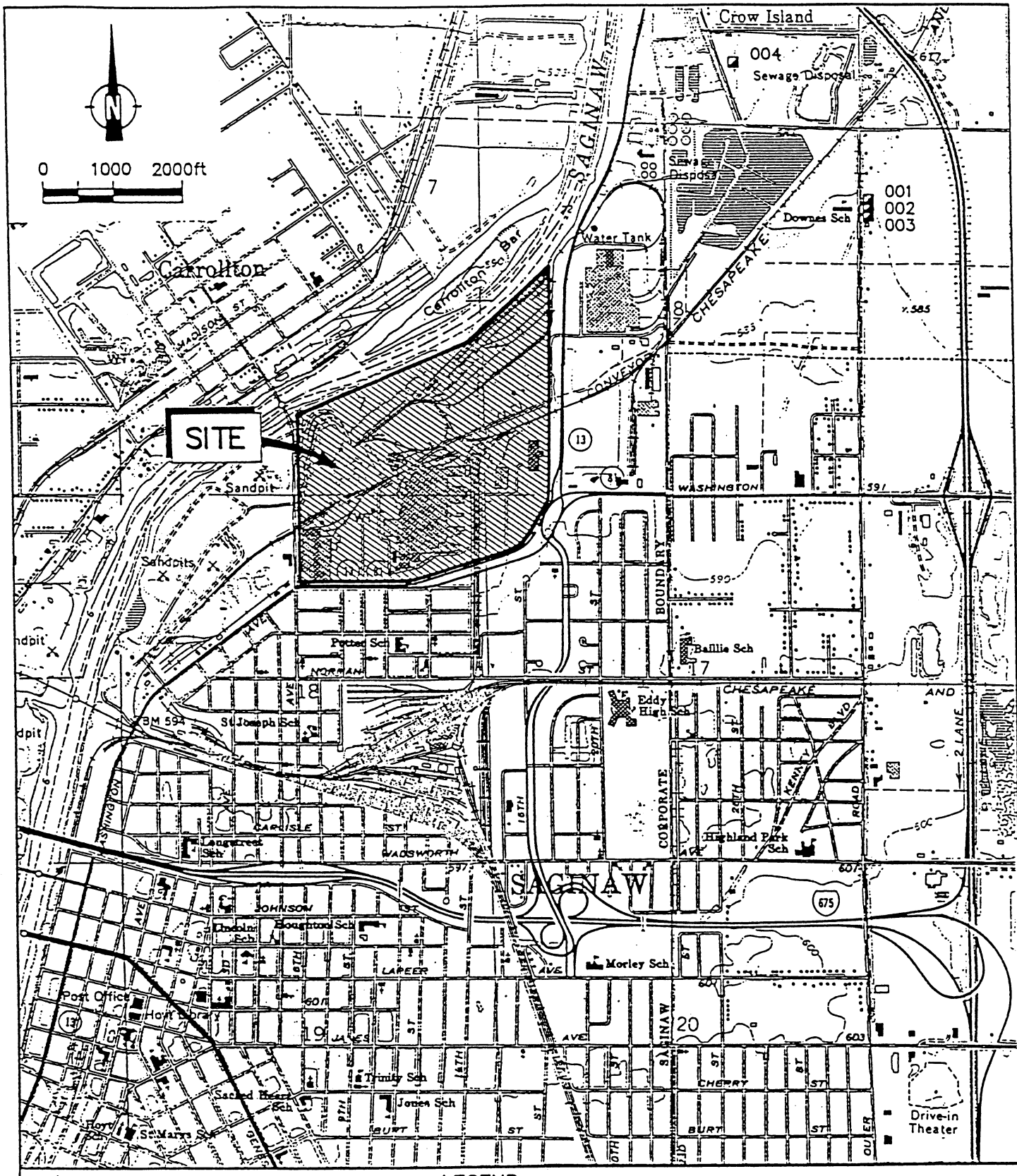
SOURCE: WILLIAM A. KIBBE & ASSOC. INC. JUNE 15, 1993.

figure 4

BACKGROUND LEAD SAMPLE LOCATIONS
SAGINAW METALS CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEP 07/95 (W) REV.0



SOURCE: USGS QUADRANGLE MAP, SAGINAW, MICH.

LEGEND

SOIL SAMPLE LOCATION (S-5397-31395-TAH-001)

figure 5

ADDITIONAL BACKGROUND LEAD SAMPLE LOCATIONS
SAGINAW METALS CASTING OPERATIONS
Saginaw, Michigan

CRA

5397 (L) SEP 07/95 (W) REV.0

TABLE 1

SOIL AND GROUNDWATER SAMPLE SUMMARY
ANNEX BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	*S-5397-121394-SSH-*				*S-5397-121494-SSH-*	*S-5397-31395-TAH-*				
	SB-1 (µg/kg)	*SB-2* (µg/kg)	*SB-3* (µg/kg)	*SB-4* (µg/kg)	*101* (5-7') (µg/kg)	*001* (µg/kg)	*002* (µg/kg)	*003* (µg/kg)	*004* (µg/kg)	*MDNR Tier I Residential* (µg/kg)
Benzene	NA	NA	NA	NA	<10	NA	NA	NA	NA	100
Toluene	NA	NA	NA	NA	<10	NA	NA	NA	NA	16,000
Ethylbenzene	NA	NA	NA	NA	<10	NA	NA	NA	NA	4,700
Xylenes	NA	NA	NA	NA	<30	NA	NA	NA	NA	74,000
Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Copper	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Lead	100,000	58,000	58,000	110,000	NA	1,000 (1)	96,000	98,000	7,000 (1)	185,000 (2)
Magnesium	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Phosphorus	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Sodium	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Copper (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Lead (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Magnesium (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Sodium (dissolved)	NA	NA	NA	NA	NA	NA	NA	NA	NA	–
Methyl-tertiary-butyl-ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	4,800
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	100
Ethylene Bromide	NA	NA	NA	NA	NA	NA	NA	NA	NA	–

Notes:

NA - Not Analyzed
(1) Statistical Outlier
(2) - Site - Specific Background Value

TABLE 1

SOIL AND GROUNDWATER SAMPLE SUMMARY
ANNEX BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Parameter	*MW16 GW-5397-121994-SSH-109 (µg/L)*	*MW16 GW-5397-020795-SSH-402 (µg/L)*	*MW16 W-5397-950816-SSH-102B (µg/L)*	*MDNR Tier I Residential (µg/L)*
Benzene	<1.0	NA	<1.0	5
Toluene	6	NA	<1.0	1,000
Ethylbenzene	<1.0	NA	<1.0	700
Xylenes	<3.0	NA	<3.0	10,000
Chloride	220,000	28,000	NA	–
Copper	80	71	NA	–
Lead	390	56	NA	4
Magnesium	30,000	120,000	NA	–
Phosphorus	350	2,500	NA	–
Sodium	190,000	780,000	NA	–
Copper (dissolved)	NA	<25	NA	–
Lead (dissolved)	NA	<3	NA	4
Magnesium (dissolved)	NA	67,000	NA	–
Sodium (dissolved)	NA	850,000	NA	–
Methyl-tertiary-butyl-ether	<50	NA	<5.0	240
1,2-Dichloroethane	<1.0	NA	<1.0	5
Ethylene Bromide	<1.0	NA	<1.0	–

Notes:

NA - Not Analyzed
(1) Statistical Outlier
(2) - Site - Specific Background V

TABLE 2

GROUNDWATER ELEVATIONS
ANNEX BUILDING AREA
SAGINAW METAL CASTING OPERATIONS
SAGINAW, MICHIGAN

Well No.	*Ref. Elev. (ft. AMSL)*	*12/19/94*	*04/13/95*	*08/16/95*
MW-4	591.72	587.29	587.42	587.21
MW-5	591.67	587.33	587.63	587.33
MW-6	591.68	587.26	587.23	587.19
MW-16	591.06	586.19	586.18	586.62

Attachment A
Boring Logs and Well Completion Details

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT CMPT - Saginaw
LOCATION Annex

DRILLING CONTRACTOR Matec
DRILLER Bob Dreyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION BH1-94
DATE STARTED 12/14/94
DATE COMPLETED 12/14/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	NOTES AND COMMENTS: PID (ppm)
0		1	Concrete								bkg = 1.2 ppm
1			med tan sand, black spots, fill (SP)	1	SS	6	6	6	6	1-3	7.9
		4		2	SS	3	3	4	4	3-5	9.1
4		5'/2	black foundry sand, med, fill (SP)								
5'/2		6	brown gravelly sands (GW), wet, med sand	3	SS	4	3	2	1	5-7	11.0
6		7	black wet foundry sand, med, trace silt + clay, (SM/SC)								
7		8'/2	grey sand, little silt + clay, med (SM/SC)	4	SS	1	1	1	1	7-9	10.6
8'/2		9	grey clay, trace sand, silt + gravel, wet (CL)								
9		11'/2	mottled grey/brown clay, little sand, wet (CL)	5	SS	6	1	3	1	9-11	8.3
11'/2		12	sand lense, grey, med + coarse, wet (SW)	6	SS	2	3	4	4	11-13	7.7
12		13	grey clay, s.ft, wet trace silt (CL)								
13		13'/2	mottled brown/grey clay, hard, trace silt, trace gravel, (CL)	7	SS	5	7	10	20	13-15	3.4
13'/2		14	sand lense, grey/brown, med (SP)								
14		15'/2	brown clay, trace silt, hard, moist, (CL)								
15'/2		16	sand lense, grey, med to coarse, wet (SW)	8	SS	4	6	8	15	15-17	3.3
16			brown clay, hard, trace silt + gravel (CL)								
				9	SS	8	10	13	14	17-19	2.9
				10	SS	5	6	8	10	19-21	2.7
		22		11	SS	3	3	4	5	21-23	3.6

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME Grey Iron
PROJECT NUMBER 5397
CLIENT GMPT - Saginaw
LOCATION Annex

DRILLING CONTRACTOR Mateco
DRILLER Bob Dwyer
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION MW-16
DATE STARTED 12/14/94
DATE COMPLETED 12/14/94
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft)/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	NOTES AND COMMENTS
0		1/2	asphalt, almost tar								
1/2		10"	road gravel								
10"		7	black to dark brown med foundry sand, fill								
7		9	grey sandy silt, moist to wet, med								
9		12'1/2	" saturated								
	12'1/2		mottled grey/brown clay, trace silt & gravel								
	12'1/2		BOH								

Attachment B
Analytical Reports

Attachment B.1

Soil Analytical Results
(December 16, 1994)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Analytical Report

Lab I.D. :	46635
Report Date :	01/05/1995
Project :	GM-Grey Iron #5663
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario
	Canada N2V 1C2
Attention :	Mr. Mike Tomka

11 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

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Services Inc.

SB-2

Conestoga Rovers & Associates

Sample:	46635-7063	Matrix:	Soil
Client Sample:	S-5397-121394-SSH-SB-2	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	58	mg/kg	1	EPA 239.2	01/04/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	78.5	%	0.1	Standard Mtd. 2540G	12/29/1994 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

Conrad Industrial Drive
gton, Michigan 49431
343-1877
616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	46635-7065	Matrix:	Soil
Client Sample:	S-5397-121394-SSH-SB-4	Location:	
COLLECTED:	12/16/1994 :	Project:	GM-Grey Iron #5663
RECEIVED:	12/19/1994 16:08	Sampled By:	SH

SB-4

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	110	mg/kg	1	EPA 239.2	01/04/1995 MC
			Note: Results are reported on a dry weight basis.		
PHYSICAL PROPERTY ANALYSIS					
% Solids	78.1	%	0.1	Standard Mtd. 2540G	12/29/1994 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 01/05/1995

Anatech Analytical Laboratories
EPA Method 8020/602
Method Blank / Calibration Check

REVIEWED BY: SW 12/30/94

Operator: BS Intial Cal. Date: 11-14-94 Calck lot: V1 70 3

Inst. ID: BTEX PID/HALL Analytical Batch: J 29 DEC 94 A

Date Analyzed: 12-29-94

Calibration Check

BIN Number:

Compound	Method Blank conc. (ug/L)	True conc. (ug/L)	Calck#1 (ug/L)	Calck#2 (ug/L)	Calck#3 (ug/L)	QC Range (ug/L)
MTBE	ND	20	20.8	20.5	19.7	NA
Benzene		20	19.7	20.0	18.9	15.4-24.6
Toluene		20	19.8	20.7	19.9	15.5-24.5
Chlorobenzene		20	19.8	20.3	19.2	16.1-23.9
Ethylbenzene		20	20.0	20.5	19.2	12.6-27.4
p & m.- Xylene		40	38.8	39.4	38.1	NA
o - Xylene. ~~Styrene~~		~~40~~ 20	19.9	20.3	19.4	NA
4-BFB (surr.)	48.0	50	51.3	57.3	47.2	NA
1,4-Dichlorobenzene	ND	20	19.3	20.0	19.2	13.6-26.4
1,3-Dichlorobenzene		20	19.8	20.4	19.3	14.5-25.5
1,2-Dichlorobenzene		20	19.8	20.2	19.5	13.9-26.1

Comments:

4635

REVIEWED BY 1/4/95

Anatech Analytical Laboratories
EPA Method 8020/602
Method Blank / Calibration Check

Operator: CS Intial Cal. Date: 12-26-94 Calck lot: V1,703

Inst. ID: BTEX PID/HALL Analytical Batch: J30DEC94B

Date Analyzed: 12-30-94

Calibration Check

BIN Number:

Compound	Method Blank conc. (ug/L)	True conc. (ug/L)	Calck#1 (ug/L)	Calck#2 (ug/L)	Calck#3 (ug/L)	QC Range (ug/L)
MTBE	ND	20	18.9	21.6		NA
Benzene		20	18.4	22.2		15.4-24.6
Toluene		20	18.7	23.7		15.5-24.5
Chlorobenzene		20	18.9	23.3		16.1-23.9
Ethylbenzene		20	18.7	23.5		12.6-27.4
p & m - Xylene		40	36.0	46.5		NA
o - Xylene, ~~Styrene~~		~~40~~ 20	18.8	23.3		NA
4-BFB (surr.)	51.8	50	55.5	62.8		NA
1,4-Dichlorobenzene	ND	20	18.2	22.6		13.6-26.4
1,3-Dichlorobenzene		20	18.4	23.1		14.5-25.5
1,2-Dichlorobenzene		20	18.6	22.4		13.9-26.1

Comments:

46635-7072

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
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METAL QC

FOR

ANATECH REPORT 46635

Attachment B.2

Groundwater Analytical Report
(December 19, 1994)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH laboratories

a Division of
CT&E Environmental
Services Inc.

5397

Analytical Report

Lab I.D. :	46699
Report Date :	01/11/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

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): Anatech Lot Ref No 46699

REFERENCE NUMBER: 5397

PROJECT NAME: GMPT - Saginaw Grey Iron

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: Sherri S Hockemeyer

SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	Methyl-tertiary butyl ether	1,2-dichloroethane	Halogenated benzenes	copper	phosphorus	Chloride	sodium	magnesium	lead	REMARKS
1412 1	12/19/94		GW-5397-121994-SSH-607	water	2	X	X	X	X							
1413 2	12/19/94		GW-5397-121994-SSH-108	water	3	X	X	X	X	X	X	X	X	X	X	1,2 dibromoethane
1414 3	12/19/94		GW-5397-121994-SSH-109	water	3	X	X	X	X	X	X	X	X	X	X	
1415 4	12/20/94		GW-5397-122094-SSH-110	water	2	X	X	X	X							
1416 5	12/20/94		Trip Blank	water	2	X	X	X	X							
	12/22/94															
																10-40 ml VOA
																2-500 HNO3
																42°F
			TOTAL NUMBER OF CONTAINERS		12											

RELINQUISHED BY: 1. [signature]	DATE: 1300 TIME: 12/20/94	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. 9706310493

White -Fully Executed Copy Pink -Shipper Copy
Yellow -Receiving Laboratory Copy Goldenrod -Sampler Copy

SAMPLE TEAM: SSH, DJC

RECEIVED FOR LABORATORY BY:

DATE: 12/22/94 TIME: 800 AM

1001 (FC S)-APRIL 29, 93-REV.0 (C)(F-01)

NOTICE

ANATECH ANALYTICAL LABORATORIES
ORGANIC DATA PACKAGE

Project: CRA - Grey Iron
Ref. No.: 46635 & 46699

1. 8020 Analysis.

Sample ID	Date Analyzed
46635-7067	12/29/94
-7068	12/29/94
-7069	12/29/94
-7070	12/29/94
-7071	12/29/94
-7072	12/30/94

2. VOC Analysis.

Sample ID	Date Analyzed
46699-7412	12/30/94
-7413	12/30/94
-7414	12/30/94
-7415	12/30/94

3. PNA Analysis

Sample ID	Date Analyzed
46635-7070	12/27/94

624 Method Blank
Date analyzed: 12/30/91

Quantitation Report Quanfile: 12BLK30A Quan Entries: 75
Comment: BLANK, 30 UG/L.
Sorted via: Entry Number ^ (S) = Standard

Cal	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
1	PENTAFLUOROBENZENE IS1	I	11:26	873,497	30.000	BB
2	1,4 DIFLUOROBENZENE IS	I	13:32	721,477	30.000	BB
3	CHLOROBENZENE-D5 IS3	I	20:03	824,145	30.000	BB
4	1,4-DICHLOROBENZENE-D4	I	24:34	460,636	30.000	BB
5	DIBROMOFLOUROMETHANE S	S	11:09	467,194	30.013	BB
6	TOLUENE-D8 SS2	S	17:03	1,144,571	33.706	BB
7	4-BROMOFLUOROBENZENE S	S	22:22	449,725	27.522	BB
8	dichlorodifl'methane	A	NF	NF	NF	NF
9	chloromethane	A	NF	NF	NF	NF
10	vinyl chloride	A	NF	NF	NF	NF
11	bromomethane	A	NF	NF	NF	NF
12	chloroethane	A	3:27	0	0.001	BB
13	trichlorofluoromethane	A	4:01	177	0.012	BB
14	1,1 dichloroethene	A	4:54	57	0.009	BB
15	methylene chloride	A	5:52	2,778	0.236	BB
16	t-1,2-dichloroethene	A	6:33	13	0.002	BB
17	mtbe	A	NF	NF	NF	NF
18	1,1 dichloroethane	A	NF	NF	NF	NF
19	c-1,2-dichloroethene	A	NF	NF	NF	NF
20	2,2 dichloropropane	A	9:01	2	0.001	BB
21	bromochloromethane	A	NF	NF	NF	NF
22	chloroform	A	10:36	5,801	0.311	BB
23	111-trichloroethane	A	NF	NF	NF	NF
24	carbon tetrachloride	A	NF	NF	NF	NF
25	1,1 dichloropropene	A	NF	NF	NF	NF
26	benzene	A	NF	NF	NF	NF
27	1,2 dichloroethane	A	12:23	151	0.026	BB
28	trichloroethene	A	14:10	459	0.041	BB
29	1,2 dichloropropane	A	NF	NF	NF	NF
30	dibromomethane	A	15:00	682	0.054	BB
31	bromodichloromethane	A	15:25	695	0.037	BB
32	c-1,3-dichloropropene	A	16:28	97	0.015	BB
33	toluene	A	17:12	963	0.064	BB
34	t-1,3-dichloropropene	A	16:28	97	0.014	BB
35	112-trichloroethane	A	18:06	548	0.060	BB
36	tetrachloroethene	A	NF	NF	NF	NF
37	1,3 dichloropropane	A	18:25	368	0.093	BB
38	dibromochloromethane	A	18:54	519	0.029	BB
39	1,2-dibromoethane	A	19:05	1,643	0.112	BB
40	chlorobenzene	A	19:57	0	0.001	BB
41	1,1,1,2-tetrachloroeth	A	NF	NF	NF	NF
42	ethylbenzene	A	20:21	628	0.019	BB
43	P+M-xylene	A	20:34	1,944	0.141	BB
44	o-xylene	A	NF	NF	NF	NF
45	styrene	A	21:24	755	0.027	BB
46	bromoform	A	21:44	513	0.109	BB
47	isopropyl benzene	A	NF	NF	NF	NF
48	1122 tetrachloroethane	A	22:42	2,395	0.139	BB
49	bromobenzene	A	NF	NF	NF	NF
50	1,2,3-trichloropropane	A	22:22	151,607	Is 13.826	BB
51	n-propylbenzene	A	22:52	1,456	0.035	BV
52	2-chlorotoluene	A	23:01	1,134	0.038	BB
53	1,3,5-trimethylbenzene	A	23:13	754	0.017	BB

624 Calibration Check
Date analyzed: 12/3/84

Quantitation Report Quanfile: 12C03A Quan Entries: 75
Comment: QC CHECK, 30 UG/L.
Sorted via: Entry Number (S) = Standard

Cal	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
1	PENTAFLUOROBENZENE IS1	I	11:21	989,535	30.000	BB
2	1,4 DIFLUOROBENZENE IS	I	13:29	766,424	30.000	BB
3	CHLOROBENZENE-D5 IS3	I	20:01	848,234	30.000	BV
4	1,4-DICHLOROBENZENE-D4	I	24:34	373,806	30.000	BB
5	DIBROMOFLUOROMETHANE S	S	11:04	468,699	23.379	BB
6	TOLUENE-D8 SS2	S	17:02	1,208,741	32.154	BB
7	4-BROMOFLUOROBENZENE S	S	23:31	473,275	36.156	BB
8	dichlorodifl'methane	A	2:31	46,870	8.541	BB
9	chloromethane	A	2:31	7,813	1.378	MM
10	vinyl chloride	A	2:57	35,874	14.387	BB
11	bromomethane	A	4:52	1,593	12.674	BB
12	chloroethane	A	2:57	11,581	14.087	BV
13	trichlorofluoromethane	A	4:00	303,577	14.772	BB
14	1,1 dichloroethene	A	4:52	148,599	16.071	BB
15	methylene chloride	A	5:49	2,479	14.428	BB
16	t-1,2-dichloroethene	A	6:25	165,183	18.177	BB
17	mtbe	A	6:27	211,482	12.569	BB
18	1,1 dichloroethane	A	7:28	124,458	16.087	BB
19	c-1,2-dichloroethene	A	9:18	199,080	16.435	BB
20	2,2 dichloropropane	A	9:15	148,212	17.175	BB
21	bromochloromethane	A	10:09	119,541	19.948	BB
22	chloroform	A	10:31	460,162	18.768	BB
23	111-trichloroethane	A	11:03	484,883	18.889	BB
24	carbon tetrachloride	A	11:36	322,937	17.573	BB
25	1,1 dichloropropene	A	11:38	102,824	20.335	BB
26	benzene	A	12:15	285,105	17.874	BB
27	1,2 dichloroethane	A	12:20	133,607	18.456	BB
28	trichloroethene	A	14:06	267,207	17.992	BB
29	1,2 dichloropropane	A	14:39	61,522	19.759	BB
30	dibromomethane	A	14:57	260,360	15.939	BB
31	bromodichloromethane	A	15:24	446,507	18.508	BB
32	c-1,3-dichloropropene	A	16:27	162,788	18.404	BB
33	toluene	A	17:09	391,165	20.025	BB
34	t-1,3-dichloropropene	A	16:27	162,788	16.750	BB
35	112-trichloroethane	A	18:04	162,002	15.696	BB
36	tetrachloroethene	A	18:19	214,101	23.327	BB
37	1,3 dichloropropane	A	18:24	96,125	20.215	BB
38	dibromochloromethane	A	18:52	389,695	16.713	BB
39	1,2-dibromoethane	A	19:03	353,998	18.406	BB
40	chlorobenzene	A	20:05	648,592	20.359	BB
41	1,1,1,2-tetrachloroeth	A	20:15	264,455	21.837	BB
42	ethylbenzene	A	20:20	948,292	22.784	BB
43	P+M-xylene	A	20:33	638,794	36.149	BB
44	o-xylene	A	21:19	320,152	18.263	BB
45	styrene	A	21:22	632,962	16.970	BB
46	bromoform	A	21:43	106,109	17.407	BV
47	isopropyl benzene	A	22:04	948,282	24.846	BB
48	1122 tetrachloroethane	A	22:41	294,551	17.810	BB
49	bromobenzene	A	22:37	539,559	20.866	BB
50	1,2,3-trichloropropane	A	22:43	130,015	11.197	BB
51	n-propylbenzene	A	23:52	1,131,413	28.490	BV
52	2-chlorotoluene	A	23:00	734,851	25.474	VB
53	1,3,5-trimethylbenzene	A	23:14	904,562	21.000	BB

624 Matrix Spike
date analyzed: 12/30/94

Quantitation Report Quanfile: DEC30MS Quan Entries: 75
Comment: MOOS, 46730-7526, 5 ML. PURGE.
Sorted via: Entry Number ^ (S) = Standard

al	Name of Compound	S	R Time	Peak Area	Calc Amt(A)	Me
1	PENTAFLUOROBENZENE ISI	I	11:27	865,277	30.000	BB
2	1,4 DIFLUOROBENZENE IS	I	13:33	881,211	30.000	BB
3	CHLOROBENZENE-D5 IS3	I	20:05	813,713	30.000	BV
4	1,4-DICHLOROBENZENE-D4	I	24:37	373,106	30.000	BB
5	DIBROMOFLOUROMETHANE S	S	11:11	456,224	26.025	BB
6	TOLUENE-D8 SS2	S	17:05	1,154,915	26.720	BB
7	4-BROMOFLUOROBENZENE S	S	22:24	482,029	27.770	BB
8	dichlorodifl'methane	A	2:33	43,748	9.117	BB
9	chloromethane	A	2:33	5,541	1.118	BB
10	vinyl chloride	A	3:00	34,329	15.745	BB
11	bromomethane	A	4:55	1,932	17.578	BV
12	chloroethane	A	3:00	10,808	15.034	BB
13	trichlorofluoromethane	A	4:03	274,413	15.271	BB
14	1,1 dichloroethene	A	4:55	114,818	14.201	BB
15	methylene chloride	A	5:54	2,633	17.525	BB
16	t-1,2-dichloroethene	A	6:31	154,343	19.423	BB
17	mtbe	A	6:33	211,834	14.398	BB
18	1,1 dichloroethane	A	7:35	124,417	18.391	BB
19	c-1,2-dichloroethene	A	9:24	132,946	12.551	BB
20	2,2 dichloropropane	A	9:22	110,607	14.658	BB
21	bromochloromethane	A	10:16	98,670	18.829	BB
22	chloroform	A	10:39	447,493	20.872	BB
23	111-trichloroethane	A	11:11	461,508	20.560	BB
24	carbon tetrachloride	A	11:42	304,487	14.410	BB
25	1,1 dichloropropene	A	11:43	101,379	17.437	BB
26	benzene	A	12:19	291,987	15.921	BB
27	1,2 dichloroethane	A	12:25	139,114	16.713	BB
28	trichloroethene	A	14:10	271,379	20.897	BB
29	1,2 dichloropropane	A	14:43	61,968	17.310	BB
30	dibromomethane	A	15:01	370,535	14.404	BB
31	bromodichloromethane	A	15:28	451,058	16.262	BB
32	c-1,3-dichloropropene	A	16:30	153,301	15.074	BB
33	toluene	A	17:13	477,445	12.962 21.258	BB
34	t-1,3-dichloropropene	A	16:30	153,301	18.040	BB
35	112-trichloroethane	A	18:07	169,551	14.287	BB
36	tetrachloroethene	A	18:22	297,547	23.035	BB
37	1,3 dichloropropane	A	18:27	96,616	21.180	BB
38	dibromochloromethane	A	18:55	393,046	14.661	BB
39	1,2-dibromoethane	A	19:06	379,797	17.175	BB
40	chlorobenzene	A	20:07	628,333	23.589	BB
41	1,1,1,2-tetrachloroeth	A	20:18	266,382	22.929	BB
42	ethylbenzene	A	20:22	938,439	23.504	BB
43	p+m-xylene	A	20:37	623,852	36.802	BB
44	o-xylene	A	21:22	315,749	17.717 18.776	BB
45	styrene	A	21:25	603,880	16.877	BB
46	bromoform	A	21:46	108,781	18.603	BV
47	isopropyl benzene	A	22:07	915,292	24.027	BB
48	1122 tetrachloroethane	A	22:43	323,967	19.625	BB
49	bromobenzene	A	22:40	541,162	20.967	BB
50	1,2,3-trichloropropane	A	22:46	142,699	12.313	BB
51	n-propylbenzene	A	22:55	1,073,239	27.076	BV
52	2-chlorotoluene	A	23:05	710,486	24.676	VB
53	1,3,5-trimethylbenzene	A	23:16	879,942	20.467	BB

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

46699 GC/MS PNA QC

NOTES:

1. The MS/MSD were analyzed on another client's sample.

Quantitation Report

Data File : C:\HPCHEM\1\DATA\DEC27\MB113S.D
Acq Time : 27 Dec 94 4:51 pm
Sample : Method Blank 8270#113s
Misc : 12/21/94 30/1 S1,60,7
Quant Time: Dec 27 17:41 1994

Operator: tmj
Inst : 5970 - In
Multiplr: 1.00

Method : C:\HPCHEM\1\METHODS\8270.M
Title : SW-846 Mtd. 8270 and EPA Mtd. 625
Last Update : Tue Dec 27 14:25:50 1994
Response via : Multiple Level Calibration

Internal Standards	R.T.	QIon	Response	Conc	Units		Dev(Min)
1) 1,4-Dichlorobenzene-d4	9.24	152	5247020	40.00	ppb		0.02
20) Naphthalene-d8	12.84	136	20726858	40.00	ppb		-0.04
34) Acenaphthene-d10	18.29	164	8335472	40.00	ppb		-0.04
62) Phenanthrene-d10	22.92	188	16914120	40.00	ppb		-0.05
74) Chyrsene-d12	31.35	240	15989520	40.00	ppb		-0.05
93) Perylene-d12	36.63	264	14292665	40.00	ppb		-0.04
System Monitoring Compounds							%Recovery
7) 2-Fluorophenol (s.s.)	6.65	112	20219796	87.61	ppb		43.80%
8) Phenol-d6 (s.s)	8.95	99	25040768	79.56	ppb		39.78%
21) Nitrobenzene-d5 (s.s)	10.97	82	8084617	42.36	ppb		42.36%
46) 2-Fluorobiphenyl (s.s)	16.27	172	14522949	59.11	ppb		59.11%
65) 2,4,6-Tribromophenol (s.s)	20.94	330	5490041	81.00	ppb		40.50%
85) Terphenyl-d14 (s.s)	28.08	244	21443487	94.14	ppb		94.14%
Target Compounds							Qvalue
58) Diethylphthalate	20.06	149	897842	2.73	ppb		95
78) Endrin aldehyde	31.25	67	4021	3.22	ppb	#	100
80) 4,4-DDE	28.08	246	390233	4.43	ppb	#	35
83) Dieldrin	28.08	79	101165	1.71	ppb	#	47

ND

(#) = qualifier out of range (m) = manual integration

Report 46699

RUN DATE: 1/9/95
ANALYTE: TP
INSTRUMENT:
BATCH NO.: 234
ANALYST: [illegible]
UNITS: mg/L

REPORT DATE: 1/11/95
METHOD: 365.2
RUN NO.: 010995
DIGESTION DATE: 1/9/95
REVIEW (Init/Date): [illegible] 1/17/95

BLANKS	CONCENTRATION	LOD	Q
Prep Blank			
ICB	N/D	0.002	
CCB	N/D	0.002	

Control Limits: =1 x LOD

CALIBRATION VERIFICATION	TRUE	FOUND	% RECOVERY	Q
INITIAL	0.2	0.20	100	
CONTINUING	0.2	0.21	104	

=10% - =15%

DUPLICATE ANLYSIS

SAMPLE NUMBER	SAMPLE	DUPLICATE	RPD	Q

=20% IF < 10 x LOD = 1 x LOD

	SPIKE RECOVERY SAMPLE NUMBER	SPIKED SAMPLE RESULT	SAMPLE RESULT	SPIKE ADDED	%R	Q
MS	Preparation	0.229	0.025	0.2	102	
MSD		0.227	0.025	0.2	101	

Sample of simular matrix =15%
used for MS, MSD

RPD - 0.57%

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

METAL QC

FOR

ANATECH REPORT 46699

Report 46699

Anatech QC Report
Inorganic Data Package

Calibration Blanks Report

Project # 46699

Units: ug/L

Control Limits: 0 +/- 1xLOD

Analyte	Run #	LOD	ICB	CCB 1	CCB 2	CCB 3	CCB 4	CCB 5	CCB 6	C
Al										
Sb										
As										
Ba										
Be										
Cd										
Ca										
Cr										
Co										
Cu	992	4	ND	ND	ND					
Fe										
Pb	992	30	ND	ND	ND					
Mg	992	40	ND	ND	ND					
Mn										
Hg										
Ni										
K										
Se										
Ag										
Na	992	1000	ND	ND	ND					
Tl										
V										
Zn										

Comments:

Report 46699

Anatech QC Report
Inorganic Data Package

Duplicate Report

Sample #_____ Batch # M-4436

Matrix (soil/water): Water Units (ug/L or mg/kg): mg/L

Control Limits: +/- 20 RPD

Analyte	Run #	Matrix Spike (MS)	MS Duplicate (MSD)	RPD	C
Al					
Sb					
As					
Ba					
Be					
Cd					
Ca					
Cr					
Co					
Cu	992	9,867	9,861	<1%	*
Fe					
Pb	992	10,250	10,280	<1%	*
Mg	992	10,200	10,190	<1%	*
Mn					
Hg					
Ni					
K					
Se					
Ag					
Na	992	10,020	10,000	<1%	*
Tl					
V					
Zn					

Comments: * Sample of Similar Matrix was analyzed for QC

Attachment B.3

Groundwater Analytical Report
(February 7, 1995)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Analytical Report

Lab I.D. :	50802
Report Date :	02/14/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50802-3019	Matrix:	Water
Client Sample:	GW-5397-020795-SSH-402	Location:	
COLLECTED:	02/07/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	02/09/1995 16:27	Sampled By:	SH

MW16

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Copper (ICAP)	ND	mg/L	0.025	SW-846 Mtd. 6010	02/10/1995 CG
Lead (GFAA)	ND	mg/L	0.003	SW-846 Mtd. 7421	02/14/1995 MC
Magnesium (ICAP)	67	mg/L	0.2	SW-846 Mtd. 6010	02/10/1995 CG
Sodium (ICAP)	850	mg/L	5	"	02/10/1995 CG

ND = Non Detectable

Laboratory Manager
C. David Hainer

Reported : 02/14/1995

Attachment B.4

Soil Analytical Reports
(March 13, 1995)

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Analytical Report

Lab I.D. :	51378
Report Date :	03/22/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

5 pages including cover sheet

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	51378-5185	Matrix:	Soil
Client Sample:	S-5397-31395-TAH-002	Location:	
COLLECTED:	03/13/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	03/14/1995 15:47	Sampled By:	TH

002

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (ICAP)	96	mg/kg	2	SW-846 Mtd. 6010	03/21/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	80.8	%	0.1	Standard Mtd. 2540G	03/17/1995 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/22/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	51378-5187	Matrix:	Soil
Client Sample:	S-5397-31395-TAH-004	Location:	
COLLECTED:	03/13/1995 :	Project:	GMPT - SG1 #5397-10
RECEIVED:	03/14/1995 15:47	Sampled By:	TH

004

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (ICAP)	7	mg/kg	2	SW-846 Mtd. 6010	03/21/1995 MC
Note: Results are reported on a dry weight basis.					
PHYSICAL PROPERTY ANALYSIS					
% Solids	80.4	%	0.1	Standard Mtd. 2540G	03/17/1995 PL

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 03/22/1995

Attachment B.5

Groundwater Analytical Report
(August 16, 1995)

onrad Industrial Drive
on, Michigan 49431
3-1877
16-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

5397

Analytical Report

Lab I.D. :	54889
Report Date :	08/30/1995
Project :	GMPT - SG1 #5397-10
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario Canada N2V 1C2
Attention :	Mr. Mike Tomka

10 pages including cover sheet

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE ORGANIC GC/MS TUNING AND MASS CALIBRATION - BROMOFLUOROBENZENE (BFB)

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
File Name: 8TUN22A
Batch: H22AUG95A

m/e	ION ABUNDANCE CRITERIA	% RELATIVE ABUNDANCE
50	15.0-40.0% of mass 95	17.2
75	30.0-60.0% of mass 95	45.1
95	Base peak, 100% relative abundance	100.0
96	5.0-9.0% of mass 95	6.8
173	Less than 2.0% of mass 174	0.0
174	Greater than 50.0% of mass 95	93.6
175	5.0-9.0% of mass 174	7.1
176	Greater than 95.0%, but less than 101.0% of mass 174	98.4
177	5.0-9.0% of mass 176	6.3

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spike level: 50 ug/L

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
File Name: 8CC22A
Batch: H22AUG95A

Compound	AvgRRF	CCRRF	%D	MIN RRF	MAX %D
Dichlorodifluoromethane	0.153	0.149	2.6%		
Chloromethane	0.104	0.119	-14.4%	0.1	
Vinyl chloride	0.137	0.128	6.6%		20
Bromomethane	0.029	0.036	-20.7%		
Chloroethane	0.033	0.043	-30.3%		
Trichlorofluoromethane	0.268	0.338	-26.1%		
1,1-Dichloroethene	0.246	0.251	-2.0%		20
Methylene chloride	0.345	0.255	26.1%		
t-1,2-Dichloroethene	0.280	0.272	2.9%		
MTBE	0.581	0.523	10.0%		
1,1-Dichloroethane	0.448	0.408	8.9%	0.1	
2,2-Dichloropropane	0.427	0.472	-10.5%		
c-1,2-Dichloroethene	0.302	0.284	6.0%		
Bromochloromethane	0.144	0.151	-4.9%		
Chloroform	0.555	0.576	-3.8%		20
1,1,1-Trichloroethane	0.467	0.529	-13.3%		
2-Chloroethylvinylehter	0.116	0.107	7.8%		
Carbon tetrachloride	0.377	0.419	-11.1%		
1,1-Dichloropropene	0.364	0.348	4.4%		
Benzene	0.879	0.752	14.4%		
1,2-Dichloroethane	0.360	0.395	-9.7%		
Trichloroethene	0.367	0.347	2.8%		
1,2-Dichloropropane	0.240	0.196	18.3%		20
Dibromomethane	0.239	0.228	4.6%		
Bromodichloromethane	0.472	0.485	-2.8%		
c-1,3-Dichloropropene	0.416	0.386	7.2%		
Toluene	0.651	0.616	5.4%		20
t-1,3-Dichloropropene	0.416	0.386	7.2%		
1,1,2-Trichloroethane	0.206	0.188	8.7%		
1,2-Dibromoethane	0.330	0.332	-0.6%		
Tetrachloroethene	0.780	0.730	6.4%		
1,3-Dichloropropane	0.431	0.379	12.1%		
Dibromochloromethane	0.406	0.416	-2.5%		
Chlorobenzene	0.949	0.944	0.5%	0.3	
1,1,1,2-Tetrachloroethane	0.330	0.338	-2.4%		

ANATECH Laboratories a div. of CT and E Environmental Services

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spiked sample ID: 54888-0315

Analyst: RJW
Date Analyzed: 08/22/95
Date Reported: 09/22/95
Batch: H22AUG95A

MS File Name: 0315MS
MSD File Name: 0315MSD

Compound	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC	#	QC LIMITS REC.
1,1-Dichloroethene	50	0	52	104%		D-234
Benzene	50	0	46	90%		37-151
Trichloroethene	50	0	48	96%		71-157
Toluene	50	0	48	96%		47-150
Chlorobenzene	50	0	51	102%		37-160

Compound	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC	#	% RPD	#	QC LIMITS RPD	REC.
1,1-Dichloroethene	50	56	112%		7%		22	D-234
Benzene	50	50	100%		11%		24	37-151
Trichloroethene	50	53	106%		10%		21	71-157
Toluene	50	52	104%		8%		21	47-150
Chlorobenzene	50	54	108%		6%		21	37-160

Values outside of QC limits

QC limits taken from method 8240.

Comments:

6/1/95

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE CONTINUING CALIBRATION CHECK

Lab Name: CT & E, Ludington
Method: SW-846 Mth. 8260A
Instrument: HP 5972 GC/MS - H
Spike level: 50 ug/L

Analyst: RJW
Date Analyzed: 08/23/95
Date Reported: 09/22/95
File Name: 8CC23A
Batch: H23AUG95A

Compound	AvgRRF	CCRRF	%D	MIN RRF	MAX %D
Dichlorodifluoromethane	0.153	0.138	9.8%		
Chloromethane	0.104	0.128	-23.1%	0.1	
Vinyl chloride	0.137	0.138	-0.7%		20
Bromomethane	0.029	0.037	-27.6%		
Chloroethane	0.033	0.057	-72.7%		
Trichlorofluoromethane	0.268	0.357	-33.2%		
1,1-Dichloroethene	0.246	0.268	-8.9%		20
Methylene chloride	0.345	0.279	19.1%		
t-1,2-Dichloroethene	0.280	0.293	-4.6%		
MTBE	0.681	0.564	2.9%		
1,1-Dichloroethane	0.418	0.440	1.8%	0.1	
2,2-Dichloropropane	0.427	0.508	-19.0%		
c-1,2-Dichloroethene	0.302	0.310	-2.6%		
Bromochloromethane	0.144	0.164	-13.9%		
Chloroform	0.555	0.613	-10.5%		20
1,1,1-Trichloroethane	0.467	0.564	-20.8%		
2-Chloroethylvinylether	0.116	0.107	7.8%		
Carbon tetrachloride	0.377	0.446	-18.3%		
1,1-Dichloropropene	0.364	0.382	-4.9%		
Benzene	0.879	0.829	5.7%		
1,2-Dichloroethane	0.360	0.420	-16.7%		
Trichloroethene	0.357	0.376	-5.3%		
1,2-Dichloropropane	0.240	0.212	11.7%		20
Dibromomethane	0.239	0.242	-1.3%		
Bromodichloromethane	0.472	0.521	-10.4%		
c-1,3-Dichloropropene	0.416	0.416	0.0%		
Toluene	0.651	0.670	-3.0%		20
t-1,3-Dichloropropene	0.416	0.416	0.0%		
1,1,2-Trichloroethene	0.206	0.201	2.4%		
1,2-Dibromoethane	0.330	0.350	-6.1%		
Tetrachloroethene	0.780	0.796	-2.1%		
1,3-Dichloropropane	0.431	0.405	6.0%		
Dibromochloromethane	0.406	0.435	-7.1%		
Chlorobenzene	0.949	1.005	-5.9%	0.3	
1,1,1,2-Tetrachloroethane	0.330	0.359	-8.8%		

ANATECH Laboratories a div. of CT and E Environmental Services

VOLATILE METHOD BLANK SUMMARY

Lab Name: CT & E, Ludlngtion
Method: SW-846 Mth. 8250A
Instrument: HP 5972 GC/MS - H

Analyst: RJW
Date Analyzed: 08/23/95
Date Reported: 09/22/95
File Name: 8BLK23A
Batch: H23AUG95A

Compound	Amount (ug/L)	DL (ug/L)
Dichlorodifluoromethane	ND	1
Chloromethane	ND	1
Vinyl chloride	ND	1
Bromomethane	ND	1
Chloroethane	ND	1
Trichlorofluoromethane	ND	1
1,1-Dichloroethene	ND	1
Methylene chloride	1	1
t-1,2-Dichloroethene	ND	1
MTBE	ND	1
1,1-Dichloroethane	ND	1
2,2-Dichloropropane	ND	1
c-1,2-Dichloroethene	ND	1
Bromochloromethane	ND	1
Chloroform	ND	1
1,1,1-Trichloroethane	ND	1
2-Chloroethylvinylether	ND	1
Carbon tetrachloride	ND	1
1,1-Dichloropropene	ND	1
Benzene	ND	1
1,2-Dichloroethane	ND	1
Trichloroethene	ND	1
1,2-Dichloropropane	ND	1
Dibromomethane	ND	1
Bromodichloromethane	ND	1
c-1,3-Dichloropropene	ND	1
Toluene	ND	1
t-1,3-Dichloropropene	ND	1
1,1,2-Trichloroethane	ND	1
1,2-Dibromoethane	ND	1
Tetrachloroethene	ND	1
1,3-Dichloropropane	ND	1
Dibromochloromethane	ND	1
Chlorobenzene	ND	1
1,1,1,2-Tetrachloroethane	ND	1

Compound	Amount (ug/L)	DL (ug/L)
Ethylbenzene	ND	1
p&m-Xylene	ND	2
o-Xylene	ND	1
Styrene	ND	1
Bromoform	ND	1
Isopropylbenzene	ND	1
Bromobenzene	ND	1
1,1,2,2-Tetrachloroethane	ND	1
1,2,3-Trichloropropane	ND	1
n-Propylbenzene	ND	1
2-Chlorotoluene	ND	1
4-Chlorotoluene	ND	1
1,3,5-Trimethylbenzene	ND	1
tert-Butylbenzene	ND	1
1,2,4-Trimethylbenzene	ND	1
sec-Butylbenzene	ND	1
1,3-Dichlorobenzene	ND	1
4-Isopropyltoluene	ND	1
1,4-Dichlorobenzene	ND	1
1,2-Dichlorobenzene	ND	1
n-Butylbenzene	ND	1
1,2-Dibromo-3-chloropropane	ND	1
1,2,4-Trichlorobenzene	ND	1
Hexachlorobutadiene	ND	1
Naphthalene	1	1
1,2,3-Trichlorobenzene	ND	1
Ethyl Ether	ND	1
Benzyl chloride	ND	50
2-Butanone (MEK)	ND	50
4-Methyl-2-pentanone (MIBK)	ND	50
2-Hexanone	ND	50

Comments:

ICP

Anatech QC Report
Inorganic Data Package

Project # 5488?

Client Sample Identifier	Anatech Sample Number

Comments: _____

Approval: _____ Date: 9-25-95

Anatech QC Report
Inorganic Data Package

Calibration Verification Report

Project # 54899 Source : _____

Units: PERCENT RECOVERY

Control Limits: ICV/CCV 90-110%

Analyte	Run #	True(ug/L)	ICV	CCV 1	CCV 2	CCV 3	CCV 4	CCV 5	C
Al									
Sb									
As									
Ba									
Be									
Cd									
Ca									
Cr									
Co									
Cu	1178	10,000	98% 384%	101%	99%				
Fe									
Pb									
Mg	1178	10,000	97%	101%	104%				
Mn									
Hg									
Ni									
K									
Se									
Ag									
Na	1178	10,000	103%	104%	105%				
Tl									
V									
Zn									

Comments:

Anatech QC Report
Inorganic Data Package

Digestion Log

Project # 54889

Batch #	Date	ANALYTES																							
		AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN
M5428	8/23										X			X							X			

Anatech QC Report
Inorganic Data Package

Matrix Spike Recovery Report

Sample # 54389 Batch # M5428

Matrix (soil/water): Water Units (ug/L or mg/kg): ug/L

Control Limits: +/- 15%

Analyte	Run #	Spiked Sample Recovery (SSR)	Sample Result (SR)	Spike Added (SA)	% Recovery	C
Al						
Sb						
As						
Ba						
Be						
Cd						
Ca						
Cr						
Co						
Cu	1178	9524	ND	10,000	95%	
Fe						
Pb						
Mg	1178	16,620	7389	10,000	92%	
Mn						
Hg						
Ni						
K						
Se						
Ag						
Na	1178	28,800	20,810	10,000	86%	
Tl						
V						
Zn						

Comments:

6FAA

ANATECH QC REPORT

ANALYTE: Pb
RUN DATE: 9/21/95
INSTRUMENT: PE
BATCH NO: M5480
ANALYST: DEP
UNITS: ug/L

REPORT DATE: 9-25-95
METHOD: 7421
RUN NO.: P1103
DIGESTION DATE: 9/13/95
REVIEW(Init/Date):
PROJECT NO: 54889

BLANKS	CONCENTRATION	LOD	Q
Prep Blank	ND	2	
ICB	ND		
CCB	ND		
CCB	ND		
CCB	ND		
CCB			
CCB			

Control Limits < ± 1 * LOD

CALIBRATION VERIFICATIONS	TRUE	FOUND	% RECOVERY	Q
ICV	40	40.9	102	
CCV		35.9	90	
CCV		40.1	100	
CCV		35.4	88	
CCV				
CCV				

ICV ± 10%; CCV ± 15%

SPIKES	SPIKE ADDED	SAMPLE CONC.	SPIKE CONC.	% RECOVERY	% RPD
Prep Spike M5480	10	-	11.2	112	
54889-0317 MS		ND	9.7	97	4
MSD			9.3	93	

Matrix spike % recovery 85% - 115%; % RPD < 20%

ANATECH QC REPORT

ANALYTE: Chloride
RUN DATE: 8-25-95
INSTRUMENT: —
BATCH NO: —
ANALYST: LS
UNITS: mg/L

REPORT DATE: 8-25
METHOD: 4500 Cl⁻ B
RUN NO.: —
DIGESTION DATE: —
REVIEW(Init/Date): CJ 9-25
PROJECT NO: 54889

BLANKS	CONCENTRATION	LOD	Q
Prep Blank	N/A	1	
ICB	ND	1	
CCB	ND	↓	
CCB			
CCB			
CCB			
CCB			

Control Limits < ± 1 * LOD

CALIBRATION VERIFICATIONS	TRUE	FOUND	% RECOVERY	Q
ICV	25	24.7	99	
CCV	↓	24.7	99	
CCV				
CCV				
CCV				
CCV				

ICV ± 10%; CCV ± 15%

SPIKES	SPIKE ADDED	SAMPLE CONC.	SPIKE CONC.	% RECOVERY	% RPD
Prep Spike	N/A	- - - - -	- - - - -		
* MS	25	42.6	67.5	101	
* MSD	↓	↓	66.3	95	6%

Matrix spike % recovery 85% - 115%; % RPD <20%

* Sample was of Ammonia - unit. ?

Attachment C
Data Validation

MEMO

TO: Mike Tomka

REFERENCE NO: 5397

FROM: Lou Almeida/dm/2

DATE: February 3, 1995

RE: Data Quality Assurance Evaluation
Soil and Groundwater Samples
General Motors Power Train Division Site
Saginaw, Michigan

1.0 OVERVIEW

Eleven soil samples and four groundwater samples were collected from the General Motors Power Train Division Site (Site) in Saginaw, Michigan between December 13, 1994 and December 20, 1994. The samples were submitted for the analysis of benzene, toluene, ethylbenzene, xylenes (BTEX); polynuclear aromatics (PNAs); copper; phosphorous chloride; sodium; magnesium; lead and volatile organic compounds (VOCs).

This memo presents an analytical assessment and validation of results obtained by Anatech Laboratories (Anatech) from the analysis of these soil and water samples. Analytical results were received in a report provided by Anatech and were reviewed to determine conformance with the requirements stipulated in the relevant methods and Anatech's quality control criteria.

Anatech completed sample analyses in accordance with the analytical methods, as outlined in the United States Environmental Protection Agency (USEPA) documents entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, July 1992, and "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, Revised March 1983. The documents entitled, "National Functional Guidelines for Organic Data Review", (Revised 1994) and "National, Functional Guidelines for Inorganics Data Review", (Revised 1994), were used in the assessment and validation of the data.

2.0 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) REVIEW

Analytical results for sample 106B (MW-11) for total metals (copper, lead, magnesium and sodium) are qualified as J, estimated, because the sample was submitted without preservative in a glass sample container. Samples submitted for metals analyses should be collected in plastic containers as metals will adhere to glass.

2.1 SAMPLE HOLDING TIME

Sample holding time criteria, as specified in the applicable methods, were used as the basis of the review of sample holding times. Sample holding times were determined using sample collection dates noted in the chain-of-custody documents and sample extraction/analysis dates reported by Anatech. Sample holding time criteria, as outlined in the methods, are outlined in Table 1.

Samples submitted for analysis were extracted and analyzed prior to expiration of the holding time criteria with the following exception. Sample 103B (MW-15), submitted for total phosphorus analysis, was not preserved. The holding time for an unpreserved sample is 48 hours. This sample was analyzed twelve days after collection. Therefore, the sample result must be qualified as R, unusable.

2.2 SURROGATE SPIKE RECOVERIES

Laboratory performance on individual samples was evaluated on the basis of surrogate spike recoveries. Samples analyzed for VOCs and BTEX were spiked with dibromfluorobenzene, toluene-d8 and 4-bromofluorobenzene.

Reported surrogate recoveries fell within laboratory-established control limits. Therefore, data qualifications were not required.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the soil and water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.3 METHOD BLANK ANALYSES

In order to assess potential sample contamination attributable to laboratory conditions, laboratory method blank samples were analyzed along with the soil and water samples.

Target analytes were not detected in any method blanks, indicating no sample contamination attributable to laboratory conditions. Consequently, no qualifications were necessary on this basis.

2.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES

Matrix spike/matrix spike duplicate (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 these data alone do not give a complete indication of overall precision or accuracy. However, in conjunction with other QC data, the need for qualifications can be assessed.

Reported MS/MSD recoveries fell within laboratory-established control limits, indicating acceptable accuracy.

The precision of a method is reflected by the reproducibility of the MS and MSD recoveries. The relative percent difference (RPD) was calculated for the MS/MSD results, and the RPD values fell below laboratory-established control maximums, demonstrating acceptable method precision.

No qualifications were necessary based on the MS/MSD recoveries or the RPD values.

2.5 LABORATORY CHECK SAMPLES (LCS)

Laboratory check sample results are reviewed in order to further monitor laboratory accuracy. LCS samples were analyzed in conjunction with the soil and water samples.

TABLE 1

SUMMARY OF ANALYTICAL METHODS AND HOLDING TIME CRITERIA GENERAL MOTORS POWER TRAIN DIVISION SITE SAGINAW, MICHIGAN

Analysis	*Analytical Method*	*Holding Time Criteria Water Matrix (days)*
VOCs, BTEX	SW-846 8260	14
Copper	SW-846 6010	6 months
Lead	SW-846 7421	6 months
Magnesium	SW-846 6010	6 months
Sodium	SW-846 6010	6 months
Chloride	SW-846 9250	28
Total Phosphorous	EPA 365.2	28

Notes:

BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
VOCs - Volatile Organic Compounds
SW-846 - USEPA's document entitled: "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, Revision 1, 1st Update, November 1990.
EPA - "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, Revised March 1983.

STATE OF MICHIGAN

JOHN ENGLER, Governor
DEPARTMENT OF ENVIRONMENTAL QUALITY
HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973
RUSSELL J. HARDING, Director

REPLY TO:
UNDERGROUND STORAGE TANK DIVISION
TOWN CENTER
PO BOX 30157
LANSING MI 48909-7657

November 17, 1995

Mr. Ray Illka
General Motors Powertrain Group
1629 N. Washington Avenue
Saginaw, Michigan 48601

Dear Mr. Illka:

SUBJECT: Closure Report Date: 10/04/95
Confirmed Release Date: 01/03/90
Location of Tank(s): General Motors Powertrain Group, Saginaw Metal Casting Operations, Annex Building Area, Saginaw, Michigan, Saginaw County
MERA Site ID #: 730015
MUSTFA Claim #: N/A
Facility ID #: 0010581

In accordance with Section 21312a(2) of Part 213 Leaking Underground Storage Tanks (LUST) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, (Act 451) the Underground Storage Tank Division (USTD) of the Michigan Department of Environmental Quality (MDEQ) acknowledges receipt of your closure report. This closure report was submitted on your behalf for the above referenced site by Conestoga-Rovers and Associates, Inc., Qualified Underground Storage Tank Consultant (QC), in accordance with Section 21312a(1) of Part 213.

The closure report submitted by the QC concludes that corrective action at the site has resulted in

- UNRESTRICTED RESIDENTIAL USE of the site.

Please note that when contaminated soil and/or groundwater as a result of a release of a regulated substance remains on site consistent with site closure requirements, the owner/operator shall not remove soil and/or groundwater, or allow soil and/or groundwater to be removed from the site to an off-site location without properly characterizing the soils and/or groundwater to determine that the soils and/or groundwater can be lawfully relocated without posing a threat to the public health safety, or welfare, or the environment. The determination shall consider whether the soil and/or groundwater is subject to regulations under Part 111 of Act 451.

Under Section 21315 (1) of Act 451, the USTD may audit the results of the investigation and corrective actions undertaken to confirm the results and conclusions indicated by the QC within six months of receipt of the closure report. If the audit confirms that corrective action has been conducted in compliance with Part 213 and that the cleanup criteria have been met, you will be provided with a letter describing the audit and its results. 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 21315(3) of Act 451.

If you have any questions, please contact Ms. Joyce Broka, Project Manager, at the Saginaw Bay District Office, Michigan Department of Environmental Quality, Underground Storage Tank Division, 503 N. Euclid Avenue, Bay City, Michigan, or at telephone number 517-684-9141, ext. 8371.

Sincerely,

Mohammad Yusaf, P.E., Chief
Field Operations Section
Underground Storage Tank Division
517-373-3135

cc: Mr. William Baker, Conestoga-Rovers & Associates, Inc.
Sedgwick James of Michigan, Inc.
Mr. Eric Alexander, MDEQ
Ms. Joyce Broka, MDEQ

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APPENDIX 10.1

E.12 Riverdock Crane Repair Building UST (G.I. #9)

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

September 20, 1995

Reference 5663

Ms. Ann Smolarz
Underground Storage Tank Division
Michigan Department of Natural Resources
503 North Euclid Avenue
Bay City, Michigan 48706

Dear Ms. Smolarz:

Re: Tank 6 at Riverdock Area
Final Assessment Report and Remediation Proposal
Supplemental Investigation - Phase II
Saginaw Metal Casting Operations, Saginaw, Michigan

This report presents the findings of the Phase II supplemental investigation for the Tank 6 at Riverdock Area at the Saginaw Metal Casting Operations, Saginaw, Michigan. The Phase II supplemental investigation was completed in accordance with a CRA letter dated December 21, 1994 which was submitted to the MDNR on December 22, 1994.

BACKGROUND

In November 1992, a 5,000-gallon diesel tank (Tank 6) was removed at the Riverdock Area. Verification samples were collected from the sidewalls and floor of the excavation. Samples were analyzed for polynuclear aromatic hydrocarbons (PNAs) and benzene, toluene, ethylbenzene and xylenes (BTEX). The reported values were below Type B criteria (under former Act 307). However, a sheen was observed on the water in the bottom of the excavation.

As a result of the sheen, GM completed three soil borings around the former UST in July 1993. One sample was selected and analyzed for PNAs and BTEX. Ethylbenzene was reported above Tier I Residential and Industrial Land Use criteria. All samples exhibited petroleum odors and positive photoionization detector (PID) readings.

In accordance with a CRA work plan dated December 3, 1993, seven (7) additional soil borings were completed between June 30 to July 1, 1994 to investigate the vertical and horizontal extent of contamination. Figure 1 presents the soil boring locations. During this Phase I work one sample was collected at each of the seven locations and was analyzed for PNAs and BTEX. The selected sample from SB-5 contained two parameters (benzene and naphthalene) above Tier I Residential and

Industrial Land Use values. PNAs and BTEX were present at low levels in samples from soil borings SB-4, SB-6 and SB-7. All parameters analyzed were non-detect for the remaining three soil borings. See Table 1 for a summary of these analytical results. These results were presented in a letter dated December 21, 1994 which compared the results to former Act 307 Type B and C criteria.

PHASE II - SOIL INVESTIGATION

In accordance with the recommendation presented in a CRA letter report dated December 21, 1994, nine (9) additional soil borings were completed at the locations presented on Figure 1 in order to further investigate the vertical and horizontal extent of contamination around SB-4, SB-5 and SB-6. These additional borings were completed on February 7 and 8, 1995. Soil borings were advanced through the upper fill layer to native clay which was encountered at a depth of 5-8 feet below ground surface. Soil boring logs are presented in Attachment A.

Continuous soil samples were collected at each borehole. One sample was selected at each of the nine locations based on PID readings. A duplicate sample was collected at the SB-15 location. All samples were analyzed for PNAs and BTEX. The sample results are presented on Table 2. Analytical data reports are presented in Attachment B. The data validation report is presented in Attachment C.

The selected samples from SB-9, SB-10, SB-11 and SB-13 had some low level detects but all were below Tier I Residential and Industrial Land Use values. All parameters analyzed were non-detect for the remaining five soil borings.

CONCLUSIONS

In order to obtain a Tier I Residential Land Use closure for the Tank 6 at Riverdock area, which would result in unrestricted land use, removal of contaminated soil associated with SB-5 and the July 1993 remediation verification sample would need to be conducted and verified. The soil samples from SB-5 and the initial July 1993 boring are the only samples with parameters exceeding Tier I Residential criteria (benzene, naphthalene). Soil removal would continue to a depth of 8 feet based on the depths of soil samples collected or until all visually impacted soil or soil exhibiting elevated PID readings is removed. The proposed limits of soil removal are presented on Figure 2. It is expected that at least 100 cubic yards of material would require excavation based on the current database. Verification sampling will be performed in the excavation in accordance with MDNR Guidance document "Verification of Soil Remediation" dated April 1994, Revision 1. Verification

samples will be analyzed for benzene and naphthalene. If verification sampling on the side walls or floor of the excavation reveals contamination above Tier I Residential criteria, additional material will be excavated. The excavated soil will be disposed off-Site in accordance with applicable laws.

If the excavation reaches the water table, a water sample will be collected and analyzed for BTEX and PNAs. If this analysis reveals contamination above Tier I Residential criteria three monitoring wells will be installed at the locations presented on Figure 2. It should be noted that the proposed monitoring well locations may be adjusted in the field to account for obstacles such as structures and utilities. The monitoring wells will be constructed of stainless steel with a 5 foot screen and will be screened at the water table. One groundwater sample will be collected from each well and analyzed for BTEX and PNAs. The results will be submitted to the MDNR in a letter report. The need for future monitoring activities, if any, will be assessed based on this sampling event.

Due to the limited extent of contamination, a feasibility analysis was not performed. Removal of the source of contamination is expected to be a cost-effective remedial action. A schedule for the corrective action plan implementation is presented on Figure 3.

Should you have any questions, please do not hesitate to contact our office.

Yours truly,

CONESTOGA-ROVERS & ASSOCIATES

Michael Tomka

Michael R. Tomka, P. Eng.

MRT/cf/1
Encl.

c.c. Laura Tucker, GM
Joe Toth, GM
Reg Sobczynski, GM
Ray Ilkka, GM
Ian Richardson, CRA
Jim McGuigan, Emcon

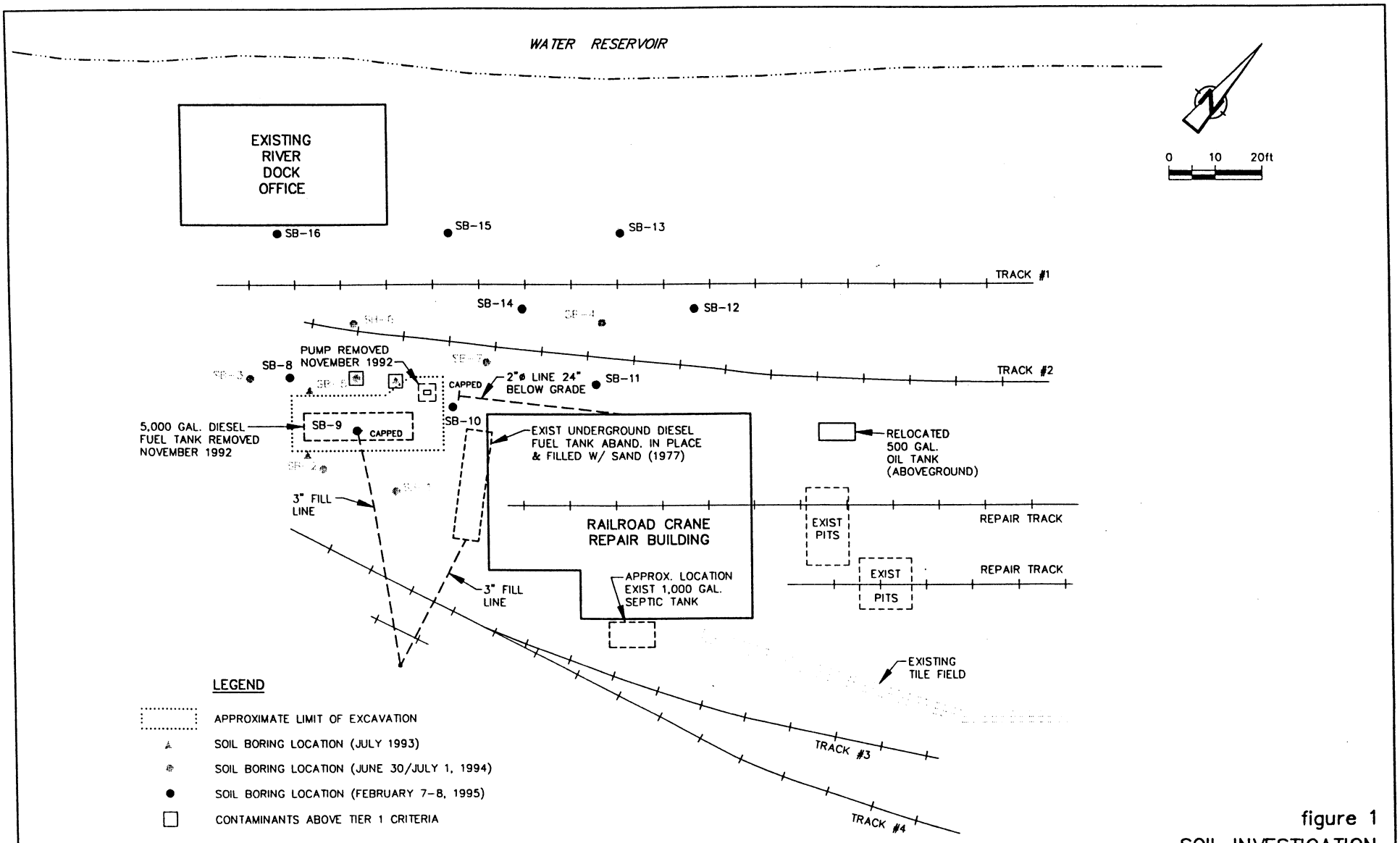


figure 1
SOIL INVESTIGATION
TANK 6 AT RIVERDOCK
Saginaw, Michigan

CRA

5663 (L) JULY 31/95(W) REV 0 (P 08)

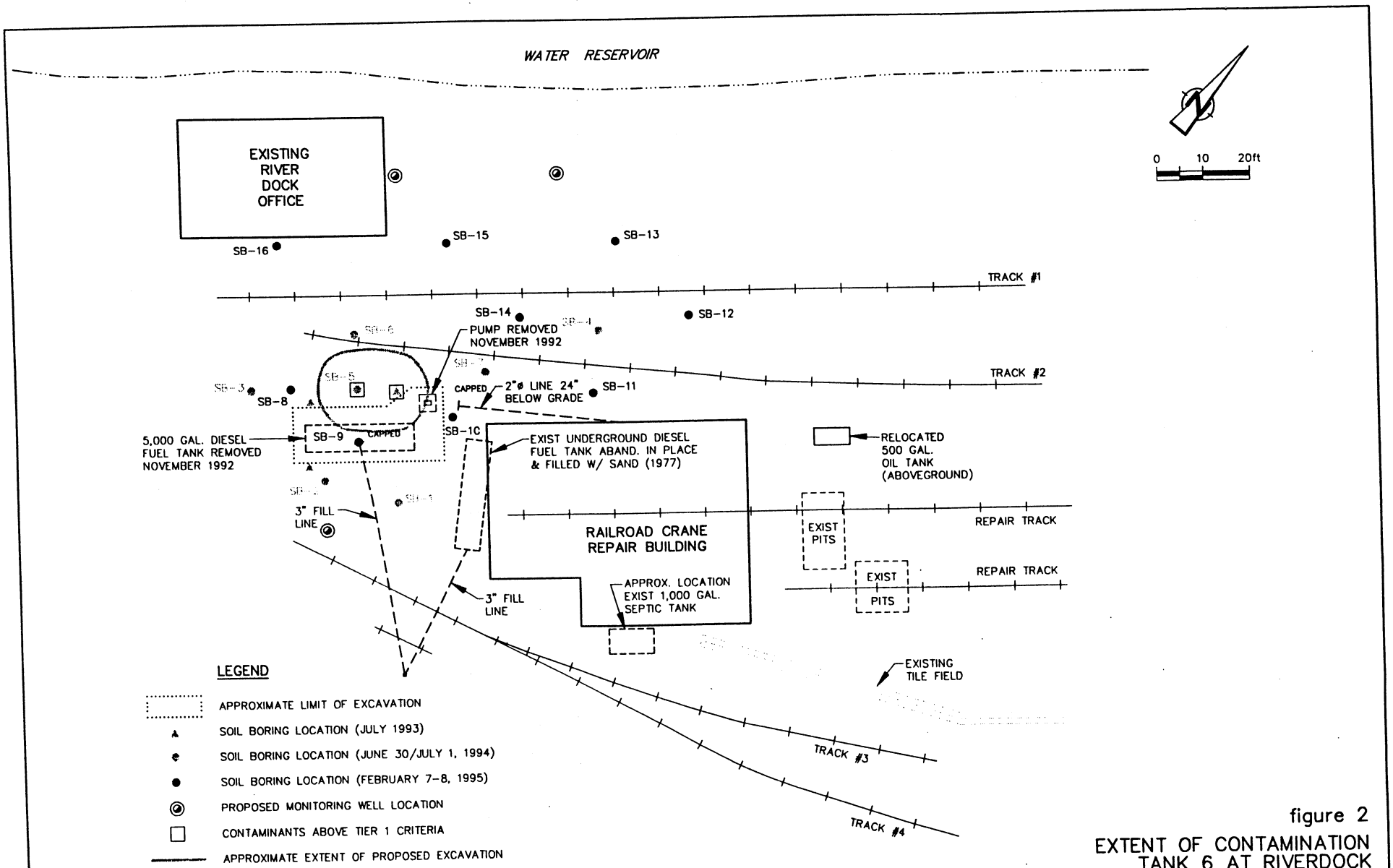
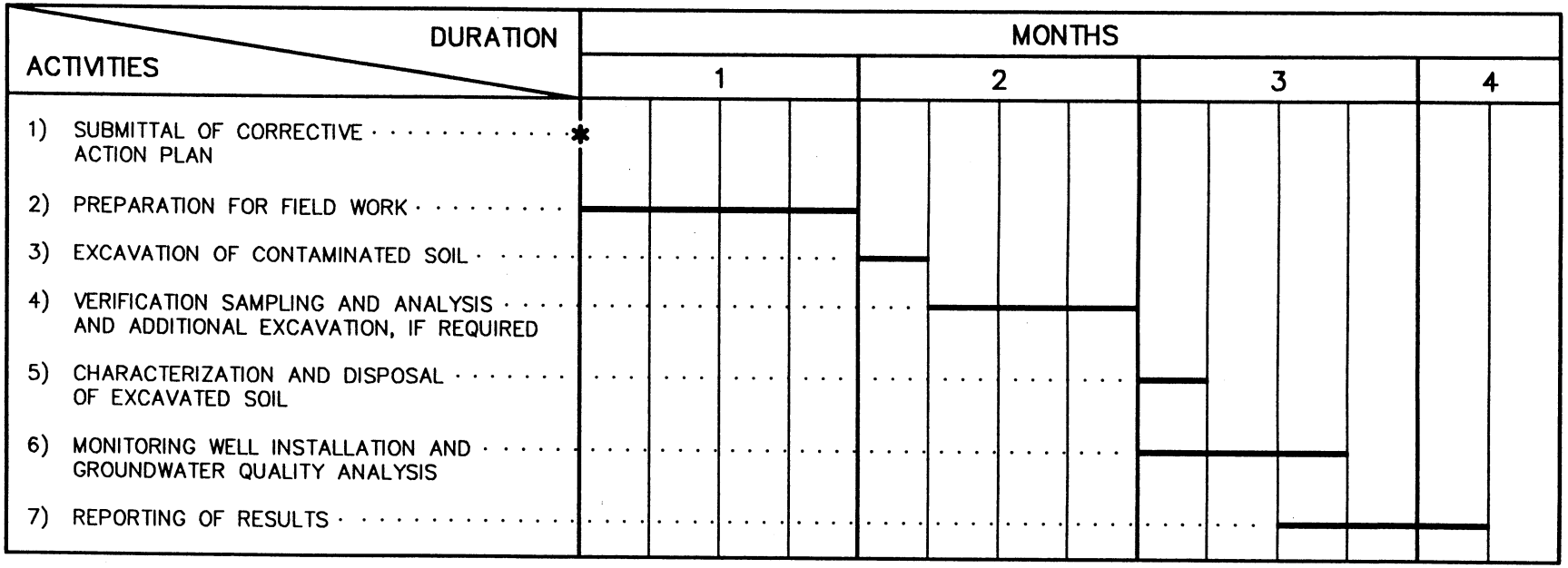


figure 2
EXTENT OF CONTAMINATION
TANK 6 AT RIVERDOCK
Saginaw, Michigan

CRA

5663 (L) JUL 31/95(W) REV.1 (P-09)



LEGEND

* MILESTONE EVENT

CONTINUOUS ACTIVITY

figure 3

SCHEDULE FOR CORRECTIVE ACTION PLAN IMPLEMENTATION TANK 6 AT RIVERDOCK *Saginaw, Michigan*

CRA

5663 (L) SEPT 19/95(W) REV.0 (S-02)

TABLE 1

SOIL SAMPLE SUMMARY
TANK 6 AT RIVERDOCK
SAGINAW GREY IRON PLAN
SAGINAW, MICHIGAN

Parameter	*Units*	*June 30 - July 1, 1994*							*Tier I Residential Land Use*	*Tier I Industrial Land Use*
		SB-1 (6-7')	*SB-2 (6-7')*	*SB-3 (5-6')*	*SB-4 (5')*	*SB-5 (8')*	*SB-6 (6-8')*	*SB-7 (5-6')*		
Benzene	(µg/kg)	<10	<10	<10	<10	1,100	<10	<10	100	100
Toluene	(µg/kg)	<10	<10	<10	<10	2,500	<10	40	16,000	16,000
Ethylbenzene	(µg/kg)	<10	<10	<10	<10	2,800	30	10	4,700	4,700
Xylenes	(µg/kg)	<30	<30	<30	<30	7,300	60	390	74,000	74,000
Benzo(a)Anthracene	(µg/kg)	<330	<330	<330	<330	<1,000	1,400	<330	14,000	14,000
Benzo(a)Pyrene	(µg/kg)	<330	<330	<330	400	<1,000	550	<330	3,700	3,700
Benzo(b)Fluoranthene	(µg/kg)	<330	<330	<330	390	<1,000	610	<330	14,000	14,000
Benzo(g,h,i)Perylene	(µg/kg)	<330	<330	<330	360	<1,000	<330	<330	1,500,000	1,500,000
Benzo(k)Fluoranthene	(µg/kg)	<330	<330	<330	360	<1,000	660	<330	140,000	140,000
Dibenzo(a,h)Anthracene	(µg/kg)	<330	<330	<330	<330	<1,000	<330	<330	4,200	4,200
Indeno(1,2,3-cd)Pyrene	(µg/kg)	<330	<330	<330	<330	<1,000	<330	<330	14,000	14,000
Naphthalene	(µg/kg)	<330	<330	<330	<330	6,400	<330	<330	5,500	5,500
Acenaphthene	(µg/kg)	<330	<330	<330	<330	<1,000	700	<330	120,000	120,000
Acenaphthylene	(µg/kg)	<330	<330	<330	<330	<1,000	<330	<330	1,400	1,400
Fluorene	(µg/kg)	<330	<330	<330	<330	1,500	1,400	<330	89,000	89,000
Phenanthrene	(µg/kg)	<330	<330	<330	<330	<1,000	5,800	<330	7,400	7,400
Anthracene	(µg/kg)	<330	<330	<330	<330	<1,000	1,300	<330	150,000	150,000
Fluoranthene	(µg/kg)	<330	<330	<330	<330	<1,000	6,000	<330	68,000	68,000
Pyrene	(µg/kg)	<330	<330	<330	370	<1,000	4,100	<330	56,000	56,000
Chrysene	(µg/kg)	<330	<330	<330	<330	<1,000	1,400	<330	1,400,000	1,400,000
TPH (semi-volatile)	(mg/kg)	<10	<10	<10	92	15,300	1,900	1,000		

TABLE 2

SOIL SAMPLE SUMMARY
TANK 6 AT RIVERDOCK
SAGINAW GREY IRON PLAN
SAGINAW, MICHIGAN

Parameter	*Units*	*February 8, 1995*										*Tier I Residential Land Use*	*Tier I Industrial Land Use*
		SB-8 (6-8')	*SB-9 (5-7')*	*SB-10 (4-6')*	*SB-11 (5-7')*	*SB-12 (4-6')*	*SB-13 (0-2')*	*SB-14 (4-6')*	*SB-15 (4-6')*	*SB-15 (dup) (4-6')*	*SB-16 (4-6')*		
Benzene	(µg/kg)	<10 UJ	<10	<50	<10	<10 UJ	<10	<10	<10 UJ	<10 UJ	<10	100	100
Toluene	(µg/kg)	<10 UJ	160	<50	<10	<10 UJ	<10	<10	<10 UJ	<10 UJ	<10	16,000	16,000
Ethylbenzene	(µg/kg)	<10 UJ	560	490	<10	<10 UJ	90	<10	<10 UJ	<10 UJ	<10	4,700	4,700
Xylenes	(µg/kg)	<10 UJ	2,800	510	<30	<30 UJ	180	<30	<30 UJ	<30 UJ	<30	74,000	74,000
Benzo(a)Anthracene	(µg/kg)	<330	<330	<330	590	<330	<330	<330	<330	<330	<330	14,000	14,000
Benzo(a)Pyrene	(µg/kg)	<330	<330	<330	510	<330	<330	<330	<330	<330	<330	3,700	3,700
Benzo(b)Fluoranthene	(µg/kg)	<330	<330	<330	600	<330	<330	<330	<330	<330	<330	14,000	14,000
Benzo(g,h,i)Perylene	(µg/kg)	<330	<330	<330	450	<330	<330	<330	<330	<330	<330	1,500,000	1,500,000
Benzo(k)Fluoranthene	(µg/kg)	<330	<330	<330	490	<330	<330	<330	<330	<330	<330	140,000	140,000
Dibenzo(a,h)Anthracene	(µg/kg)	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	4,200	4,200
Indeno(1,2,3-cd)Pyrene	(µg/kg)	<330	<330	<330	370	<330	<330	<330	<330	<330	<330	14,000	14,000
Naphthalene	(µg/kg)	<330	4,200	2,700	670	<330	<330	<330	<330	<330	<330	5,500	5,500
Acenaphthene	(µg/kg)	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	120,000	120,000
Acenaphthylene	(µg/kg)	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	1,400	1,400
Fluorene	(µg/kg)	<330	470	440	<330	<330	<330	<330	<330	<330	<330	89,000	89,000
Phenanthrene	(µg/kg)	<330	760	<330	560	<330	<330	<330	<330	<330	<330	7,400	7,400
Anthracene	(µg/kg)	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	150,000	150,000
Fluoranthene	(µg/kg)	<330	<330	<330	860	<330	<330	<330	<330	<330	<330	68,000	68,000
Pyrene	(µg/kg)	<330	<330	<330	1,000	<330	<330	<330	<330	<330	<330	56,000	56,000
Chrysene	(µg/kg)	<330	<330	<330	850	<330	<330	<330	<330	<330	<330	1,400,000	1,400,000

Note:
UJ - The parameter was not detected above the sample reporting limit. The sample reporting limit is an estimated reporting limit.

ATTACHMENT A

SOIL BORING LOGS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Casting
PROJECT NUMBER 5663
CLIENT GMPT - Saginaw
LOCATION River Dock Area - UST

DRILLING CONTRACTOR Mateco
DRILLER James Page
SURFACE ELEVATION
WEATHER (A.M.) cold, 15°C, breezy, overcast
(P.M.)

HOLE DESIGNATION SB-8
DATE STARTED 2/7/95
DATE COMPLETED 2/7/95
DRILLING METHOD HSA
CRA SUPERVISOR SSH

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		2	fill, dark brown to grey med sand + gravel										
			SW-SAND/GW-Gravel										
2		4	black foundry sand, med, fill SW-SAND	1	SS	5	7	5	5	2-4	1.2	N=12	R=12"
4		5'/2	tan med sand, moist to wet, SW-SAND	2	SS	2	3	2	2	4-6	0.0	N=5	R=20"
5'/2		6'/2	greyish brown to black sand, med, trace silt SM-SAND	3	SS	hammer wt.			2	6-8	1.4		R=12"
6'/2		10	blackish grey/blue clay, trace sand + silt, slight mottling brown or black CL-clay	4	SS	1	1	2	1	8-10	0.0	N=3	R=18"
	10		Bolt										
			S-5663-020795-SSH-011 6-8' bgs										

NOTES AND COMMENTS

- had to auger 0-2' bgs due to frozen soil - split spoon refusal

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Castings
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-9
DATE STARTED 2/7/95
DATE COMPLETED 2/7/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		2	fill, sand to gravel, brown, pieces of concrete							0-2			
			SW/GW sand + gravel										
2		2'/2	concrete slab	1	SS	/	/	/	/	2-4			
2'/2		4'/2	void space										
4'/2		6	black to brown sand to gravel, trace silt, med sand	2	SS	/	17	8	4	4-6	5.0	N=25	R=6"
			SW/GW sand + gravel										
6		7	black wet sand, some silt, med SM-SAND	3	SS	7	4	2	2	6-8	0.0	N=6	R=12"
7		7'/2	dark brown med sand, green tint SW-SAND										
7'/2		10	blackish grey/blue clay, soft, trace silt	4	SS	hammer		1	2	8-10	0.0		R=12"
			CL-clay										
	10		Bolt										
			GW-5663-020795-SS14-012 5-7' bgs										

NOTES AND COMMENTS

- Had to auger 0.2' bgs due to frozen soil - split spoon refusal

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Casting
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-10
DATE STARTED 2/7/95
DATE COMPLETED 2/7/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		2	brown med sand, some gravel, [redacted] fill							0-2			
2		2 1/2	SW/GW sand + gravel [concrete slab]										
2 1/2		3 1/2	brown med sand, some gravel, fill	1	SS	7	7	5	3	2-4	11.0	N=12	R=18"
			SW/GW sand + gravel										
3 1/2		5	black med sand (foundry), trace gravel + silt	2	SS	2	3	3	2	4-6	12.1	N=6	R=20"
			SW - SAND										
5			blackish grey foundry sand, med SW-SAND	3	SS	2	1	2	1	6-8	2.2	N=3	R=12"
	7		moist	4	SS	hammer wt		1	1	8-10	0.0		R=12"
	8		wet										
		9											
9		10	grey/blue clay, trace silt CL - clay										
	10		BOH										
			S-5663-020795-SSH-013 4-6' bgs										

NOTES AND COMMENTS

- had to auger ~2' bgs due to frozen soil - split spoon refusal

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Castings
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-11
DATE STARTED 2/7/95
DATE COMPLETED 2/7/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		~~2~~	black foundry sand, med, some gravel										
			SW/GW sand + gravel										
~~2~~		3		1	SS	4	6	8	11	2-1'	0.0	N=14	R=16"
3			brown med sand + gravel, mottled black, trace silt										
		5	SW/GW sand + gravel	2	SS	10	10	7	4	4-6	2.3	N=17	R=18"
5			brown med sand, trace gravel SW-SAND										
		7		3	SS	2	2	1	1	6-8	N.O	N=3	R=20"
7			grey/blue clay, soft, trace silt CL-clay										
		10		4	SS	2	1	2	1	8-10	0.3	N=3	R=4"
	10		BOH										
			S-5663-020795-SSH-014 5-7' bgs										

NOTES AND COMMENTS

- had to auger 0-2' bgs due to frozen soil - split spoon refusal

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Casting
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-12
DATE STARTED 2/7/95
DATE COMPLETED 2/7/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	brown sand sand + gravel, fill SW/GW sand + gravel	1	SS	4	5	6	6	0-2	0.0	N=11	R=18"
1/2		2	black med sand (foundry) SW-SAND										
2			brown to grey sand med + gravel SW/GW	2	SS	5	6	6	4	2-4	4.0	N=12	R=16"
		4											
4		5	black med sand, (foundry) SW-SAND	3	SS	hammer wt.	6	3	3	4-6	5.8	N=9	R=16"
5			grey/blue clay, soft, trace silt CL-clay	4	SS	1	1	2	2	6-8	0.0	N=3	R=22"
		8											
8			grey/blue clay, soft, trace sand + silt, CL-clay	5	SS	hammer wt	2	4		8-10	0.0		R=24"
		10											
	10		BOH										
			S-5663-020795-SSH-015 4-6' bgs										

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Castings
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-13
DATE STARTED 2/8/95
DATE COMPLETED 2/8/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN (ft) m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	brown med sand trace gravel SW-SAND	1	SS	5	5	4	4	0-2	13.0	N=9	R=18"
1/2		1 1/2	grey/black sand + gravel SW/GW sand + gravel										
1 1/2		2	silty clay, grey/blue, soft CL-clay										
2			brown to black med sand + gravel SW/GW sand/gravel	2	SS	5	5	4	4	2-4	0.8	N=9	R=16"
		5											
5			grey/blue clay, soft, trace silt	3	SS	1	1		1	4-6	5.1	N=1	R=12"
				4	SS	wt.	hammer		2	6-8	0.0		R=20"
		10		5	SS	wt.	hammer		2	8-10	5.8		R=20"
	10		Bolt										
			S-5663-020895-SSH-016 0-2' bgs										

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Castings
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-14
DATE STARTED 2/8/95
DATE COMPLETED 2/8/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	brown med sand + gravel SW/GW sand + gravel	1	SS	7	6	4	3	0-2	0.0	N=10	R=14"
1/2			black foundry sand, med, some gravel SW-SAND										
		3 1/2		2	SS	4	7	7	7	2-4	0.0	N=14	R=16"
3 1/2		4	brown sand + gravel SP/GP sand + gravel										
4		5	black to brown sand + gravel SW/GW sand + gravel	3	SS	1	5	3	3	4-6	25.3	N=8	R=14"
5			grey/blue clay, soft, trace silt CL-clay										
		7		4	SS	3	5	7	8	6-8	0.0	N=12	R=16"
7		8	grey/brown med to coarse sand, SP-SAND										
8			grey/blue clay, soft	5	SS	hammer weight			2	8-10	9.5		R=20"
		10											
	10		BOH										
			S-5663-020895-SSH-017 4-6' bgs										

NOTES AND COMMENTS

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Casting
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-15
DATE STARTED 2/8/95
DATE COMPLETED 2/8/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION — ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	brown med sand, f.'11 SW-SAND	1	SS	8	9	7	4	0-2	0.0	N=16	R=20"
1/2		1'1/2	black med sand + gravel (foundry) SW/GW sand + gravel										
1'1/2		3	grey/blue clay, soft, trace silt CL-clay	2	SS	4	4	7	7	2-4	0.3	N=11	R=16"
3		3'1/2	grey/blue clay, some gravel + silt, trace sand CL-clay										
3'1/2		4'1/2	black to brown sand + gravel, SW/GW sand + gravel	3	SS	1	2	2	4	4-6	10.9	N=4	R=20"
4'1/2			grey/blue clay, soft, trace silt CL-clay										
	7'1/2		1" sand lense, med, brown to grey	4	SS	1	3	3	3	6-8	0.0	N=6	R=24"
	9		1" sand lense, med, brown to grey										
		10		5	SS	1	1	1	2	8-10	0.0	N=2	R=24"
	10		Bolt										
			S-5663-020895-SSH-018/019 4-6' bgs										

NOTES AND COMMENTS: -018/-019 dup

STRATIGRAPHY LOG (OVERBURDEN)

PROJECT NAME GM Metal Castings
PROJECT NUMBER 5663
CLIENT
LOCATION

DRILLING CONTRACTOR
DRILLER
SURFACE ELEVATION
WEATHER (A.M.)
(P.M.)

HOLE DESIGNATION SB-16
DATE STARTED 2/8/95
DATE COMPLETED 2/8/95
DRILLING METHOD
CRA SUPERVISOR

STRATIGRAPHIC INTERVALS (DEPTHS IN ft/m BGS) FROM	AT	TO	SAMPLE DESCRIPTION ORDER OF DESCRIPTORS: SOIL SYMBOL, (PRIMARY COMPONENT) SECONDARY COMPONENTS, RELATIVE DENSITY/CONSISTENCY, GRAIN SIZE/PLASTICITY, GRADATION/STRUCTURE, COLOUR MOISTURE CONTENT, SUPPLEMENTARY DESCRIPTORS	SAMPLE DETAILS: SAMPLE #	SAMPLING METHOD	PENETRATION RECORD SPLIT SPOON BLOWS 6"	6"	6"	6"	SAMPLE INTERVAL	PID (ppm)	CHEMICAL ANALYSIS	GRAIN SIZE
0		1/2	brown med sand + gravel SW/GW sand + gravel	1	SS	16	10	6	5	0-2	0.0	N=16	R=20"
1/2			black med grain sand + gravel, SW/GW sand + gravel										
	3		trace silt	2	SS	7	4	3	4	2-4	0.0	N=7	R=14"
		4											
4			grey/blue clay, soft, trace silt CL-Clay	3	SS	hammer wt.		1	1	4-6	0.3		R=18"
	7		pieces of organic matter (wood)	4	SS	hammer wt.		1	2	6-8	0.0		R=24"
	9		pieces of organic matter (wood)	5	SS	hammer wt.		1	1	8-10	0.0		R=24"
		10											
	10		BOH										
			S-5663-020895-SSH-020 4-6' bgs										

NOTES AND COMMENTS

ATTACHMENT B

ANALYTICAL REPORTS

00 Conrad Industrial Drive
dington, Michigan 49431
6-843-1877
X: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Rec'd CRA
MAR 2 1995

Analytical Report

Lab I.D. :	50801
Report Date :	02/21/1995
Project :	GM-Grey Iron #5663
Client :	Conestoga Rovers & Associates
	651 Colby Drive
	Waterloo, Ontario
	Canada N2V 1C2
Attention :	Mr. Mike Tomka

11 pages including cover sheet

200 Conrad Industrial Drive
idington, Michigan 49431
16-843-1877
AX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3006	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-011	Location:	
COLLECTED:	02/07/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-5
6-8'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	70.5	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

200 Conrad Industrial Drive
idington, Michigan 49431
16-843-1877
AX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3007	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-012	Location:	
COLLECTED:	02/07/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

5-7'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	74.5	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	160	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	560	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	2800	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	450	SW-846 Mtd. 8270	02/16/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	450	"	02/16/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	450	"	02/16/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	450	"	02/16/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	450	"	02/16/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	450	"	02/16/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	450	"	02/16/1995 LBC
Naphthalene	4200	ug/kg	450	"	02/16/1995 LBC
Acenaphthene	ND	ug/kg	450	"	02/16/1995 LBC
Acenaphthylene	ND	ug/kg	450	"	02/16/1995 LBC
Fluorene	470	ug/kg	450	"	02/16/1995 LBC
Phenanthrene	760	ug/kg	450	"	02/16/1995 LBC
Anthracene	ND	ug/kg	450	"	02/16/1995 LBC
Fluoranthene	ND	ug/kg	450	"	02/16/1995 LBC
Pyrene	ND	ug/kg	450	"	02/16/1995 LBC
Chrysene	ND	ug/kg	450	"	02/16/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

200 Conrad Industrial Drive
udington, Michigan 49431
16-843-1877
AX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3008	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-013	Location:	
COLLECTED:	02/07/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-16
4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	83.9	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	50	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	50	"	02/15/1995 LS
Ethylbenzene	490	ug/kg	50	"	02/15/1995 LS
Xylenes (Total)	510	ug/kg	150	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/16/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/16/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/16/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/16/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/16/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/16/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/16/1995 LBC
Naphthalene	2700	ug/kg	330	"	02/16/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/16/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/16/1995 LBC
Fluorene	440	ug/kg	330	"	02/16/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/16/1995 LBC
Anthracene	ND	ug/kg	330	"	02/16/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/16/1995 LBC
Pyrene	ND	ug/kg	330	"	02/16/1995 LBC
Chrysene	ND	ug/kg	330	"	02/16/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3009	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-014	Location:	
COLLECTED:	02/07/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-11
5-7'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	81.2	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	590	ug/kg	330	SW-846 Mtd. 8270	02/15/1995 LBC
Benzo (a) Pyrene	510	ug/kg	330	"	02/15/1995 LBC
Benzo (b) Fluoranthene	600	ug/kg	330	"	02/15/1995 LBC
Benzo (g,h,i) Perylene	450	ug/kg	330	"	02/15/1995 LBC
Benzo (k) Fluoranthene	490	ug/kg	330	"	02/15/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/15/1995 LBC
Indeno (1,2,3-cd) Pyrene	370	ug/kg	330	"	02/15/1995 LBC
Naphthalene	670	ug/kg	330	"	02/15/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/15/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/15/1995 LBC
Fluorene	ND	ug/kg	330	"	02/15/1995 LBC
Phenanthrene	560	ug/kg	330	"	02/15/1995 LBC
Anthracene	ND	ug/kg	330	"	02/15/1995 LBC
Fluoranthene	860	ug/kg	330	"	02/15/1995 LBC
Pyrene	1000	ug/kg	330	"	02/15/1995 LBC
Chrysene	850	ug/kg	330	"	02/15/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager
C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3010	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-015	Location:	
COLLECTED:	02/07/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-17
4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	83.4	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3011	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-016	Location:	
COLLECTED:	02/08/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-13
0-2'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	91.0	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	90	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	180	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager
C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3012	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-017	Location:	
COLLECTED:	02/08/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-14
4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	74.8	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND - Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3013	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-018	Location:	
COLLECTED:	02/08/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

-15-15

4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	75.1	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

200 Conrad Industrial Drive
udington, Michigan 49431
516-843-1877
FAX: 616-845-9942

ANATECH Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3014	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-019	Location:	
COLLECTED:	02/08/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

SB-15 (dup)
4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	74.5	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/14/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/14/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/14/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/14/1995 LBC
Fluorene	ND	ug/kg	330	"	02/14/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/14/1995 LBC
Anthracene	ND	ug/kg	330	"	02/14/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/14/1995 LBC
Pyrene	ND	ug/kg	330	"	02/14/1995 LBC
Chrysene	ND	ug/kg	330	"	02/14/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 02/21/1995

1200 Conrad Industrial Drive
Ludington, Michigan 49431
616-843-1877
FAX: 616-845-9942

ANATECH
Laboratories

a Division of
CT&E Environmental
Services Inc.

Conestoga Rovers & Associates

Sample:	50801-3015	Matrix:	Soil
Client Sample:	S-5663-0207950SSH-020	Location:	
COLLECTED:	02/08/1995 :	Project:	GM-Grey Iron #5663
RECEIVED:	02/09/1995 16:02	Sampled By:	SH

5-6
4-6'

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
PHYSICAL PROPERTY ANALYSIS					
% Solids	75.8	%	0.1	Standard Mtd. 2540G	02/10/1995 PL
VOLATILE AROMATIC HYDRO.					
Benzene	ND	ug/kg	10	SW-846 Mtd. 8020	02/15/1995 LS
Toluene	ND	ug/kg	10	"	02/15/1995 LS
Ethylbenzene	ND	ug/kg	10	"	02/15/1995 LS
Xylenes (Total)	ND	ug/kg	30	"	02/15/1995 LS
			Note: Results are reported on a dry weight basis.		
POLYNUCLEAR AROMATIC HYDRO.					
Benzo (a) Anthracene	ND	ug/kg	330	SW-846 Mtd. 8270	02/15/1995 LBC
Benzo (a) Pyrene	ND	ug/kg	330	"	02/15/1995 LBC
Benzo (b) Fluoranthene	ND	ug/kg	330	"	02/15/1995 LBC
Benzo (g,h,i) Perylene	ND	ug/kg	330	"	02/15/1995 LBC
Benzo (k) Fluoranthene	ND	ug/kg	330	"	02/15/1995 LBC
Dibenzo (a,h) Anthracene	ND	ug/kg	330	"	02/15/1995 LBC
Indeno (1,2,3-cd) Pyrene	ND	ug/kg	330	"	02/15/1995 LBC
Naphthalene	ND	ug/kg	330	"	02/15/1995 LBC
Acenaphthene	ND	ug/kg	330	"	02/15/1995 LBC
Acenaphthylene	ND	ug/kg	330	"	02/15/1995 LBC
Fluorene	ND	ug/kg	330	"	02/15/1995 LBC
Phenanthrene	ND	ug/kg	330	"	02/15/1995 LBC
Anthracene	ND	ug/kg	330	"	02/15/1995 LBC
Fluoranthene	ND	ug/kg	330	"	02/15/1995 LBC
Pyrene	ND	ug/kg	330	"	02/15/1995 LBC
Chrysene	ND	ug/kg	330	"	02/15/1995 LBC
Semi Volatile Extraction	-	-	-	"	02/14/1995 SJ
			Note: Results are reported on a dry weight basis.		

ND = Non Detectable

Laboratory Manager
C. David Hainer

Reported : 02/21/1995

Lab KY F 50801

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): Anatech Analytical Labs

REFERENCE NUMBER: 5663

PROJECT NAME: GM Metal Castings - Saginaw

SAMPLER'S SIGNATURE: [signature] PRINTED NAME: Steven S. Hemmeyer

Lab I.D.	SEQ: No.	DATE	TIME		SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS: BTEX	PARAMETERS: PNA	REMARKS
3006	1	2/7/95		S-5663-020795-SSH-011	soil	2	X	X	
3007	2	"		S-5663-020795-SSH-012	"	2	X	X	
3008	3	"		S-5663-020795-SSH-013	"	2	X	X	
3009	4	"		S-5663-020795-SSH-014	"	2	X	X	
3010	5	2/7/95		S-5663-020795-SSH-015	"	2	X	X	
3011	6	2/8/95		S-5663-020895-SSH-016	"	2	X	X	
3012	7	"		S-5663-020895-SSH-017	"	2	X	X	
3013	8	"		S-5663-020895-SSH-018	"	2	X	X	
3014	9	"		S-5663-020895-SSH-019	"	2	X	X	
3015	10	"		S-5663-020895-SSH-020			X	X	Client confirmation
				TOTAL NUMBER OF CONTAINERS					

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
1. [signature]	2/8/95	1600	1.		
2.			2.		
3.			1.		

METHOD OF SHIPMENT: Fed Ex AIR BILL No. 074205910 2

White -Fully Executed Copy Yellow -Receiving Laboratory Copy Pink -Shipper Copy Goldenrod -Sampler Copy

1092

SAMPLE TEAM: SSH, TAH

RECEIVED FOR LABORATORY BY: M.A.

DATE: 2/9/95 TIME: pm

1001 (F[illegible]S)-APRIL 29, 93-REV.0-(C)(F-01)

ATTACHMENT C

DATA VALIDATION REPORT

M E M O

TO: Mike Tomka REFERENCE NO: 5579

FROM: Lou Almeida/dm/3 DATE: March 22, 1995

RE: Analytical Data and Quality Assurance Review
General Motors (GM) Metal Castings Site
Saginaw, Michigan

1.0 OVERVIEW

A total of 10 soil samples were collected on between February 7 and February 8, 1995 at the GM Metal Castings Site located in Saginaw, Michigan. Samples collected were submitted for the analysis of benzene, toluene, ethylbenzene, xylenes (BTEX) and polynuclear aromatics (PNAs).

2.0 QA/QC REVIEW

This memo presents an analytical assessment and validation of results obtained by Anatech Laboratories (Anatech) of Ludington, Michigan, resulting from the analysis of 10 soil samples collected from the Site. Analytical results were received in reports provided by Anatech and were reviewed to determine conformance with the requirements stipulated in SW-846 Method 8020 and Method 8270 and Anatech's quality control criteria.

Anatech completed sample analyses in accordance with Method 8020 for BTEX and Method 8270 for PNAs, as outlined in the United States Environmental Protection Agency (USEPA) document entitled, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods", SW-846, 3rd Edition, September 1986. The USEPA document entitled, "National Functional Guidelines for Organic Data Review", (Revised 1994) was used in the assessment and validation of the data.

Evaluation of the data was based upon laboratory quality assurance/quality control (QA/QC) results supplied in the final analytical report. The QA/QC data included dates of analysis, surrogate spike recoveries, laboratory blank results and check sample spike recoveries.

2.1 SAMPLE HOLDING TIME

The sample holding time criterion, as specified in SW-846 (14 days from the sample collection date to the sample extraction date and 40 days from the sample extraction date to the analysis date), was 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 extraction/analysis dates reported by Anatech.

All samples submitted for analysis were analyzed prior to expiration of the prescribed holding time criterion. Qualifications were not required 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 BTEX analysis were fortified with the surrogate compound 4-bromofluorobenzene. Samples submitted for PNA analysis were fortified with nitrobenzene-d_5, 2-fluorobiphenyl and terphenyl-d_{14} surrogates. Surrogate recovery review limits are presented in Table 1.

In reviewing the data, it was determined that reported surrogate recoveries fell within laboratory-established control limits with some exceptions. The 4-bromofluorobenzene surrogate recoveries for sample S-5663-02795-SSH-011, S-5663-020795-SSH-015, S-5663-020895-SSH-018 and S-5663-020895-SSH-019 all fell below review limits. Qualifications are presented in Table 2.

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.

Upon review, target analytes were not detected above the quantitation limits. Consequently, qualifications were not required on this basis.

2.4 CHECK SAMPLES

Check sample data are assessed in order to determine method accuracy and laboratory performance.

Upon review, all check sample recoveries fell well within laboratory-established limits, demonstrating acceptable method accuracy and laboratory performance. Data qualifications were not required on this basis.

3.0 CONCLUSION

The data provided by Anatech are acceptable for use noting the qualifications arising for poor 4-bromofluorobenzene recoveries. Qualifications are presented in Table 2.

TABLE 1

SURROGATE RECOVERY CONTROL LIMITS*
GM METAL CASTINGS SITE
SAGINAW, MICHIGAN

Analysis	*Surrogate Compound*	*Laboratory Control Limits (%)*
BTEX	4-Bromobenzene	60 - 140*
PNAs	Nitrobenzene-d_5	23 - 120
	2-Fluorobiphenyl	30 - 115
	Terphenyl-d_{14}	18 - 137

Notes:

BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
PNAs - Polynuclear Aromatics
* - CRA review limits

TABLE 2

SUMMARY OF DATA QUALIFICATIONS
GM METAL CASTINGS SITE
SAGINAW, MICHIGAN

Sample ID	*Analysis*	*Parameter*	*Report Results*	*Qualified Results*
S-5663-020795-SSH-011	BTEX	Benzene	ND 10	10 UJ
		Toluene	ND 10	10 UJ
		Ethylbenzene	ND 10	10 UJ
		Xylenes (Total)	ND 30	30 UJ
S-5663-020795-SSH-015	BTEX	Benzene	ND 10	10 UJ
		Toluene	ND 10	10 UJ
		Ethylbenzene	ND 10	10 UJ
		Xylenes (Total)	ND 30	30 UJ
S-5663-020895-SSH-018	BTEX	Benzene	ND 10	10 UJ
		Toluene	ND 10	10 UJ
		Ethylbenzene	ND 10	10 UJ
		Xylenes (Total)	ND 30	30 UJ
S-5663-020895-SSH-019	BTEX	Benzene	ND 10	10 UJ
		Toluene	ND 10	10 UJ
		Ethylbenzene	ND 10	10 UJ
		Xylenes (Total)	ND 30	30 UJ

Notes:

BTEX - Benzene, Toluene, Ethylbenzene and Xylenes (Total)
ND - Not Detected
UJ - The parameter was not detected above the sample reporting limit. The sample reporting limit is an estimated reporting limit.

APPENDIX 12.1

G.4 Former (Original) Desulfurization Slag
RCRA Treatment Unit, Weathering Slab
MDNR Inspection Reports

1-13-81

E.P.A. HAZARDOUS WASTES AT NICP

Certain wastes are defined by the E.P.A. as hazardous. The treatment and disposal of these wastes is governed by law, and facilities generating and treating such wastes must have a permit to do so. At NICP we are involved with three E.P.A. hazardous wastes.

1. Used Chlorothene VG. - from various degreasers
2. Paint Residues & Thinners - from Paint Shop
3. Calcium Carbide Slag - from iron desulpherization operations

Our permit states exac·ly where these wastes are to be accumulated prior to shipment off-site: -

Used Clorothene VG. — Must be accumulated in closed top 55 gallon drums. Drums must be marked "Waste Chlorothene VG." Drums must be stored inside Oil House prior to shipment off-site.

Paint Residues & Thinners — Must be accumulated in closed top 55 gallon drums. Drums must be marked "Waste Paint Residues/Thinners." Drums must be stored inside enclosure east of Paint Shop prior to shipment off-site.

Calcium Carbide Slag — Material must be dumped on the designated slab east of the core room. Material must be hosed down daily to decompose any unreacted carbide. This is a treatment process spelled out in our permit. The reacted material is no longer hazardous waste and is to be removed to the Hatchett pile at GICP.

Manifesting (Required by law) of wastes shipped off-site to bona fide reclaimers will be handled by Meredith Robinson - Assistant Chief Chemist, 62-575.

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
E R CAROLLO
JACOB A HOEFER
STEPHEN F MONSMA
HILARY F SNELL
PAUL H WENDLER
HARRY H WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING
BOX 30028
LANSING, MI 48909

RONALD O SKOOG, Director

Reply to: Saginaw State Office Building
411-J East Genesee
Saginaw, Michigan 48607

June 22, 1984

GMC Central Foundry Division
Saginaw Nodular Iron Castings Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Attention: D.C. Johnson, Plant Manager
Meredith E. Robinson, Chemist and Environmental Coordinator

Gentlemen:

On June 14, 1984, staff of the Michigan Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency and Joe Boyle of the United States Environmental Protection Agency conducted an investigation of your facility located in Saginaw, Michigan, to evaluate compliance of that facility with requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), as amended.

As a result of this investigation staff of the Department have determined that the above facility is in violation of the requirements of Subtitle C of RCRA. Specifically, staff observed the following violations:

1. The waste analysis plan does not specifically address the analysis of the treated waste pile to determine if the calcium carbide slag has been totally reacted by the quenching process and rendered non-hazardous. This is a violation of 40 CFR 265.13 (a)(1).

2. A review of the inspection log revealed that time of the inspection was not consistently indicated and the remedial actions taken were not always identified. This is a violation of 40 CFR 265.15 (d).

3. An inspection of the treatment slab revealed areas where the reenforcement rods have been exposed resulting in a potential safety hazard. This condition was not reflected in the inspection log and remedial actions have not been taken to date to correct this problem. This is a violation of 40 CFR 265.15 (c) and 40 CFR 265.403 (3).

4. Based on the visual inspection of the calcium carbide slag being dumped onto the treatment slab, it was evident that specific training procedures are necessary for the operators of the fork lift in order to minimize the fugitive emissions that are generated during the dumping operation. The dispersal of the calcium carbide slag is a violation of 40 CFR 265.251. Because dispersal by wind must be managed your training descriptions have been determined to be inadequate and is a violation under 40 CFR 265.16 (a)(1). Unloading the gons over the wall results in greater wind dispersal and waste piles that are much to voluminous to be properly treated. This operating practice must be revised to both reduce wind dispersal of the material and to create manageable piles of calcium carbide slag that can be effectively treated. Carbide slag piles were over the height of the side walls which severely restrained protection from the wind.

5. The Contingency Plan examined does not appear to reflect the presence of an emergency coordinator at the Grey Iron Facility. Because both plants are under the same EPA identification number only one Contingency Plan and Emergency Procedures is necessary. It was evident during our inspection, however, that an effort is being made to separate the two hazardous waste operations. Separate inspection logs are now kept and Mr. Offenborn indicated Grey Iron's intent to have their own Contingency Plan and Emergency Procedures. Please indicate the intent of coverage provided by the Contingency Plan and Emergency Procedures that are on file at the Nodular Iron Plant.

6. Results of all waste analyses were not on file for the container waste which is manifested from the Nodular Iron Plant. This is a violation of 40 CFR 265.73 (b)(3) and 40 CFR 262.40 (c). This analysis must be made part of the operating record.

7. The facility's Closure Plan does not specify the maximum extent unclosed during facility life nor does it specify an estimated year of closure. This violates 40 CFR 265.112 (a)(1) and (a)(4). It was noted that the Saginaw Parts Plan has been closed, but partial closure was not requested. This could make closure certification difficult.

8. The Inspection Log indicated that the drain at the treatment slab was inspected weekly earlier in the year, however, daily inspections are now taking place. 40 CFR 265.403 (a)(1) requires that daily inspection of the treatment slab drain be conducted.

The current operation of your Calcium Carbide Treatment Process poses several regulato questions under RCRA regulations. Pursuant to your Part A Application, you apparently consider the gondolas to be containers. By leaving the containers at the site to cool they are, by regulation, required to be covered and labeled "Hazardous Waste". The gondolas are then placed on the treatment slab once they have cooled, and form a waste pile until such time as treatment is provided by reacting the calcium carbide slag with water to render the material non-hazardous. To control the fugitive dust emissions from the transfer of the gondolas to the treatment slab, it appears to be desirable to allow the material to cool down in the gondolas prior to

transfer.

It is suggested that you consider amending your Part A application to license the gondolas under 40 CFR 265 Subpart Q. By doing so the gondolas become a physical treatment device which allows the calcium carbide slag to cool to a less hazardous state. While under this situation the gondolas would be subject to inspection, they could be placed adjacent to the treatment pad for cooling and not subjected to the container requirements under 40 CFR 265.173. Furthermore, these gondolas could then be managed in a manner that would protect them from materials or conditions which may cause them to ignite or react, pursuant to 40 CFR 265.256 (a)(2). This could be accomplished by leaving the gondolas inside the plant to cool in the event of rain, or placing the waste on the treatment slab for immediate treatment when it begins to rain. Careful management in this manner would allow your facility to stay in compliance with 40 CFR 265.256 (a)(2), 40 CFR 265.405 (a)(1), and 40 CFR 265.173 (a).

Pursuant to Act 64, P.A. of 1979, as amended a quarter inspection under the Michigan Hazardous Waste Management Act was also conducted at the time of the RCRA inspection.

In addition to the deficiencies cited above the following violations must also be addressed:

1. During our inspection a gondola of calcium carbide was being transported to the treatment slab in a manner that resulted in spills between the point of generation and the treatment slab. Special Condition 3 C of your Operating License requires immediate clean up of these spills and the material to be placed on the treatment pad. This was not done for the spills observed.

2. Evaluations to determine if the calcium carbide slag remains hazardous after treatment must be refined. Treated calcium carbide slag that remains hazardous must not be placed in your Type III Landfill.

3. Paragraph 6 of the Special Conditions of your Operating License indicates that you must ensure the integrity of the treatment slab to detect failures. Cracking of the slab was obvious on the apron during the inspection. This must be addressed immediately.

4. Fugitive emissions were evident around the entire perimeter of the treatment slab. This violates paragraph 3 F of the Special Conditions of your Operating License and 40 CFR 265.31.

5. As an uncovered reaction vessel your facility did not provide 2 feet of freeboard per Rule 425 (6). Calcium carbide slag was piled well above the containment wall.

6. Several cracks were noted in the containment areas cement pad adjacent to the oil house. Remedial action should be taken to correct this deficiency.

We request that you respond to this letter by July 18, 1984, and provide documentation to this office regarding those actions taken to correct the violations cited.

Continued failure to mitigate the observed violations will result in elevated enforcement actions taking place pursuant to Section 3008 of the Resource Conservation & Recovery Act and/or 299.548 of Act 64, P.A. of 1979, as amended.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim Joseph Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517/771-1731

JJS:rh
cc: EPA Region V
John Bohunsky/File
Al Howard

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
E. R. CAROLLO
MARLENE J. FLUHARTY
STEPHEN F. MONSMA
O. STEWART MYERS
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

411-J East Genesee
Saginaw, Michigan 48607

October 5, 1984

G.M.C. Central Foundry Division
Saginaw Nodular Iron Castings Plant
2000 Veterans Memorial Parkway
Saginaw, Michigan 48605

Attention: Mr. Jack Findlay
Sr. Environmental Engineer

Dear Mr. Findlay:

On September 27, 1984, staff of the Michigan Department of Natural Resources conducted an inspection of your calcium carbide treatment facility pursuant to the requirements of Act 64, P.A. 1979, as amended.

As a result of the inspection staff of the Department have determined that the above facility is in violation of the requirements of Act 64, P.A. 1979, as amended, and your facility's operating license.

1. An inspection of the treatment slab continues to reveal areas where reinforcement rods have been exposed, resulting in a potential safety hazard. Paragraph 6 of the Special Conditions of your Operating License indicates that you must ensure the integrity of the treatment slab to detect failures. Repairs should be initiated immediately.

2. While your waste analysis plan has been amended to analyze the treated calcium carbide to determine if it has been totally reacted by the treatment process and rendered non-hazardous, the method was not used at the site during our September 27, 1984 observations.

3. Operating practices have not been revised to reflect the concerns stated in our letter of June 22, 1984. Gondolas are dumped when the waste is red hot, piles of waste were placed outside the treatment containment area, and fugitive emissions continue to be a severe problem during the removal of the ingots and loading of the waste for disposal. This violates Part I, Paragraph (6)(B) and Part II Paragraph (3)(F) & (H) of your Act 64 Operating License.

4. The Operating Log reflects the purchase of calcium carbide and not the amount of waste that is treated. Your Operating License requires that the volume or weight of hazardous waste that is treated be maintained. This requires greater evaluation of the Calcium Carbide that is not used up in the desulfurization process.

5. Fugitive emissions were evident around the entire perimeter of the treatment slab. While the retaining wall has been expanded to minimize spillage during the removal process, the facility is still in violation of paragraph (3)(F) of the Special Conditions of your Operating License.

As discussed in our meeting of September 27, 1984, we request that you provide a detailed proposal which will identify both your short and long term alternatives for complying with the requirements of your Act 64 Operating License for this facility. Based upon your response a decision will be made as to the appropriate enforcement action which needs to be taken.

We also request that you respond to the violations sited for the inspection of September 27, 1984 by October 15, 1984, and to provide data on the quantity of phosphine and hydrogen sulfide being generated as part of the treatment process.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517/771-1731

JJS:rh
cc: Mark Reed, AQ - Saginaw District
J. Bohunsky/C&E File
Al Howard

RECEIVED
PLANT ENGINEERING
OCT 10 1984
Central Foundry Division
Saginaw Nodular Iron Plant

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Inter-Organization

Subject: GM Industrial Hygiene Department Visit

Date: September 18, 1984

To: Mr. M. B. Hamilton

Address: Plant Manager

Ron Stolberg from the GM Industrial Hygiene Department called today to inform me that their department received a call from the Michigan Department Of Public Health, concerning the calcium carbide containment area located east of the finishing department. They informed the GM Department that various tests were recently conducted at this location because of an employe complaint regarding an odor emitted from the calcium carbide containment area.

The Michigan Department Of Public Health advised the GM Industrial Hygiene Department that the instrument that was used on the night of September 14, 1984, may have detected phosphine gas, however; the instrument was not calibrated for this gas.

GM Industrial Hygiene requested entrance to the Nodular Plant to test for this gas. Approval was granted, and Ron Stolberg will enter the plant Thursday night at 11:30 P.M. to make various tests throughout the night for phosphine gas.

S. J. Toyzan
Safety Supervisor

cc G B Mauch
T J Karnosky
W. O'Neill
J. Medved

RECEIVED
PLANT MANAGER
SEP 18 1984
Central Foundry Division
Saginaw Nodular Iron Plant

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
E. R. CAROLLO
ARLENE J. FLUHARTY
STEPHEN F. MONSMA
O. STEWART MYERS
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

411-J East Genesee
Saginaw, Michigan 48607

cc: Messrs: Mauch
Karnosky
Coleman
O'Neill
Medved

August 30, 1984

Mr. M. B. Hamilton
~~Mr. D.C. Johnson~~, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Dear Mr. Johnson:

The Department of Natural Resources has received the materials you submitted on August 15, 1984 in response to deficiencies revealed in the inspection which this Department performed as a representative of the U.S. Environmental Protection Agency to determine compliance with the provisions of the Resource Conservation and Recovery Act (RCRA) and the State Hazardous Waste Management Act, Act 64, P.A. 1979, as amended.

Your letter states that all violations of RCRA requirements and your Act 64 Operating License will be resolved by October 1, 1984. Failure to demonstrate that the observed violations have been corrected and that fugitive emissions from the calcium carbide treatment slab are being controlled will initiate the administrative process outlined in Sections 47 and 48 of Act 64, P.A. 1979, as amended and Section 3008 of the Resource Conservation and Recovery Act of 1976.

Should you have any questions concerning this letter, please contact us at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517/771-1731

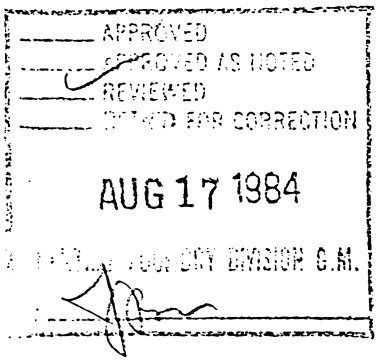
JJS:rh
cc: EPA Region V
J. Bohunsky/C& E File
Al Howard

RECEIVED
PLANT MANAGER
SEP [illegible] 1984
Nodular Iron Casting Plant

R1026-1
1 84

Central Foundry Division
General Motors Corporation
Grey Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

August 15, 1984



Department of Natural Resources
Saginaw State Office Building
411-J East Genesee
Saginaw, Michigan 48607

Attention: Mr. J. J. Sygo - Hazardous Waste Division

Dear Mr. Sygo:

In reply to your letter of June 22, 1984, concerning calcium carbide handling and disposal, and pursuant to our meeting on July 24, 1984, the following response is made addressing the items noted in your letter. The reply is made on the basis of the item numbers in your letter on Pages 1 and 2, #1-8 and on pages 3 and 4, #1-6.

Pages (1) and (2)

1. Waste Analysis Plan - The analysis of the treated calcium carbide slag will be accomplished by a field tube test method (Dräger Tube) that will insure the absence of acetylene gas before disposal. This will be monitored daily until an agreement is reached between both parties to a lesser sampling time. This procedure has been included in our waste analysis plan.

2. Inspection Record - We will continue to inspect the treatment area and consistently enter all repairs and other remedial actions as required.

3. Treatment Slab Condition - A repair order has been issued to repair the area where the re-inforcement rods are exposed. This will be scheduled as soon as possible but not later than September 1, 1984 so as not to interfere with slag removal.

4. Training of Hourly Employes - Specific instructions of all training requirements have been given to the supervisors and all hourly employes involved on July 30, 1984. Any other communications necessary to insure proper handling and disposal will be forwarded to their supervisor by the environmental co-ordinator as so noted.

5. Contingency Plan - A modified contingency plan and emergency procedure will be updated to include the Grey Iron Plant. This will be completed by September 1, 1984. Mr. Robert Offenborn is the environmental co-ordinator at the Grey Iron Plant.

6. Waste Analysis Results - The results of the analyses will be kept on file and will be made part of the operating record.

7. Facility Closure Plan - The closure plan for the Saginaw Parts Plant was reviewed by the Michigan Dept. of Natural Resources and per our meeting of July 22, 1984, this was resolved.

8. Calcium Carbide Drain - Daily inspections are made of the drain and if clean-out is required, it is so noted in the inspection record.

In addition, based on your suggestion, we are amending Part A of our original application so that we are in compliance with 40 CFR 265.256 (a) (2), 40 CFR 265.405 (a) (1) and 40 CFR 265.173 (a).

Pages (3) and (4)

1. Spills - Any noticeable spillage of material in the future will be cleaned up per Special Operating Condition 3C.

2. Waste Analysis Sampling - See item #1 on page #1.

3. Treatment Slab Integrity - See item #3 on page #1.

4. Fugitive Emissions - A wetting agent, known as Chemlink's Dusbloc Foam Dust Control System, has been ordered to control the fugitive dust emissions. This will be mixed with water and is a biodegradable product. It is anticipated that this will be installed by October 1, 1984.

5. Freeboard Requirements - Responsible supervisory personnel have been instructed on this matter.

6. Cement Storage Pad - Although this cement pad, adjacent to the oil house facility, is not part of the hazardous waste facility, it will be repaired by September 1, 1984.

We appreciate your taking the time from your busy schedule to meet with us. We hope that the above responses address all items raised in your letter of June 22, 1984. If you have any further questions concerning these items, please contact the Plant Environmental Co-ordinators, J. V. Findlay at Nodular, 517 776-2464 or R. Offenborn at Grey Iron, 517 776-2391.

Sincerely,

D. C. Johnson
Plant Manager

central foundry

Division of General Motors Corporation
Divisional Offices
77 W. Center St., Box 1629
Saginaw, Michigan 48605

File X
Follow

October 11, 1984

RECEIVED
PLANT MANAGER
OCT 15 1984
Central Foundry Division
Saginaw Nodular Iron Plant

Mr. J. J. Sygo
Michigan Department of
Natural Resources
Hazardous Waste Division
411-J East Genesee
Saginaw, Michigan 48607

SUBJECT: Calcium Carbide Treatment Facility

Dear Mr. Sygo:

The Saginaw Nodular Iron Foundry has implemented a number of equipment and operating method changes during the past several months to reduce fugitive emissions from the calcium carbide treatment facility. These include:

1. A daily inspection of the treatment area to identify and log for corrective action any deficiencies of the facility.

2. Additional training for the proper handling, storing, and treatment of the calcium carbide slag.

3. Auditing of the slag dumping operation to verify that all treatment is confined to the calcium carbide treatment facility.

4. Establishment of written operating procedures for treatment operation that define the dumping, wetting, material removal, clean-up, and inspection practices.

Your inspection on September 27, 1984, and your letter dated October 5, 1984, indicate that these actions were not sufficient to satisfy the requirements for this facility. As a result, the Saginaw Nodular Iron Foundry has implemented the following improvements to further reduce emissions and address stated concerns:

1. Retained an outside consultant to analyze the calcium carbide slag for gas generation and treatment effectiveness, to examine the process and materials for potential unidentified concerns, and to determine potential methods for short and long term alternatives to the existing process. Actions to date are:

a) Representative slag samples were gathered by consultant on October 10, 1984.

b) Lab analysis of samples was begun on October 11, 1984.

c) Completion of study anticipated by December 3, 1984.

2. Revised method to dump calcium carbide slag more carefully to reduce fugitives generation and reinstructed employes.

3. Revised method to immediately remove the hot iron ingots from the slag to promote faster cooling and better wetting of the slag.

4. Began wetting the dumped slag manually during operating shifts after the iron is removed to promote better deactivation of the slag over a longer time period to reduce fugitive emissions caused by mechanical agitation.

During the inspection of the facility by you and Mr. M. Reed on October 11, 1984, you indicated that the above items improved the fugitive emissions by 100%, but compliance could not be verified by this single visit. During this inspection, further improvements by the Saginaw Nodular Iron Plant were discussed. These are:

1. Limitation of slag depth in the treatment facility to 24 inches to improve water penetration. This will be completed by October 12, 1984.

2. Instruction of contractor to improve diking of treatment facility to prevent water run-off during the final addition of water and wetting agents. This will be completed by October 12, 1984.

3. Installation of an automatic wetting agent injection system with spray nozzles to uniformly wet the calcium carbide slag. This will be completed by October 15, 1984.

4. Start-up and calibration of the automatic wetting agent injection system will be completed during the week of October 15, 1984.

5. Purchase of additional calcium carbide slag gons to reduce slag temperatures prior to dumping in the treatment area. Scheduled deliveries are:

10 by October 31, 1984
10 by November 9, 1984
40 by November 14, 1984
5 by November 16, 1984

The Saginaw Nodular Iron Plant is committed to resolve your concerns as indicated by the above actions. Both short-term and long-term alternatives are being investigated to determine if all potential environmental concerns can be eliminated. Several areas being investigated are extending the retention time of treated slag prior to disposal, complete submersion of the waste and thermal degradation of the waste. If a second treatment facility is shown to be necessary for attainment, the Saginaw Nodular Iron Plant will install the facility within six months from that date.

If you have questions regarding any of the above items, please contact Mr. Jack Findlay, Environmental Coordinator, at (517) 776-2464.

G. B. Mauch

G. B. Mauch
General Plant Manager

GBM:kh

cc: Mr. M. Reed
Mr. M. Hamilton
Mr. J. Walle

MBH

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

October 15, 1984

Department of Natural Resources
Hazardous Waste Division
Saginaw District Office
411-J E. Genesee
Saginaw, MI 48607

SUBJECT: Calcium Carbide Treatment Area

In response to your letter of October 5, 1984, regarding requirements of Act 64, Paragraph 1979, and our facilities operating license, the following items are being accomplished.

1. Repairs were made on October 14, 1984, to the treatment slab by replacing the exposed areas with a concrete covering.

2. The method to measure the analysis of total reacted calcium carbide is being accomplished by the field tube test as forementioned per Item No. 1. in our letter of August 15, 1984. To further clarify, the test is accomplished by our Nodular Iron personnel when the contractor notifies Central Foundry Division, Nodular Iron Plant, prior to removing the slag to the landfill.

3. Operating practices regarding the prevention of dumping gons outside the treatment enclosure have been corrected per operating procedures and employe training.

4. The operating log now reflects the correct volume of waste that is treated. This is accomplished by the contractor reporting the cubic yards transported to the landfill daily to the owner.

5. Fugitive emissons are being controlled by a new Wetting Agent Injection System. This was installed with new spray piping around the entire perimeter of the treatment slab. Trial runs will be completed during the week of October 15, 1984, to establish proper control procedures. New spray nozzles and a booster pump will be installed for complete spray coverage by October 29, 1984, weather permitting.

6. The data you requested pertaining to the wetting agent composite is as follows:

   Chemlink Wetting Agent Dustbloc 163 with Detergent Surfactant Base and Blend of Alkyl Aryl Poly Ester Alcohol and Succinic Acid Ester.

If you have further questions on any of the above items, please contact Jack V. Findlay, Environmental Coordinator, at (517) 776-2464.

M. B. Hamilton
Plant Manager

MBH:df

Jill
CuCr

cc/D. Hansen
dh

TURAL RESOURCES COMMISSION
HOMAS J. ANDERSON
MARLENE J. FLUHARTY
STEPHEN V. MONSMA
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

State Office Building
411-J E. Genesee
Saginaw, Michigan 48607
October 10, 1985

RECEIVED
PLANT MANAGER
OCT 9 1985
Central Foundry Division
Saginaw Nodular Iron Plant

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Re: GM Central Foundry - Nodular Iron
MID 041793340

Dear Mr. Hamilton:

On September 18, 1985, staff of the Department of Natural Resources conducted an investigation of your facility located at Saginaw, Michigan. The purpose of that investigation was to evaluate compliance of your facility with the requirements of the Hazardous Waste Management Act, Act 64, P.A. of 1979, as amended, and your Operating License for that facility.

As a result of that investigation, staff of the Department have determined that the above facility remains in violation of the requirements of Act 64 and your Operating License: Specifically, staff cited the following violations:

1. Diking used at the facility continues to be inadequate for containment during treatment. This has now been aggravated with the new floor that serves the treatment pad. The natural slope of the treatment pad is now to the outside of the containment area. This violates General Condition 10.C., of your Operating License.

2. Gondolas of calcium carbide slag were left along side the treatment pad and were subject to reaction due to the rain which fell on September 18, 1985. Reactive or ignitable wastes must be protected from sources that may cause reaction or ignition prior to treatment. Your operation continues to violate 40 CFR 265.256 (a) (2). Additionally, calcium carbide slag waste was dumped from the gondolas in the iron house and at the storage site adjacent to the treatment pad. This violates Special Condition 3.C. of your Operating License.

3. Operation of your facility has been in violation of Rule 404(b) and (f) since June of 1984. While some efforts have been documented to correct these violations, it has become clear the full compliance will not be attained given the current design of the facility. This also violates Part I, General Condition 6, of your Act 64 Operating License.

4. Iron ingots removed prior to treatment of the slag and stored for reuse contain hazardous calcium carbide slag. Removing this waste with the ingots prior to treatment violates Special Condition 3.G. and H, of your Operating License.

5. The Emergency Telephone has been removed from the facility adjacent to the treatment area. This violates Rule 407 and General Condition 9, of your Operating License.

6. Your monthly operating report for July shows that you exceeded 1,000 cubic yards per month of calcium carbide slag treatment. This violates Special Condition 2, of your Operating License.

As you know, we are negotiating a Consent Agreement that will provide a schedule for future studies and testing at the pilot facility to be constructed. Act 64 License Modification will be made an element of the Agreement and, subject to operational compliance at the pilot facility. Failure to enter into such an agreement will result in our Division initiating the license revocation process for your treatment facility at this site.

Should you have any questions concerning the violations cited, please contact me at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517-771-1731

JJS:amc
cc: J. Bohunsky
A. Howard
EPA - Region V

NATURAL RESOURCES COMMISSION
[redacted]MAS J. ANDERSON
CAROLLO
JACOB A. HOEFER
STEPHEN F. MONSMA
HILARY F. SNELL
PAUL H. WENDLER
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

RONALD O. SKOOG, Director

411-J East Genesee
Saginaw, Michigan 48607

December 19, 1984

jill cc

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Dear Mr. Hamilton:

On November 15 and 28, 1984, staff of the Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency, conducted an investigation of your facility located at Saginaw, Michigan. The purpose of that investigation was to evaluate compliance of your facility with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) and the Hazardous Waste Management Act, Act 64, P.A. of 1979, as amended.

As a result of that investigation, staff of the Department have determined that the above facility is in violation of the requirements of Subtitle C of RCRA. Specifically, staff cited the following violations:

1. An inspection of the calcium carbide treatment slab revealed areas where the reinforcement rod continues to be exposed resulting in a potential safety hazard. This condition was also reflected in the inspection log, yet remedial actions have not been taken. This continues to be a violation of 40 CFR 265.15 (c) and 40 CFR 265.403 (3) & (4) as stated in our letter of June 22, 1984.

2. The drain in the calcium carbide treatment slab continues to remain blocked. Nightly earthen dikes are constructed to drain the facility to a manhole located on the apron of the treatment slab. On at least two occasions the earthen dikes broke open and the wastewater escaped the containment area. This violates 40 CFR 265.503 (a)(1) and (4), and continues to be an unacceptable method for operating this treatment facility.

3. Your Part A application has not been amended as suggested in our June 22, 1984 letter. This results in violations under 40 CFR 265.173 (a) which requires the gondolas to be closed during storage. I understand that this item in part will be addressed by the submittal of your Part B application to EPA Region V.

4. The water pressure available to the nozzles is insufficient and does not allow the spray from the nozzles attached to the wall of the treatment facility to reach the center of the treatment area. Furthermore at least three nozzles on the back wall of the facility were not operating the morning of November 15, 1984. The combined deficiencies resulted in visible emissions, both during the treatment process and during the removal of the treated waste. This violates 40 CFR 265.17 (b). Water pressure and fogging nozzles were originally to be installed by October 29, 1984, pursuant to your letter of October 15, 1984. Visible emissions continue to exceed 20% during the treatment process which violates your Act 348 Permit and Act 64, Operating License.

5. Warning signs required by 40 CFR 265.14 (c), on the east side of the treatment facility were unreadable due to the dust and pitting caused by the treatment process. These signs must be cleaned or replaced immediately.

6. While not a violation, the waste piles exceeded a 24-inch limitation which was imposed to improve treatment and water penetration. This limitation was imposed in G.B. Mauch's letter of October 11, 1984.

7. An operating record was not available for the container storage sites at the time of our inspection. This is a violation of 40 CFR 265.73 (a) & (b). The operating record must provide a description of each hazardous waste received the method and dates of it storage, and the quantity at each location.

8. Based upon your mode of operation, waste slag is placed on the treatment pad but treatment does not take place until the third shift. You therefore have a waste pile in temporary storage which is required to be treated immediately under 40 CFR 265.405 (a). 40 CFR 265.256 (a)(2) requires that this waste pile be managed in such a way that it is protected from any material or condition which may cause it to ignite or react. This management is not available at your present facility.

STATE OF MICHIGAN C#2024038
#24c-69

Reply to: State Office Building
411-H East Genesee
Saginaw, Michigan 48607

JAMES J. BLANCHARD, Governor

DEPARTMENT OF PUBLIC HEALTH

3500 N. LOGAN
P.O. BOX 30035, LANSING, MICHIGAN 48909
GLORIA R. SMITH, Ph.D., M.P.H., F.A.A.N., Director

January 28, 1985

RECEIVED
PLANT MANAGER
JAN 30 1985
Central Foundry Division
Saginaw Nodular Iron Plant

Central Foundry Division, Nodular Iron Plant
General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Attention: Mr. M. B. Hamilton, Plant Manager

Gentlemen:

On August 27, 28, 31, September 14, 21, November 2, 1984, and January 3, 1985, in response to a complaint, we conducted an investigation at your nodular iron foundry to evaluate worker exposure to calcium carbide and odors generated from the slag pit operation. An opening conference was held with Mr. Steve Toyzan, Safety Director, and Mr. Sammy Seals, Union Safety and Health Representative, during which time the purpose and procedure of the investigation was explained.

Information/Observations

Nodular Iron Plant utilizes calcium carbide to desulphurize production iron. Slag containing calcium carbide is removed from the foundry in gondolas where it is dumped hot or stored to cool, then dumped into the slag pit located east of the Cleaning Room's shipping door which was permanently closed during the first night of our investigation. Residual calcium carbide in slag, upon contact with water, generates acetylene gas and calcium hydroxide (lime). Since the production of acetylene gas occurs spontaneously upon contact with moisture or humidity, the residual calcium carbide must be reacted with water (in an open air area to prevent an explosive condition) to render it non-hazardous before it can be landfilled.

Slag Pit Operation

At the onset of our investigation, we noted on the midnight shift the red hot iron ingots were removed from the slag by payloaders, the slag pit was dyked and water sprayed on the slag by nozzles. After watering, the slag was stirred by payloaders, to assure water contact, and then loaded onto trucks for transportation to the company's landfill. During this operation we observed: 1) visability of less than 10 feet due to thermal rise of the caustic dust, 2) the payloaders rubber tires and hydraulic hoses caught fire as they contacted the 1000 to 3000 lb. ingots of red hot

iron, and 3) there was sufficient thermal updraft to carry slag pit dust with the wind up over the plant near the filtered make-up air intakes, and/or into the plant through open shipping doors in the Cleaning Room.

Industrial Hygiene Study

Testing was conducted during day shift operations for total particulates and calcium oxide. Then because slag watering occurs from 12 midnight to 4:00 a.m., monitoring for total particulates, calcium oxide, solvents, and ammonia was conducted on the midnight shift. The results of this testing is described on the enclosed Data Sheets #1, 3, 4, 5, and 6 and indicated low levels of total particulates and ammonia were detected inside the plant while no (CaO) calcium oxide was detected indoors.

Nuisance Odor Study

Acetylene gas is classified as a simple asphyxiant and has mild narcotic effect at high levels. We sensed the slag pit had an extremely strong, nauseating, garlic/onion like odor during the watering process.

A second midnight shift study was scheduled and air monitoring was conducted using a Miron Infrared Gas Detector to attempt to quantify the concentrations of acetylene generated from the slag pit. The results of this testing is described on Data Sheet #7 and revealed a maximum concentration, near the odor threshold, of 400 to 500 parts per million (ppm) of acetylene gas. This level is not considered a health hazard. The determination did not in itself explain the extremely strong pungent odor. A further review of literature concerning the process of producing acetylene gas from calcium carbide revealed that pure acetylene does not have an unpleasant odor. However, when calcium carbide stock is contaminated with calcium phosphate, phosphine (PH_3) gas is produced resulting in an extremely unpleasant odor. A review of our infrared scan revealed an absorption peak at a wave length at which phosphine would absorb infrared.

Phosphine Study

We then returned on September 21, 1984, to observe General Motors Industrial Hygiene staff members conduct air testing. This testing detected the presence of phosphine, hydrogen sulfide, and elevated levels of carbon monoxide in the slag pit.

On November 2, 1984, air samples were taken on the payloader operator (Champagne & Marx Excavating Inc. employee) during the slag pit operation to evaluate his exposure to phosphine gas. The results of this study are also contained on the enclosed Champagne & Marx Excavating Inc. Data Sheet #1 which indicated that no phosphine gas was detected at this time.

Control of Fugitive Dust Containing Calcium Oxide and Silica

The irritant action of calcium oxide is due to its alkalinity. It may be caustic to the skin, eyes, and mucous membranes of the upper respiratory tract. In cases of extreme exposure; dermatitis, eye ulceration, respiratory ulceration, bronchitis, and pneumonia have been reported.

As described in medical literature, silica is relatively biologically toxic to the alveoli's (small air sacs of the lung) phagocytic cells which help clean the alveoli of debris. The death of silica laden phagocytic cells (macrophages) promote fibrosis and the formation of silicotic nodules. This degenerative lung disease is known as silicosis. Medical research also indicates that small particles of silica, created normally by the smashing of silica crystals during sandblasting or from excessive heat, are typically the particles that are carried into the small air sacs of the lungs where they appear to be less readily expelled. As described on the enclosed Data Sheet #9, the particle size of the material (38 percent silica) in the slag pit ranged from 3 microns and up. Three microns is considered to be a respirable sized particle.

For all of the above listed reasons, it is necessary to minimize employee exposure by controlling fugitive dust generated from the slag pit operation.

Conclusion

At present, our air testing does not indicate a health hazard to foundry employees working in the Cleaning Room. However, exit and shipping doors should remain closed to help prevent the indrafting of air contaminants from the slag pit as the plant appears to be under negative pressure, see enclosed Data Sheet #2. Also, we noted continuing improvements have been made in the slag pit operation which reduced dust emissions from the pit. The improvements are described as follows:

1. The removal of iron ingots by the forklift trucks at the time of slag dumping, to reduce fugitive dust and safety problems caused by payloaders driving over hot slag and iron ingots.

2. The addition of a wetting agent to the water sprayed on the slag, to assist in thorough wetting of the slag.

3. Installation of a new watering system to better distribute water and the wetting agent.

4. Elimination of the usage of sand to insulate slag pit gondolas. This is a very substantial improvement, by eliminating the usage of sand, silica containing dust and bulk waste material handling are both reduced.

Summary

As a result of this investigation, no violations of Michigan's Occupational Health Standards for General Industry were determined. We wish to thank Nodular Iron Plant officials for their cooperation in instituting procedural changes in the slag pit operation which resulted in reduced dust emissions. However, until the "state of the art" desulphurization of iron allows for a discontinuance of calcium carbide usage, continual effort is necessary to alleviate the nuisance odors emitted from the slag pit. We suggest Nodular Iron Plant may also wish to consider the addition of an oxidizing agent during the watering phase to attempt to reduce gases evolved from the pit.

Should you have any questions regarding this report or other occupational health related matters, please do not hesitate to contact us.

Very truly yours,

BUREAU OF ENVIRONMENTAL
AND OCCUPATIONAL HEALTH

Robert E. Dayringer

Robert E. Dayringer, Industrial Hygienist
Division of Occupational Health

RED:mjb

Enclosures

cc: Mr. Sammy Seals, Union Safety and Health Representative
Mr. Steve Toyzan, Safety Director
Mr. Jack O. Findley, Senior Engineer

DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

AIR CONTAMINANT DATA SHEET

Data Sheet # 1 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

LOCATION/ ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: August 28, 1984 Conducted by: Robert E. Dayringer

Applicable standard for Total Particulates

Max. Allowable Concentration 15 mg/m^3 8-hour, time-weighted average | Ceiling Limit - in any 8-hour period | Peak Limit - __ min. in __ hrs.

Sample Identification and Description	Sample Time	Sample Results	Calculated Exposure
2-NI-1 Breathing zone of Ed McCarthy, Line #107 Loader/Unloader	9:45 am to 10:52 am and 11:37 am to 2:22 pm	0.13 mg twt/m^3	0.13 mg twt/m^3
2-NI-2 Breathing zone of Fred Wibirt, Line #210 Operator	9:55 am to 10:57 am and 11:35 am to 2:53 pm	1.23 mg twt/m^3	1.23 mg twt/m^3
2-NI-3 Blank		No gain in weight	

Sampling equipment: MSA Air Sampling Pump connected to a vinyl metricel filter.

ppm = parts per million
ppb = parts per billion
fibr/cc = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
µg/m^3 = micrograms per cubic meter
NA = Not Applicable

OH 100
7/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

VENTILATION DATA SHEET

Data Sheet # 2 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

LOCATION/ ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: August 28, 1984

Conducted by: Robert E. Dayringer

Results Expressed In feet per minute (fpm)

Ventilation System Description	Results	Applicable Standard	Seriously Below Std.
Cleaning Room's north shipping door	Indrafting 250 fpm	—	—
Cleaning Room's south shipping door	Indrafting 400 fpm	—	—

Testing equipment: Kurz Model #441 Air Velocity Meter

AIR CONTAMINANT DATA SHEET
MULTIPLE CONTAMINANTS

Central Foundry Division, Nodular Iron Plant
General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study Date: August 31, 1984 Conducted by: Robert E. Dayringer

	Contaminant (C)	MAC	Ceiling Lt.	Peak Limit
C_1	Total Particulates	15 mg/m^3	-	-
C_2	Calcium Oxide (lime) CaO	5 mg/m^3	-	-
C_3				
C_4				
C_5				

Sample Identification and Description	Sample Time	Contaminant (C)	Sample Results	Calc. Exposure
2-NI-1 and 2-NI-8 Area sample west side of the slag pit on the automatic dumper track	2-NI-1 1:00 am to 5:10 am	C_1	6.51 mg twt/m^3	-
		C_2	3.3 mg CaO/m^3	-
	and 2-NI-8 5:15 am to 7:25 am	C_1	5.55 mg twt/m^3	-
		C_2	3.2 mg CaO/m^3	-
	Time-weighted average	C_1	6.18 mg twt/m^3	-
		C_2	3.3 mg CaO/m^3	-
2-NI-2 Area sample by the small maintenance door exit east side of plant by Cleaning Room	1:20 am to 6:20 am	C_1	1.43 mg twt/m^3	-
		C_2	0.63 mg CaO/m^3	-
2-NI-3 Breathing zone of Pete Rodarte, Line #210 Operator	1:45 am to 7:40 am	C_1	0.79 mg twt/m^3	0.79 mg twt/m^3
		C_2	None detected	None detected

Sampling equipment: MSA Air Sampling Pump connected to a vinyl metricel filter.

MAC = Maximum Allowable Concentration based on 8-hour, time-weighted average
ppm = parts per million
mg/m3 = milligrams per cubic meter
ug/m3 = micrograms per cubic meter

AIR CONTAMINANT DATA SHEET
MULTIPLE CONTAMINANTS

Central Foundry Division, Nodular Iron Plant
General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study Date: August 31, 1984 Conducted by: Robert E. Dayringer

	Contaminant (C)	MAC	Ceiling Lt.	Peak Limit
C_1	Total Particulates	15 mg/m^3	-	-
C_2	Calcium Oxide (lime) CaO	5 mg/m^3		
C_3				
C_4				
C_5				

Sample Identification and Description	Sample Time	Contaminant (C)	Sample Results	Calc. Exposure
2-NI-4 Breathing zone of Dave Schabel, Line #107 Operator	1:45 am to 2:54 am and 3:35 am to 5:20 am	C_1	1.12 mg twt/m^3	1.12 mg twt/m^3
		C_2	None detected	None detected
2-NI-9 Blank		C_1	No gain in weight	
		C_2	None detected	

Sampling equipment: MSA Air Sampling Pump connected to a vinyl metricel filter.

MAC = Maximum Allowable Concentration based on 8-hour, time-weighted average
ppm = parts per million
mg/m3 = milligrams per cubic meter
ug/m3 = micrograms per cubic meter

DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

AIR CONTAMINANT DATA SHEET

Data Sheet # 5 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

LOCATION/ ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: August 31, 1984 Conducted by: Robert E. Dayringer

Applicable standard for Ammonia

Max. Allowable Concentration 50 ppm (8-hour, time-weighted average) Ceiling Limit - (in any 8-hour period) Peak Limit - (__ min. in __ hrs.)

Sample Identification and Description	Sample Time	Sample Results	Calculated Exposure
2-NI-5 Area sample by the small maintenance door exit east side of the plant by Cleaning Department	1:24 am to 2:55 am	1.05 ppm	-
2-NI-6 Area sample by the west side of the slag pit on automatic dumper track	3:00 am to 4:44 am	18.4 ppm	-
2-NI-10 Blank		Subtracted from sample	

Sampling equipment: MSA Air Sampling Pump connected to a midget impinger containing 0.1 N H_2SO4

ppm = parts per million
ppb = parts per billion
fibr/cc = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter
NA = Not Applicable

OH 100
7/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

AIR CONTAMINANT DATA SHEET

Data Sheet # 6 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

LOCATION/ ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: August 31, 1984 Conducted by: Robert E. Dayringer

Applicable standard for N-propyl acetate

Max. Allowable Concentration 200 ppm 8-hour, time-weighted average | Ceiling Limit - in any 8-hour period | Peak Limit - __ min. in __ hrs.

Sample Identification and Description	Sample Time	Sample Results	Calculated Exposure
2-NI-7 Area sample on the west side of the slag pit on the automatic dumper track as a solvent scan	5:10 am to 5:30 am	Trace of n-propyl acetate < 1 ppm	-

< = less than

Sampling equipment: MSA Air Sampling Pump connected to a charcoal tube.

ppm = parts per million
ppb = parts per billion
fibr/cc = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
$\mu g/m^3$ = micrograms per cubic meter
NA = Not Applicable

OH 100
7/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

AIR CONTAMINANT DATA SHEET

Data Sheet # 7 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

LOCATION/ ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: September 14, 1984 Conducted by: Robert E. Dayringer

Applicable standard for Acetylene (simple asphyxiant)

Max. Allowable Concentration - (8-hour, time-weighted average) Ceiling Limit - (in any 8-hour period) Peak Limit - (__ min. in __ hrs.)

Sample Identification and Description	Sample Time	Sample Results	Calculated Exposure
Area sample downwind from the slag pit	2:15 am to 2:27 am and 2:40 am to 2:50 am	400-500 ppm acetylene maximum	-
Area sample in the Cleaning Department	3:15 am	None detected	

Sampling equipment: Miran Intra Red Gas Detector

ppm = parts per million
ppb = parts per billion
fibr/cc = fibers per cubic centimeter
mg/m^3 = milligrams per cubic meter
µg/m^3 = micrograms per cubic meter
NA = Not Applicable

OH 100
2/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

MATERIAL SAMPLE DATA SHEET

Data Sheet # 8 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: September 21, 1984 Conducted by: James H. Hanna

Results Expressed In pH (A pH of 7 is considered neutral. A lower pH is an indication of increasing acidity and a higher pH is an indication of increasing alkalinity.)

SAMPLE IDENTIFICATION AND DESCRIPTION		RESULTS
2-CFD-1 Grab sample of material from the slag pit	10% solution	11.5
	20% solution	11.9

OH 520
1/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

MICHIGAN DEPARTMENT OF PUBLIC HEALTH
DIVISION OF OCCUPATIONAL HEALTH

Case # 2024038

MATERIAL SAMPLE DATA SHEET

Data Sheet # 9 of 9

ESTAB. NAME: Central Foundry Division, Nodular Iron Plant

ADDRESS: General Motors Corporation
2100 Veterans Memorial Highway
Saginaw, Michigan 48601

Study date: September 21, 1984

Conducted by: James H. Hanna

Results Expressed In particle size in microns and percent silica (SiO_2)

SAMPLE IDENTIFICATION AND DESCRIPTION	RESULTS
2-CFD-2 Grab sample of material from the slag pit	* 3 microns and up 34% SiO_2

*3 microns is considered respirable

OH 520
1/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

DIVISION OF OCCUPATIONAL HEALTH

Case # 2024044

AIR CONTAMINANT DATA SHEET

Data Sheet # 1 of 1

ESTAB. NAME: Champagne & Marx Excavating Incorporated

LOCATION/ ADDRESS: 1445 Liberty Road
Saginaw, Michigan 48604

Study date: November 2, 1984

Conducted by: Robert E. Dayringer

Applicable standard for Phosphine (PH_3)

Max. Allowable Concentration 0.3 ppm (8-hour, time-weighted average) Ceiling Limit - (in any 8-hour period) Peak Limit - (__ min. in __ hrs.)

Sample Identification and Description	Sample Time	Sample Results	Calculated Exposure
2-CM-1 Breathing zone of Larry Syring, Jr. during slag pit operation, wearing approved respiratory protection	12:40 am to 5:00 am	None detected	-
2-CM-2 Area sample on the west side of the slag pit wall	12:50 am to 5:00 am	None detected	-
2-CM-3 Area sample on the west side of the slag pit wall	2:48 am to 4:10 am	None detected	-
2-CM-4 Blank		0 mg PH_3	

Sampling equipment: MSA Air Sampling Pump connected to a mercuric cyanide impregnated silica gel tube.

ppm = parts per million
ppb = parts per billion
fiber/cc = fibers per cubic centimeter
mg/m³ = milligrams per cubic meter
µg/m³ = micrograms per cubic meter
NA = Not Applicable

OH 100
7/84

AUTHORITY: P.A. 154 of 1974
COMPLETION: MDPH

411-J East Genesee
Saginaw, Michigan 48607

December 17, 1985

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Re: RCRA & Act 64 December 4, 1985 Inspection
G.M. Central Foundry
Nodular Iron Plant
MID 041793340

Dear Mr. Hamilton:

On December 4, 1985, staff of the Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency, and a representative of the United States Environmental Protection Agency, conducted an inspection of your facility located at Saginaw, Michigan. The purpose of the inspection was to evaluate compliance of that facility with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) as amended, and Act 64, P.A. of 1979, as amended.

As a result of that inspection, staff of the Department have determined that the above facility remains in violation of Subtitle C of the RCRA and Act 64. Specifically, staff cited the following violations:

1. The time of inspection was not indicated on the inspection logs dated for November of 1985. 40 CFR 265.15 (d) requires that the time of inspection be recorded.

2. The date that repairs take place are not indicated in the inspection log as required by 40 CFR 265.15 (d).

3. Calcium carbide slag was being spilled to the floor during the slagging operation and was not being cleaned up based upon the pile that had collected near the gondolas receiving the waste. This violates 40 CFR 265.31 and requires that immediate action be taken to assure that all slag is captured in gondolas.

4. Gondolas are being stored on a temporary basis in the iron house to prevent the waste from reacting during wet weather. This violates 40 CFR 265.256 (a)(2). The iron house has several sources of water that could come in contact with the waste. A permanent site for temporary cooling must be identified and used for the storage of hot gondolas.

5. Treatment of the waste in the existing facility does not meet the requirements of 40 CFR 265.256. Treatment of reactive or ignitable wastes cannot take place in a waste pile.

6. Treatment by chemical, physical, or biological methods is only allowed in tanks, surface impoundments, and land treatment facilities. Your facility has been formally amended on your Part A application to meet the definition of a waste pile. This violates 40 CFR 265.400. This problem has been addressed in your Part B application by proposing the construction of tanks for the treatment of the Calcium Carbide Slag.

7. Manifest number MI 0519650 indicated that an 029L(waste was being manifested as a non-hazardous wastes when based upon the description a hazardous F001 waste was being shipped. This violated 40 CFR 262.21. A letter must be sent to correct those manifest violations cited. Similar manifest violations were observed on Manifest numbers MI 0650770 and MI 0650723 involving the DOT shipping name.

8. Two of four drums stored in your 90 day storage facility were not labeled with the words, "Hazardous Waste" and did not have accumulation dates. This violates 40 CFR 262.34 (a)(3) and (2) respectively.

9. The discharge control system originally designed for the system is no longer functional and has been replaced with a diked discharge channel to an off-site drain. Based upon inspection reports, this discharge control system is not inspected during a period when it is subject to failure. These dikes must be inspected at the time of discharge to meet the requirements of 40 CFR 265.403 (a)(1) on a daily basis.

In addition to these RCRA violations the staff of the Department also cited the following violations of Act 64 rules and your Operation Licenee.

A. Diking used at the facility allows runoff to be discharged out of the treatment pad. The natural slope of the floor of the facility is also to the outside of the treatment pad. This violates General Condition 10.C. of your Operating License.

B. Calcium carbide slag was evident in areas adjacent to the treatment pad. This is assumed to have been caused from the transport of overfilled gondolas. Your Operating License requires that these spills be cleaned up immediately and placed in the treatment pad for treatment.

C. Operation of your facility continues to violate Rule 404 (b) and (f). Cooling of the gondolas for 24 hours prior to treatment has substantially reduced emissions, however Part I, General Condition 6 of your Operating License continues to be violated.

D. Iron ingots removed prior to treatment of the slag and stored for reuse contains hazardous calcium carbide slag. Removing this waste with the ingots prior to treatment violates Special Condition 3.G. and H. of your Operating License.

E. Several monthly operating reports since July have shown that you exceeded 1000 cu. yards per month of calcium carbide treatment. This violate Special Condition 2 of your Operating License.

We request that you respond to this letter by January 8, 1985, and identify those actions taken to correct the violations cited.

As you know a Consent Agreement is in the process of being negotiated to address the construction of a pilot facility for future treatment testing and interim actions to be taken at the existing facility. Failure to enter such an agreement with the Department will result in license revocation proceedings being initiated.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim J. Sygo
Hazardous Waste Division
(517) 771-1731

JJS:rh
cc: J. Bohunsky, C & E File
A. Howard
EPA Region V
J. Findlay - GM

GM Legal Staff

Inter-Organization

Date: January 9, 1986

To: Joseph Chu
Jack Findlay

From: LoVeen J. Moody

Subject: RCRA and Act 64 December 4, 1985 Inspection at Central Foundry Saginaw - Nodular

In reviewing the letter prepared by Jim Sygo to Mr. Hamilton, I would like to note the following items:

1. If the calcium carbide slag is spilled within the foundry during the slagging operation it is arguably not subject to RCRA. An OSHA attorney on GM's Legal Staff has informed me that OSHA regulations preempt other regulations in matters which can affect worker safety and health. In addition, 40 CFR section 265.31 relates to "the facility". Arguably the foundry building is not part of the facility because it is not used for treating, storing, or disposing of hazardous waste as these terms are defined the 40 CFR section 260.10.

2. 40 CFR section 265.256(a)(2), applies to management of waste piles. During the cooling period the wastes are in gondolas and are not in piles therefore this subsection does not appear to be applicable. However, 40 CFR section 265.17(a) requires the same protection from accidental ignition Mr. Sygo is requesting pursuant to 40 CFR section 265.256(a)(2).

3. 40 CFR section 265.256(1) allows placement of reactive or ignitable waste in waste piles as long as placement in an existing pile will render the waste non-reactive or ignitable and as long as management of the waste pile complies with 40 CFR section 265.17(b).

4. 40 CFR section 265.400 applies to treatment by chemical, physical or biological methods other than in tanks, surface impoundments and land treatment. Therefore, this section is applicable to treatment in the waste piles.

5. Please let me know what wastes were being shipped under the manifests Mr. Sygo cites as the seventh point in his letter.

6. Let me know what materials were in the unlabeled drums cited as point eight in Mr. Sygo's letter. Specifically, were they hazardous wastes?

7. Mr. Sygo's comment about the inadequacy of the dikes is contrary to his verbal statements at the meeting we had in December in Lansing. At that meeting I specifically asked if the current diking at the facility was adequate and he indicated it was.

8. Please find out what rules 404 (b) and (f) he is referring to in point "C" of his letter.

I will look forward to discussing these issues with you at a meeting sometime next week.

LJM:pk

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
STEPHEN V. MONSMA
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

2/10/86

cc Hansen
Fiedler
Anderson
Medvec

State Office Building
411-J E. Genesee
Saginaw, Michigan 48607
February 7, 1986

Mr. Michael B. Hamilton
Plant Manager
Saginaw Nodular Iron Plant
G.M.C. Central Foundry Division
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605-5073

Re: RCRA & Act 64 Inspection
of December 4, 1985

Dear Mr. Hamilton:

The Department of Natural Resources has received the material you submitted on January 22, 1986, in response to violations revealed in the December 4, 1985 inspection which this Department performed as a representative of the U.S. Environmental Protection Agency The purpose of the inspection was to determine compliance with the provisions of the Resource Conservation and Recovery Act (RCRA).

Your submittal has addressed items 1, 2, 3, 6, 7, 8, and 9, cited in our December 17, 1985 letter. Finalization of the Consent Agreement is expected to address the remaining violations that exist at your facility. We expect to have the Department's comments compiled by February 14, 1986, and hope that the Consent Agreement can be initiated shortly thereafter.

Should you have any further questions, please contact me at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517-771-1731

JJS:amc
cc: EPA Region V
J. Bohunsky/C&E File
A. Howard

Central Foundry Division
General Motors Corporation
Divisional Offices
77 W. Center St.
Saginaw, Michigan 48605-1629

Inter-Organization

cc
McCarthy
Hamm
Shepard
File

2-8-86
Mr. Hamilton

Subject: Update of the Calcium Carbide Issue at Saginaw Nodular Iron

Date: February 7, 1986

To: J. H. Newcomb

Address:

The following sets forth the current status of calcium carbide, the calcium carbide pad, and the overall issue as it now exists at the Saginaw Nodular Iron Plant.

Union Visit

International UAW Representative, John Clark, who serves on Ted Miller's staff at Solidarity House, formerly the Health & Safety Representative at the Defiance Plant, came into Nodular Iron for a plant visit and calcium carbide review on Wednesday, February 5, 1986. He was pleased with the overall condition of the plant and the status of permits, gons storage, etc. These items are reviewed below:

Construction of New Pad

- The site preparation is being completed at the present time and will be ready for construction when all of the permits are approved.

- A letter was received at Nodular Iron from the DNR on Tuesday, February 4, 1986, requesting information concerning contaminants admitted from the treatment of calcium carbide slag. The informaton requested by the DNR is being prepared at the present time by the outside consultant and is targeted for finalization by Friday, February 14, 1986, at which time it will be reviewed with the GM Legal Staff before being provided to the DNR.

- A consent order to put us in compliance on the old pad and steps being taken to do that is ready for final signature.

- Construction drawings for the new pad have been verbally approved but still has to be signed by the DNR. All of the requested DNR changes have been incorporated into the prints which they have for final approval.

RECEIVED
PLANT MANAGER
FEB 11 1986
Central Foundry Division
Saginaw Nodular Iron Plant

Lets Get It Together
SAFETY BELTS SAVE LIVES

Miscellaneous

- It appears that we have enough gons to hold the slag treatment until the wind is out a direction other than the east. For example, we have not treated the calcium carbide slag since Friday, January 31, 1986, up to and through today, Friday, February 7, 1986, because of the wind being out of the east. Because of necessity, we will be treating this weekend regardless of the wind direction.

In summation, it appears that the only obstacle to construction of the new pad is the issuance of the air permit by the DNR. The other items are pretty well taken care of. We are hoping to start construction by March 1, 1986. It also should be noted that a plant visit to Defiance for hourly and salaried personnel from Nodular Iron to review calcium carbide procedures is being scheduled to take place within the next ten days.

J. D. Mallery
Director of Labor Relations

ms/JD5/02
cc: J. R. Tracy

Central Foundry Division
General Motors Corporation
Saginaw Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605-5073

February 20, 1986

RECEIVED
PLANT MANAGER
FEB 20 1986
Central Foundry Division
Saginaw Nodular Iron Plant

Mr. J. L. Trout, Chief
Southeast Permit Unit
Michigan Department of Natural Resources
Air Quality Division
P. O. Box 30163
Lansing, MI. 48909

Subject: Calcium Carbide Treatment Facility

Dear Mr. Trout:

In response to your request of information on January 30, 1986, regarding Air Pollution Permit #16-82B, the attached information is being submitted to you as itemized on your letter.

This attached information, of course, is based on calculations and assumptions as only some information could be obtained from the field test data. The original information was generated for industrial hygiene purposes which was prepared by our outside consultants, Residuals Management Technology. The process rates of which the calculations and estimates have been made are based on present rates and what is anticipated for the next four (4) to five (5) years. The weights and cubic yard estimated were based on actual slag weighed including iron particles that mix with the slag during the operating process and the volume of slag gondolas.

We request expediting this permit as soon as possible as it is anticipated that by March 3, 1986, a contract award could possibly be made to start construction.

The consent agreement, drawings and specification approvals are in process and are expected to be resolved shortly.

Meetings are scheduled Friday, February 21, 1986, and Tuesday, March 11, 1986, to resolve these issues on the consent agreement between General Motors and the Department of Natural Resources Hazardous Waste Division.

If you have any further questions, please call me on (517) 776-2474.

Sincerely,

Jack V. Findlay
Sr. Environmental Coordinator

cc: M. Reed - Saginaw Office
J. Sygo - Saginaw Office

Lets Get It Together
SAFETY BELTS SAVE LIVES

MBH

file

Central Foundry Division
General Motors Corporation
Saginaw Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605-5073

April 7, 1986

Mr. J. Sygo
Hazardous Waste Division
Michigan Department of Natural Resources
411-J E. Genesee Avenue
Saginaw, MI. 48607

Dear Mr. Sygo:

This is in response to your letter dated March 18, 1986, concerning the R.C.R.A and ACT 64 inspection on February 12, 1986*.

* (Note: Our records indicated March 12, 1986--you may want to verify this date).

The reply is made on the basis of the number in your letter on Pages 1 & 2, Items #1-9.

Item #1 - General Condition 10C Operating License

The sand diking presently used is to ensure that the discharge from the present facility does not lead to an environmental or health problem. This condition, of course, will be corrected by the construction and operating of the new proposed facility.

Item #2 - Dumping CAC2 Slag in Iron House

Gons containing CAC2 slag are not dumped in the Iron House or any area except the treatment slab. The gons have been used for purposes other than containment of CAC2 slag such as cupola slag, ladle skimming on sandwich lines and furnace slagging of both Ajax and Roto-Pour furnaces. Moreover, Melting employes have been penalized for dumping CAC2 slag improperly and they understand the ramifications of not handling the CAC2 slag in the prescribed manner.

New signs have been ordered and will be placed in the conspicuous areas that state "All Spills Must Be Cleaned Up Immediately. Supervision to be Notified".

Item #3 - Holes in Containment Wall

Any holes in the containment wall of the treatment slab are reported daily. The Maintenance Department is making daily repairs as required. These repairs will be documented on log sheets when completed.

Lets Get It Together
SAFETY BELTS SAVE LIVES

Item #4 - Temporary Storage

In our view, the matter of employe safety is in the purview of the Michigan Office of Safety and Health, however, your suggestion of providing signs in the Iron Yard (House) where gondolas are stored for cooling purposes will be posted. Signs will consist of: "All Areas Must Be Kept Dry".

Item #5 - Leaking Water Pipes for Slag Treatment

The potassium permaganate and surfactant (wetting agent) has been reviewed by the Hazardous Material Control Committee and is not a hazardous material. However, any leaks in the treatment water system are reported daily. Repairs are made as required. These repairs will be documented on log sheets when completed.

Item #6 - General Condition 10D - Inspection

The personnel responsible for the daily inspections and filling in the log sheet have been instructed to complete all parts of the log. Your recommendation to provide other instrumentation other than the "Drager Tube Method" has been investigated by our Chief Chemist, M. E. Robinson, and our Environmental Coordinator, J. V. Findlay, with the following results: The calcium carbide supplier, CYANAMID, data sheet attached, gives the flammable limits in air by volume. This consists of 2.5 82.0% (25,000-820,000 ppm) whereas the Drager Tube range reads into the low limits of .05% (500 ppm). Normally the readings have been below .05%, so this is considered an adequate method for reactivity. The present instrument "Foxboro Chromatograph" on hand, is for Engineering research and is considered too delicate to use on a daily basis at this time.

Item #7 - Reaction Pots Stored in Facility Area

The area on all sides of the facility will not be used for storage so access will be available for the calcium carbide gondolas.

Item #8 - Gons/Snow/Sand South of Facility

The area will be kept open to permit access for the facility operator.

Item #9 - Re-rod on Treatment Slab Apron

Any exposed re-rod is being reported daily. Repairs are made daily as required. These repairs will be documented on the log sheets when completed.

If you have any further questions, please contact Galen A. Shepard, our Chief Metallurgist at 776-2693, or Jack V. Findlay, 776-2474.

Sincerely,

M. B. Hamilton
Plant Manager

slc

Attachment

D: env85

HEAD OFFICE:
2255 SHEPPARD AVENUE EAST,
WILLOWDALE, ONTARIO, CANADA M2J 4Y5
TELEPHONE: (416) 498-9405

Acetylene Physical Constants

Molecular Weight	26.038
Vapor Pressure of Pure Liquid @ 70 °F (Not Cylinder Pressure)	635 p.s.i.g. (44.6 kg/cm² gauge)
Specific Volume @ 60°F., 1 atm.	14.463 cu ft/lb (902.9 ml/g)
Boiling Point @ 1.22 atm.	−103°F (−75°C)
Sublimation Point @ 1 atm.	−119.2°F (−84.0°)
Triple Point @ Saturation Pressure	−113.4°F (−80.8°C)
Specific Gravity, Gas@ 60°F., 1 atm. (Air = 1)	0.9057
Density, Gas @ 0°C., 1 atm.	1.1709 g/l
Critical Temperature	97.3°F (36.3°C)
Critical Pressure	905.5 p.s.i.g. (61.6 atm) (63.6 kg/cm² absolute)
Critical Density	0.231 g/ml
Latent Heat of Sublimation @ −119.2°F	193.46 cal/g
Latent Heat of Fusion @ t.p.	23.04 cal/g
Flammable Limits in Air	2.5-82.0% (by volume)
Autoignition Temperature	635°F (335°)
Gross Heat of Combustion @ 60°F, 1 atm	1483.8 BTU/cu ft (13.2 cal/cc)
Specific Heat, Gas @25°C, 1 atm.	
Cp	0.4047 BTU/ (1b) (°F) or cal/(g) (°C)
Cv	0.3212 BTU/ (1b) (°F) or cal/ (g) (°C)
Specific Heat Ratio, Gas @ 25°C, 1 atm., Cp/Cv	1.26
Thermal Conductivity, Gas @ 0°C	0.01169 BTU/ (hr)(ft²)(°F/ft) or 0.048 cal/(sec.) (cm²) (°C/cm)
Viscosity, Gas @ 0°C, 1 atm.	0.00943 centipoise
Entrophy, Gas @ 25°C, 1 atm.	48.004 cal/(mole) (°C) (1.843 cal/ (g) (°C))
Solubility in Water @ 0°C, 1 atm.	1.7 (volumes/volume H_2O)

This information is given without a warranty or representation. We do not assume any responsibility or liability for damages. Nor do we give permission, inducement or recommendation to practice any patented invention without a compulsory license. It is intended for your consideration, investigation and verification. Before using any product, read its label.

DRÄGER Tube Hydrocarbon 0.1%/b

Standard range of measurement (20°C, 1013 mbar)	0.1 to 0.8 vol.% butane 0.5 to 1.3 vol.% propane
Number of strokes of the DRÄGER gas detector pump	n = 15 to 3 n = 15 to 7
Relative standard deviation	30 to 20%
TLV	600 ppm butane

Description

Comparison tube – white precleanse layer – white indicating layer, reagent: iodine pentoxide and fuming sulphuric acid – colour change to brownish-grey – brownish-grey colour comparison layer.

Reaction principle

C_4H_{10} Butane C_3H_8 Propane	$+I_2O_5$ Iodine pentoxide	$+H_2S_2O_7$ Fuming sulphuric acid	$\longrightarrow I_2$ Iodine (colour: brownish-green)

Cross-sensitivity

Methane and ethane are not indicated. In addition to propane and butane, unsaturated hydrocarbons with high boiling point are indicated. CO is also indicated, but with a green discoloration. The sensitivities of indication are different.

8.1 **Test instructions for acetylene**

Number of strokes for complete, uniform discoloration (yellow to brownish with slight green shade) of the indicating layer. Colour does not correspond to the colour comparison layer.	Vol.% acetylene (app.)
9	0.05
8	0.06
7	0.07
6	0.09
5	0.13
4	0.18
3	0.22
2	0.3

8.2 **Test instructions for ethylene**

Number of strokes for complete uniform discoloration (dark brown) of the indicating layer. Colour does not correspond to the colour comparison layer.	Vol.% ethylene (app.)
15	0.5
12	0.6
9	0.8
8	1.0
7	1.2
6	1.6
5	2.0

APPENDIX 12.2

G.4 Former (Original) Desulfurization Slag
RCRA Treatment Unit
10/14/93 Arsenic Investigation Report

The Dragun Corporation

30445 Northwestern Hwy. • Suite 260 • Farmington Hills, MI 48334 • 313-932-0228 • FAX 313-932-0618

October 14, 1993

Mr. William Newsted
General Motors Corporation
Powertrain Casting Technology Center
77 West Center Street
Saginaw, Michigan 48605-5077

SUBJECT: Soil and Groundwater Investigation
Existing RCRA Area
General Motors Former Nodular Iron Facility (GMNI)
Saginaw, Michigan
Project #1040

Dear Mr. Newsted:

Attached you will find the Soil and Groundwater Investigation Report for the Existing RCRA Area at the GMNI plant in Saginaw, Michigan.

If you have any questions regarding The Dragun Corporation's findings or conclusions, please contact us at your convenience.

Sincerely,

THE DRAGUN CORPORATION

Christopher J. Englert, P.E.
Project Manager

attachment

cc: Mr. John Takle

CJE/jfk
/1040gmni.rpt

ATTACHMENT 1

Soil and Groundwater Investigation
Existing RCRA Area
General Motors Former Nodular Iron Facility
Saginaw, Michigan

Prepared for
Mr. G. Keith West
General Motors Corporation
Environmental and Energy Staff
Manufacturing Building
2860 Clark Street
Detroit, Michigan

Prepared by
The Dragun Corporation
30445 Northwestern Highway
Suite 260
Farmington Hills, Michigan 48334
Phone: (313) 932-0228
Project #1040

October 14, 1993

TABLE OF CONTENTS

TITLE	PAGE
LIST OF FIGURES	2
LIST OF TABLES	3
LIST OF APPENDICES	4
INTRODUCTION	5
SOIL AND GROUNDWATER INVESTIGATION - EXISTING RCRA UNIT	5
Static Water Level Measurements	6
Soil Sampling	6
Groundwater Sampling	6
RESULTS OF THE SOIL AND GROUNDWATER INVESTIGATION	7
Hydraulic Gradient Calculation	8
Results of Laboratory Testing - Soil	8
Total Arsenic	8
Total Kjeldahl Nitrogen (TKN)	8
Results of Laboratory Testing - Groundwater	8
Field Test Results: pH, Eh, Specific Conductance, Temperature, and Ammonia	9
Laboratory Test Results for Groundwater	9
Total and Dissolved Arsenic	10
Ammonia Nitrogen	10
Total Kjeldahl Nitrogen (TKN)	10
SUMMARY AND CONCLUSIONS	10

LIST OF FIGURES

FIGURE	DESCRIPTION
1	Site Location Map
2	Boring Location Map
3	Groundwater Contour Map
4	Total and Dissolved Arsenic in Groundwater
5	Ammonia Concentrations in Groundwater

LIST OF TABLES

TABLE	DESCRIPTION
1	Record of Water Level Measurements
2	Laboratory Test Results - Soil
3	Measurement of Field Parameters for Groundwater Samples
4	Laboratory Test Results - Groundwater

LIST OF APPENDICES

APPENDIX	TITLE
A	SOIL BORING LOGS

INTRODUCTION

Mr. G. Keith West of the General Motors Corporation authorized The Dragun Corporation to perform a soil and groundwater investigation at the former Nodular Iron Plant in Saginaw, Michigan. The investigation included several tasks which were discussed in the June 24, 1993, Work Plan prepared by The Dragun Corporation. The Work Plan included the following three tasks: (a) the collection of static water levels from the monitoring wells in the vicinity of the existing calcium carbide desulfurization slag treatment area (Resource Conservation and Recovery Act [RCRA] unit), (b) the investigation of soil and groundwater quality in the area of the existing RCRA unit, and (c) the preparation of a summary report.

These tasks were conducted to address three issues:

- Determination of the groundwater flow direction in the vicinity of the existing RCRA unit
- Investigation of the groundwater quality in the area surrounding the existing RCRA unit
- Determination of whether the ammonia nitrogen detected in the groundwater around the existing RCRA unit is the source of ammonia detected in the basement sumps

This report presents the results of the soil and groundwater investigation in the area of the existing RCRA unit.

SOIL AND GROUNDWATER INVESTIGATION - EXISTING RCRA UNIT

The Dragun Corporation performed a subsurface investigation in the vicinity of the existing RCRA unit from July 12 through July 14, 1993. The purpose of the investigation was to determine the extent of ammonia nitrogen, total Kjeldahl nitrogen, and arsenic in the soil and groundwater surrounding the RCRA unit. A total of ten borings were completed as part of this investigation. The soil boring locations are shown on Figures 1 and 2.

Seven soil borings (B-1 to B-4, B-8, B-9, and B-10) were drilled outside the manufacturing building in the vicinity of the existing RCRA unit (see Figure 2). Soil and groundwater samples in these soil borings were collected by geologists from The Dragun Corporation with a Geoprobe System (Geoprobe). The Geoprobe is a hydraulically-powered, soil and groundwater probing device manufactured by Geoprobe Systems.

The soil and groundwater were sampled at four locations (B-1 to B-4) in the vicinity of the existing RCRA unit. In addition, three further groundwater samples (B-8, B-9, and B-10) were collected from the existing RCRA unit with the Geoprobe.

Three soil borings (B-5, B-6, and B-7) were drilled through the basement floor of the manufacturing building to the west of the existing RCRA unit (see Figure 2). Allen Services from Kawkawlin, Michigan cored three holes through the basement floor which was approximately 30 inches thick.

Static Water Level Measurements

Static water level measurements for monitoring wells MW-3, MW-4, MW-17, and MW-18 were measured on July 12, 1993, using a contact probe. The probe was decontaminated between wells with a solution of phosphate-free detergent and distilled water, followed by a distilled water rinse.

Soil Sampling

Soil samples were collected with the Geoprobe by hydraulically pushing and/or hammering a completely sealed, stainless-steel sampling tube. Soil samples were collected continuously at two-foot intervals in each soil boring until the underlying clay was encountered. Samples were logged by a geologist from The Dragun Corporation and were field screened for the presence of organic vapors with a photoionization detector (PID - Photovac Microtip, Model HL 2000).

Soil samples were collected from soil borings B-1 to B-4 from a depth of zero feet to two feet below ground level (BGL), and two feet to four feet BGL, respectively. The pH and Eh of soil samples collected from a depth of zero feet to four feet BGL were measured in the field. Saturated soil conditions were observed at approximately four feet BGL. A description of the soil samples was recorded on the soil boring logs which are included in Appendix A.

Soil samples from soil boring B-5, inside the building, were collected with the Geoprobe from a depth of three feet to seven feet below the surface of the concrete basement.

Groundwater Sampling

Five groundwater samples were collected from the soil borings outside the manufacturing building. The groundwater samples were collected with the Geoprobe at depths which ranged from four feet to eight feet BGL. One duplicate groundwater sample was collected from boring B-4 and designated B-4B.

Groundwater samples were collected with the Geoprobe by hydraulically pushing and/or hammering a stainless-steel screen assembly (19" in length with an expendable drive-point tip) to the desired sampling depth. The screen remained completely sealed within a steel sleeve until, at the desired sampling depth, the sleeve was retracted and the screen was exposed. Groundwater was brought to the surface through polyethylene tubing (1/4" inner-diameter) using a vacuum pump. Approximately one liter of water was purged prior to sampling. After purging, groundwater samples were collected and stored in an ice-filled cooler.

One groundwater sample was collected from each boring located inside the manufacturing building. This groundwater sample was collected with a disposable bailer from the open borehole prior to the soil sampling.

All groundwater samples were field tested for pH, Eh, specific conductance, temperature, and ammonia nitrogen. Field data for each water sample were recorded on groundwater sampling data sheets.

All soil and groundwater sampling equipment was decontaminated in three steps: (a) an initial tap water rinse, (b) a brush wash with tap water and phosphate-free detergent, and (c) a final distilled water rinse.

All of the soil and water samples obtained during the investigation of the RCRA unit were submitted to National Environmental Testing (NET) Inc. laboratory located in Auburn Hills, Michigan. Soil samples were submitted to NET for laboratory tests of total arsenic (using United States Environmental Protection Agency [USEPA] Method 200.7) and total Kjeldahl nitrogen (USEPA Method 351.3). Water samples were tested for the presence of total suspended solids (USEPA Method 160.2), total and dissolved arsenic (USEPA Method 200.7), and ammonia (USEPA Method 350.1). All samples were transported to the laboratory in a cooler filled with ice.

RESULTS OF THE SOIL AND GROUNDWATER INVESTIGATION

The following sections present the results of the tasks conducted during this investigation. The first section discusses the results of the static water level measurements. The second section presents the results of the soil investigation. The third section presents the results of the groundwater investigation.

Hydraulic Gradient Calculation

The hydraulic gradient was calculated using static water level data from monitoring wells in the vicinity of the existing RCRA unit. The static water levels are included on Table 1. Horizontal groundwater flow in the fill layer is in a south to southwest direction (see Figure 3). Based on review of Figure 3, the horizontal hydraulic gradient, or the change in hydraulic head over horizontal distance, was calculated. The horizontal hydraulic gradient in the vicinity of the Existing RCRA unit is estimated to be approximately 0.012 to 0.015 feet per foot.

Results of Laboratory Testing - Soil

Soil samples from soil borings B-1 to B-4 were submitted for laboratory testing. One soil sample was collected from each boring. These soil samples were collected at depths from zero feet to two feet BGL. In addition, one soil sample from soil boring B-5, located inside the manufacturing building, was submitted for laboratory testing. This sample was collected at a depth of three feet to five feet below the surface of the concrete floor in the basement of the manufacturing building.

Table 2 provides a summary of the results of the laboratory testing of soil samples collected in the vicinity of the RCRA unit.

Total Arsenic. A review of Table 2 indicates that total arsenic in the soil ranges from 0.39 to 6.8 milligrams per kilograms (mg/kg). The highest concentration (6.8 mg/kg) was detected in a sample from boring B-4. According to the data published in the literature by Kessler and Arnold (1990 Kessler-Arnold & O'Hearn, "Background Concentrations of Metals and Cyanide in Lower Michigan Soils", 44th Purdue University Industrial Waste Conference), the total arsenic concentrations in the soil from this investigation are less than typical values for silty-sand found in Michigan.

Total Kjeldahl Nitrogen (TKN). A review of Table 2 indicates that TKN in the soil ranges from less than 22 to 290 mg/kg. TKN includes the sum of ammonia nitrogen plus organic nitrogen. The highest TKN concentration was detected in soil from boring B-4. With the exception of the soil from B-1 (less than 22 mg/kg), TKN ranges from 77 to 290 mg/kg.

Results of Laboratory Testing - Groundwater

This section presents the results of the groundwater investigation in the vicinity of the existing RCRA unit. A discussion of the results is presented in two sections. The first section presents the results of the water quality measurements conducted in the field immediately following sample collection. The second section presents the results of laboratory testing of groundwater samples.

Field Test Results: pH, Eh, Specific Conductance, Temperature, and Ammonia. Water quality measurements were conducted immediately upon sample collection in the field to provide accurate measurements of pH, Eh, specific conductance, temperature, and ammonia. Several of these parameters, namely pH, Eh, and temperature, are subject to change following sample collection and must be analyzed immediately to provide the most accurate data. Specific conductance and ammonia were measured in the field to provide information necessary to complete the investigation and adequately delineate the horizontal and vertical extent of ammonia in the vicinity of the existing RCRA unit.

Table 3 presents the results of the water quality measurements of pH, Eh, specific conductance, temperature, and ammonia. Review of Table 3 reveals the following information:

(a) The groundwater pH ranged from 7.85 to greater than 10. The highest concentrations were measured in groundwater from borings B-4, B-6, and B-7. The pH was not measured for water samples from B-8, B-9, and B-10.

(b) The groundwater Eh ranged from less than -80 to +150 millivolts (mV). Groundwater from most sample locations had Eh values of less than -80 mV.

(c) The conductivity of the groundwater ranged from 561 to 5220 micro mho per square centimeter (umho/cm^2). The highest conductivity value was measured for a sample collected from boring B-2.

(d) The temperature of the groundwater ranged from 58.2° F to 84.6° F. The highest temperature was for a water sample collected from boring B-2. The elevated groundwater temperatures measured at B-1, B-2, B-3, and B-4 may be a sampling anomaly.

(e) The ammonia concentration ranged from 1.2 to 350 milligrams per liter (mg/l). The lowest ammonia concentration was detected in water collected from boring B-2, while the highest concentration was detected in boring B-7.

Laboratory Test Results for Groundwater

Seven water samples from borings in the basement of the manufacturing building and in the vicinity of the existing RCRA unit were submitted for laboratory testing. Table 4 provides a summary of the laboratory testing of the groundwater samples collected in the vicinity of the RCRA unit.

Total and Dissolved Arsenic. Review of Table 4 reveals that the total arsenic concentration in the groundwater ranges from 0.002 to 0.055 mg/l. Further review indicates that dissolved arsenic ranges from 0.002 to 0.047 mg/l. The dissolved arsenic concentrations are less than the total arsenic values, which may indicate the presence of arsenic associated with suspended solids or colloidal solids in groundwater in the investigation area.

Figure 4 provides a summary of the test results for total and dissolved arsenic in the groundwater. Review of Figure 4 reveals that the highest concentration of total arsenic in the groundwater was 0.055 mg/l from a groundwater sample obtained from boring B-5. The highest concentration of dissolved arsenic was 0.047 mg/l in Boring B-5 beneath the floor of the manufacturing building.

Ammonia Nitrogen. Review of Table 4 indicates that ammonia was detected in water samples collected from borings B-1 through B-5, and B-10. The ammonia concentrations ranged from 0.9 to 160 mg/l, with the highest ammonia concentration measured in soil boring B-5. Similar test results were obtained from water quality measurements in the field.

Figure 5 presents the ammonia concentrations in groundwater measured during this investigation. Review of Figure 5 reveals that the highest ammonia concentrations were measured in water from borings B-1 and B-5 through B-10. The highest concentrations were detected in borings B-5, B-6, and B-7 which are located in the basement of the manufacturing building. The highest concentration was detected in boring B-7 which had an ammonia concentration of 350 mg/l. The borings B-5, B-6, and B-7 are located to the west of the existing RCRA unit.

Total Kjeldahl Nitrogen (TKN). Review of Table 4 indicates that the TKN concentration in the groundwater ranges from 1.3 to 360 mg/l. The highest TKN concentration was detected in groundwater from boring B-5.

A comparison of the ammonia and TKN test results reveals that in most cases the concentrations are nearly equivalent. Since TKN is a measure of organic nitrogen plus ammonia nitrogen, this data indicates that organic nitrogen is not present in the groundwater with the exception of groundwater collected from B-5.

SUMMARY AND CONCLUSIONS

The area containing the highest arsenic, ammonia, and TKN concentrations in groundwater was found to be located under the basement of the manufacturing building. Borings B-5, B-6, and B-7 contained ammonia concentrations which exceeded 100 mg/l. Comparison of the ammonia and TKN data reveals that ammonia is the only source of TKN detected at all locations except B-5. Water from B-5 contained elevated levels of TKN which suggest the presence of organic nitrogen in water at that location.

In general, the data summarized in this report correspond with previous data and information collected at the site. Several observations and conclusions were reached based on The Dragun Corporations review of this data.

First, the groundwater flow direction in the vicinity of the existing RCRA unit is to the south or the southwest.

Second, the groundwater Eh is less than -80 mV in the area east of the southeast sump.

Third, the groundwater pH exceeds 10 in the area west of the existing RCRA unit.

Fourth, the ammonia concentration is one order of magnitude higher for samples collected from beneath the manufacturing building basement compared to those in the vicinity of the existing RCRA unit.

Fifth, the presence of arsenic may be associated with the presence of ammonia in groundwater.

Sixth, the groundwater data suggests that the source of ammonia may be located beneath the manufacturing building.

Review of the laboratory data reveals that groundwater from the test locations upgradient from the manufacturing building (i.e., to the north or northeast) contained ammonia concentrations approximately one to two orders of magnitude lower than those found in water under the manufacturing building. Because the highest ammonia and TKN concentrations were detected in water samples collected from beneath the manufacturing building, the source of ammonia appears to be located beneath the building. Since ammonia concentrations in excess of 50 mg/l would impede the biological uptake of ammonia, we would expect the highest ammonia concentrations to be found in the area of the ammonia release.

Therefore, the data collected during this investigation suggests that the presence of ammonia beneath the manufacturing building does not appear to be the result of activities in the vicinity of the existing RCRA unit, but may be due to a source beneath the manufacturing building.

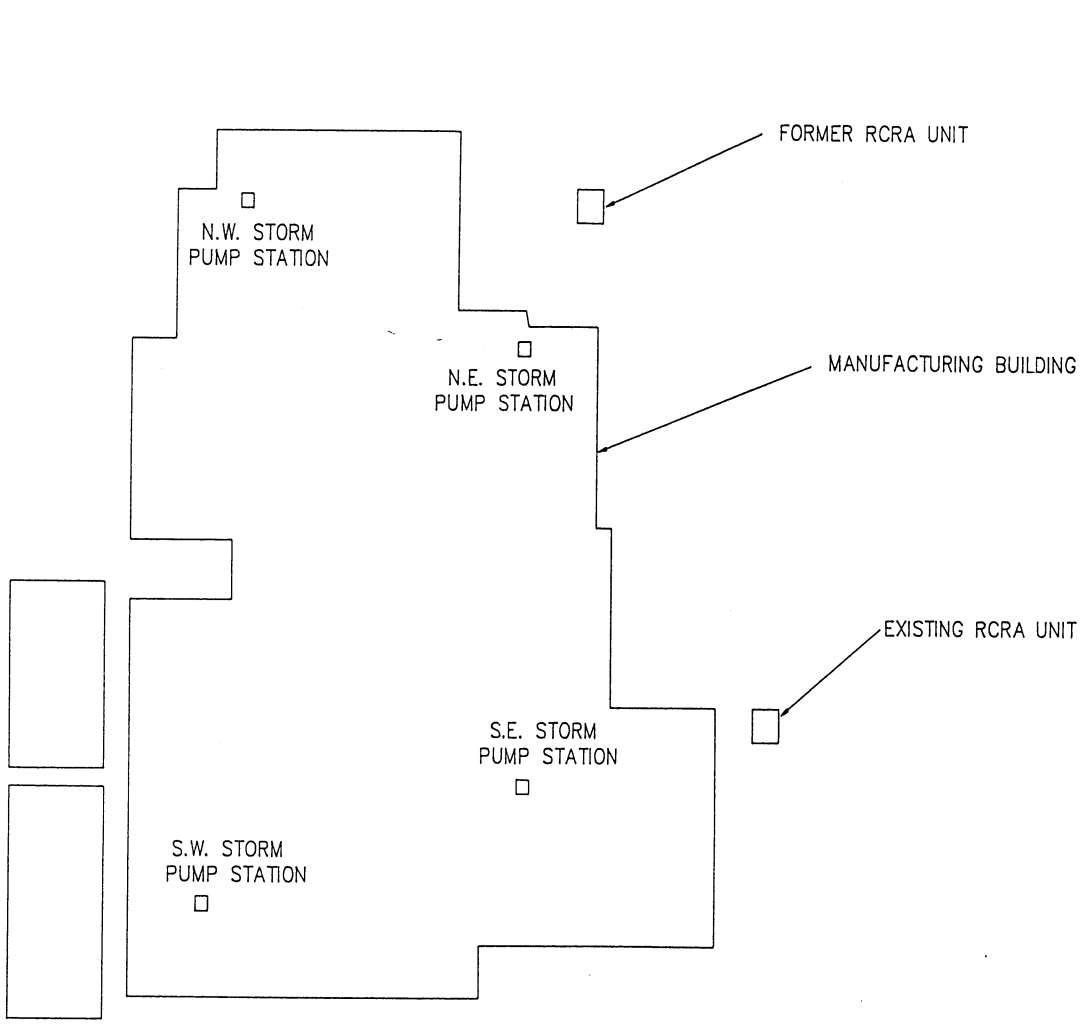


FIGURE 1
SITE LOCATION MAP
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

The Dragun Corporation

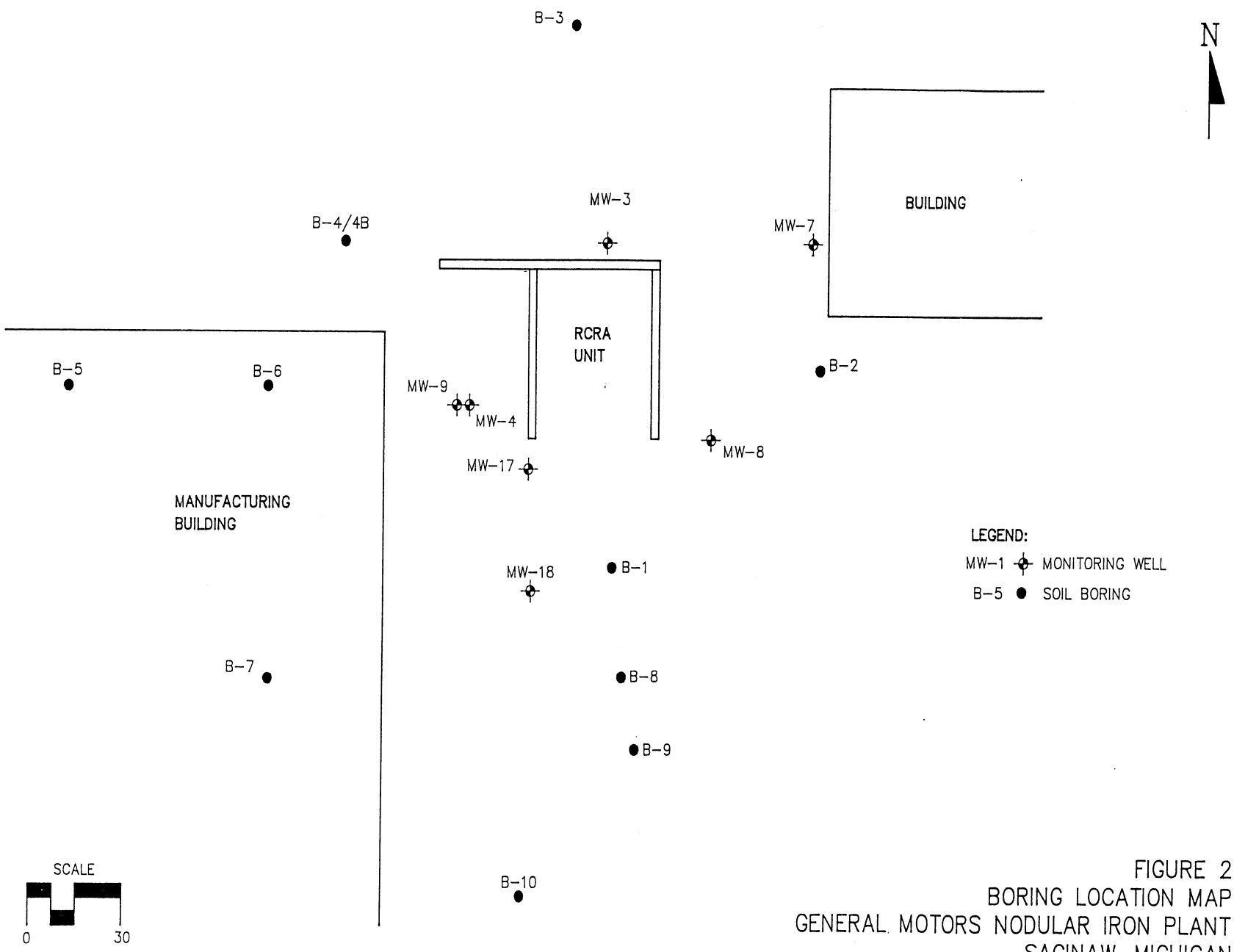


FIGURE 2
BORING LOCATION MAP
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

The Dragun Corporation

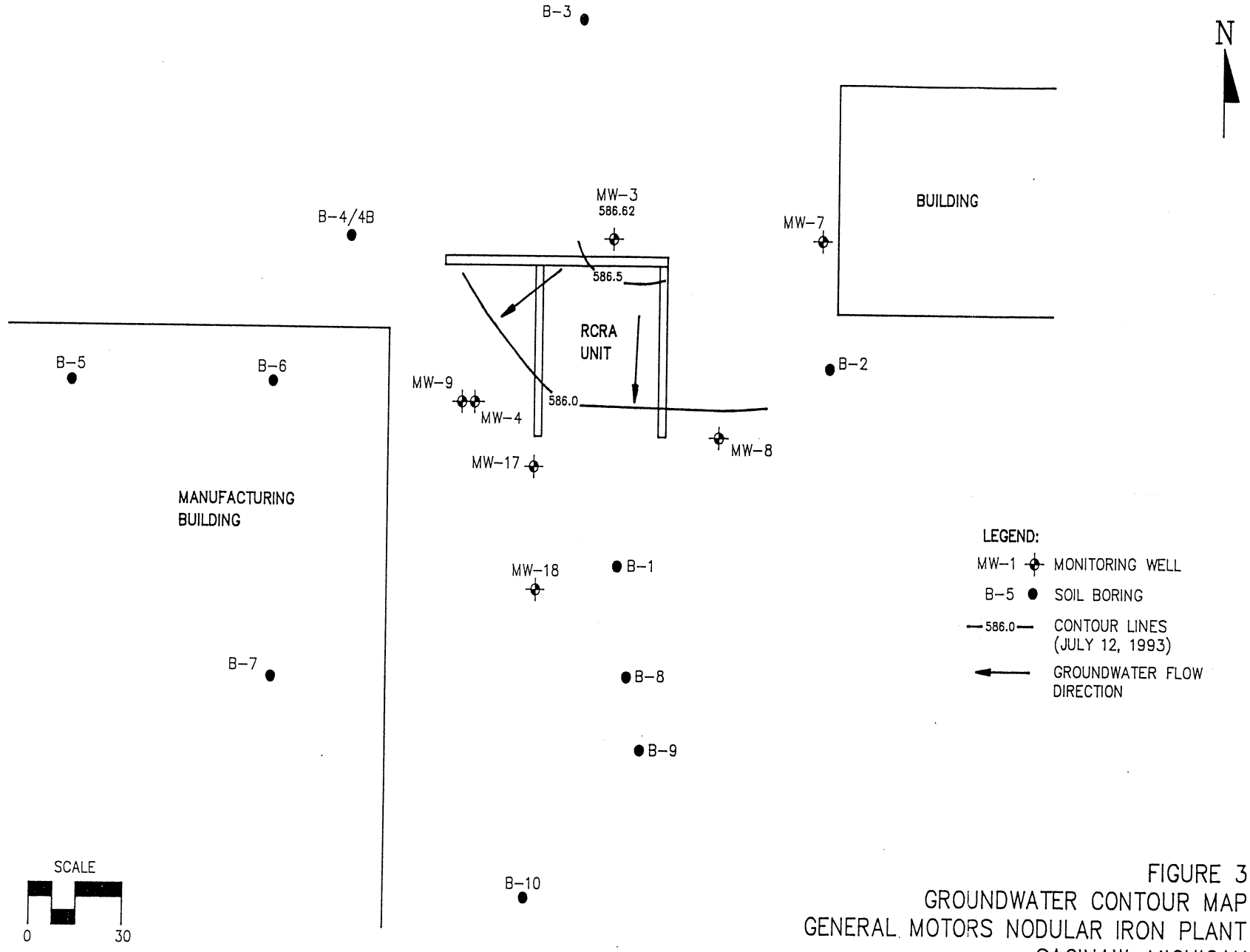


FIGURE 3
GROUNDWATER CONTOUR MAP
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

The Dragun Corporation

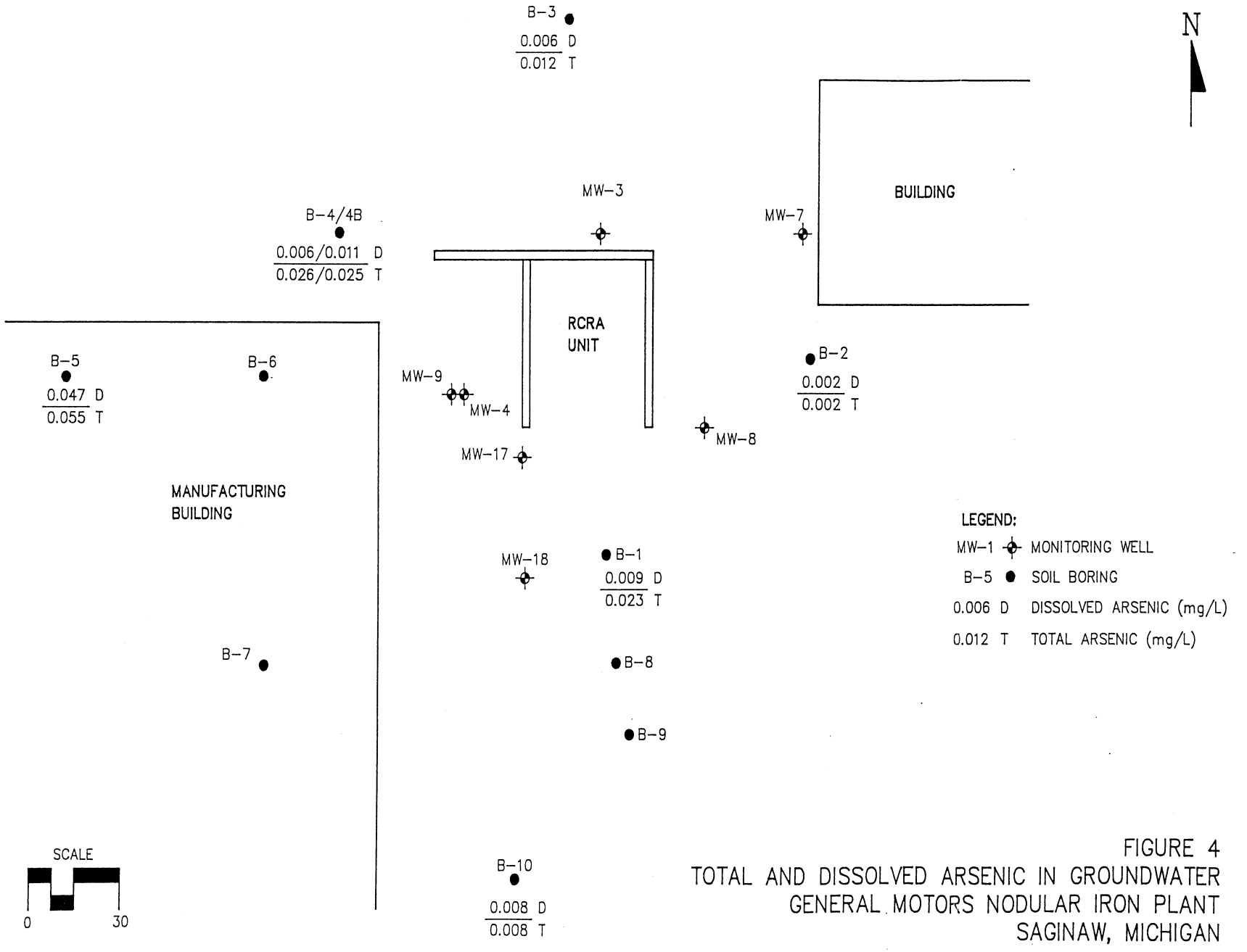


FIGURE 4
TOTAL AND DISSOLVED ARSENIC IN GROUNDWATER
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

The Dragun Corporation

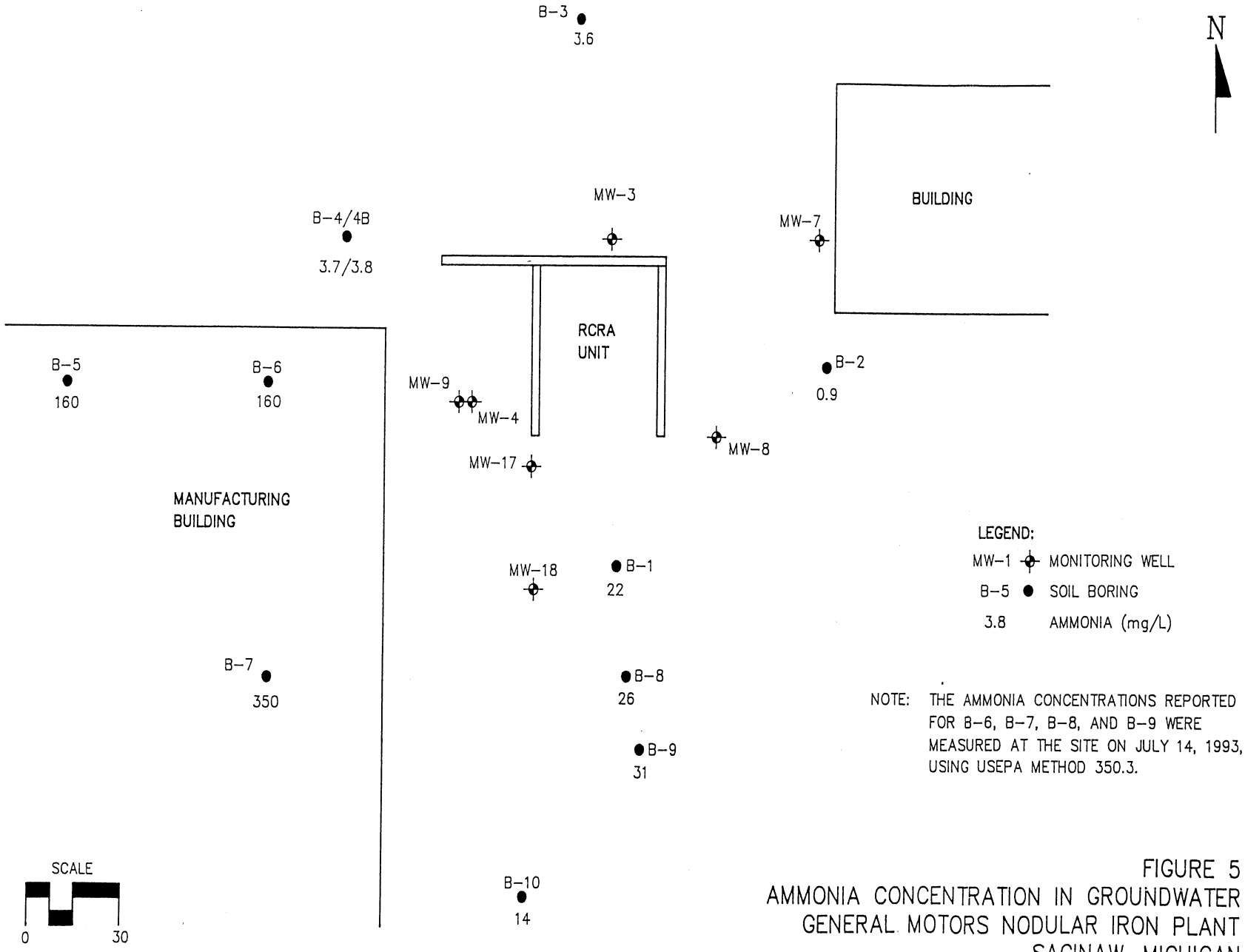


FIGURE 5
AMMONIA CONCENTRATION IN GROUNDWATER
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

The Dragun Corporation

Table 1. Record of Water Level Measurements
General Motors Nodular Iron Plant
Saginaw, Michigan

Date	Monitoring Well Designation	Top of Casing Elevation (Feet)	Static Water Level (Feet)	Static Water Elevation (Feet)
7-12-93	MW-3	593.36	6.74	586.62
7-12-93	MW-4	593.19	7.52	585.67
7-12-93	MW-8	591.72	5.84	585.88
7-12-93	MW-17	593.96	8.23	585.73

Table 2. Laboratory Test Results - Soil
Existing RCRA Area
General Motors Nodular Iron Plant
Saginaw, Michigan

Parameter	Sample Location				
	B-1 (0-2')	B-2 (0-2')	B-3 (0-2')	B-4 (0-2')	B-5 (0-2')
Arsenic, mg/kg	0.39	1.7	1.2	6.8	2.2
Nitrogen, Kjeldahl, mg/kg	<22	77	190	290	220
Solids, Total, percent	96%	94%	94%	93%	86%

Notes:
1) Soil samples were collected on July 12 and 13, 1993.
2) All values are reported in milligrams per kilogram (mg/kg), except for total solids.

Table 3. Measurement of Field Parameters for Groundwater Samples
General Motors Nodular Iron Plant
Saginaw, Michigan

Parameter	B-1 (7-12-93)	B-2 (7-12-93)	B-3 (7-13-93)	B-4 (7-13-93)	B-5 (7-14-93)	B-6 (7-14-93)	B-7 (7-14-93)	B-8 (7-14-93)	B-9 (7-14-93)	B-10 (7-14-93)
pH	7.85	9.6	9.6	> 10	9.38	> 10	> 10	--	--	--
Eh (mV)	+150	< -80	+150	< -80	+140	< -80	< -80	< -80	< -80	< -80
Conductivity	3500	5220	561	2070	3330	3480	1550	2280	586	926
Temperature (F)	82.7	84.6	81.7	74.2	62	62.2	62.6	58.2	62.3	67.7
Ammonia (mg/L)	17	1.2	4	4.0/3.9	210	160	350	26	31	17

NOTE: -- pH reading was not taken

Table 4. Laboratory Test Results - Groundwater
Existing RCRA Area
General Motors Nodular Iron Plant
Saginaw, Michigan

Parameter	Sample Location						
	B-1	B-2	B-3	B-4	B-4B	B-5	B-10
Arsenic, mg/l	0.023	0.002	0.012	0.026	0.025	0.055	0.008
Arsenic, dissolved, mg/l	0.009	0.002	0.006	0.006	0.011	0.047	0.008
Conductivity, umhos/cm	310	450	490	1,900	1,900	4,500	980
Nitrogen, Ammonia, mg/l	22	0.9	3.6	3.7	3.8	160	14
Nitrogen, Kjeldahl, mg/l	27	1.3	3.8	5.2	5.0	360	14
Solids, Suspended, mg/l	790	40	830	880	850	44	65

Notes:
1) Groundwater samples were collected on July 12, 13, and 14, 1993.
2) All values are reported in milligrams per liter (mg/l) except for conductance which is reported in umhos/cm.

APPENDIX A

SOIL BORING LOGS

Project	1040	Name	GM Foundry	Page	1 of 1
Location	Saginaw	Sampling Method			
Soil Boring	B-1	Operator	C. Lawton	Date	07/12/1993
Total Depth	9'	Assistant		Weather	partly cloudy
Surface Elevation		Geologist	R.Sherman		70-75 degrees F
				Time Started:	11:00 AM
				Time Finished:	1:30 PM

SAMPLE DEPTH (ft)	PID Reading (ppm)	RECOVERY (in)	SOIL DESCRIPTION
0-2	0.8	12	FILL 6" sand and gravel, loose, gray, dry,
2-4	0.1	18	from 6" to 5'9", FILL, sand, loose, light to dark brown, dry, moist to wet at 1'6", saturated at 2'0"
4-6	0	14	at 5'9", asphalt with trace gravel
7-9	0	14	at 6'0", obstruction
			at 7'0", FILL, sand, loose, gray to black, saturated
			at 8'0", SILTY CLAY with trace organic material - peat, soft, gray, moist
EOB			END OF BORING @ 9'
			NOTE - Eh and pH were measured in the field for soil samples collected from 0-2 and 2-4 feet below grade. 0-2 Eh +135 mV 2-4 Eh +170 mV pH 6.60 pH 7.80
			NOTE - A groundwater sample was collected at a depth from 4 to 6 feet. The groundwater sample was dark brown in color and very cloudy. Pumping of the groundwater provided a limited supply of water for sampling.

Project	1040	Name	GM Foundry	Page	1 of 1
Location	Saginaw	Sampling Method			
Soil Boring	B-2	Operator	C. Lawton	Date	07/12/1993
Total Depth	12'	Assistant		Weather	partly cloudy
Surface Elevation		Geologist	R.Sherman		70-75 degrees F
				Time Started:	3:00 PM
				Time Finished:	5:00 PM

SAMPLE DEPTH (ft)	PID Reading (ppm)	RECOVERY (in)	SOIL DESCRIPTION
0-2	0	16	FILL, sand with trace gravel, brick, slag, and organic material, loose, light to dark brown and dark gray to black, dry to moist, saturated at 3'2",
2-4	0	16	at 8'0" SILT with trace gravel and trace organic material - peat, shells,
4-6	0	10	soft, moist, no odor
6-8	0	18	at 10'3", SANDY CLAY with trace organic material - shells, roots, dark gray to black, soft, moist to saturated
8-10	0	14	
10-12	0	14	
EOB			END OF BORING @ 12'
			NOTE - Eh and pH were measured in the field for soil samples collected from 0-2 and 2-4 feet below grade. 0-2 Eh +85 mV 2-4 Eh +95 mV pH 10.24 pH 10.31
			NOTE - A groundwater sample was collected at a depth from 6 to 8 feet. The groundwater sample was light brown in color and cloudy to slightly cloudy. Pumping of the groundwater provided a steady stream of water for sampling.

Project	1040	Name	GM Foundry	Page	1 of 1
Location	Saginaw	Sampling Method			
Soil Boring	B-3	Operator	C. Lawton	Date	07/13/1993
Total Depth	13'	Assistant		Weather	sunny
Surface Elevation		Geologist	R.Sherman		70-75 degrees F
				Time Started:	10:30 AM
				Time Finished:	2:00 PM

SAMPLE DEPTH (ft)	PID Reading (ppm)	RECOVERY (in)	SOIL DESCRIPTION
0-2	0	20	FILL, sand with trace to little slag, trace gravel, brick, and wood, loose, dark to rusty brown and dark gray to black, dry to moist, saturated at 3'6",
2-4	0	18	at 6'0" obstruction
4-6	0	14	at 9'0" SILT with trace gravel and trace organic material - peat, shells,
6-8	0	0	soft, moist, no odor
9-11	0	2	at 11'0", SILTY TO SANDY CLAY with trace top little organic material - shells, roots, dark gray to black, soft, moist to saturated
11-13	0	20	
EOB			END OF BORING @ 13'
			NOTE - Eh and pH were measured in the field for soil samples collected from 0-2 and 2-4 feet below grade. 0-2 Eh -40 mV 2-4 Eh +140 mV pH 11.51 pH 8.92
			NOTE - A groundwater sample was collected at a depth from 4 to 6 feet. The groundwater sample was rusty orange or light brown in color and cloudy to slightly cloudy. Pumping of the groundwater provided a steady stream of water for sampling.

Project	1040	Name	GM Foundry	Page	1 of 1
Location	Saginaw	Sampling Method			
Soil Boring	B-4	Operator	C. Lawton	Date	07/13/1993
Total Depth	12'	Assistant		Weather	partly cloudy 70-75 degrees F
Surface Elevation		Geologist	R.Sherman	Time Started:	2:30 PM
				Time Finished:	5:30 PM

SAMPLE DEPTH (ft)	PID Reading (ppm)	RECOVERY (in)	SOIL DESCRIPTION
0-2	0	22	FILL, sand with trace to little slag and trace gravel, loose, dark to maroon brown and dark gray to black, dry to moist, saturated at 3'0",
2-4	0	16	at 10'6" SILT with trace organic material - peat, shells, soft, moist, no odor
4-6	0		at 11'0", SILTY TO SANDY CLAY with trace organic material - shells, roots,
6-8	0	8	dark gray to black, soft, moist to saturated
8-10	0	4	
10-12	0	14	
EOB			END OF BORING @ 12'
			NOTE - Eh and pH were measured in the field for soil samples collected from 0-2 and 2-4 feet below grade. 0-2 Eh +1.9 mV 2-4 Eh +20 mV pH 12.41 pH 10.75
			NOTE - A groundwater sample was collected at a depth from 6 to 8 feet. The groundwater sample was dark gray in color and very cloudy. Pumping of the groundwater provided a steady stream of water for sampling.

APPENDIX 12.3

G.5 Former (Replacement) Desulfurization Slag
RCRA Treatment Unit
MDNR Inspection Reports

CP-1

#777

Reply to: Washburn Building - Room 201
1230 South Washington
Saginaw, Michigan 48601

August 25, 1982

Mr. Norman Carter, Chief Metallurgist
GMC Chevrolet Saginaw Casting & Parts Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Dear Mr. Carter:

On August 5, 1982, staff of the Department of Natural Resources conducted an investigation of your facility located at 2100 Veterans Memorial Parkway in Saginaw, Michigan, to evaluate compliance of this facility with requirements of Subtitle C of the Resource Conservation Recovery Act (RCRA) as amended. The report is enclosed for your information.

As a result of this investigation, staff of the Department of Natural Resources have determined that the above mentioned facility is in violation of the requirements of Subtitle C of RCRA. Specifically, staff found that:

1. Waste located at the Nodular Iron paint waste shed was not separated or protected from sources of ignition or reaction, as required in 40 CFR 265.17. Also, ignitable waste at the Parts Plant waste storage shed did not meet the 50 feet minimum set back distance from the facility's property line, as required under 40 CFR 265.176.

NW-5

2. Owner or operator has not attempted to make arrangements with local authorities in case of an emergency at the facility, as required under 40 CFR 265.37(a).

3. The carbide waste pile does not need additional covering or protection from dispersal by wind when contained in the 3 sided concrete slab structure, as required in 40 CFR 265.251. However, carbide waste was found outside of the concrete slab area; the surrounding area was very dusty.

NW-3

4. Containers at the Nodular Iron paint waste shed and the Parts Plant PCB transformer storage area were not clearly marked with the start of accumulation date, as required in 262.34(a)(3). Also, waste containers at the Parts Plant were not properly labeled, as required under 262.34(a)(4) and 262.31.

PW-3

Cont.

You are hereby requested to respond to this letter by September 30, 1982, providing written documentation to this office regarding those actions taken to correct the above violations. Please address your response to this office.

If you have any questions regarding this matter, please feel free to contact me at (517) 754-1451.

Sincerely,

Helen A. Leinonen, Resource Specialist
Air Quality Division

Enclosure: Inspection Form

cc: Al Howard: OHWM, MDNR
U.S. EPA, Region V
Rick Johns: AQD, MDNR

HAL:vr

NW-3
NW-5
PW-3
EPA

CHEVROLET MOTOR DIVISION

General Motors Corporation

Saginaw Nodular Iron Casting Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

#777
GES
11/1/82

RECEIVED
SEP
AIR QUALITY DIVISION

September 20, 1982

Helen A. Leinonen, Resource Specialist
Air Quality Division
Department of Natural Resources
Stevens Mason Building
Box 30028
Lansing, Michigan 48909

Dear Ms. Leinonen:

In response to your letter of August 25, 1982, the following corrective action and/or comments pertain to items 1 through 4 of your letter.

1. A large trash container filled with paper and cardboard was inadvertently located next to the fence that surrounds the Waste Paint Solvent Storage Area at the Nodular Iron Casting Plant. It has since been removed with instructions to Yard Dept. personnel to keep this area clear of any containers or equipment whatsoever. Weekly inspections of the Hazardous Waste Storage areas will include an audit of the zone immediately surrounding the Waste Paint Solvent Storage Area.

   NW-5

   The Chevrolet Parts Plant Waste Storage Shed is located about 20 feet from a fence that separates this area from a railroad easement that runs through the Chevrolet property. The Chevrolet property extends 1500 feet west to the Saginaw River and 300 feet south to Sixth Street.

2. Because of the nature of activities carried out at the Metal Casting Plants and the type of emergency fire fighting equipment on hand, Chevrolet has opted not to enter into arrangements with the local emergency response teams. A statement to this effect is included in the Contingency Plan as required under 40CFR 265.53 (b). The amount of hazardous waste stored at any moment in time is considered small and, as stated above, well within the capability of in-house personnel and equipment to deal with on an emergency basis.

   EPA states (on page 33135 of the May 19, 1980 Federal Register) that the phrase "who may be called upon to provide emergency services" means that a contingency plan need not be filed with local authorities if the nature of the waste handled at a facility, or if the internal emergency response

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OCT 07 1982

capabilities at the facility, are such that local authorities will not be called upon to provide services either to the facility or to the people outside the facility.

3. With respect to Calcium Carbide Waste, procedures have been changed relative to the frequency of removing material after it has been deactivated. Whereas this was done on an approximately two week basis (thus allowing the bunker to be filled almost to capacity and some material to be inadvertently spilled or dumped beyond the strict confines of the slab), it is now removed approximately twice per week. This allows a much smaller quantity of material to be present on the slab at any one time, and, in addition, the Yard Dept. pushes this material deep into the bunker on a daily basis, this allowing plenty of free space at the entrance side of the bunker for the dumping of fresh waste. Finally written instructions have been documented for this operation and all concerned personnel have been made aware of these procedures and the importance of compliance with the RCRA requirements.

4. With respect to accumulation dates not appearing on hazardous waste containers at the Nodular Iron Waste Paint Solvent Storage area, we believe that we are in compliance with 40 CFR 265.1 (b) since this area is a designated storage area in our RCRA permit application operated under Interim Status. Containers in such areas are not required to be labelled with the start of accumulation date.

   Containers accumulating hazardous waste outside these designated areas, so called "satellite" areas where waste may be generated, are labelled with the start of accumulation waste, as required under 40 CFR 262.34.

   No PCB containers are located (or have been located) at the Parts Plant PCB Transformer Storage area. However the transformers are properly labelled although they may have been difficult to see under the plastic sheets protecting the transformers. These labels have the date of withdrawal from service clearly marked on them. (as required under the Toxic Substance Control Act - not RCRA).

   Waste containers at the Parts Plant RCRA Storage area did not have the required Hazardous Waste Labels. These labels have since been placed on the containers and steps taken to ensure that such containers are properly labelled in future.

The above corrective measures have been instituted to ensure that the Chevrolet Metal Casting and Parts Plant complex satifies the requirements Subtitle C of RCRA as amended. If there are any questions, do not hesitate to contact me at 517-776-2572.

Norman Carter
Chief Metallurgist

NC:mes

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
JACOB A. HOEFER
ROBERT HOLMES
E. M. LAITALA
HILARY F. SNELL
PAUL H. SPINDLER
HARRY H. VANDELEY

JAMES J. BLANCHARD, Governor
DEPARTMENT OF NATURAL RESOURCES
STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909
James F. Cleary, Acting Director

GE 7/22/83 Status 5 Code X

RCRA NW-3 NW-4 PW-3

June 27, 1983

GMC

General Motors Corporation
Chevrolet Saginaw Metal Castings
& Parts Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

MID 041 793 540

Attn: Mr. Norman Carter, Chief Metallurgist

Gentlemen:

On June 9, 1983, staff of the Michigan Department of Natural Resources conducted an inspection to evaluate your facility's compliance with the requirements of Subtitle C of the Resource Conservation & Recovery Act (RCRA), as amended. A copy of the report from the investigation is enclosed for your information.

As a result of that investigation, a determination has been made that your facility is in violation of the requirements of Subtitle C of RCRA. The following violations were noted:

1. The inspection schedule that identified items that would be inspected could not be located at the time of my site visit. The individual items inspected are not recorded during the weekly inspection. Only an okay for an entire area is noted and an occasional notation of observations made. Additionally, there were no entries indicating date and nature of any repairs or remedial actions. The inspection log would be greatly improved by use of a checklist covering all items inspected in each area. The general inspection requirements are found in 40 CFR 265.15.

2. Job titles and descriptions were not available for inspection as part of the training records. However, it was indicated this documentation is maintained by your personnel office. It was also indicated at the time of the inspection that one new employee had received training during the past six months. However, this was not recorded in the training record. Otherwise, documentation in this area was excellent. Refer to 40 CFR 265.16.

3. It was also noted that no smoking and other signs were on the calcium carbide treatment area were badly in need of repair or replacement, as evidenced by their being knocked down.

4. One drum in the Grey Iron Plant oil house had Zorb-all on its top and on the floor around it, apparently to absorb some spillage. Drums were stacked on top of one another and potential for rupture during handling by a forklift was discussed. In addition two open barrels (one recently filled) in the satellite area near the Nodular Iron oil house had been left opened. This is a violation of 40 CFR 265.173.

5. Leachate and runoff from the calcium carbide treatment area could not be removed since the drain to the wastewater treatment plant was plugged and had been for some time according to the inspection log. In addition, slag and other debris placed outside the containment slab would be subject to wind dispersal. Refer to 40 CFR 265.251 and 265.253.

6. Two chloroethane drums in the Grey Iron oil house were not labeled and dated at the time of the inspection (they were labeled and dated before the inspection was concluded). This was a violation of 40 CFR 262.34.

7. Finally, PCB capacitors were found being stored in two drums at the Parts Plant. The conditions under which they were being stored appeared to violate TSCA requirements. At the time of the inspection, it was indicated the drums would be transferred to an approved storage location immediately.

An Act 64 inspection was also conducted at the time of the RCRA inspection. A copy of the results of that inspection is also enclosed. In addition to the deficiencies cited above, the following must also be addressed:

1. No annual update for your closure costs could be found. Refer to R 299.6410(3).

2. Items 2.A., 2.B., and 2.H. concerning special conditions, as found on Form C need to be addressed.

3. As a general comment, it was noted that some materials required in your spill and accident prevention and contingency plans were contained in other documents viewed during the inspection.

You are hereby requested to respond to this letter within two weeks and indicate your plans for correcting the above deficiencies. Should you have any questions regarding this letter, feel free to contact me at (517) 373-2911.

Sincerely,

Scott C. Ross
Hazardous Waste Division

Enclosure
cc: U.S. EPA - Region V
J. Bohunsky/HWD Files
G. Calhoun

Central Foundry Division
General Motors Corporation
Saginaw Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

July 13, 1983

NW-3
NW-4
PW-3

Mr. Scott C. Ross
Hazardous Waste Division
Department of Natural Resources
Stevens T. Mason Building
Box 30028
Lansing, Michigan 48909

Dear Mr. Ross:

In response to your letter of June 27, 1983, the following corrective action and/or comments pertain to Items 1 through 7, and Act 64, Items 1 through 3 of your letter.

1. The weekly - general inspection requirements book (40CFR 265.15) as used since January 9, 1981, and approved during other inspection visits, was changed to a checklist covering all items inspected in each area. This checklist is attached, and covers the requirements of 265.15. This checklist is in the present book and will be reviewed and updated as necessary to meet all necessary requirements of this inspection.

2. 40CFR 265.16 - Personnel training requires in Section (d), the owner or operator must maintain documents and records at the facility that describe a written job description for each position under (d) (1) of the above section. These descriptions have been put in the training file, and the new employe at the Nodular Iron Oil House has been trained and his name entered in the file.

3. As noted in the inspection book, these signs had been in the hands of the Maintenance Department for three weeks, and had not been put up.

   The new signs were put up, and several signs repaired, and new signs added to improve the safety and security of the calcium carbide slag storage slab area.

   The signs will be maintained on a regular schedule, and replaced as needed.

4. The drum as described had Zorb-All placed on the drum in the area where it was collected. The drum has been cleaned, and the bung tightened.

   The drums are stacked on top of one another in a restricted area, one time, until they are shipped for disposal, and there is little chance for rupture or puncture, as they are not moved or lifted.

4. (continued)

The two drums described in the last sentence of Question #4, were in the Modular Iron Waste-Paint storage area, next to the Paint Shop. Two painters were in the process of cleaning the Paint Shop, and were dumping dirty solvent into these drums, via a funnel. When they finished their clean-up, the bungs were tightened, and the funnel left on top of the drums.

The full and properly labeled drum was removed to the primary storage area in the Modular Iron Oil House, the same day of the inspection.

5. The inspection log had described many time that the drain was plugged, and the proper departments and personnel notified of the condition.

The drain is being maintained in an open condition and will be redesigned to prevent plugging, in order that all leachant water from the calcium carbide slag area is being drained to the Wastewater Treatment Plant.

Pictures were taken of the calcium carbide slag storage area and taken to all involved personnel. They were also entered into the weekly inspection book.

We hope this will never happen again, and paper, wood, and foreign debris will not be placed in this area.

The slag and fines that were placed outside of the storage slab containment area was in violation of Section 40CFR 265.251 - Protection from Wind.

The pile will be managed so that wind disposal of dust is controlled.

6. This is the first time that drums of waste chloroethane VG were not properly labeled. The Oil House operator that is trained and puts the labels on the drums, was on vacation and had the labels locked up.

Drums are now labeled in the satellite areas where the waste is collected. The accumulation is entered on the label, and removed to the primary storage, N.I.P. & G.I.P. Oil House within 90 days.

7. The two drums of PCB capacitors found in the waste storage area at the Chevrolet Parts Plant were taken to the Casting Development Plant PCB storage area the next day, June 10, 1983, and recorded in our PCB record books as being stored for the Chevrolet Parts Plant until disposal and incineration later this year.

Since June 10, 1983, two other drums of PCB capacitors have been put in our PCB storage area.

ACT 64

1. The update of closure costs and report as required under R299.6410(3) - Closure Plan is updated and provision made for a yearly review and update.

2. Drain in the center of the calcium carbide slag storage area will be kept ope so all surface, leachant, and inwater will drain to the Wastewater Treatment Plant. Item 2.A.

   Calcium carbide slag area containment is watered down on a daily basis to render the material non-ignitable and inactive so that it can be removed to the Hatchett Pile. Item 2.B.

   Personnel and management have been informed that this material cannot be dumped outside the barrier wall. The area has been cleaned up and is being kept in proper operating condition. The area is inspected everyday and recorded in the weekly inspection book. Item 2.H.

3. The plan that we now have was set up to meet the requirements of 40 parts 100 to 399 - revised as of July 1, 1980.

   The requirements as described in the Department of Natural Resources RCRA Inspection Report - Act 64 Disposal Facility Inspection Report, and Act 64 Quarterly Inspection, will be incorporated into our system in the near future.

The above corrective measures have been instituted to ensure that Central Foundry Division, General Motors Corporation, Grey Iron Plant/Nodular Iron Plant, satisfies Subtitle C of RCRA as amended.

If there are any questions, do not hesitate to contact me at (517) 776-2572. Thank you.

Sincerely,

Norman Carter

Norman Carter
Chief Metallurgist

MER/slc

cc: J. Medved
D. Hansen
D. Shaw
U.S. EPA Region V
J. Bohunsky/HWD Files
G. Calhoun
J. Findlay

xc: J. Bohunsky/HWD Files
U.S. EPA Region V

EXHIBIT 2

STATE OF MICHIGAN

NW-3

ATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
E A CAROLLO
JACOB A HOEFER
STEPHEN E VONSMA
HILARY E SNELL
PAUL W WENDLER
HARRY W WHITELE

JAMES J BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T MASON BUILDING
BOX 30028
LANSING, MI 48909

RONALD O SKOOG Director

Reply to: Saginaw State Office Building
411-J East Genesee
Saginaw, Michigan 48607

June 22, 1984

GMC Central Foundry Division
Saginaw Nodular Iron Castings Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Attention: D.C. Johnson, Plant Manager
Meredith E. Robinson, Chemist and Environmental Coordinator

Gentlemen:

On June 14, 1984, staff of the Michigan Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency and Joe Boyle of the United States Environmental Protection Agency conducted an investigation of your facility located in Saginaw, Michigan, to evaluate compliance of that facility with requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), as amended.

As a result of this investigation staff of the Department have determined that the above facility is in violation of the requirements of Subtitle C of RCRA. Specifically, staff observed the following violations:

NW-3

1. The waste analysis plan does not specifically address the analysis of the treated waste pile to determine if the calcium carbide slag has been totally reacted by the quenching process and rendered non-hazardous. This is a violation of 40 CFR 265.13 (a)(1).

2. A review of the inspection log revealed that time of the inspection was not consistently indicated and the remedial actions taken were not always identifi This is a violation of 40 CFR 265.15 (d).

3. An inspection of the treatment slab revealed areas where the reenforcement rod have been exposed resulting in a potential safety hazard. This condition was not reflected in the inspection log and remedial actions have not been taken t date to correct this problem. This is a violation of 40 CFR 265.15 (c) and 40 CFR 265.403 (3).

transfer.

It is suggested that you consider amending your Part A application to license the gondolas under 40 CFR 265 Subpart Q. By doing so the gondolas become a physical treatment device which allows the calcium carbide slag to cool to a less hazardous state. While under this situation the gondolas would be subject to inspection, they could be placed adjacent to the treatment pad for cooling and not subjected to the container requirements under 40 CFR 265.173. Furthermore, these gondolas could then be managed in a manner that would protect them from materials or conditions which may cause them to ignite or react, pursuant to 40 CFR 265.256 (a)(2). This could be accomplished by leaving the gondolas inside the plant to cool in the event of rain, or placing the waste on the treatment slab for immediat treatment when it begins to rain. Careful management in this manner would allow y facility to stay in compliance with 40 CFR 265.256 (a)(2), 40 CFR 265.405 (a)(1), and 40 CFR 265.173 (a).

Pursuant to Act 64, P.A. of 1979, as amended a quarter inspection under the Michigan Hazardous Waste Management Act was also conducted at the time of the RCRA inspection.

In addition to the deficiencies cited above the following violations must also be addressed:

1. During our inspection a gondola of calcium carbide was being transported to the treatment slab in a manner that resulted in spills between the point of generation and the treatment slab. Special Condition 3 C of your Operating License requires immediate clean up of these spills and the material to be placed on the treatment pad. This was not done for the spills observed.

2. Evaluations to determine if the calcium carbide slag remains hazardous after treatment must be refined. Treated calcium carbide slag that remains hazardou must not be placed in your Type III Landfill.

3. Paragraph 6 of the Special Conditions of your Operating License indicates that you must ensure the integrity of the treatment slab to detect failures. Cracking of the slab was obvious on the apron during the inspection. This must be addressed immediately.

4. Fugitive emissions were evident around the entire perimeter of the treatment slab. This violates paragraph 3 F of the Special Conditions of your Operating License and 40 CFR 265.31.

5. As an uncovered reaction vessel your facility did not provide 2 feet of freebo per Rule 425 (6). Calcium carbide slag was piled well above the containm wall.

6. Several cracks were noted in the containment areas cement pad adjacent to the oil house. Remedial action should be taken to correct this deficiency.

Central Foundry Division
General Motors Corporation
[illegible]
[illegible] Vernor Memorial Parkway
Saginaw, Michigan 48601

RECEIVED
AUG 16 1984
SAGINAW DISTRICT
H. W. SLVQD GWQD LAW 41R

August 15, 1984

Department of Natural Resources
Saginaw State Office Building
411-J East Genesee
Saginaw, Michigan 48607

Attention: Mr. J. J. Sygo - Hazardous Waste Division

Dear Mr. Sygo:

In reply to your letter of June 22, 1984, concerning calcium carbide handling and disposal, and pursuant to our meeting on July 24, 1984, the following response is made addressing the items noted in your letter. The reply is made on the basis of the item numbers in your letter on Pages 1 and 2, #1-8 and on pages 3 and 4, #1-6.

Pages (1) and (2)

1. Waste Analysis Plan - The analysis of the treated calcium carbide slag will be accomplished by a field tube test method (Dräger Tube) that will insure the absence of acetylene gas before disposal. This will be monitored daily until an agreement is reached between both parties to a lesser sampling time. This procedure has been included in our waste analysis plan.

2. Inspection Record - We will continue to inspect the treatment area and consistently enter all repairs and other remedial actions as required.

3. Treatment Slab Condition - A repair order has been issued to repair the area where the re-inforcement rods are exposed. This will be scheduled as soon as possible but not later than September 1, 1984 so as not to interfere with slag removal.

4. Training of Hourly Employes - Specific instructions of all training requirements have been given to the supervisors and all hourly employes involved on July 30, 1984. Any other communications necessary to insure proper handling and disposal will be forwarded to their supervisor by the environmental co-ordinator as so noted.

5. Contingency Plan - A modified contingency plan and emergency procedure will be updated to include the Grey Iron Plant. This will be completed by September 1, 1984. Mr. Robert Offenborn is the environmental co-ordinator at the Grey Iron Plant.

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

NW-3

MID 041 703 340

October 8, 1984

Dept. of Natural Resources
State Office Building
411-J E. Genesee
Saginaw, MI 48607

SUBJECT: Calcium Carbide Treatment Area

ATTENTION: J. Sygo - Hazardous Waste Division

Pursuant to the Management meeting with you and our manager of Plant Engineering on September 26, 1984, to the quarterly inspection of the Calcium Carbide Slag Treatment Area, the review of your letter of June 22, 1984, and the reply of our letter dated August 15, 1984, the following responses are submitted:

Your recommendation to concentrate our priorities on specific areas of concern is being addressed. They are: (1) Analyze the calcium carbide slag for potential toxic gases; (2) Control fugitive dust emissions; (3) Assure the complete deactivation of acetylene gas; and (4) Update on the wetting foam dust suppression injector system status.

At this time, an outside consultant, Residuals Management Technology, Madison, Wisconsin, has been retained to complete the items listed below:

1. a. Gather waste samples for analysis - week of October 8, 1984.
   b. Complete analysis of waste material - by December 3, 1984.
   c. Recommend short term action to address the recommendations previously stated - January 11, 1985.

2. The trial wetting agent was given to the contractor on the morning of September 27, 1984, and applied during the watering operation. It took approximately 1½ hours to completely saturate the slag. This was very effective in deactivation and fugitive dust control. The installation of more spray nozzles and the wetting injection system should greatly improve the distribution and coverage of the dust suppressant.

3. Assuring the complete deactivation of acetylene gas is being accomplished by the testing of the off gas. This is being done at the end of the wetting period, and is listed in our standard operating procedure. New measuring instrumentation is being investigated. See (1) of the proposals attached.

4. The new wetting foam dust suppression injection system has been received and will be installed no later than November 5, 1984. (See attached brochure and sketch).

Should you have any further questions concerning the items discussed, please contact the Plant Engineering Coordinator, J. V. Findlay, Nodular Iron Plant, at (517) 776-2464.

Sincerely,

M. B. Hamilton
Plant Manager

MBH:df

NATURAL RESOURCES COMMISSION
MAS J ANDERSON
CAROLLO
OB A HOEFER
STEPHEN F MONSMA
HILARY F SNELL
PAUL H WENDLER
HARRY H WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

RONALD O. SKOOG, Director

MID 041 733 5-0

NW-3

411-J East Genesee
Saginaw, Michigan 48607

November 2, 1984

N.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Dear Mr. Hamilton:

The Department of Natural Resources has received the material that you submitted on October 15, 1984, in response to deficiencies revealed in the inspection which this Department conducted on September 27, 1984. The purpose of the inspection was to determine compliance with the provisions of the State Hazardous Waste Management Act, Act 64, Public Acts of 1979 as amended.

While your submittal has addressed the areas of concern that were raised as a result of the inspection, it will be necessary to demonstrate operational compliance at the calcium carbide treatment facility. Staff will return to your facility to evaluate operational compliance in the very near future. Should you have any further questions, please contact us at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517/771-1731

JJS:rh
cc: John Bohunsky/C&E File
Al Howard
EPA Region V

NW-3
NW-4

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
CAROLLO
JACOB A HOEFER
STEPHEN F MONSMA
HILARY F SNELL
PAUL H WENDLER
HARRY H WHITELEY

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING
BOX 30028
LANSING, MI 48909

RONALD O. SKOOG, Director

411-J East Genesee
Saginaw, Michigan 48607

December 19, 1984

MID 006179331

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Dear Mr. Hamilton:

On November 15 and 28, 1984, staff of the Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency, conducted an investigation of your facility located at Saginaw, Michigan. The purpose of that investigation was to evaluate compliance of your facility with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) and the Hazardous Waste Management Act, Act 64, P.A. of 1979, as amended.

As a result of that investigation, staff of the Department have determined that the above facility is in violation of the requirements of Subtitle C of RCRA. Specifically, staff cited the following violations:

1. An inspection of the calcium carbide treatment slab revealed areas where the reinforcement rod continues to be exposed resulting in a potential safety hazard. This condition was also reflected in the inspection log, yet remedial actions have not been taken. This continues to be a violation of 40 CFR 265.15 (c) and 40 CFR 265.403 (3) & (4) as stated in our letter of June 22, 1984.

NW-3

2. The drain in the calcium carbide treatment slab continues to remain blocked. Nightly earthen dikes are constructed to drain the facility to a manhole located on the apron of the treatment slab. On at least two occasions the earthen dikes broke open and the wastewater escaped the containment area. This violates 40 CFR 265.503 (a)(1) and (4), and continues to be an unacceptable method for operating this treatment facility.

3. Your Part A application has not been amended as suggested in our June 22, 1984 letter. This results in violations under 40 CFR 265.173 (a) which requires the gondolas to be closed during storage. I understand that this item in part will be addressed by the submittal of your Part B application to EPA Region V.

4. The water pressure available to the nozzles is insufficient and does not allow the spray from the nozzles attached to the wall of the treatment facility to reach the center of the treatment area. Furthermore at least three nozzles on the back wall of the facility were not operating the morning of November 15, 1984. The combined deficiencies resulted in visible emissions, both during the treatment process and during the removal of the treated waste. This violates 40 CFR 265.17 (b). Water pressure and fogging nozzles were originally to be installed by October 29, 1984, pursuant to your letter of October 15, 1984. Visible emissions continue to exceed 20% during the treatment process which violates your Act 348 Permit and Act 64, Operating License.

5. Warning signs required by 40 CFR 265.14 (c), on the east side of the treatment facility were unreadable due to the dust and pitting caused by the treatment process. These signs must be cleaned or replaced immediately.

6. While not a violation, the waste piles exceeded a 24-inch limitation which was imposed to improve treatment and water penetration. This limitation was imposed in G.B. Mauch's letter of October 11, 1984.

7. An operating record was not available for the container storage sites at the time of our inspection. This is a violation of 40 CFR 265.73 (a) & (b). The operating record must provide a description of each hazardous waste received the method and dates of it storage, and the quantity at each location.

NW-4

8. Based upon your mode of operation, waste slag is placed on the treatment pad but treatment does not take place until the third shift. You therefore have a waste pile in temporary storage which is required to be treated immediately under 40 CFR 265.405 (a). 40 CFR 265.256 (a)(2) requires that this waste pile be managed in such a way that it is protected from any material or condition which may cause it to ignite or react. This management is not available at your present facility.

Pursuant to Act 64, P.A. of 1979, as amended, the quarterly inspection under the Michigan Hazardous Waste Management Act was also conducted at the time of the RCRA inspection.

In addition to the violations cited above the following violations were also observed.

1. Operation of your facility has been in violation of Rule 404 (b) & (f) since June of 1984. While some efforts have been documented to correct these violations it has become clear the full compliance will not be attained given the current design of the facility. This also violates Part I General Condition 6 of your Act 64 Operating License.

2. Warning signs at the facility were difficult to read due to the dust from emissions. The signs must be replaced or cleaned to comply with Part I General Condition 8. c. of your Operating License.

3. General Condition 9 of your Operating License requires at least two employees shall be on-site and whenever hazardous waste is being poured, mixed, spread or otherwise handled. During my November 15, 1984 inspection, only one individual from the contracting firm was at the site. This violates General Condition 9.

4. Diking currently used during the treatment operation is not adequate for this facility and violates General Condition 10. C. of your Operating License.

5. Part II Special Conditions of your Operating License requires that the facility be operated and maintained to prevent discharge to groundwater. This condition has been violated on at least twice when the temporary earthen dikes failed. Drainage must be provided within the treatment area.

6. Due to the poor coverage of the facilities spray nozzles resulting from the lack of water pressure and malfunctioning nozzles, portions of the calcium carbide slag could not be adequately treated as required by Special Condition 3. B. of your Operating License.

7. Iron ingots removed prior to treatment of the slag and stored for reuse contain hazardous calcium carbide slag. Removing this waste with the ingots prior to treatment, appears to violate Special Condition 3. G. & H.

8. Inspections required by Special Condition 6 are documented, however, remedial action has not been taken to correct failures of the treatment pad when noted.

9. The secondary containment facility holding your D001 waste did not have adequate capacity to contain the number of containers stored at the site. Act 64 requires secondary containment that will be sufficient to contain 150% of the volume of waste to be stored. This violates Rule 703 of Act 64. Provisions must be taken to reduce the number of drums stored or provide additional containment.

NW-4

We request that you respond to this letter by January 9, 1985, and provide documentation regarding the actions taken to correct these violations and/or a schedule by which time the violations cited will be corrected.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517/771-1731

JJS:rh
cc: EPA Region V
John Bohunsky/C& E File
Al Howard
Jack Findley - GMC

GMC Saginaw Castings Nodular Iron c: J. Schumby, KYEA
Al Howard
NW-3
NW-4

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

January 9, 1985

RECEIVED
JAN 9 1985
SAGINAW DISTRICT
H. W. SWGD GWGD LAW, AIR

Michigan Department of Natural Resources
Hazardous Waste Division
Saginaw District Office
Saginaw, Michigan

Attention: Mr. J. J. Sygo

Dear Mr. Sygo:

This is to reply to your letter of December 19, 1984, regarding the calcium carbide treatment and solvent storage areas.

Since June 22, 1984, there have been extensive revisions, to the calcium carbide treatment areas. Residuals Management Technology, Inc. (RMT) has been retained to develop a plan for the RCRA Part A amendment and Part B applications to be filed by February 15, 1985. The November 1, 1984, meeting at the Nodular Iron Plant between the EPA-Region V, MDNR-Hazardous Waste Division, Nodular Iron and RMT was to my understanding to develop a temporary plan to address the deficiencies in the previous correspondence. Our intention, then as now, is to pursue everything necessary to insure compliance in a reasonable time.

Some of the steps taken:

A. A new water spray distribution system was installed in the treatment area and completed December 30, 1984. The new wetting system appears to be sufficient to control the fugitive dust problem and provide treatment of the slag. This system was first used on January 2, 1985, and in spite of some nozzle freezing, treatment was maintained. Various steps are being investigated to remedy the freezing problem.

B. RMT gathered samples of calcium carbide on June 29, 1984, for laboratory analysis. Attached are the laboratory reports from the slag analysis taken on June 29, 1984, pertaining to the EP Toxicity and ASTM Leachate Tests. These samples show parameter levels below the EPA Hazardous Waste Limits.

C. RMT's air sampling results from October 10, and October 11, 1984, have been consistent with findings obtained by the G.M. Industrial Hygiene Department and the Michigan Division of Occupation Health (attached). You will note that they are all well within the permissible exposure limits (PEL) for the contaminants of concern. (Mr. R. Dayringer M.D.O.H, is in the process of finalizing his report and you may obtain a copy from him at your building).

In reply to Items #1-7 pertaining to Act 64 Regulations:

1. Rule 404 (b) & (f) pertaining to (b) air emission and (f) RCRA violations are being addressed as previously mentioned.

2. Warning Signs - See Item #5 as aforementioned.

3. General Condition 9 - Operating License - Another contracting employe has been added to the handling operation on third shift to meet General Condition 9 of our operating license.

4. & 5. Diking & Draining - We understand that current diking and drainage conditions were agreed to as a temporary measure at the November 1, 1984, meeting between the EPA-DNR-RMT and Nodular Iron. We recognize the problems and will continue to address them and make corrections.

6. Nozzle Water Pressure - This has been corrected per the new spray system installed and operating as of January 2, 1985.

7. Iron Ingot Removals - As we discussed at the November 1, 1984, meeting, changes in operation procedures are being explored, which would remedy this problem. In the meantime, it was our understanding that based on this meeting, we could continue to recycle. (See Item #4-November 1, 1984 Meeting attached).

8. Treatment Pad Failures - Plant personnel have been instructed to record remedial actions when it is taken. See Item #1 - Page 2.

9. Secondary Containment Facility - All drums will be removed by January 11, 1985. Personnel have been instructed to more closely monitor the 150% maximum capacity and not to store more than one (1) empty drum in the area.

In Summary:

Corrections are being made in good faith, and tangible progress is being made. Due to the difficulties in treating and handling of calcium carbide slag, we welcome assistance to resolve all the forementioned problems. Jack Findlay, our Environmental Coordinator, or myself will be in contact with you shortly to set up a meeting.

If you have any further questions, you may contact Jack at (517) 776-2464.

Sincerely,

M. B. Hamilton
Plant Manager

JVF/slc

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

EXHIBIT 5

8 0104

File
Follow

STATE OF MICHIGAN

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
E. R. CAROLLO
MARLENE J. FLUHARTY
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RAYMOND POUPORE
HARRY H. WHITELEY

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

State Office Building
411-J E. Genesee
Saginaw, Michigan 48607
April 10, 1985

RECEIVED
PLANT MANAGER
APR 12 1985
Central Foundry Division
Saginaw Nodular Iron Plant

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Re: Act 64 Inspections
of March 25, & 29, 1985

Dear Mr. Hamilton:

On March 25, & 29, 1985, staff of the Department of Natural Resources and the Environmental Protection Agency, conducted an investigation of your facility located at Saginaw, Michigan. The purpose of the investigation was to evaluate compliance of your facility with the requirements of Act 64, P.A. 1979, as amended, and your Act 64 Operating License.

As a results of that investigation, staff of the Department have determined that the above facility is in violation of Act 64 requirements. Specifically, staff cited the following violations:

1. Operation of your facility continues to be in violation of Rule 404(b) and (f). While substantial efforts have been documented to reduce the extent of these violations, it has become clear that full compliance will not be attained given the existing technology for treatment used at this facility. We urge you to investigate alternative technologies that might available to contain the emissions given off as a result of treating the calcium carbide slag with water. This may involve a closed system technology which would result in the need to collect the emissions and scrub them with a device to be constructed as part of a new facility.

2. Diking currently used during the treatment operation continues to be inadequate for this facility and violates General Condition 10.C. of your Operating License.

3. Part II of the Special Condition of your Operating License requires that the facility

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

be operated and maintained to prevent discharge to groundwater. This condition has been violated on several occasions when the manhole receiving the runoff from the containment area failed to drain the water. This violation can only be corrected as part of the construction of a new facility that would also meet the visible emissions required under Item Number 1 above.

4. Iron that is removed as part of the treatment of the slag and stored for reuse are assumed to contain hazardous calcium carbide slag. Removing this waste without treatment violates Special Condition 3.G. & H of your Operating License.

5. While not a violation the waste piles exceeded the 24 inch limitation on March 29, 1985, which was imposed to improve treatment and water penetration at this facility, this limitation was imposed by G.B. Mauch's letter of October 11, 1984.

6. Emergency equipment at the site of the facility was not in operating condition at the time of the inspection. The fire hose utilized to control fires within the facility and to assist in spraying the waste had been cut by equipment in the area and has not yet been replaced. This is a violation of 40 CFR 265.33.

7. Piles of calcium carbide slag are typically placed within the treatment facility and left until third shift, until treatment commences. This results in a reactive waste being subjected to the influence of the local weather. 40 CFR 265.256 (a) (2) requires that piles of reactive or ignitable waste be protected. Having this waste subjected to the potential of spring rainstorms will result in the material being reacted prior to the desired time of treatment.

We request that you respond to this letter by April 26, 1985, and provide documentatation regarding the actions to be taken to correct these violations and/or a schedule by which time the violations cited will be corrected.

We advise you to work closely with your EPA Permits Engineer to determine whether a facility of this nature can be permitted under the Resource Conservation and Recovery Act Amendments of 1984. Your proposed design in your Part B Application is currently under review however, based on your existing facility's operation it is questionable that your new design can meet the requirements of the Resource Conservation and Recovery Act Amendments and Act 64, P.A. 1979, as amended.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim J. Sygo

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517-771-1731

JJS:amc

cc: J. Bohunsky/C & E File
A. Howard
J. Findley, GMAC

MID 071 793 3

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

APR 25 1985

RECEIVED

AIR QUALITY DIVISION

April 23, 1985

Mr. James Sygo
Michigan Department of Natural Resources
Hazardous Waste Division
411J Genesee Avenue
Saginaw, Michigan 48607

Subject: Calcium Carbide Treatment Facility

Dear Mr. Sygo:

In reply to your letter of April 10, 1985, referring to your inspection of March 25th and March 29, 1985, and to your comments on the alleged facility violations we are proceeding on schedule with the Part B application to meet the Federal Hazard Waste Regulations (RCRA) and Michigan Act 64 requirements.

Everything is being done that can be done utilizing the best available technology. Continued development of improved methods is still in process and will be utilized as improved methods become known.

The Part B application filed with USEPA Region V, on February 15, 1985, includes a new facility and location that we feel will answer and comply with the noted Item #'s 2, 3, 4, 5, and 7 in your letter. The recent construction drawings for the new facility have been completed and were filed on April 15, 1985.

Item #6, referring to emergency equipment at the site, has been corrected. A fire hose has been provided by the treatment and disposal contractor (Champagne & Marx) and is in their possession.

In response to Item #1, alternatives to the proposed method are being investigated as you are aware, but no positive solutions are available at the present time. It is our intent to continue with the present submittal, but propose a pilot operation that will meet interim status and Part 265.193 of 40 CFR (pilot operation). Therefore, the Saginaw Nodular Iron Plant desires a meeting with the regulatory agencies to review these items, establish compliance dates and address your concerns about the proposed facility. Mr. Jack Findlay, our Environmental Coordinator, will be contacting you to establish a meeting date.

We thank you for your cooperation in this difficult endeavor and if you have any questions, please contact me, or Jack at 776-2474.

Yours truly,

M. B. Hamilton
Plant Manager

:slc

NW-3
NW-4
RCRA

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
CARLENE J. FLUHARTY
STEPHEN V. MONSMA
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

RONALD O. SKOOG, Director

411-J East Genesee
Saginaw, Michigan 48607

December 17, 1985

Mr. M.B. Hamilton, Plant Manager
Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Re: RCRA & Act 64 December 4, 1985 Inspection
G.M. Central Foundry
Nodular Iron Plant
MID 041793340

Dear Mr. Hamilton:

On December 4, 1985, staff of the Department of Natural Resources, acting as representatives of the United States Environmental Protection Agency, and a representative of the United States Environmental Protection Agency, conducted an inspection of your facility located at Saginaw, Michigan. The purpose of the inspection was to evaluate compliance of that facility with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA) as amended, and Act 64, P.A. of 1979, as amended.

As a result of that inspection, staff of the Department have determined that the above facility remains in violation of Subtitle C of the RCRA and Act 64. Specifically, staff cited the following violations:

1. The time of inspection was not indicated on the inspection logs dated for November of 1985. 40 CFR 265.15 (d) requires that the time of inspection be recorded.

2. The date that repairs take place are not indicated in the inspection log as required by 40 CFR 265.15 (d).

3. Calcium carbide slag was being spilled to the floor during the slagging operation and was not being cleaned up based upon the pile that had collected near the gondolas receiving the waste. This violates 40 CFR 265.31 and requires that immediate action be taken to assure that all slag is captured in gondolas.

NW-3

4. Gondolas are being stored on a temporary basis in the iron house to prevent the waste from reacting during wet weather. This violates 40 CFR 265.256 (a)(2). The iron house has several sources of water that could come in contact with the waste. A permanent site for temporary cooling must be identified and used for the storage of hot gondolas.

5. Treatment of the waste in the existing facility does not meet the requirements of 40 CFR 265.256. Treatment of reactive or ignitable wastes cannot take place in a waste pile.

6. Treatment by chemical, physical, or biological methods is only allowed in tanks, surface impoundments, and land treatment facilities. Your facility has been formally amended on your Part A application to meet the definition of a waste pile. This violates 40 CFR 265.400. This problem has been addressed in your Part B application by proposing the construction of tanks for the treatment of the Calcium Carbide Slag.

7. Manifest number MI 0519650 indicated that an 029L waste was being manifested as a non-hazardous wastes when based upon the description a hazardous F001 waste was being shipped. This violated 40 CFR 262.21. A letter must be sent to correct those manifest violations cited. Similar manifest violations were observed on Manifest numbers MI 0650770 and MI 0650723 involving the DOT shipping name.

NW-4

8. Two of four drums stored in your 90 day storage facility were not labeled with the words, "Hazardous Waste" and did not have accumulation dates. This violates 40 CFR 262.34 (a)(3) and (2) respectively.

9. The discharge control system originally designed for the system is no longer functional and has been replaced with a diked discharge channel to an off-site drain. Based upon inspection reports, this discharge control system is not inspected during a period when it is subject to failure. These dikes must be inspected at the time of discharge to meet the requirements of 40 CFR 265.403 (a)(1) on a daily basis.

In addition to these RCRA violations the staff of the Department also cited the following violations of Act 64 rules and your Operation License.

A. Diking used at the facility allows runoff to be discharged out of the treatment pad. The natural slope of the floor of the facility is also to the outside of the treatment pad. This violates General Condition 10.C. of your Operating License.

B. Calcium carbide slag was evident in areas adjacent to the treatment pad. This is assumed to have been caused from the transport of overfilled gondolas. Your Operating License requires that these spills be cleaned up immediately and placed in the treatment pad for treatment.

C. Operation of your facility continues to violate Rule 404 (b) and (f). Cooling of the gondolas for 24 hours prior to treatment has substantially reduced emissions, however Part I, General Condition 6 of your Operating License continues to be violated.

D. Iron ingots removed prior to treatment of the slag and stored for reuse contains hazardous calcium carbide slag. Removing this waste with the ingots prior to treatment violates Special Condition 3.G. and H. of your Operating License.

E. Several monthly operating reports since July have shown that you exceeded 1000 cu. yards per month of calcium carbide treatment. This violate Special Condition 2 of your Operating License.

We request that you respond to this letter by January 8, 1985, and identify those actions taken to correct the violations cited.

As you know a Consent Agreement is in the process of being negotiated to address the construction of a pilot facility for future treatment testing and interim actions to be taken at the existing facility. Failure to enter such an agreement with the Department will result in license revocation proceedings being initiated.

Should you have any questions concerning the violations cited, please contact us at the number listed below.

Sincerely,

Jim J. Sygo
Hazardous Waste Division
(517) 771-1731

JJS:rh
cc: J. Bohunsky, C & E File
A. Howard
EPA Region V
J. Findlay - GM

MID 041 775 570

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

8 0108

State Office Building
411-J E. Genesee
Saginaw, Michigan 48607
February 7, 1986

Mr. Michael B. Hamilton
Plant Manager
Saginaw Nodular Iron Plant
G.M.C. Central Foundry Division
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605-5073

Re: RCRA & Act 64 Inspection
of December 4, 1985

Dear Mr. Hamilton:

The Department of Natural Resources has ~~received~~ the material you submitted on January 22, 1986, in response to violations revealed in the December 4, 1985 inspection which this Department performed as a representative of the U.S. Environmental Protection Agency The purpose of the inspection was to determine compliance with the provisions of the Resource Conservation and Recovery Act (RCRA).

Your submittal has addressed items 1, 2, 3, 6, 7, 8, and 9, cited in our December 17, 1985 letter. Finalization of the Consent Agreement is expected to address the remaining violations that exist at your facility. We expect to have the Department's comments compiled by February 14. 1986, and hope that the Consent Agreement can be initiated shortly thereafter.

Should you have any further questions, please contact me at the number listed below.

Sincerely,

Jim J. Sygo
Hazardous Waste Division
Saginaw District Office
517-771-1731

JJS:amc
cc: EPA Region V
J. Bohunsky/C&E File
A. Howard

NW-3
RCRA

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
ARLENE J. FLUHARTY
EPHEN V. MONSMA
STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE
HARRY H. WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

Gordon E. Guyer, Director

411-J East Genesee
Saginaw, Michigan 48607
April 7, 1987

Michael Hamilton, Plant Manager
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 3/10/87 ~~Act~~ 64 Inspection
MID 041793340

Dear Mr. Hamilton:

On March 10, 1987, staff of the Department of Natural Resources Hazardous Waste Division conducted an investigation of your facility located in Saginaw, Michigan. The purpose of the investigation was to evaluate compliance of that facility with the requirements of Act 64, P.A. 1979, as amended, and the facility's Operating License.

As a result of that investigation Department staff have determined that your facility is in violation with the requirements of Act 64 and the facility Operating License. The following violations were noted:

NW-3

1. The slope of the facility floor and diking used at the facility allows runoff to be discharged out of the treatment pad area. This violates General Condition 6a and 6b of your Operating License.

2. The treatment pad runoff problem has been identified in previous inspections. Failure to remedy this situation violates General Condition 10c of your Operating License.

3. Fire and excessive smoke emissions were observed at the calcium carbide treatment facility on 4/1/87. This violates General Condition 6a and 6b of your Operating License. Furthermore, on 3/27/87, hot slag was placed in the treatment facility. This violates the facility's agreement to cool the slag for 24 hours prior to treatment and 40 CFR 265.405.

4. Cracks were noted in the base of your secondary containment for your hazardous waste drum storage. This violates 40 CFR 264.175 (b)(1). The cracks must be sealed immediately.

5. As noted in previous inspections, gondolas are not marked with the words "HAZARDOUS WASTE", or the accumulation date as required by 40 CFR 262.34. Furthermore, gondolas are not stored closed as required by 40 CFR 265.172(a). Due to the type of waste generated, we have not enforced these regulations. Appropriate signs must be placed in the iron house where gondolas are cooling to indicate the material held in the gon's are hazardous due to its reactivity.

6. While not a violation, it was also noted that some of the signs at the treatment facility are not readable and must be replaced.

We request that you respond in writing by April 30, 1987, and provide documentation of those actions taken or to be taken to correct the violations identified.

Sincerely,

Jim J. Sygo
Waste Management Division
Saginaw District Office
517-771-1731

JJS:amc
cc: U.S. EPA - Region V
John Bohunsky/C & E File

TURAL RESOURCES COMMISSION
THOMAS J ANDERSON
E R CAROLLO
MARLENE J FLUHARTY
STEPHEN F MONSMA
O STEWART MYERS
RAYMOND POUPORE
HARRY H WHITELEY

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

Gordon E. Guyer, Director

411-J East Genesee
Saginaw, Michigan 48607
July 16, 1987

James E. Wheeler
Plant Manager
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 6/3/87 Act 64 Inspection
MID041793340

Dear Mr. Wheeler:

On June 3, 1987, staff of the Department of Natural Resources, Waste Management Division conducted an investigation of your facility located in Saginaw, Michigan. The purpose of the investigation was to evaluate compliance of that facility with the requirements of Act 64, P.A. 1979, as amended, and the Facility's Operating License.

As a result of that investigation, Department staff have determined that your facility is in violation with the requirements of Act 64, and the Facility Operating License. The following violations were noted:

1. The slope of the facility floor and diking used at the facility allows runoff to be discharged out of the treatment pad area. This violates General Condition 6a and 6b of your Operating License. Proposed corrections for this violation were submitted on July 2, 1987, and are currently being reviewed by the Department.

2. The treatment pad runoff problem has been identified in previous inspections. Failure to remedy this situation violates General Condition 10c of your Operating License. A proposed remedy is currently under review by the Department.

Should you have any questions concerning this inspection, please contact us at the number listed below.

Sincerely,

Jim J. Sygo
Saginaw District Supervisor
Waste Management Division
Saginaw District Office
517-771-1731

JJS:amc
cc: U.S. EPA - Region V
John Bohunsky/WMD
Al Howard/WMD
Dennis Drake/C & E File

NATURAL RESOURCES COMMISSION
THOMAS J ANDERSON
MARLENE J FLUHARTY
KERRY KAMMER
O STEWART MYERS
DAVID D OLSON
RAYMOND POUPORE

RCRA
NW-3

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

GORDON E GUYER, Director

411-J East Genesee
Saginaw, Michigan 48607
October 9, 1987

James E. Wheeler
Plant Manager
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 9/28/87 Act 64 Inspection
MID041793340

Dear Mr. Wheeler:

On June 3, 1987, staff of the Department of Natural Resources, Waste Management Division, conducted an investigation of your facility located in Saginaw, Michigan. The purpose of the investigation was to evaluate compliance of that facility with the requirements of Act 64, P.A. 1979, as amended, and the Facility's Operating License.

As a result of that investigation, Department staff have determined that your facility is in violation with the requirements of Act 64, and the Facility Operating License. The following violations were noted:

NW-3

1. The slope of the facility floor and diking used at the facility allows runoff to be discharged out of the treatment pad area. This violates General Condition 6a and 6b of your Operating License.

2. The treatment pad runoff problem has been identified in previous inspections. Failure to remedy this situation violations General Condition 10c of your Operating License.

3. Communications equipment was not deployed at the time of inspection when treatment was in progress. This violates General Conditions 7 and 9 of your Operating License.

4. Personnel records required by 40 CFR 265.16(d) were not available. This violates General Condition 17h of your Operating License.

5. Training records required by 40 CFR 265.16(e) were not available. This violates General Condition 17i of your Operating License.

Your corrective action proposal for citations 1 and 2 has been reviewed by Department staff, and discussed in our August 28, 1987 letter to Mr. Hudson.

Should you have any questions concerning this inspection, please contact me at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
Waste Management Division
517/771-1731

cc: U.S. EPA - Region V
John Bohunsky/WMD
Al Howard/WMD
Dennis Drake C & E File

EPA Saginaw

RCRA NW-3

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

GORDON E. GUYER, Director

411-J East Genesee
Saginaw, Michigan 48607
January 11, 1988

James E. Wheeler
Plant Manager
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 12/21/87 Act 64 Inspection
MID041793340

Dear Mr. Wheeler:

On December 21, 1987, staff of the Department of Natural Resources, Waste Management Division, conducted an investigation of your Nodular Iron facility located in Saginaw, Michigan. The purpose of the investigation was to evaluate compliance of that facility with the requirements of Act 64, P.A. 1979, as amended, and the Facility's Operating License.

As a result of that investigation, Department staff have determined that your facility violates the requirements of Act 64, and the Facility Operating License. The following violations were noted:

NW-3

1. The slope of the facility floor and diking used at the facility allows runoff to be discharged out of the treatment pad area. This violates General Condition 6a and 6b of your Operating License.

2. The treatment pad runoff problem has been identified in previous inspections. Failure to remedy this situation violations General Condition 10c of your Operating License.

3. Communications equipment was not deployed at the time of inspection when treatment was in progress. This violates General Conditions 7 and 9 of your Operating License.

4. Your log does not show any remedial actions for equipment deficiencies noted on 10/30/87, 11/03/87, 11/19/87, 12/13/87, and 12/18/87. This violates General Conditions 6 and 7 of your Operating License.

It is our understanding that hazardous waste treatment has ceased at this facility. A closure plan was received from Bill Hudson on December 23, 1987, and will be reviewed by Department of Natural Resources staff.

Should you have any questions concerning this inspection, please contact me at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
Waste Management Division
517/771-1731

cc: U.S. EPA - Region V
John Bohunsky/WMD
Dennis Drake C & E File
Karl Zollner/WMD

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

8 0049

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
JERRY KAMMER
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

GORDON E. GUYER, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
March 29, 1988

James E. Wheeler
Plant Manager
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 3/24/88 Inspection
MID041793340

Dear Mr. Wheeler:

On March 24, 1988, Department of Natural Resources staff, acting as representatives of the U.S. Environmental Protection Agency, conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, P.A. 1979, as amended.

As a result of the inspection, Department staff have determined that your facility is in compliance with the requirements of Subtitle C of RCRA, and Act 64, P.A. 1979, as amended. Compliance with those requirements evaluated during the March 24, 1988 inspection does not limit the applicability of other provisions of the RCRA and Act 64 regulations.

If you have any questions, please contact this office at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
Waste Management Division
517-771-1731

cc: U.S. EPA Region V

6-15-88

RCRA Facility Assessment
for
GMC - Central Foundry
Saginaw, Michigan
MID 041 793 340

A Visual Site Inspection (VSI) was performed at GMC - Central Foundry's Nodular Iron Plant in Saginaw, Michigan at 8:00 am on June 15, 1988. The weather was sunny and approximately 85°F. Present for the pre-inspection meeting were Joe Medved, GMC; Bill Hudson, GMC - Nodular Iron Plant, Environmental Coordinator; Jim Sygo, MDNR - Saginaw District; and Wayde Hartwick, United States Environmental Protection Agency (U.S. EPA).

I informed the group of the purpose of the inspection and what exactly it entailed. We talked about each Solid Waste Management Unit (SWMU) and its location. Mr. Medved informed us that Bob Offenborn, GMC - Grey Iron Plant Environmental Coordinator, would be joining us for the inspection.

Mr. Hudson informed us that a letter and blue prints were being forwarded to the MDNR's Saginaw District Office regarding the facilities Underground Storage Tanks (UST). A copy of the letter was given to me for our records. The blue prints did not address the USTs at the old Downes School Building. Located here are three USTs, two of which are under the foundation of the building. All three are 2000 gallon capacity, and contained fuel oil.

OR-1

I informed the group of the informational needs I had regarding each SWMU. Mr Medved explained that if the information wasn't immediately available that I should send him an official letter requesting the information and he would then forward it. I also informed the group that I would take pictures of each SWMU and then turn over the film to GMC for their review before they forwarded a copy of the prints and the negatives to U.S. EPA.

All USTs will be excavated and removed. Soil samples will be taken at both ends of the tanks to confirm/deny contamination.

The walk-over inspection began at approximately 8:30 am. The group was joined by Bob Offenborn, GMC. The first stop was the old Calcium Carbide Treatment slab located at the northeast corner of the plant. This unit is a 20' X 20' concrete pad that currently was covered with foundry sand. Three groundwater monitoring wells (2 shallow and 1

SW-2

deep) were installed in the last three months to help facilitate closure activities. The pad was used to cool and treat calcium carbide to a nonhazardous state. Its operation was ceased in 1983. A closure plan has been submitted to the MDNR.

NW-3

The next unit is the new Calcium Carbide Treatment pad located at the eastern side of the plant. This unit is a 120' X 120' concrete slab that has three sheet metal walls and a roof over about a 20' X 20' section. The unit has 4 groundwater monitoring wells installed around it (3 shallow, 1 deep), was put into use in 1983, and ceased use when the plant shutdown on 12/22/87. Calcium Carbide slag was deposited into the treatment area. The area was then flooded with H_2O and a potassium permangante solution (used to keep the smell down) for neutralization. Drained water would go directly to the waste water treatment plant (WWTP). The pad was bermed with concrete (primary) and an earthen berm (secondary). On at least two occasions releases had occurred through the secondary containment. Foundry sand wa then added to the tested slag and the mixture was landfilled on-site.

OW-1

NW-5

The next unit encountered was the <90 day drum storage area located at the south of the plant and just east of the paint storage building. This unit is a 10' X 10' curbed, concrete pad with a portion roofed and a cyclone fence completely enclosing the entire unit. A maximum capacity for the unit would be 20 drums, however, Mr. Hudron informed us that only 3 or 4 drums at a time are ever accumulated. Wastes managed include 1,1,1,trichloroethane, various other paint solvents, and waste gas. No releases have been documented from this unit. The unit is still active in case they find hazardous waste drums during final shutdown of the plant.

NEW

~~NW-4~~

Another container storage area was located in the Old Saginaw Paint Plant, but has already been certified closed.

OR-1
NR-10
NS-6
NR-11
NR-12
NS-9
NR-13

The next units discussed were the USTs. As previously discussed, there are three USTs at the Downes School Building (located at the extreme east end of the plant); one 6000 gallon diesel fuel tank located near the east end of the main cooling tower; one 15,000 gallon unleaded gasoline tank at the north end of the oil house building; 4 USTs in a concrete vault behind (south) of the oil house containing 6000 gallon capacity lube line oil tank, 6000 gallon capacity parting agent tank, 8000 gallon capacity posting agent tank, and 6000 gallon capacity waste oil tank, one 6000 gallon capacity diesel fuel tank located just west of the oil house building; one 5000 gallon unleaded gas tank located at the west side of the plant; and one 6000 gallon diesel fuel tank located west, area M-13, and just northwest of the Mill water pumphouse.

All USTs were leak tested in 1986. No leaks were detected. All are active except the tanks at the Downes School Building (actually a warehouse). All will have sampling activities associated with their closure.

NW-4 The third container storage area was located inside the oil house building. This was actually an area where 3 or 4 drums set atop a grating above a 500 gallon capacity secondary containment. During the inspections, the 500 gallon secondary containment tank had been moved out of the building for cleaning. It was returned to the original location immediately. No drums were associated with it.

GW-1 The fourth drum storage area was located at the Grey Iron plant. We did not visit it. Additional information on this unit will be requested. A product drum storage area is also located directly behind the Oil House Building.

NW-3 The next unit encountered is the Waste Water Treatment System. A building and entirely new WWTP is currently under construction here and is rescheduled to start-up in October 1988.

NW-U NW-4 NW-1 NW-2 NP-4 The current WWTP was started in 1974 and consists of two primary clarifiers (classifiers) a concrete sluice, two mixing tanks where polymer is added to coagulate particles, 4 primary lagoons (approximately 600' X 100') used to settle out the sludge, and a 23 acre secondary lagoon used for final settling before discharge through a well to outfall 002 into the Saginaw River.

weir

SEP 1983

NW-6 Sands are removed from the primary classifiers by conveyor and stockpiled (classified sands). When winter months cause the conveyor to freeze up, sands are stockpiled in a depressed area northeast of the primary classifiers. Waste water is conveyed by a concrete conduit to the mixing tanks where a polymer is added. Leachate from the onsite landfill is continuously pumped into the mixing tanks. After mixing, the water is transferred to one of 4 lagoon for sludge settling. When the lagoon is full another lagoon is utilized allowing the previous lagoon to dry out. When the sludge is dry it is dredged out to the on-site landfill. The secondary lagoon accumulates waste water and passes through a weir, down a drainage ditch, and into the Saginaw River (outfall 002).

OW-1

NW-17 Across the railroad tracks are stockpiles of classified sand and recycled sand. The Hatchet Reclamation Project was a magnetic separator to remove particles from the sands for reclamation.

OW-1 The 80 acre landfill is located north of Hack Road. During the investigation Jim Sygo inquired about the water in the unfilled area. The plant personnel said they were actively pumping into the mixing tanks (as we saw) but they couldn't keep up with it.

The inspection concluded about 11:30 am.

GMC - CENTRAL FOUNDRY
SAGINAW, MICHIGAN
PHOTOLOG

PICTURE	DESCRIPTION
1	Old Calcium Carbide Treatment Pad (looking Southwest)
2	Old Calcium Carbide Treatment Pad
3	New Calcium Carbide Treatment Pad (looking Northwest)
4	Container Storage Area East of Paint Storage Building (looking Southwest)
5	Hazardous Waste Spill Tank (looking West)
6	Underground Storage Tanks Behind Oil House (looking South)
7	New WWTP Building (looking Northeast)
8	Primary Classifiers (looking South)
9	Classified Sand (looking Southeast)
10	Mixing tanks (looking North)
11	Landfill Leachate into Mixing Tanks (looking North)
12	Line out of Mixing Tank (looking Northwest
13-15	Primary Settling Lagoons (looking Northeast, North, Northwest)
16	Conduit from Mixing Tank into

Lagoons
(looking East)

17 #1 Primary Settling Lagoon
Completely
Full of Sludge (looking South)

18 Landfill
(looking North)

19 Landfill
(looking South)

20 Recycling Operation Near Sand Piles
(looking North)

Central Foundry Division
General Motors Corporation
Divisional Offices
77 W. Center St.
Saginaw, Michigan 48605-1629

June 22, 1988

RECEIVED
JUN 29 1988
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V

CERTIFIED MAIL P 030 551 108
RETURN RECEIPT REQUESTED

MR .WAYDE M. HARTWICK
USEPA
REGION V
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

RE: RCRA FACILITY ASSESSMENT
VISUAL SITE INSPECTION
GMC - CENTRAL FOUNDRY
MID 041 793 340
PHOTOGRAPHS

DEAR MR. HARTWICK

ATTACHED ARE THE PRINTS OF THE PHOTOGRAPH'S THAT YOU TOOK DURING YOUR VISUAL SITE INSPECTION ON JUNE 15TH. IF YOU HAVE ANY FURTHER COMMENTS OR QUESTIONS PLEASE FEEL FREE TO CONTACT BILL HUDSON ON 517-757-0223

SINCERELY,

JOSEPH B. MEDVED, P.E., CIH
ADMINISTRATOR -
ENVIRONMENTAL ACTIVITIES

ENCLOSURE (PHOTOGRAPHS)

CC: W. F. HUDSON

Lets Get It Together
SAFETY BELTS SAVE LIVES

Note to RFA for MID 041 793 340
5/23/94

The photographs taken during the RFA were not assembled with a final RCRA Facility Assessment report. I used the descriptions on the photolog + ~~text~~ (of the RFA) to assign photo numbers to each print and to put the photos in order. There may be mistakes.

Sue Rodenbeck Brauer
Environmental Scientist
RCRA Enforcement Branch

photo of ?

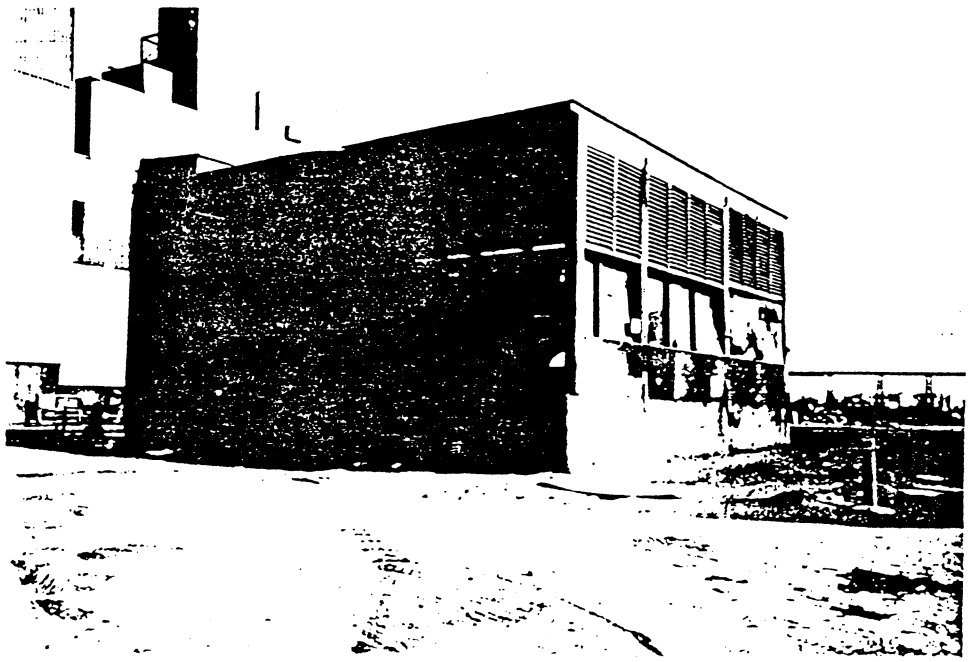
polishing lagoon?

041 793 340

KH 6/15/88

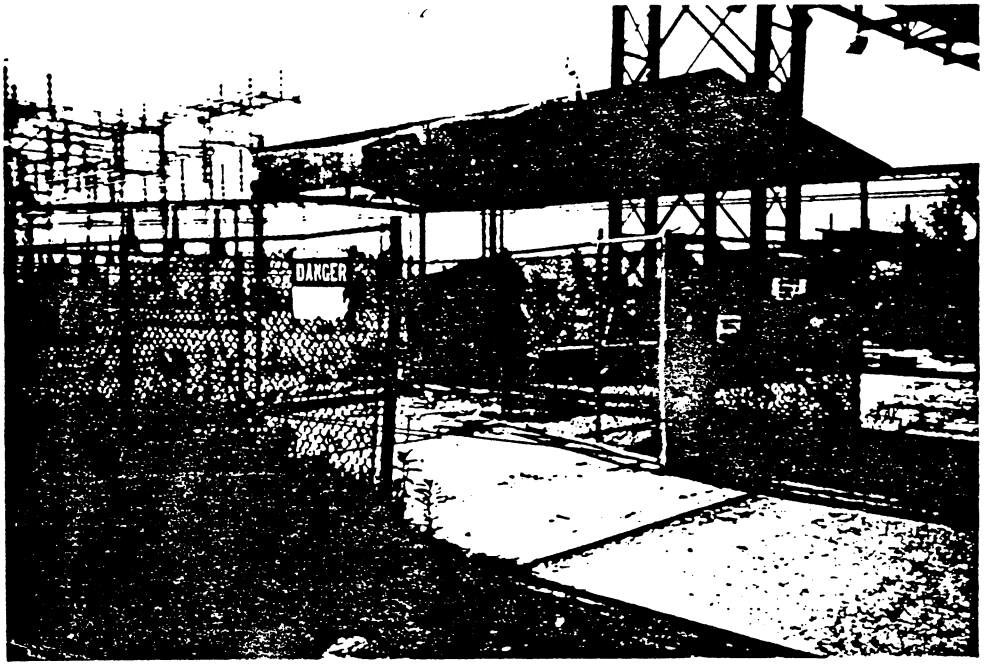
#1

#2 old Calcium Carbide Treatment Pad

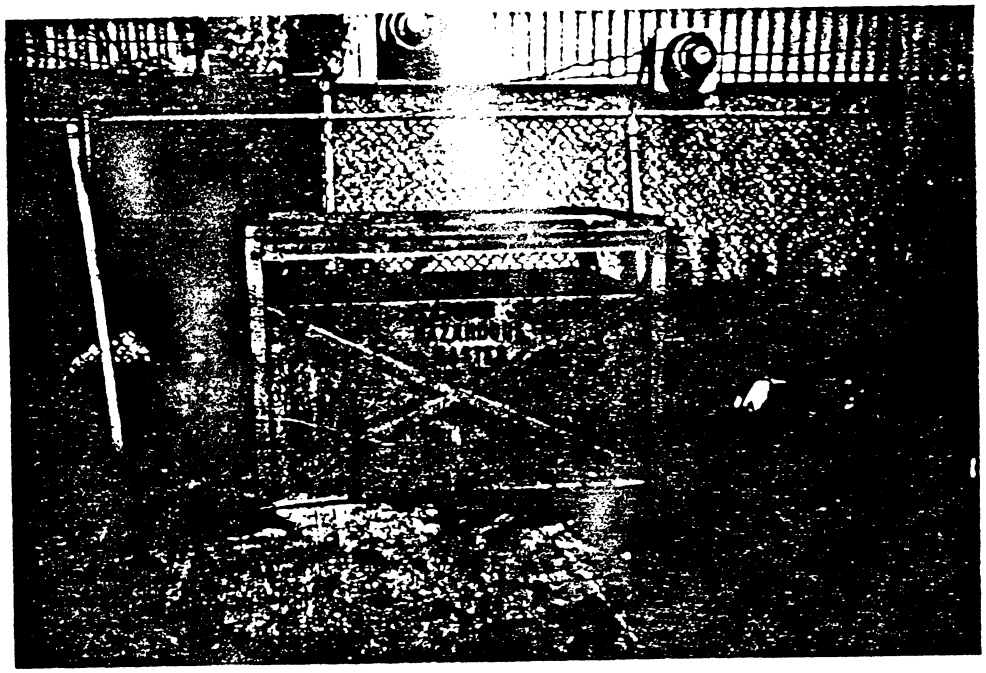


#3 New Calcium Carbide Treatment Pad

MID 041 793 34
RFA 6/15/88



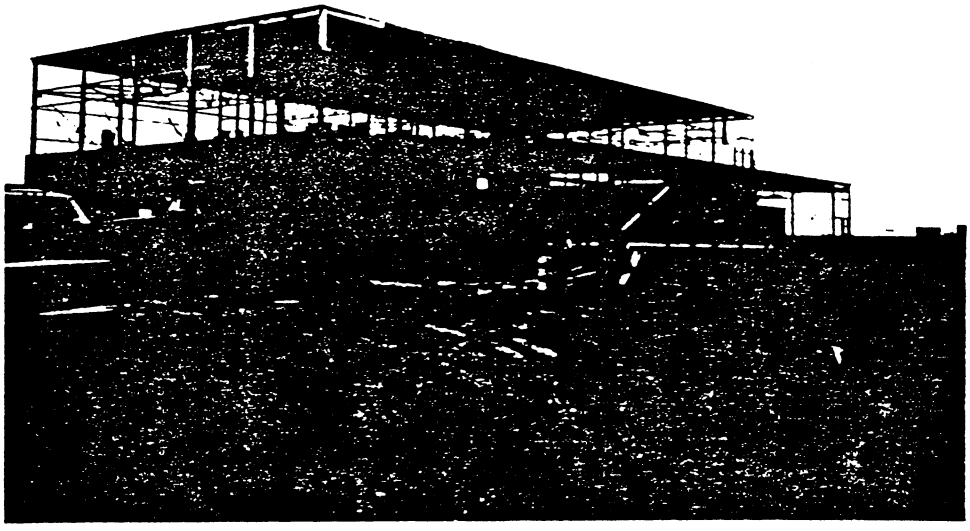
#4 Container Storage Area East of
[illegible] Storage Building



Hazardous Waste Spill Tank

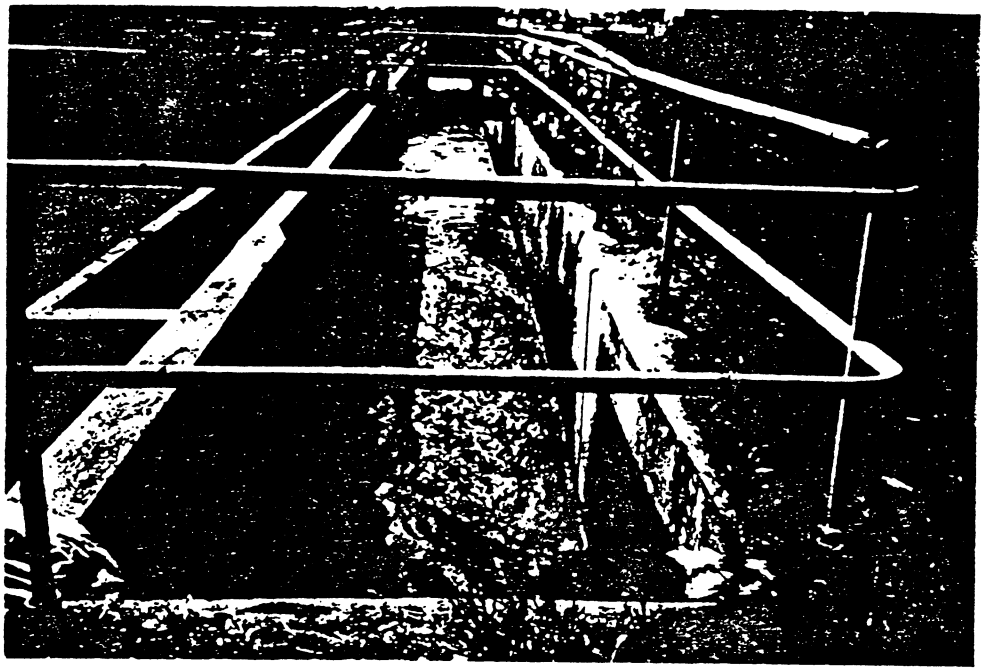
MID 041 793 3[illegible]
KFA 6/15/83

#6 Underground Storage Tanks
Behind Oil House



#7 New WWTP Building

MID 041 79334
RFA 6/15/88

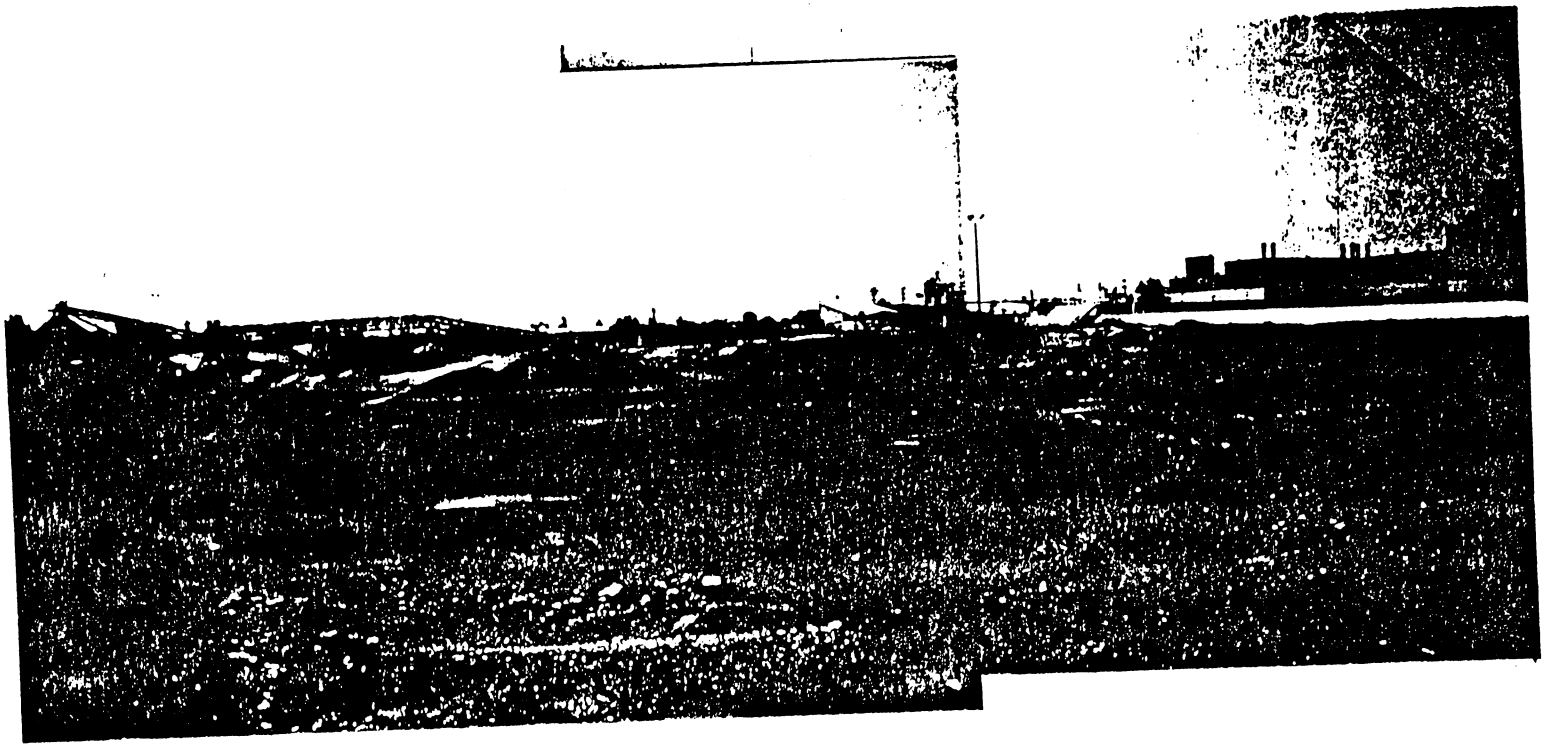


#5 Primary Classifiers

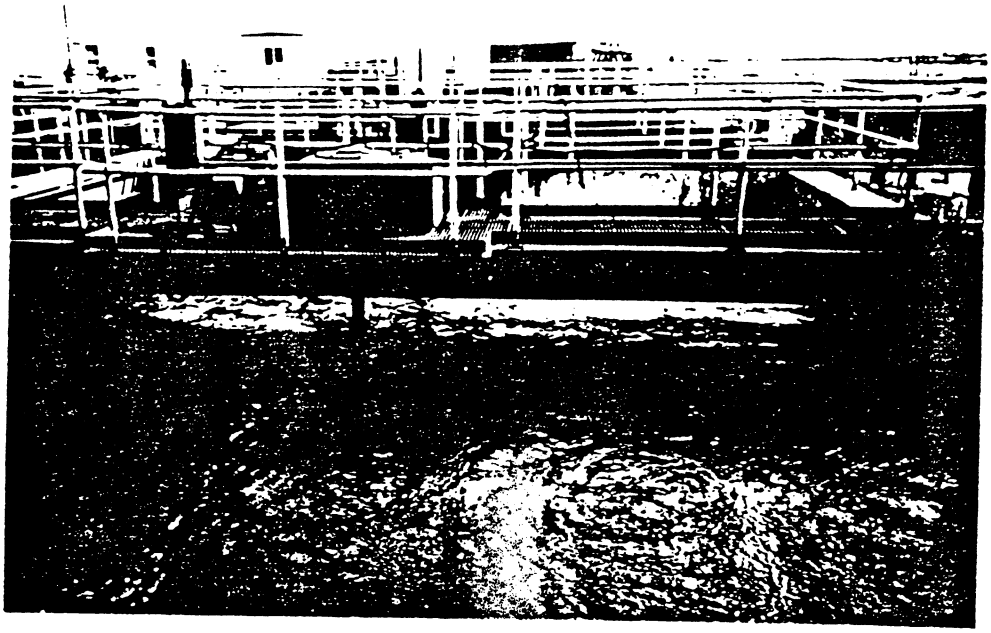
#16 Conduit from mixing Tank into Lagoons

Classifiers are round on '85 RMT plan sheets.

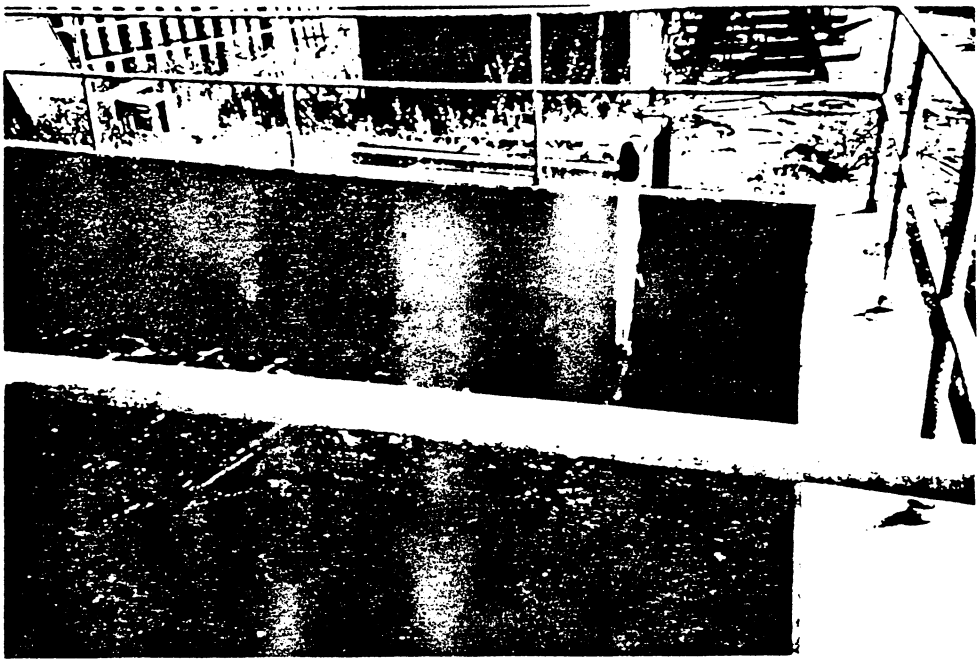
Looks like 4 conc. pads. from mixing tanks to primary lagoons



#9 Classified Sand

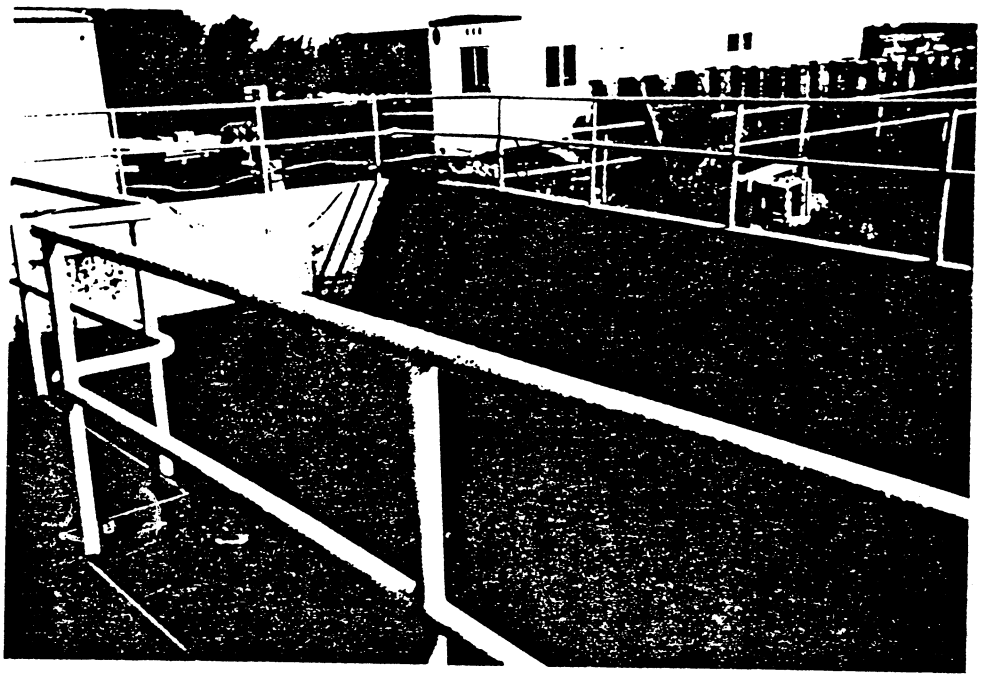


#10 Mixing Tanks



#11 Landfill Leachate into Mixing Tanks

MID 041 793 34
EFA 6/15/88



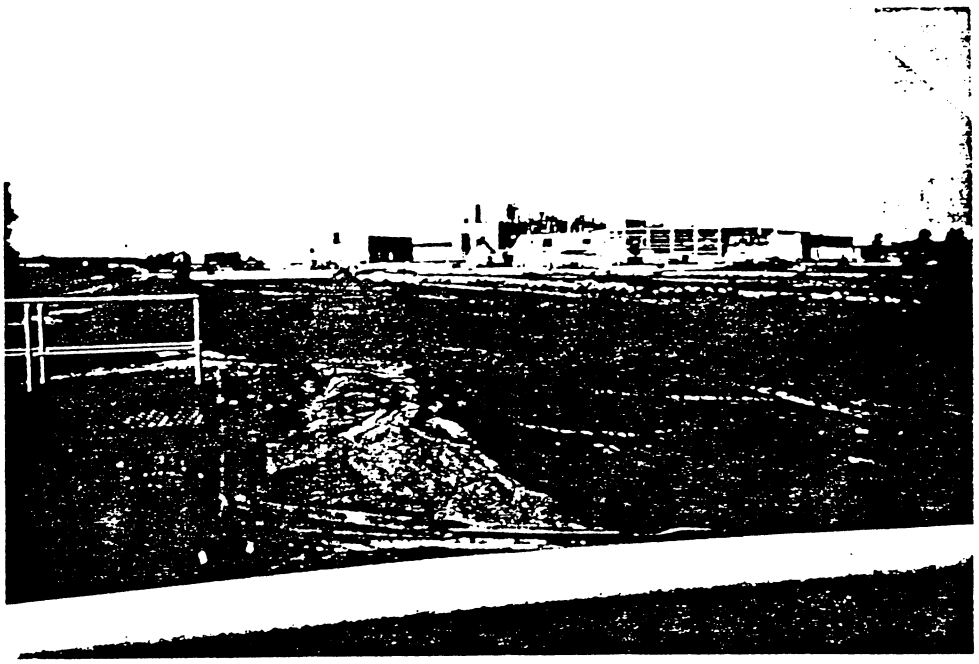
#12 Line Out of Mixing Tanks

MID 041 793 34
RFA 6/15/88

#13-15 Primary Settling Layers.

MID 041 763 360

~~#16 Conduit from Mixing Tank into Lagoons~~ Intake? Outfall?



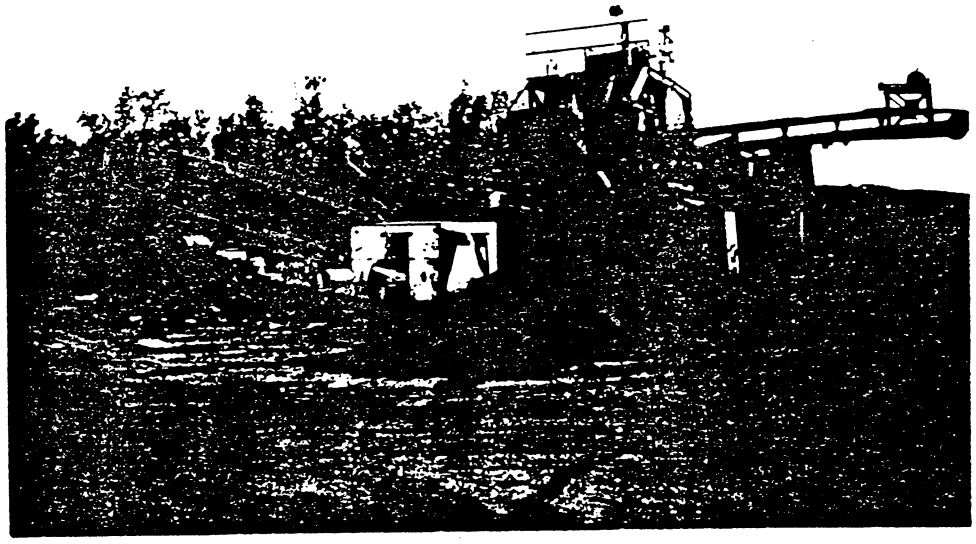
#17 #1 Primary Settling Lagoon
Completely Full of Sludge

MID 041793341
CFA 6/15/88

#18 Landfill looking north

#19 Landfill looking south

MID 041 793 340



#20 Recycling Operation
near sand piles

MI0 041 793 340
RFA 6/15/85

USE A FOIA REQUEST
RIN 768-94
FEB. 14, 1994

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
CARLENE J. FLUHARTY
HENRY KAMMER
STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

David F. Hales, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
July 11, 1988

William Hudson
Senior Environmental Engineer
GMC Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 6/15/88 Inspection
MID041793340

Dear Mr. Hudson:

On June 15, 1988, Department of Natural Resources staff conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, P.A. 1979, as amended.

As a result of the inspection, Department staff have determined that your facility is in compliance with the requirements of Subtitle C of RCRA, and Act 64, P.A. 1979, as amended. Compliance with those requirements evaluated during the March 24, 1988 inspection does not limit the applicability of other provisions of the RCRA and Act 64 regulations.

If you have any questions, please contact this office at the number listed below.

Sincerely,

Jim J. Sygo
Saginaw District Supervisor
Waste Management Division
517/771-1731

JJS:amc

cc: EPA
D. Drake / C&E File

USEPA FOIA REQUEST
RIN 7F8-94

MID 041793340

8 0044

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

DAVID F. HALES, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
January 10, 1989

Bill Hudson
GMC Central Foundry Division
Nodular Iron Plant
1805 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: MID041793340

Dear Mr. Hudson:

On **December 19, 1988**, Department of Natural Resources staff conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, P.A. 1979, as amended.

As a result of the inspection Department staff have determined that your facility is now in compliance with the requirements of Subtitle C of RCRA, and Act 64, P.A. 1979, as amended. Compliance with those requirements evaluated during this inspection does not limit the applicability of other provisions of the RCRA and Act 64 regulations.

If you have any questions, please contact this office at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
Waste Management Division
517-771-1731

cc: U.S. EPA Region V

USEPA FOIA REQUEST
RIN 7088-94
FEB 14, 1994

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARIE FLUHART
KERR[illegible]ER
O. STEWART MYERS
DAVID D. OLSON
RAYMOND POUPORE

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F. HALES, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
April 3, 1989

LB=0

William Hudson
Central Foundry Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, MI 48605

Re: MID041793340

Dear Mr. Hudson:

On March 10, 1989, MDNR staff conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, P.A. 1979, as amended.

As a result of the inspection Department staff have determined that your facility is in compliance with the requirements of Subtitle C of RCRA, and Act 64, P.A. 1979, as amended. Compliance with those requirements evaluated during the March 10, 1989, inspection does not limit the applicability of other provisions of the RCRA and Act 64 regulations.

If you have any questions, please contact this office at the number listed below.

Sincerely,

Jim J. Sygo
Saginaw District Supervisor
WASTE MANAGEMENT DIVISION
517-771-1731

cc: U.S. EPA Region V

R 1026-1
5/88

USEPA FOIA REQUEST
RIN 768-94
FEBRUARY 14, 1994

CERTIFIED MAIL #P 030 553 439

RECEIPT REQUESTED

Central Foundry Division
General Motors Corporation
Saginaw Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48605-5073

To: The United States Environmental Protection Agency

5-3-89

From: William Hudson
Environmental Coordinator
Saginaw Nodular Iron

Ref: Section 3007 Information Request

The following is addressing Part III "Request for Answers to Questions and the Production of Documents."

QUESTION 1,2,3,4,5,& (6 - Certification.)

CALCIUM CARBIDE DESULFURIZATION SLAB

This waste results from the addition of Calcium Carbide (CaC2) to molten iron in order to remove Sulfur. The slag is a characteristic hazardous waste, classified as "reactive" (USEPA hazardous waste number D003) in accordance with 40 CFR Part 261.23 (a) (4) because it generates a combustible gas (Acetylene) when the slag comes in contact with water. Approximately 50 tons of slag were generated per day.

N113

TREATMENT

Water treatment, by flooding the slag with large volumes of water in an open bunker in order to render it non-reactive, was chosen as the most effective and practicable method. Its impacts on the surrounding air and water were considered and appeared to be manageable. Water treatment of the slag in open bunkers also allows for landfilling the reacted, non-hazardous slag as a solid waste on site. In terms of regulatory compliance and general orderliness of the slag treatment operation, the open bunker water treatment method is superior to the previously used practice of accumulating the slag in waste piles and letting it re-act with rainwater.

Note: This material was cooled 24 hours prior to water treatment.

Lets Get It Together
SAFETY BELTS SAVE LIVES

USEPA FOIA REQUEST 1
RIN 768-94
FEBRUARY 14, 1994

CLEANING AND DEGREASING SOLVENTS

This class of waste results from the use of 1,1,1-Trichloroethane, a halogenated solvent, for degreasing and general cleaning of metal parts.

The 1,1,1 Trichloroethane was purchased as a Dow Chemical Corporation Product called Chlorothene VG and is a listed hazardous waste (USEPA Hazardous Waste Number F001) in accordance with 40 CFR Part 261.31.

Central Foundry Division, Saginaw Nodular Iron Plant, has minimized the quantity and/or toxicity of solvents generated through the following methods.

RECYCLING/REUSE

Currently, waste 1,1,1-Trichloroethane is being collected in 55 gal. drums and sent to an off site reclaimer.

These drums were stored in a designated "Hazardous Drum Storage Area", Not to exceed a 90 day duration.

RAW MATERIAL SUBSTITUTION AND/OR PROCESS CHANGES

CFD Saginaw Nodular Iron Plant has substituted mineral spirits for 1,1,1-Trichloroethane in many applications which has resulted in a reduction in waste toxicity.

This materials substitution has resulted in a 90% reduction in the amount of 1,1,1-Trichloroethane used by this plant.

PAINT SOLVENTS

This waste is generated in the Paint Shop and is a mixture of mineral spirits and lacquer.

It is a Characteristic Hazardous Waste classified as "Ignitable" (USEPA Hazardous Waste Number D001) in accordance with 40 CFR Part 261.21 (a) (1) because it's flash point is less than 140 degrees Fahrenheit (i.e., about 135 degrees Fahrenheit).

CFD Saginaw Nodular Iron Plant is using the following method to minimize the quantity and/or toxicity of the paint solvent waste.

EPA FOIA REQUEST
RIN 768-94
FEBRUARY 14, 1994

RECYCLING/REUSE

CFD Saginaw Nodular Iron Plant is currently saving this waste in 55 gal. drums. (A solvent recycling firm comes to the Plant quarterly (90 days) and transports the waste off-site and reclaims the material for reuse). New products (mineral spirits - lacquer thinner) are purchased direct from suppliers.

SPECIAL NOTICE:

This Plant, CFD Saginaw Nodular Iron was permanently closed and ceased production on December 22, 1987 and is presently involved with a RCRA-ACT-64 Closure Plan approved by the Michigan Department of Natural Resources.

For Example:

(A) Underground tank removal and disposal.
(B) Removal of roof stacks (260).
(C) Removal of all oils, greases, etc.
(D) Draining oil from all operating equipment and it's disposal, or sold for recycle and reuse.
(E) Removal of Cooling Tower.
(F) Removal of all Productive Material for reuse. (inside-outside).
(G) Complete cleanup of Plant Site. Scrap, equipment marshalling areas, storage areas.

NP-5

USEPA FOIA REQUEST
RIN 768-94
FEBRUARY 14 1994

ESTIMATE OF QUANTITIES OF WASTE HANDLED PER YEAR, SINCE NOVEMBER, 1980.

A. CALCIUM CARBIDE SLAG.

1980	7000 TONS
1981	10000 TONS
1982	13000 TONS
1983	15000 TONS
1984	18500 TONS
1985	18800 TONS
1986	17500 TONS
1987	13000 TONS
1988	0 TONS
1989	0 TONS

B. WASTE LIQUID 1,1,1-Trichloroethane.

1980	1175 POUNDS
1981	1250 POUNDS
1982	1100 POUNDS
1983	1175 POUNDS
1984	1150 POUNDS
1985	1210 POUNDS
1986	400 POUNDS
1987	400 POUNDS
1988	100 POUNDS
1989	100 POUNDS

C. WASTE PAINT SOLVENTS.

1980	300 POUNDS
1981	375 POUNDS
1982	350 POUNDS
1983	375 POUNDS
1984	320 POUNDS
1985	308 POUNDS
1986	250 POUNDS
1987	200 POUNDS
1988	50 POUNDS
1989	50 POUNDS

RE: A FOIA REQUEST
RIC 768 94
FEBRUARY 14, 1994

D. WASTE PETROLEUM NAPTHA.

1980	1700 POUNDS
1981	1900 POUNDS
1982	2200 POUNDS
1983	2700 POUNDS
1984	3000 POUNDS
1985	3600 POUNDS
1986	2000 POUNDS
1987	1700 POUNDS
1988	0 POUNDS
1989	0 POUNDS

E. WASTE OIL,(GEAR OIL,MOTOR OIL,ETC.).

1980	10500 GALLONS
1981	10000 GALLONS
1982	11000 GALLONS
1983	11500 GALLONS
1984	12000 GALLONS
1985	11500 GALLONS
1986	12000 GALLONS
1987	12000 GALLONS
1988	12000 GALLONS
1989	18000 GALLONS

EPA FOIA REQUEST
RIN 768-94
FEBRUARY 14, 1994

CERTIFICATION PROVISION

I 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.

Issued this 25 Day of MAY 1989

James E. Wheeler
Plant Manager
CFD Saginaw Nodular Iron Plant
General Motors Corporation
Saginaw Mi. 48605

LINDA K. KRUEGER
Notary Public, Saginaw County, Michigan
My Commission Expires July 12, 1989

USEPA FOIA REQUEST
FIN 768-94
FEB 14, 1994

EPA
8 0029
LDF

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

DAVID F. HALES, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
August 9, 1989

Ron Anderson
G.M.C. Central Foundry Division
Nodular Iron Plant
1805 Veterans Memorial Parkway
Saginaw, Michigan 48605

Re: 7/13/89 Inspection [redacted]

Dear Mr. Anderson:

On July 13, 1989, MDNR staff conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, PA 1979, as amended.

As a result of the inspection, MDNR staff have determined that this facility violates the requirements of Subtitle C of RCRA and Act 64, PA 1979, as amended. The following violations were cited:

1. Facility staff had not received hazardous waste training to assure facility compliance with hazardous waste regulations. This violates Act 64, Rule 306(1)(d) and 40 CFR 265.16(a)(b).

2. Complete personnel training records were not available at the facility. This violates Act 64, Rule 306(1)(g) and 40 CFR 265.16(d)(e). Training records must be maintained at the facility until closure of the facility.

3. You could not document that land disposal restriction notices had been made for at least 2 shipments of hazardous waste. This violates Act 64, Rule 311(1), and 40 CFR 268.7(a)(6). You must retain on site a copy of all notices and certifications transmitted with the hazardous waste manifests.

USEPA FOIA REQUEST
RIN 768-94
FEB 14 1994

We request that you respond in writing to these citations by August 21, 1989, and document those actions taken or to be taken to correct the violations cited. Failure to correct all violations within 30 days of this letter will result in referral of these violations for elevated enforcement action.

If you have any questions regarding the inspection, please contact this office at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
WASTE MANAGEMENT DIVISION
517-771-1731

cc: U.S. EPA, Region V
Dennis Drake/C & E File

EPA

NW-1
OW-1
NW-3

NATURAL RESOURCES COMMISSION
THOMAS J. ANDERSON
MARLENE J. FLUHARTY
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JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F. HALES, Director

S A G I N A W D I S T R I C T

411-J East Genesee
Saginaw, Michigan 48607
August 9, 1989

LDF

Mr. Joe Toth
Grey Iron Plant
Central Foundry Division
General Motors Corporation
1629 N. Washington Avenue
Saginaw, Michigan 48605-5073

Re: 7/31/89 Inspection
MID041793340

Dear Mr. Toth:

On July 31, 1989, MDNR staff conducted an inspection at your Wastewater Treatment Plant Lagoon, and Type III Landfill facilities located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, PA 1979, as amended.

As a result of the inspection, Department staff have determined that the facility violated the requirements of RCRA and Act 64, PA 1979, as amended. The following violations were cited:

1. You failed to characterize contaminated sediment generated, stored, and disposed of at your facility. This violates Act 64, Rule 302(1)(a)(b). Generators of solid waste as defined by 40 CFR 261.2, and Act 64, Rule 202, must determine if the solid waste is a hazardous waste.

2. You failed to accumulate 003D hazardous waste in containers and comply with 40 CFR 265, Subpart I. This violates Act 64, Rule 306(1)(a). On site accumulation without an operating license is prohibited unless waste is placed in containers.

3. 003D hazardous waste was stored in an area exposed to weather. This violates Act 64, Rule 306(1)(e) and 40 CFR 265.31. Accumulation areas must be protected from weather.

4. 003D hazardous waste was accumulated where rainwater and snow melt could transport hazardous waste and hazardous waste constituents into soil, groundwater, surface water drains, and sewers. This violates Act 64, Rule 306(1)(f) and 40 CFR 265.31. Hazardous waste accumulation must be conducted to prevent release of hazardous waste.

5. 003D hazardous waste was disposed of in a lagoon which is not licensed under Act 64. This violates Act 64, Rule 502(1). Hazardous waste treatment, storage, and disposal facilities cannot be operated without an Act 64 operating license.

6. 003D hazardous waste was disposed of in a landfill which is not licensed under Act 64. This violates Act 64, Rule 502(1). Hazardous waste treatment, storage, and disposal facilities cannot be operated without an Act 64 operating license.

7. Your surface impoundments (lagoons) do not have double liners and leak detection systems. This violates Act 64, Rule 616(1) (2). Hazardous waste surface impoundments must meet minimum technology requirements.

8. Your landfill does not have a double liner and a leak detection system. This violates Act 64, Rule 619(1)(2)(3). Hazardous waste landfills must meet minimum technology requirements.

In order to obtain an exemption for construction permits under Act 64, Rule 503(4), for your proposed treatment on site, you must obtain authorization through an approved closure plan which will be appended to a Consent Order agreement between your facility and MDNR.

We request that you respond in writing to these citations by August 25, 1989, and document those actions taken or to be taken to correct the violations cited.

If you have any questions regarding this inspection, please contact our office at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
WASTE MANAGEMENT DIVISION
517-771-1731

cc: U.S. EPA Region V
Jim Sygo, WMD, Region II
Dennis Drake, C & E File
JoAnn Merrick, WMD, Lansing
Ed Haapala, WMD, Saginaw

RCRA/ACT 64 INSPECTION REPORT

U.S. EPA I.D. Number (or Michigan) MID041793340

FACILITY NAME (Mailing Address) GMC Central Foundry Div. Plant Grey Iron
2100 Veterans Memorial Parkway
Saginaw CITY MICHIGAN 48605 ZIP CODE

DATE 7/31/89 TIME OF INSPECTION (FROM) 1000 (TO) _____

PERSON(S) INTERVIEWED	TITLE	TELEPHONE
Jim Foulds	517	776-2600

INSPECTOR(S)	AGENCY/TITLE	TELEPHONE
[illegible]	MDNR 517	771-1731

Primary Business of this Facility: Iron Casting Foundry

Reason for Inspection:

_____ Routine _____ Follow-up X Complaint

Based upon the inspection, this facility: FORM

- _____ is a non-generator/liquid industrial waste generator A
- _____ conditionally exempt small quantity generator A
- _____ small quantity generator A
- X generator B
- _____ transporter C
- X treatment/storage/disposal facility D

Date of Last Inspection _____

PAGE ___ OF ___

DEPARTMENT OF NATURAL RESOURCES
WASTE MANAGEMENT DIVISION

STAFF REPORT

DAY: S | M | T | W | TH | F | S

- ☐ Complaint Inspection
- ☐ Compliance Inspection
- ☐ Construction/Closure Inspection
- ☐ Permitting Inspection
- ☐ PEAS Investigation
- ☐ PCB Report/Complaint
- ☐ Sampling Inspection
- ☐ Telephone Call
- ☐ Meeting Notes
- ☐ Other ___

WEATHER	Brite Sun	Clear	Overcast	Rain	Snow
TEMP	To 32	32-50	50-70	70-85	85 up
WIND	Still	Moder.	High	Report No.	
HUMIDITY	Dry	Moder.	Humid.		

- ☒ Act 64 ___
- ☐ Act 136 ___
- ☐ Act 641 ___
- ☐ HSWA ___
- ☐ Act 245 ___
- ☒ RCRA ___

DATE: 7/31/89 TIME: 1000

COMPANY/FACILITY: Grayson Lagoon/Landfill FACILITY NO: MID041793340

ADDRESS/LOCATION: 200 Veterans Memorial Pkwy STAFF: Crum

PARTICIPANTS: Jim Fowlds

- Observed burned waste pile & material excavated from N face of Type III Landfill
- Collected Sample 01 N (center of pile) and on E facing W face of excavation ~20' from backhoe (See photo) MID041793340
- Sample 02 W of backhoe next to pile in N middle between top of pile and pond bank (See photo) [illegible] near Ingham, Michigan. The part of the
- Sample 03 N (edge of trench in center of Lagoon 2
- Sample 04 S (edge of trench in center of Lagoon 2
- All Samples split w/ Fowlds
- On 6/20/89 GM reported 003D characterization of sediment in Lagoon #2+4 and Type III Landfill
- Results confirmed by GM 7/6/89 meeting and 7/25 letter. 7/20/89 MDNR requests closure plan
- 8/9/89 - GM presented draft closure plan

MDNR issued Act 64 LOW

SIGNED

Distribution: Original - District/Lansing ___ File.
1st copy - Lansing ___ File/District
2nd copy - Inspector

R-5114
Rev. 12/87

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

MID 041 793 340
8 0025

Central Foundry Division
General Motors Corporation
Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

William 1. Yocum
Department of Natural Resources
411-J East Genesee
Saginaw Mi. 48607

8-21-89

Dear Mr. Yocum,

While you were here on July 13, 1989 to inspect the Calcium Carbide Excavations, you also decided to perform an Act 64 inspection noting these violations per your letter of August 9, 1989.

1. Violation (1) pertains to training. Had we known an Act 64 inspection was to be performed, arrangements would have been made to have Mr. Keith West on the site. He is the designated Environmental Coordinator for the site and has been trained.

2. Violation (2) pertains to training records. All personnel functions including training records of both salary and hourly people at the Nodular Plant have been transferred to the Grey Iron Plant.

3. Violation (3) cites two manifests that did not have land disposal restrictions notices attached to. They were prepared and forwarded at the time of shipment. Copies are attached.

Sincerely,

Ron Anderson
Superintendent Plant Engineering
Saginaw Nodular Iron

AUG 1989
Received
D.N.R.
Saginaw Office

Land Disposal Restrictions Notification/Certification
40 CFR 268.7(a) (To be attached to manifest)

Manifest Number [redacted] MI 1298332

EPA Hazardous Waste Number MID041793

Generator Central Foundry Div. - Nodular-I

Part 1

This shipment contains the following restricted hazardous waste subject to the corresponding treatment standards and prohibitions (Check all that apply)

	Treatment Standard TCLP Extract Concentration (mg/l)		Prohibition
Solvent Containing Waste	Wastewater	Other	Filtrate
Acetone (F003)	0.05	0.59	
n-Butyl Alcohol (F003)	5.00	5.00	
Carbon Disulfide (F005)	1.05	1.01	
Carbon Tetrachloride (F001)	0.05	0.96	
Chlorobenzene (F002)	0.15	0.05	
Cresols (cresylic acid)(F004)	2.82	0.75	
Cyclohexanone (F003)	0.125	0.75	
1,2-dichlorobenzene (F002)	0.65	0.125	
Ethyl Acetate (F003)	0.05	0.75	
Ethyl Benzene (F003)	0.05	0.053	
Ethyl Ether (F003)	0.05	0.75	
Isobutanol (F003)	5.00	5.00	
Methanol (F003)	0.25	0.75	
X Methylene Chloride (F001, F002)	0.20	0.96	
Methyl Ethyl Ketone (F005)	0.05	0.75	
Methyl Isobutyl Ketone (F003)	0.05	0.33	
Nitrobenzene (F004)	0.66	0.125	
Pyridine (F005)	1.12	0.33	
Tetrachloroethylene (F001, F002)	0.079	0.05	
Toluene (F005)	1.12	0.33	
X 1,1,1 Trichloroethane (F001, F002)	1.05	0.41	
1,1,2 Trichloro-1,2,2-Trifluoroethane (F002)	1.05	0.96	
Trichloroethylene (F001, F002)	0.062	0.091	
Trichlorofluoromethane (F002)	0.05	0.96	
Xylene (F003)	0.05	0.15	
California List Waste			
Liquids containing Free Cyanides	*	*	≥ 1000 mg/L Ca
Liquids containing Arsenic and/or compounds	*	*	≥ 500 mg/L As
Liquids containing Cadmium and/or compounds	*	*	≥ 100 mg/L Cd
Liquids containing Chromium VI and/or compounds	*	*	≥ 500 mg/L Cr+6
Liquids containing Lead and/or compounds	*	*	≥ 500 mg/L Pb
Liquids containing Mercury and/or compounds	*	*	≥ 20 mg/L Hg
Liquids containing Nickel and/or compounds	*	*	≥ 134 mg/L Ni
Liquids containing Selenium and/or compounds	*	*	≥ 100 mg/L Se
Liquids containing Thallium and/or compounds	*	*	≥ 130 mg/L Tl
Corrosive Liquids	Neutralization Incineration	Neutralization Incineration	pH ≤ 2.0
Liquids containing PCB's	*	*	
Wastes containing halogenated organic compounds			

Evaluation of this waste is based on:

— (analysis attached)

X Knowledge of waste (material used/processes employed)

William A. Gem

8 0027

#330 P02

TEL NO:313-824-5242

ID:PETRO CHEM

MAY-12-89 08:42

This shipment (Manifest Number: HW298892) contains hazardous waste or treatment residues of a hazardous waste restricted or prohibited from land disposal under 40 CFR Part 268 Subpart C or Section 3004(d) of the federal Resource Conservation and Recovery Act of 1976, as amended, 42 USC 6901 et seq ("RCRA"), as indicated by an "X" below. This certification is included with the shipment as required by 40 CFR 268.7(a) with respect to generated waste and 40 CFR 268.7(b) with respect to treatment residues.

1. This shipment contains the following restricted dioxin-containing waste which may not be land disposed unless it complies with the applicable treatment standard: ___F020; ___F021; ___F022; ___F023; ___F026; ___F027; ___F028.

	Constituent	Treatment Standard
___	HxCDD--All Hexachlorodibenzo-p-dioxins	<1 ppb
___	HxCDF--All Hexachlorodibenzofurans	<1 ppb
___	PeCDD--All Pentachlorodibenzo-p-dioxins	<1 ppb
___	PeCDF--All Pentachlorodibenzofurans	<1 ppb
___	TCDD--All Tetrachlorodibenzo-p-dioxins	<1 ppb
___	TCDF--All Tetrachlorodibenzofurans	<1 ppb
___	2,4,5-Trichlorophenol	<0.05 ppm
___	2,4,6-Trichlorophenol	<0.05 ppm
___	2,3,4,6-Tetrachlorophenol	<0.10 ppm
___	Pentachlorophenol	<0.01 ppm

Source: 40 CFR 268.41, Table CCWE.

2. This shipment contains the following restricted F-solvent hazardous waste which may not be land disposed unless it complies with the applicable treatment standard.

		Wastewater Treatment Standard (mg/l)	Non-Wastewater Treatment Standard (mg/l)
___	Acetone (F003)	0.05	0.59
___	n-Butyl Alcohol (F003)	5.0	5.60
___	Carbon disulfide (F005)	1.05	4.81
___	Carbon tetrachloride (F001)	0.05	0.96
___	Chlorobenzene (F002)	0.15	0.05
___	Cresols (cresylic acid) (F004)	2.82	0.75
___	Cyclohexanone (F003)	0.125	0.75
___	1,2-Dichlorobenzene (F002)	0.65	0.125
___	Ethyl acetate (F003)	0.05	0.75
___	Ethylbenzene (F003)	0.05	0.053
___	Ethyl ether (F003)	0.05	0.75
___	Isobutanol (F003)	5.6	5.00
X	Methanol (F003)	0.25	0.75
X	Methylene chloride (F001, F002)	0.20	0.96
___	Methylene chloride (from the pharmaceutical industry)	12.7	0.96
X	Methyl ethyl ketone (F005)	0.05	0.75
X	Methyl isobutyl ketone (F005)	0.05	0.33
___	Nitrobenzene (F004)	0.66	0.125
___	Pyridine (F005)	1.12	0.33
X	Tetrachloroethylene (F001, F002)	0.079	0.05
X	Toluene (F005)	1.12	0.33
___	1,1,1-Trichloroethane (F001, F002)	1.09	0.41
___	1,1,2-Trichloro-1,2,2- Trifluoroethane (F002)	1.05	0.96
___	Trichloroethylene (F001, F002)	0.062	0.091
___	Trichlorofluoromethane (F002)	0.05	0.96
X	Xylene (F003)	0.05	0.15

Source: 40 CFR 268.41, Table CCWE.

3. This shipment contains the following restricted California list hazardous waste:

___ Liquid hazardous wastes containing polychlorinated biphenyls ("PCBs") at concentrations greater than or equal to 50 ppm, but less than 500 ppm. Before land disposal, these wastes must be incinerated in accordance with the technical requirements of 40 CFR 761.70 or burned in high efficiency boilers in accordance with the technical requirements of 40 CFR 761.60; thermal treatment must also be in compliance with applicable regulations in 40 CFR Parts 264, 265 and 266. Source: 40 CFR 268.43(a)(1).

___ Liquid hazardous wastes containing PCBs at concentrations greater than or equal to 500 ppm. Before land disposal, these wastes must be incinerated in accordance with the technical requirements of 40 CFR 761.70; thermal treatment must also be in compliance with applicable regulations in 40 CFR Parts 264, 265 and 266. Source: 40 CFR 268.42(a)(1).

___ Nonliquid hazardous wastes containing halogenated organic compounds ("HOCs") other than those listed in Section A.2, above, in total concentration greater than or equal to 1,000 mg/kg. Before land disposal, these wastes must be incinerated in accordance with the requirements of 40 CFR Part 264 Subpart O or 40 CFR Part 265 Subpart O. Source: 40 CFR 268.42(a)(2).

___ Liquid hazardous wastes containing HOCs, other than those listed in Section A.2., above, which are prohibited under 40 CFR 268.32(a)(1). Before land disposal, these wastes must be incinerated in accordance with the requirements of 40 CFR Part 264 Subpart O or 40 CFR Part 265 Subpart O. Source: 40 CFR 268.42(a)(2).

-2-

USEPA
RIN 766
FEB. 14,

8 0028
#330 P03
TEL NO:313-624-5842
ID:PETRO CHEM
MAY-12-'89 08:43
EUSEPA
MAY REQUEST
I RIN 768-94
FEB. 14, 1994

... to subject to a prohibition under 40 CFR 268 ... Section 3004(d) of RCRA and which may not be land disposed unless treated ... level less than the applicable prohibition;

___ Liquid hazardous wastes having a pH less than or equal to 2.0. Source: 40 CFR 268.32(a)(1).

___ Liquid hazardous wastes that are primarily water and contain HOCs in total concentrations greater than or equal to 1,000 mg/l and less than 10,000 mg/l. Source: 40 CFR 268.32(a)(3).

___ Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing free cyanides at concentrations greater than or equal to 1,000 mg/l. Source: RCRA, Section 3004(d).

___ Liquid hazardous wastes, including free liquids associated with any solid or sludge, containing the following metals (or elements) or compounds of these metals (or elements) at concentrations greater than or equal to those specified below;

(i) ___Arsenic and/or compounds (as As) 500 mg/l;

(ii) ___Cadmium and/or compounds (as Cd) 100 mg/l;

(iii) ___Chromium (VI and/or compounds (as CrVI)) 500 mg/l;

(iv) ___Lead and/or compounds (as Pb) 500 mg/l;

(v) ___Mercury and/or compounds (as Hg) 20 mg/l;

(vi) ___Nickel and/or compounds (as Ni) 134 mg/l;

(vii) ___Selenium and/or compounds (as Se) 100 mg/l; or

(viii) ___Thallium and/or compounds (as Tl) 130 mg/l.

Source: RCRA, Section 3004(d).

___ This shipment contains a hazardous waste which is subject to a case-by-case extension under 40 CFR 268.5, an exemption under 40 CFR 268.6, an extension under 40 CFR 268.1(e)(3), or a nationwide variance under 40 CFR 268 Subpart C, regarding a land disposal restriction or prohibition under 40 CFR Part 268 or RCRA Section 3004(d) as described below. This notification is included with the shipment as required by 40 CFR 268.7(a).

Source: 40 CFR 268.7(a)(3).

C. The information provided above is based upon:

X Toxicity characteristic leaching procedure ("TCLP") analyses data ... wastes listed in Sections A.1. or A.2., above, in accordance with ... CFR 268.41(a). Available data are attached.

X Total constituent analyses data (not extract or filtrate) for ... listed in Sections A.3. or A.4., above, and which are liquid ... containing PCBs or liquid or semiliquid wastes containing other HOCs ... accordance with 40 CFR 268.32(j)(2). Available data are attached.

___ Corrosivity analyses data collected in accordance with 40 CFR 261.22(a)(... for liquid wastes with a pH less than or equal to 2.0 as listed in Sect... A.4. as required by 40 CFR 268.32(j)(1). Available data are attached.

___ Total metal and free cyanide analyses data for the metal and cyan... wastes listed in Section A.4., above, for the liquid derived from ... paint filter test in accordance with 40 CFR 268.32(i). Available d... are attached.

X Knowledge of the waste.

PETRO-CHEM PROCESSING, INC.
MID 960619298

By: [signature]
Title: Asst. Dist. Eng.
Date: 5-12-89

USEPA FOIA REQUEST
RIN 768-94
FEB. 14, 1994

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

8 0018

JAMES J. BLANCHARD, Governor

DEPARTMENT OF NATURAL RESOURCES

DAVID F HALES Director

411-J East Genesee
Saginaw, Michigan 48607
December 21, 1990

Keith West
GMC Central Foundry Division
77 W. Center Street
Saginaw, MI 48605-5073

Re: 11/30/90 Inspection
MID041793340

Dear Mr. West:

On November 30, 1990, MDNR staff conducted an inspection of your facility located near Saginaw, Michigan. The purpose of the inspection was to evaluate compliance with the requirements of Subtitle C of the Resource Conservation and Recovery Act (RCRA), and Act 64, P.A. 1979, as amended.

As a result of the inspection, Department staff have determined that no new violations of Subtitle C of RCRA, and Act 64, P.A. 1979, as amended, exist. Compliance with those requirements evaluated during the November 30, 1990, inspection does not limit the applicability of other provisions of the RCRA and Act 64 regulations, or the provisions of the October 12, 1990, Consent Order.

If you have any questions, please contact this office at the number listed below.

Sincerely,

William L. Yocum
Environmental Quality Analyst
WASTE MANAGEMENT DIVISION
517-771-1731

cc: U.S. EPA Region V

USEPA FOIA REQUEST
RIN 768-94
FEBRUARY 14, 1994

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

January 24, 1991

To: Dave Slayton, Geologist, HW Permits Section, WMD

From: Liz Browne, Env. Monitoring Coordinator, WMD Liz

Subject: GMC Saginaw Nodular Iron Casting Plant, Saginaw
MID 041 793 340

The highlighted areas of the facility's ground water monitoring program for RCRA closure of two calcium carbide desulfurization slag units authored by RMT and dated November 1990 have been reviewed. A few concerns were noted, and are as follows:

1. Table 2-2. The detection limit for total alkalinity is too high. The MDNR laboratory achieves a limit of 5 mg/l. The facility should submit a lower limit, more in line with our lab's capability. This may necessitate a change in the analytical methodology. A review of the methodology proposed indicates a detection limit of 10 mg/l.

2. Table 3-1. The preservative and holding time listed for total organic halogen (TOH) is in error. Sulfuric acid should be added to the sample, and the holding time is 7 days. Additionally, the metals do not indicate that they will be filtered prior to preservation, to yield dissolved metals data.

3. Table 5-1. The preservative for TOH needs to include sulfuric acid to a pH < 2. The Chromium that appears as the first constituent under the **METALS** heading should be Chromium VI.

This concludes the review of the highlighted areas within the plan. Please let me know if you have any questions regarding this review.

cc: EPA File ✓

NO DATE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

FOIA Exempt

DATE:

SUBJECT: Preliminary Review, Visual Site Inspection - GMC - Central Foundry Saginaw, Michigan MID 041 793 340

FROM: Wayde Hartwick, Geologist
Michigan Permitting Section

TO: Richard Traub, Chief
Michigan Permitting Section

A Preliminary Review/Visual Site Inspection (PR/VSI) has been performed for GMC-Central Foundry in Saginaw, Michigan, MID 041 793 340 Recommendations for Solid Waste Management Units are summarized below.

GW-1
GW-2
NW-4
NW-5

Container storage areas at the facility are all 90-day accumulation areas. All have release controls in place. No evidence of releases was observed during the VSI. No further action is recommended for these units.

The underground storage tanks at the facility will all be removed and the underlying soils sampled to confirm/deny the presence of a release. No further action is recommended for these units. The two calcium carebide treatment pads have recently had ground-water

NW-2
NW-3

monitoring wells installed. Corrective action for these units will be addressed during closure activities. No further action is recommended.

WW-3
WW-4
WW-6
OW-1
WW-1
WW-2

A new waste water treatment system is currently under construction. Concern that landfill leachate piped to the WWTP mixing tanks may have contaminated primary and secondary lagoons, still exits. A sampling program should be initiated by the facility to confirm/deny contamination when these WWTP units are taken out of commission.

NW-6

Classified sand piles and other sand piles are known to contain traced amounts of phenols and heavy metals. A hydrogeologic study and sampling program should be conducted by the facility to determine the impact of the classified sand piles and the WWTP units on the environment. The facility should initiate a study to determine the

River

relative benefit of removing PCB-contaminated sediments from the Saginaw, River.

OW-1

Leachate removal from the landfill continues to be a problem. Although the landfill leachate is actively ??? being pumped to the WWTP mixing tanks, it doesn't appear to be keeping up with leachate production. An evaluation of the leachate removal system must be made to determine if removal efficiency can be enhanced.

APPENDIX 12.4

G.7 Basement Sumps
Groundwater Investigation

Dragun Corporation

30445 Northwestern Hwy. • Suite 260 • Farmington Hills, MI, USA 48334 • 810-932-0228 • FAX 810-932-0618

June 29, 1994

Mr. William Newsted
General Motors Corporation
Powertrain Casting Technology Center
77 West Center Street
Saginaw, Michigan 48605-5077

SUBJECT: Groundwater Investigation
Manufacturing Basement Area
General Motors Former Nodular Iron Facility (GMNI)
Saginaw, Michigan
Project #1040

Dear Mr. Newsted:

Attached, you will find the Groundwater Investigation Report for the Manufacturing Basement Area at the GMNI plant in Saginaw, Michigan.

If you have any questions regarding The Dragun Corporation's findings or conclusions, please contact us at your convenience.

Sincerely,

THE DRAGUN CORPORATION

Chris Englert

Christopher J. Englert, P.E.
Project Manager

Attachment
cc: Mr. John Takle

CJE/lrs
/1040gmri.rpt

Groundwater Investigation
Manufacturing Basement Area
General Motors Former Nodular Iron Facility
Saginaw, Michigan

Prepared for
Mr. William Newsted
General Motors Corporation
Powertrain Casting Technology Center
77 West Center Street
Saginaw, Michigan 48605-5077

Prepared by
The Dragun Corporation
30445 Northwestern Highway
Suite 260
Farmington Hills, Michigan 48334
Phone: (810) 932-0228
Project #1040

June 29, 1994

TABLE OF CONTENTS

TITLE	PAGE
LIST OF FIGURES	2
LIST OF TABLES	3
INTRODUCTION	4
SOIL AND GROUNDWATER INVESTIGATION-MANUFACTURING BASEMENT AREA	4
Details of Investigation Methods	5
Groundwater Sampling	5
RESULTS OF THE GROUNDWATER INVESTIGATION	6
Results of Field Testing - Groundwater	6
Field Test Results: pH, Specific Conductance, and Ammonia	6
Laboratory Test Results for Groundwater	7
Total and Dissolved Arsenic	7
Ammonia Nitrogen	7
SUMMARY AND CONCLUSIONS	8

LIST OF FIGURES

FIGURE	DESCRIPTION
1	Boring Location Map
2	Total and Dissolved Arsenic Concentrations In Groundwater - Field Data
3	Arsenic Iso-Concentration Map
4	Dissolved Arsenic Iso-Concentration Map
5	Ammonia Concentration in Groundwater - Field Data
6	Ammonia Concentration in Groundwater - Laboratory Data
7	Ammonia Iso-Concentration Map - Field Data
8	Ammonia Iso-Concentration Map - Laboratory Data

LIST OF TABLES

TABLE	DESCRIPTION
1	Measurement of Field Parameters for Groundwater Samples
2	Laboratory Test Results - Groundwater

INTRODUCTION

The Dragun Corporation conducted a groundwater investigation at the General Motors Nodular Iron Plant (GMNI) on May 12 and 13, 1994. The purpose of the groundwater investigation was to provide additional information regarding the extent to which groundwater beneath the manufacturing building containing ammonia and arsenic has migrated. In addition, the groundwater investigation was conducted to obtain additional data necessary to identify the source(s) of ammonia and arsenic in groundwater at the subject site. The investigation was authorized by Mr. William Newsted and the General Motors Corporation through Purchase Order No. PXS03022.

The details of the groundwater investigation were presented in The Dragun Corporation's work plan dated January 19, 1994. The work plan included the following two tasks: (a) the investigation of groundwater quality beneath the manufacturing building, and (b) the preparation of a summary report.

This report presents the results of the groundwater investigation in the vicinity of the southeast sump.

SOIL AND GROUNDWATER INVESTIGATION-MANUFACTURING BASEMENT AREA

The Dragun Corporation performed a groundwater investigation in the vicinity of the southeast sump at the GMNI facility on May 12 and 13, 1994. Prior to this investigation, water that covered the basement floor was pumped to the General Motors' waste treatment facility. Sump pumps installed in two previously installed borings B-5 and B-7 were intermittently operated to dewater the basement and remove groundwater which collected in those borings.

Groundwater samples were collected at a total of 11 locations. Groundwater samples were collected from locations beneath the manufacturing basement floor, a monitoring well positioned in an unexcavated area, a monitoring well located outside of the manufacturing building, and a soil boring/temporary monitoring well located outside of the manufacturing building. The investigation centered in the area of the southeast sump. The groundwater sample locations are shown in Figure 1.

Six previously untested locations were sampled during this investigation. Five of the six are permanent locations which can be sampled in the future. The permanent locations include boring B-12, B-13, B-14, B-15, and B-16. In addition, a groundwater sample was collected at a temporary monitoring well at B-11 which was not previously tested. Existing sample locations included monitoring wells MW-5, and MW-6, and borings B-5, B-6, and B-7.

Details of Investigation Methods

Five borings B-12, B-13, B-14, B-15, and B-16 were drilled through the basement floor of the manufacturing building in the vicinity of the southeast sump. Four-inch- diameter holes were cored through the basement floor to permit the collection of water samples. FMG Concrete Cutting, Inc. located in Brighton, Michigan cored the holes through the basement floor which ranged from 18 inches to 42 inches thick.

A groundwater sample was collected at B-11 with the Geoprobe by hydraulically pushing and/or hammering a stainless-steel screen assembly (19" in length with an expendable drive-point tip) to the desired sampling depth. The screen remained completely sealed within a steel sleeve until, at the desired sampling depth, the sleeve was retracted and the screen exposed. Groundwater was brought to the surface through polyethylene tubing (1/4" inner-diameter) using a vacuum pump. Approximately one liter of water was purged prior to sampling. After purging, two groundwater samples were collected and stored in an ice-filled cooler.

At two locations in the manufacturing building basement, well screens were installed in order to collect representative water samples at B-13 and B-14. Well screens were required due to the presence of standing water which covered the basement floor at those locations. Three-foot-long well screens were installed and grouted in the four-inch-diameter cored holes using silica sand and bentonite grout. Following well screen installation, a dedicated disposable bailer was used to evacuate each well several times. Once the well screens were bailed, a representative sample was collected for field and laboratory testing. Several water samples were collected from B-14 on both May 12 and May 13. The wells were bailed between sampling events. Field test results for ammonia data were consistent, thus indicating that representative samples were collected.

Groundwater Sampling

Duplicate groundwater samples were collected at each location immediately after the concrete core was removed. Groundwater samples were collected with a disposable bailer from the open borehole. Groundwater samples were collected after bailing each boring in order to collect a representative sample. One water sample from each location was tested in the field for ammonia. Field test results were utilized to identify additional test locations in an effort to define the horizontal extent of ammonia in groundwater. Field measurements were collected for ammonia, pH, and specific conductance.

The second groundwater sample collected from each test location was submitted for laboratory testing. Water samples obtained during this investigation were submitted to Environmental Quality Laboratory located in Sterling Heights, Michigan. Water samples were tested for the presence of total and dissolved arsenic (USEPA Method 200.7), and ammonia (USEPA Method 350.1). All samples were transported to the laboratory in an ice-filled cooler.

Groundwater sampling and sample handling were conducted according to United States Environmental Protection Agency (USEPA) protocol.

Additional concrete coring and water sampling were conducted based on the field test results following authorization by General Motors' staff.

All water sampling equipment was decontaminated in three steps: (a) an initial tap water rinse, (b) a brush wash with tap water and phosphate-free detergent, and (c) a final distilled water rinse.

RESULTS OF THE GROUNDWATER INVESTIGATION

The following sections present the results of this groundwater investigation. The first section discusses the results for field testing. The second section presents the laboratory test results for arsenic and ammonia.

Results of Field Testing - Groundwater

This section presents the results of the groundwater investigation in the vicinity of the southeast sump. A discussion of the results is presented in two sections. The first section presents the results of the water quality measurements conducted in the field immediately following sample collection. The second section presents the results of laboratory testing of groundwater samples.

Field Test Results: pH, Specific Conductance, and Ammonia. Water quality measurements were conducted immediately upon sample collection in the field to provide accurate measurements of pH, specific conductance, and ammonia. Several of these parameters, namely pH and specific conductance, are subject to change following sample collection and must be analyzed immediately to provide the most accurate data. Specific conductance and ammonia were measured in the field to provide information necessary to select additional sample locations and adequately define the horizontal extent of groundwater which contains ammonia in the vicinity of the southeast sump.

Table 1 presents the field test results for pH, specific conductance, and ammonia. Review of Table 1 reveals the following information:

(a) The groundwater pH ranged from 7.22 to 11.59. The highest concentrations were measured in groundwater from borings B-13 and B-7.

(b) The conductivity of the groundwater ranged from 583 to 3190 micro mho per square centimeter (umho/cm^2). The highest conductivity value was measured for the sample collected from boring B-6.

(c) The ammonia concentration ranged from 1.01 to 500 milligrams per liter (mg/l). The lowest ammonia concentration was detected in water collected from boring B-11, while the highest concentration was detected in boring B-5.

Laboratory Test Results for Groundwater

Ten water samples collected from locations beneath the basement of the manufacturing building and the unexcavated area in the vicinity of the southeast sump were submitted for laboratory testing. Table 2 provides a summary of the laboratory testing data.

Total and Dissolved Arsenic. Review of Table 2 reveals that the total arsenic concentration in the groundwater samples collected during this investigation ranged from 0.008 to 0.247 mg/l. The dissolved arsenic concentrations range from 0.006 to 0.172 mg/l. The dissolved arsenic concentrations are less than the total arsenic values, which may indicate the presence of arsenic associated with suspended solids or colloidal solids in groundwater in the investigation area.

Figure 2 provides a summary of the laboratory test results for total and dissolved arsenic. Review of Figure 2 reveals that the highest concentration of total arsenic in the groundwater was 0.247 mg/l for the groundwater sample obtained from boring B-5. The highest concentration of dissolved arsenic was 0.172 mg/l at boring B-7.

Figures 3 and 4 present iso-concentration maps for total and dissolved arsenic, respectively. Review of Figures 3 and 4 reveal that groundwater having the highest arsenic concentrations are found in the vicinity of B-5 and B-7. The general shape of the arsenic contours in Figures 3 and 4 suggest that groundwater in the vicinity of the southeast sump is migrating to the west.

Ammonia Nitrogen. Review of Tables 1 and 2 reveals that ammonia was detected in water samples collected from all borings, monitoring wells, and temporary wells tested during this investigation. The ammonia concentrations measured in the field ranged from 1.01 to 500 mg/l, with the highest ammonia concentration measured in water from boring B-5. Borings B-12 and B-5 contained the highest ammonia concentrations as reported by the testing laboratory; measuring 116 and 115 mg/l, respectively.

Laboratory results for ammonia were generally lower when compared with field test results. The difference between the field and laboratory test results may be attributed to the volatilization of ammonia during the two weeks between sample collection and laboratory

testing. At high pH levels, ammonia is present in the form of the ammonium ion and is relatively unstable and volatile. Due to the inordinately high pH of groundwater at the site, the quantity of acid in the sampling containers provided by the laboratory may have been insufficient to properly preserve samples. The same test method (ISE) was used both in the field and by the testing laboratory for the determination of ammonia.

Figures 5 and 6 present the ammonia concentrations in groundwater as reported by field testing and laboratory testing, respectively. A review of Figures 5 and 6 reveals that the highest ammonia concentrations were measured in water from borings B-5, B-7, B-12, and MW-6.

Figures 7 and 8 present ammonia iso-concentration maps for field test results and laboratory test results, respectively. Figures 7 and 8 reveal that the highest ammonia concentrations appear to be centered in the vicinity of B-5 and B-7. Note, that while the reported ammonia concentration for field and laboratory testing differ, the shape of the ammonia contours as shown on Figures 7 and 8 are nearly identical. The general shape of the ammonia contours suggest that groundwater in the vicinity of the southeast sump appears to be migrating to the west.

SUMMARY AND CONCLUSIONS

The area containing elevated arsenic and ammonia in groundwater beneath the basement of the manufacturing building was defined during this investigation. Based on the field test data, borings B-5, B-6, B-7, B-12, and MW-6 contained the highest ammonia concentrations in groundwater measured during this investigation. The sample locations having water which contained the highest arsenic concentrations include B-5, B-6, B-12, and MW-6.

In general, the ammonia and arsenic concentrations found during this investigation are higher than concentrations exhibited during previous sampling events. This may be due to movement of the heart of the plume toward sample locations, pumping of water from borings B-5 and B-7, or the collection of more representative water samples from beneath the manufacturing building. Several observations and conclusions were reached based on The Dragun Corporations review of this data.

First, the highest ammonia concentrations were found in groundwater collected from B-5, B-7, B-12, and MW-6.

Second, the highest total arsenic concentrations were found in groundwater collected from B-5 and B-7.

Third, the presence of arsenic seems to be associated with the presence of ammonia in groundwater.

Fourth, the boundary of groundwater that contains elevated levels of ammonia and arsenic have been defined.

Fifth, the groundwater flow direction in the vicinity of the southeast sump appears to be toward the west.

Sixth, the groundwater pH exceeds 10 in the vicinity of the southeast sump.

Seventh, groundwater containing ammonia and arsenic appears to have migrated beneath the basement floor and around the unexcavated areas.

Eight, the groundwater data suggests that the source of ammonia is from the area between B-5 and the southeast sump.

Nine, operation of the pumps located at B-5 and B-7 may be influencing the local groundwater flow in the area and may be promoting the migration of ammonia impacted groundwater to these locations.

Because ammonia is highly soluble in water and the sand used as backfill material beneath the manufacturing building is relatively permeable, an effective remedial measure for capturing the water containing elevated levels of ammonia and arsenic is feasible. The Michigan Department of Natural Resources has not promulgated a cleanup standard for ammonia in groundwater. The need to develop this criteria, coupled with a need to determine the practical groundwater withdrawal rate, precludes us from estimating the time period under which the groundwater can be remediated.

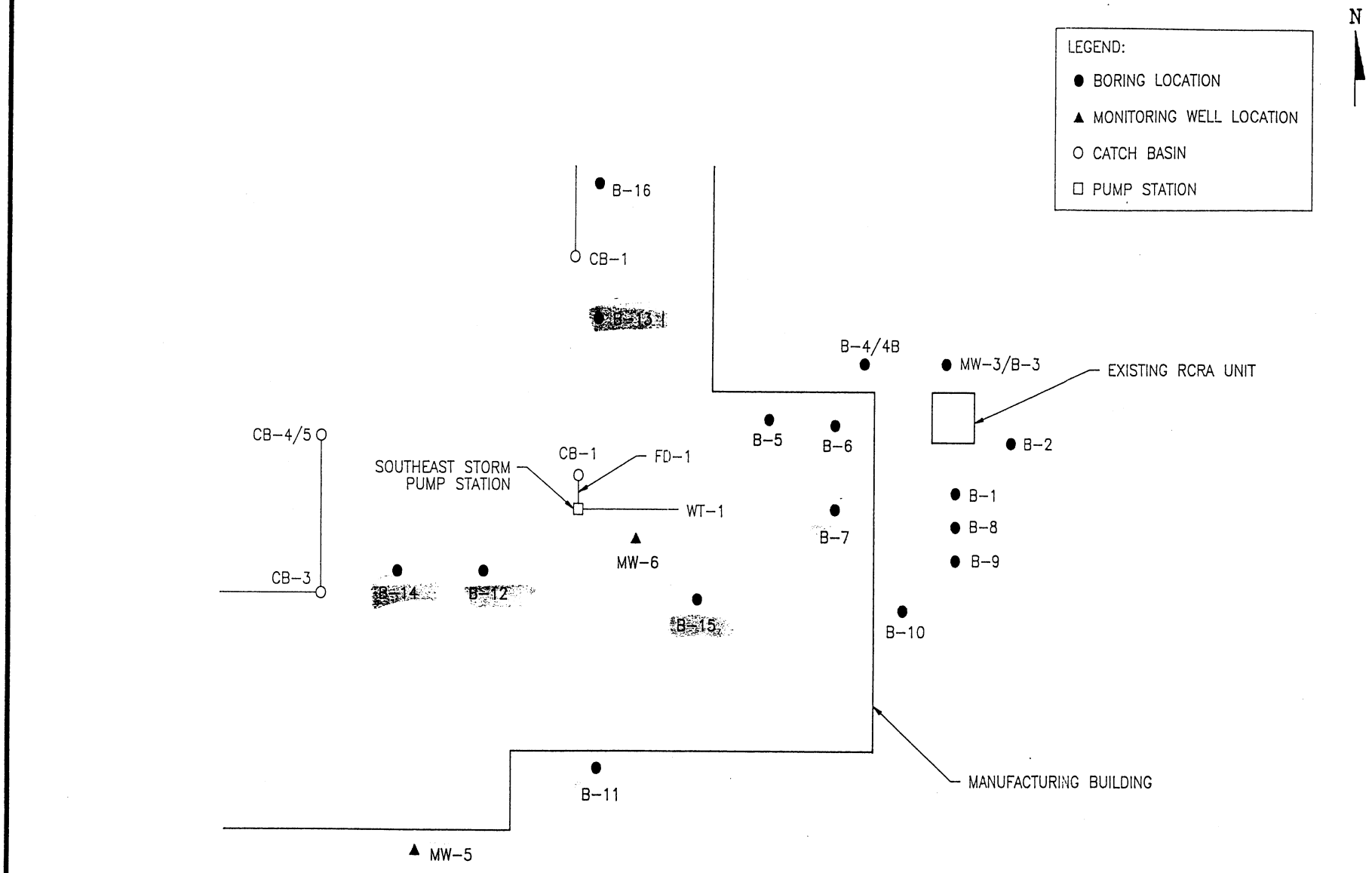

FIGURE 1
BORING LOCATION MAP
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-01 06/23/94 T.S.

The Dragun Corporation

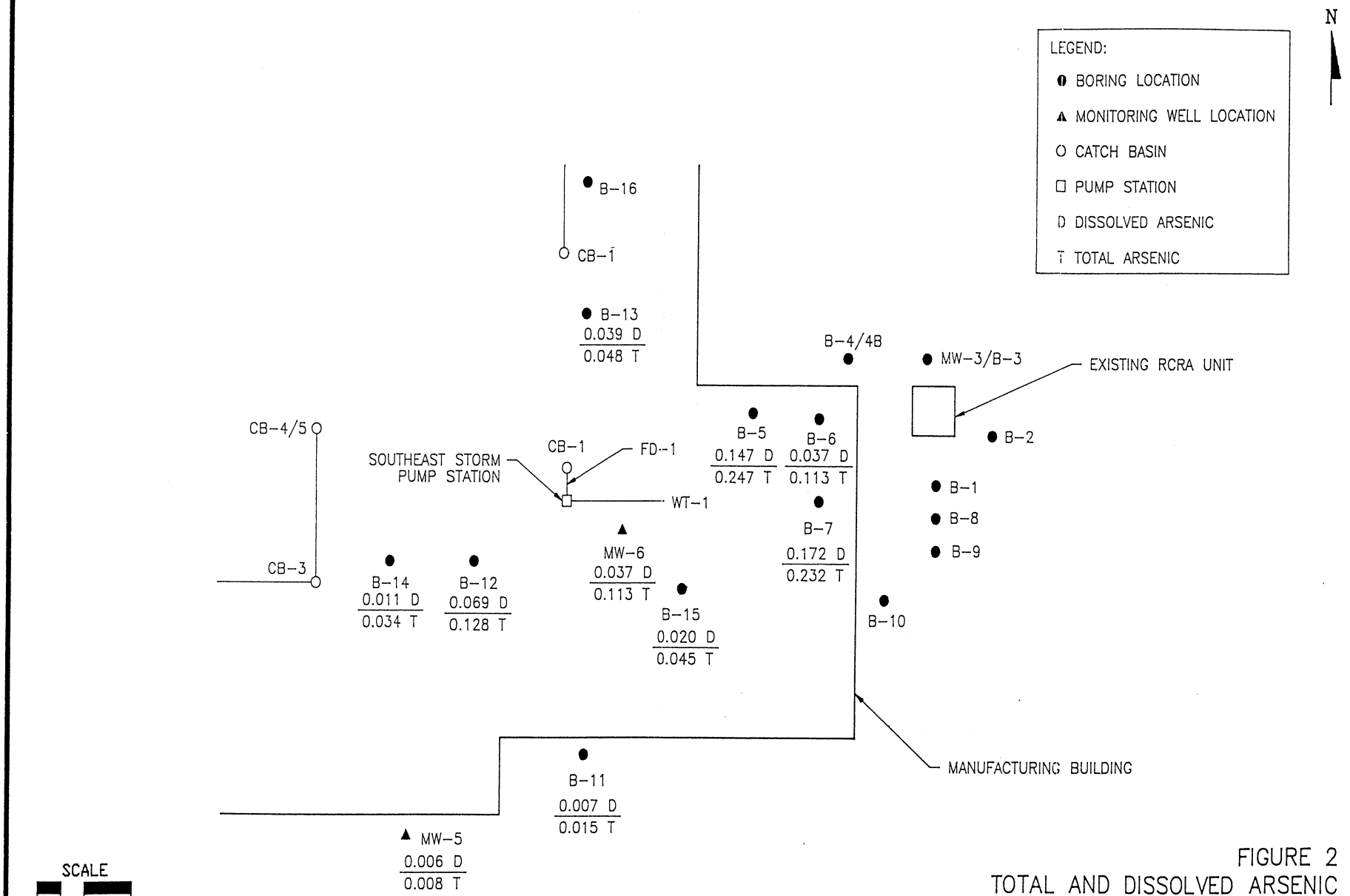

FIGURE 2
TOTAL AND DISSOLVED ARSENIC
CONCENTRATION IN GROUNDWATER
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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The Dragun Corporation

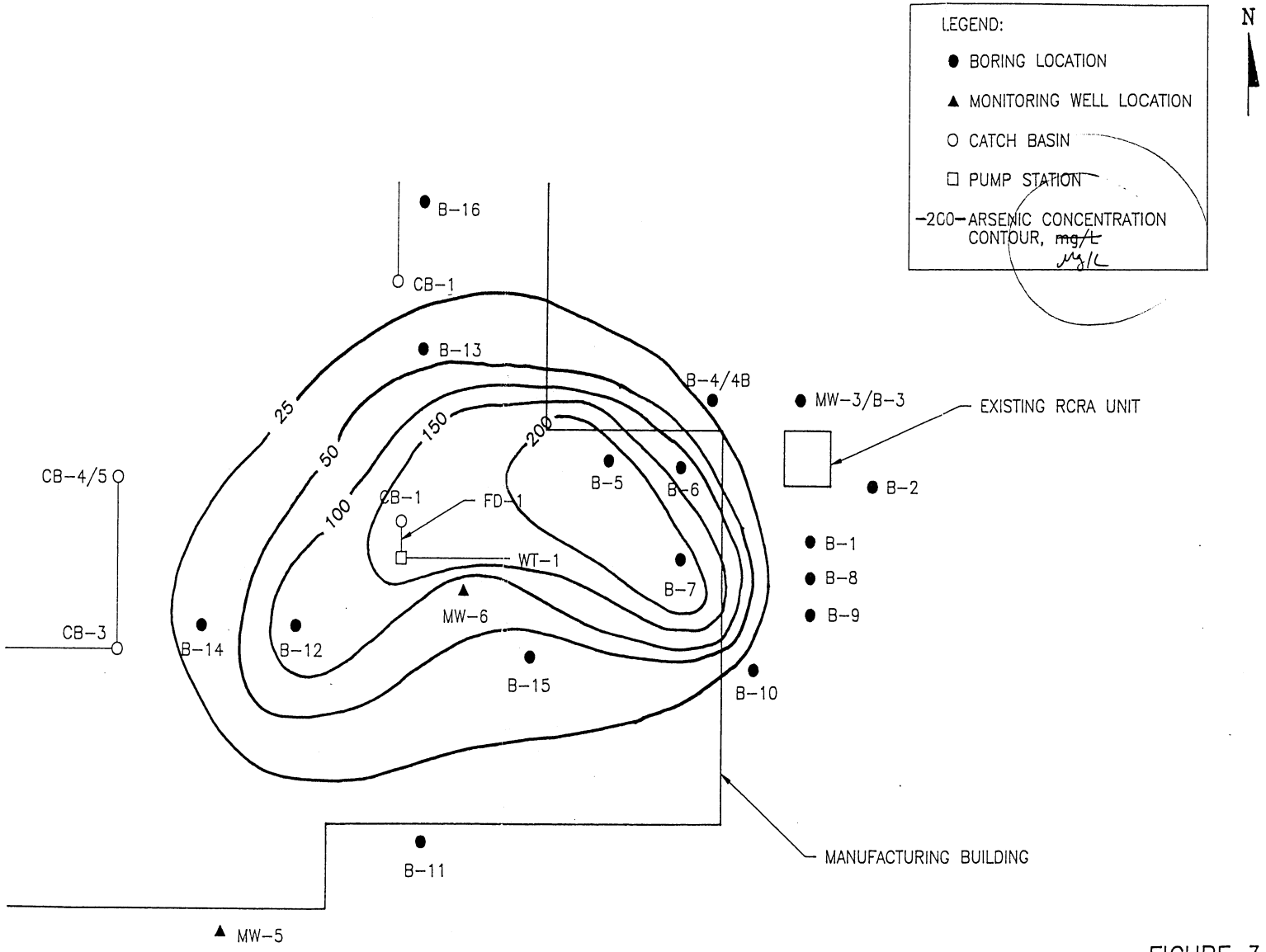

FIGURE 3
ARSENIC ISO-CONCENTRATION MAP
GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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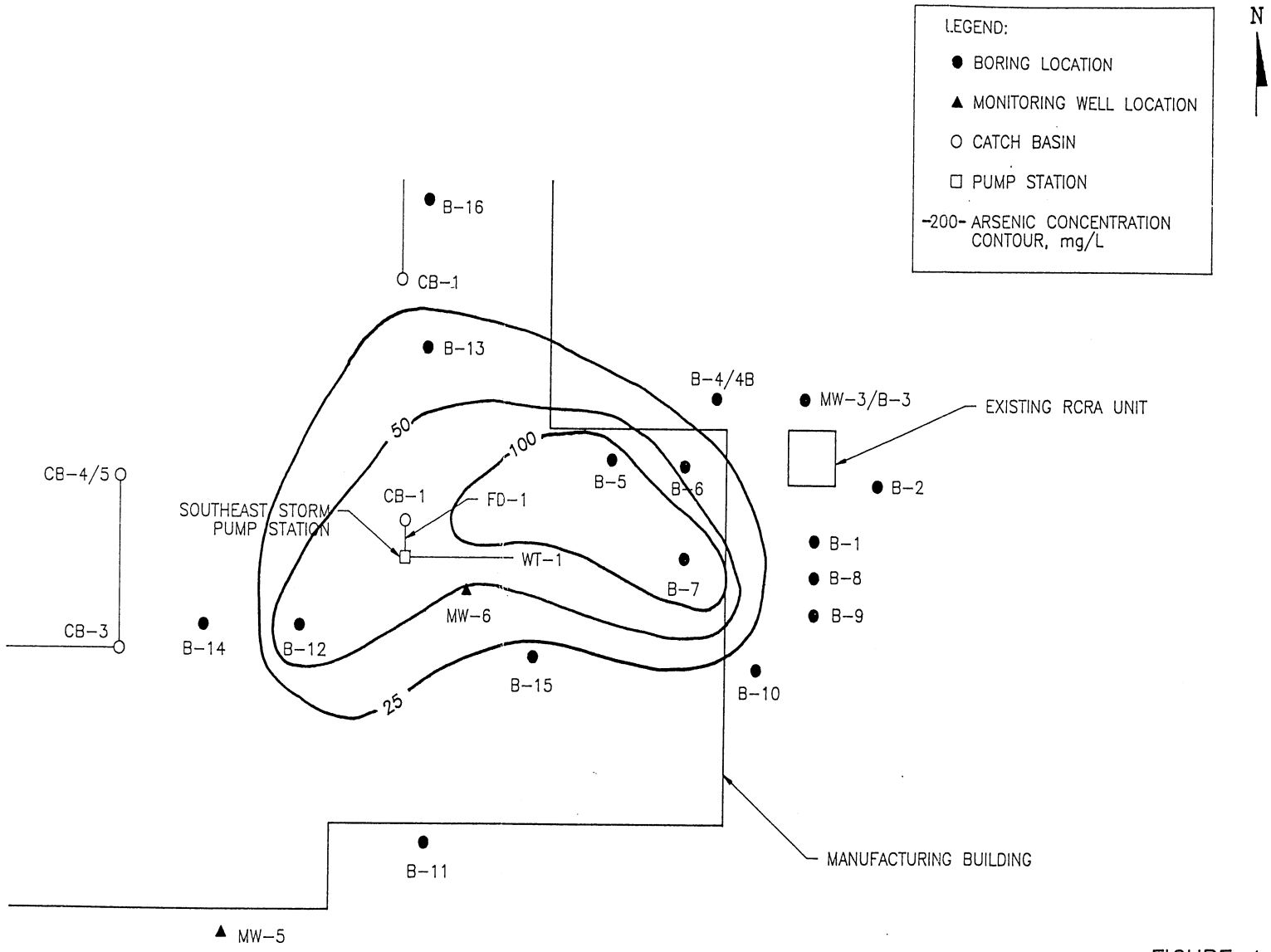

FIGURE 4
DISSOLVED ARSENIC ISO-CONCENTRATION MAP
GROUNDWATER TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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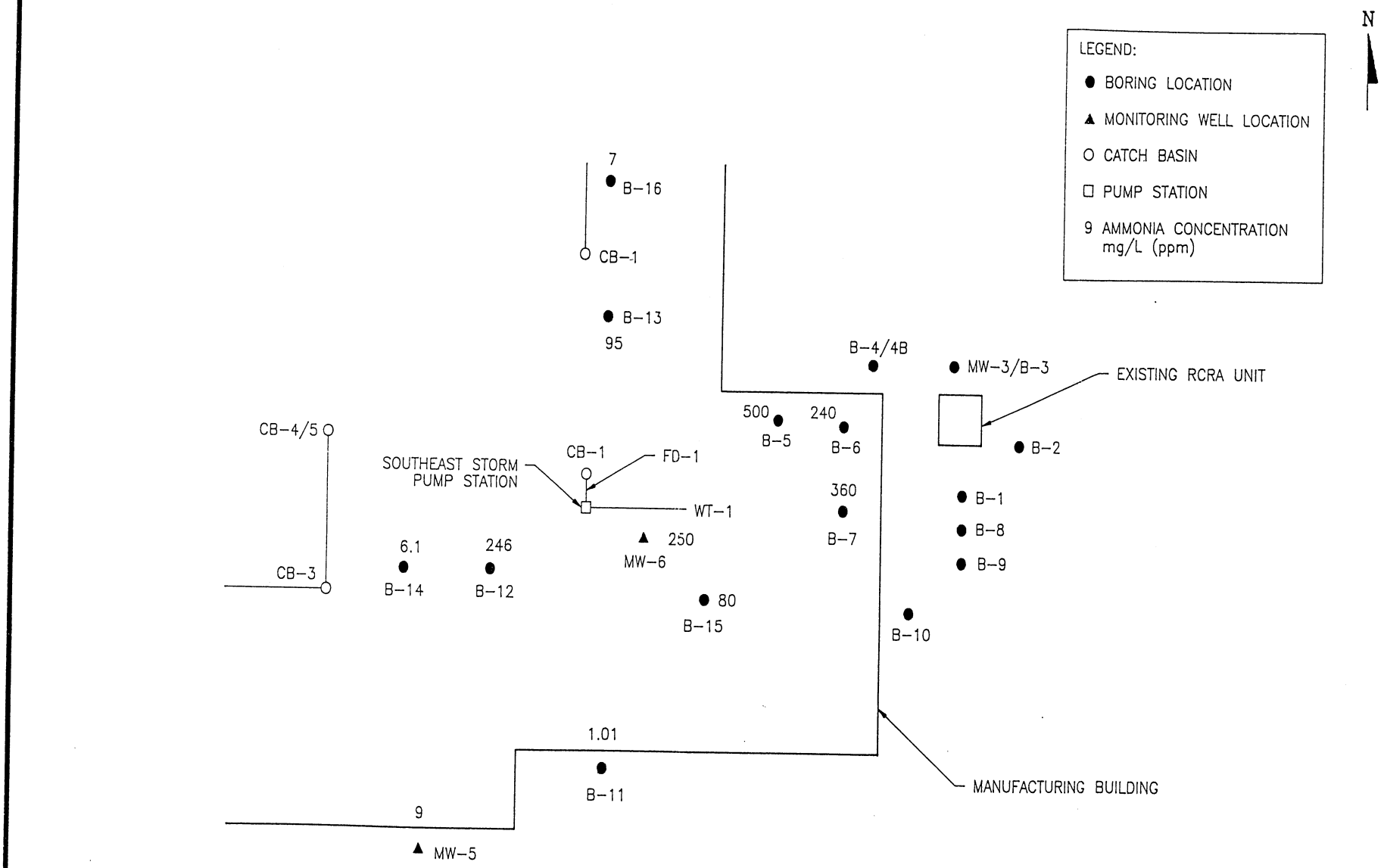

FIGURE 5
AMMONIA CONCENTRATION IN GROUNDWATER
FIELD TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

A:\1040-05 06/23/94 T.S.

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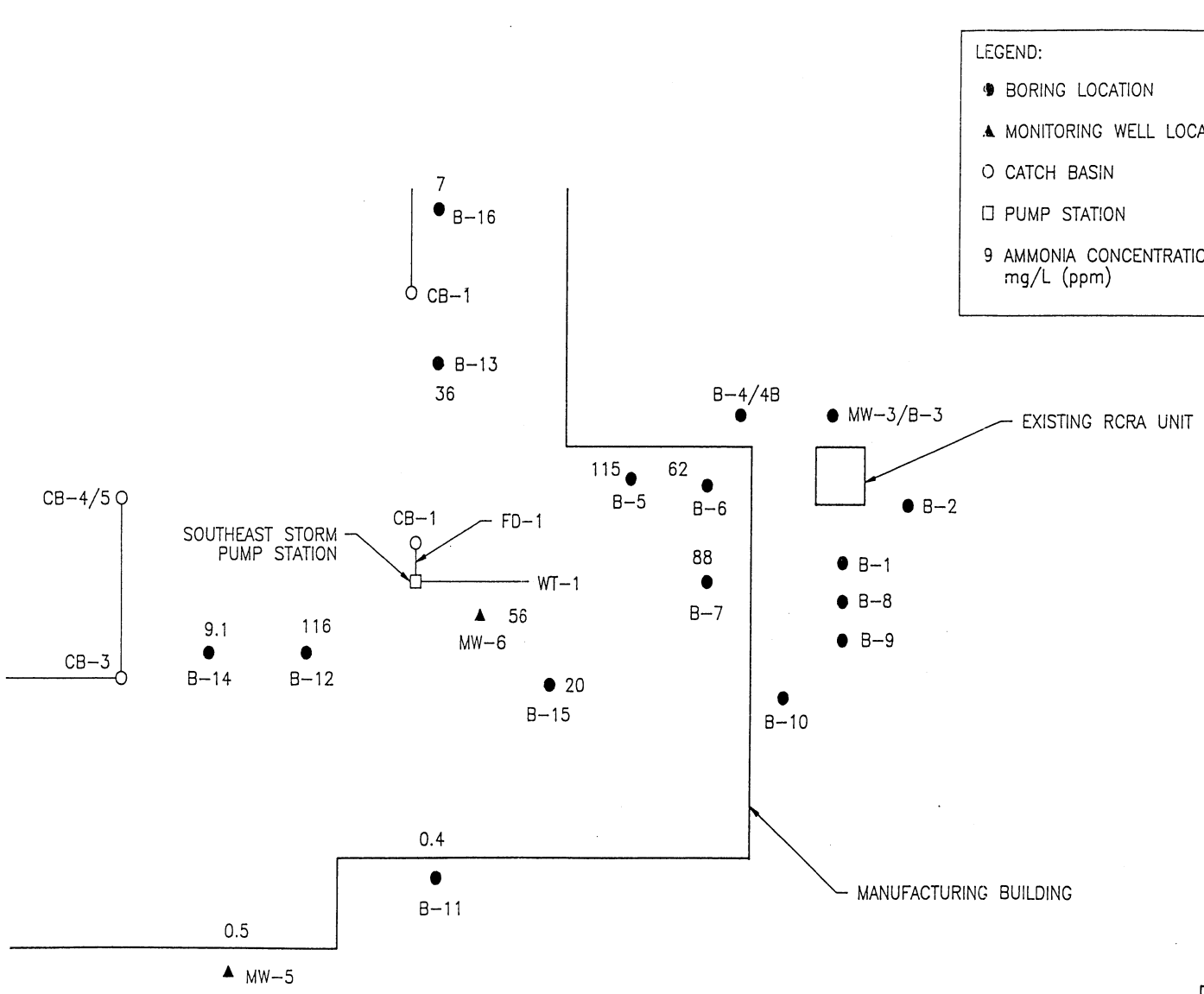

FIGURE 6
AMMONIA CONCENTRATION IN GROUNDWATER
LABORATORY TESTING DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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The Dragun Corporation

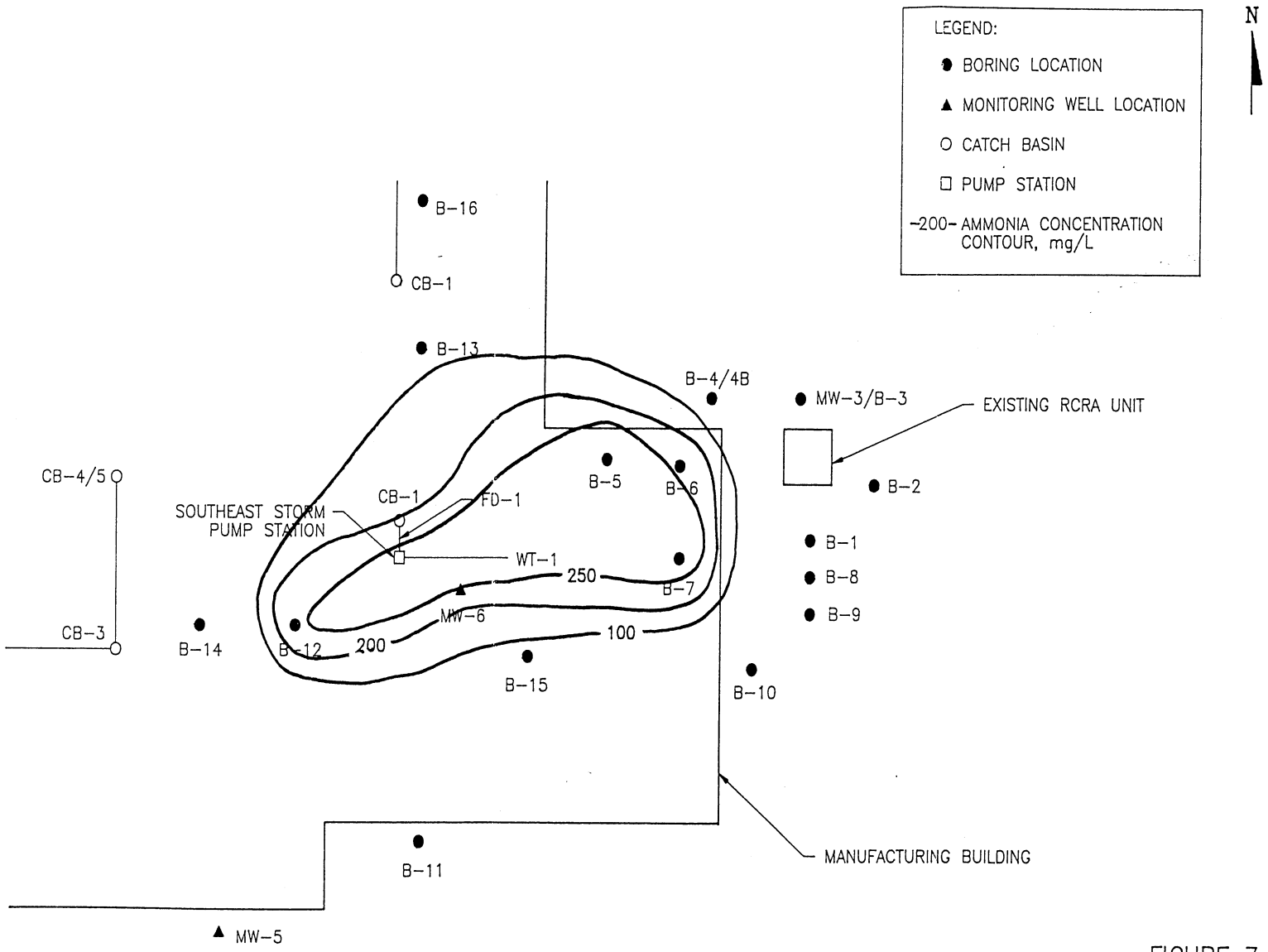

FIGURE 7
AMMONIA ISO-CONCENTRATION MAP
FIELD GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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The Dragun Corporation

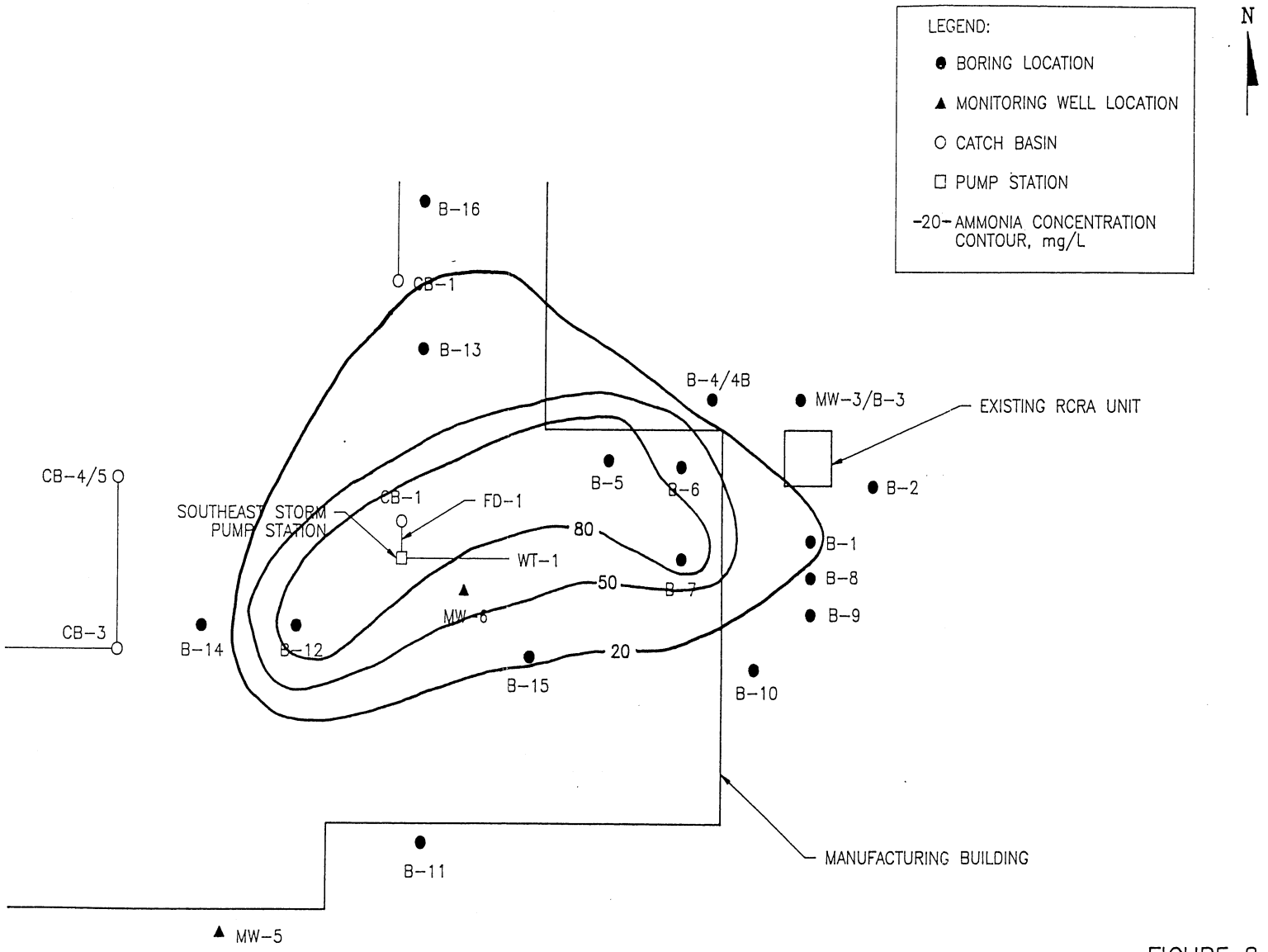

FIGURE 8
AMMONIA ISO-CONCENTRATION MAP
LABORATORY GROUNDWATER DATA
GENERAL MOTORS NODULAR IRON PLANT
SAGINAW, MICHIGAN

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The Dragun Corporation

TABLES

Table 1. Measurement of Field Parameters for Groundwater Samples
Southeast Sump Area
General Motors Nodular Iron Plant
Saginaw, Michigan

Parameter	MW-5 (5-12-94)	MW-6 (5-12-94)	B-5 (5-12-94)	B-6 (5-12-94)	B-7 (5-12-94)	B-11 (5-13-94)	B-12 (5-13-94)	B-13 (5-13-94)	B-14 (5-13-94)	B-15 (5-12-94)	B-16* (5-19-94)
pH	7.22	8.23	10.40	11.38	11.48	8.59	9.67	11.59	10.99	11.29	-
Conductivity , umhos/cm	583	1860	1085	3190	853	774	1191	1660	873	617	-
Ammonia (mg/L)	9	250	500	240	360	1.01	246	95	6.1	80	7

NOTE: *= Sample collected and tested by General Motors Corporation Staff

APPENDIX 12.5

G.7 Basement Sumps

Report on Storm Water Collection and Treatment

REPORT

TO

CENTRAL FOUNDRY DIVISION

OF

GENERAL MOTORS CORPORATION

ON

STORM WATER COLLECTION AND TREATMENT

FOR

SAGINAW NODULAR IRON PLANT

March, 1983

HUBBELL, ROTH & CLARK, INC.
Consulting Engineers
2323 Franklin Road
Bloomfield Hills, Michigan 48013

Job No. 81139

000139

April 22, 1983

Central Foundry Division - NIP
2100 Veterans Memorial Parkway
Saginaw, Michigan 48601

Re: Saginaw Nodular Iron Plant
Storm Water Collection and
Treatment Facilities

Attention: Mr. Doyle Hansen

Gentlemen:

In accordance with your authorization, we have conducted an engineering study and prepared a report regarding proposed storm water collection and treatment at the Central Foundry, Saginaw Nodular Iron Plant, Saginaw, Michigan. We hereby submit our final report which incorporates the results of our April 20 meeting to review the preliminary draft of the report.

Five (5) copies of the report are enclosed for your use and distribution.

We wish to acknowledge the valuable assistance rendered by personnel of Chevrolet Central Office and the Nodular Iron Plant.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

James W. Hubbell

James W. Hubbell

JWH/GEH/mm
encl.

000140

TABLE OF CONTENTS

1.0 INTRODUCTION

2.0 OBJECTIVES

3.0 CONCLUSIONS AND RECOMMENDATIONS

4.0 EXISTING STORM WATER FACILITIES

5.0 ANALYSIS OF EXISTING STORM WATER FACILITIES

6.0 ALTERNATIVES FOR STORM WATER COLLECTION AND TREATMENT

7.0 PROPOSED STORM WATER COLLECTION AND TREATMENT FACILITIES

8.0 EXHIBITS

A. LOCATION MAP
B. SITE PLAN - EXISTING FACILITIES
C. SITE PLAN - EXISTING FACILITIES
D. SITE PLAN - PROPOSED TREATMENT FACILITIES
E. HYDRAULIC PROFILE
F. SCHEMATIC FLOW DIAGRAM - DRY WEATHER FLOW (DIRECT DISCHARGE)
G. SCHEMATIC FLOW DIAGRAM - DRY WEATHER FLOW (CPI TREATMENT)
H. SCHEMATIC FLOW DIAGRAM - DRY WEATHER FLOW (ACCIDENTAL SPILL)
I. SCHEMATIC FLOW DIAGRAM - EXTREME FLOW

9.0 APPENDIX

A. EXISTING NPDES PERMIT

1.0 - INTRODUCTION

General

The Central Foundry, Saginaw Nodular Iron Plant (NIP) Complex covers approximately 400 acres on a site located northeast of the intersection of Veterans Memorial Highway (M-13) and the C. & O. Railroad in Saginaw, Michigan. Employment at the NIP is approximately 3500 persons engaged in the various activities involved in the manufacture of iron castings.

The western portion of the site contains a foundry and associated support facilities (oil storage building, radiation building, cooling towers, and parking lot areas). The eastern portion of the site contains process wastewater treatment facilities, classified sand storage areas, and includes large areas of open fields and woods.

Exhibit A, Location Map, shows pertinent general information on the site.

Sewer System

The Saginaw NIP Complex is serviced by sanitary, process and storm sewer systems.

All sanitary flow is collected and discharged to a City of Saginaw Interceptor Sewer and ultimately into the City of Saginaw Wastewater Treatment Plant.

In certain areas, process wastes from the site are collected and pumped to the process wastewater treatment facility. The process wastewater is discharged through an NPDES permitted outfall, which ultimately discharges to the Saginaw River.

The NIP complex has a series of storm sewers which serve approximately one half of the entire site. Flow collected in these storm sewers is discharged to the Saginaw River.

Exhibits B & C, Site Plan - Existing Facilities, shows these systems and other site details.

Dry Weather Flow (DWF) in storm Sewers

Based on site investigations conducted during December opf 1982, it is estimated that an average DWF of approximately 910 gpm is entering the existing storm water systems. Test results and visual observation of storm sewer effluent indicate this flow to contain process wastewater, and that unacceptable levels of oil and solids are occasionally present in the storm sewer system DWF.

000142

2.0 - OBJECTIVES

The purpose of this report is to present a plan that provides for improved storm water collection and treatment at the Central Foundry Saginaw NIP and accomplishes the following main objectives:

1. Treatment facilities to effectively treat dry and wet weather flow to minimize oil and solids present in the storm water discharge to the Saginaw River.

2. Storage facilities to contain the runoff from a 10 year - 1 hour storm, or accidental spill to the storm sewer system, for subsequent treatment and discharge.

3. Design of the above facilities in a manner such that all collected storm flow may be discharged through the Central Foundry Saginaw NIP Complex existing National Pollutant Discharge Elimination System (NPDES) permitted outfall.

000143

3.0 - CONCLUSIONS AND RECOMMENDATIONS

An engineering study has been completed on the existing storm water collection facilities at the Central Foundry, Saginaw Nodular Iron Plant (NIP) in Saginaw, Michigan. An analysis of the existing storm water facilities results in the following conclusions:

1. There are several sources of dry weather flow entering the existing storm water system. Based upon tests conducted by Chevrolet Motor Division personnel and on visual observation of the effluent of the NIP storm water systems, it is concluded that this flow contains process wastewater, and that unacceptable levels of oil, and solids are occasionally present in the dry weather flow.

2. The existing storm sewer facilities provide limited capacity for treatment of dry weather flows, wet weather flows, or accidental spills to the storm sewer system.

3. The existing storm sewer facilities provide no capacity for retaining contaminated dry weather flow, wet weather flow, or accidental spills to the storm sewer system. Therefore, these flows are discharged to the Saginaw River, without receiving adequate treatment.

In view of the above conclusions, an investigation of possible solutions was completed. The recommended plan calls for construction of a new collection system, and a new storage lagoon and treatment facilities consisting of the following:

1. A new storm sewer collection system which will intercept and direct flow from the existing plant storm sewers to a proposed treatment facility. This will include redirecting the existing dry and wet weather flow from the south classified sand area to the new system.

2. Pumping facilities consisting of a single 1000 gpm dry weather flow screw pump, and twin 29,000 gpm, wet weather flow screw pumps.

3. A new storage lagoon capable of retaining the storm water flow due to a "once in ten year, one hour intensity" storm event.

4. Treatment facilities consisting of CPI (Corrugated Plate Interceptor) separators to separate oil and grit from dry weather flow and storm water retained by the storage lagoon.

5. Structures to house the pump drivers, CPI units, and associated equipment.

6. A new effluent line from the above treatment facilities to the existing NPDES permitted outfall with a meter at the stormwater treatment facility to measure and record discharge.

000144

7. An overflow chamber which will connect the storm sewer system to the Saginaw River. The structure will contain a baffle and weir to minimize oil present in the overflow when the capacity of the storage lagoon or storm sewer system is exceeded or the storage lagoon is out of service.

In addition, plant personnel have indicated that plans are underway to remove the City water discharging to storm sewer system No. 1 (see Exhibit B).

It is recommended that the plans to remove this source of dry weather flow be completed in an expeditious manner in order to minimize the flow requiring treatment.

000145

4.0 - EXISTING STORM WATER FACILITIES

Exhibits B and C are site plans showing the existing storm sewer and drainage system of the NIP site. There are four (4) major storm sewer systems as follows:

Storm Sewer No. 1 - This system is located west of the plant and runs generally in a north south direction. Areas served by this system include the new scale house, west parking lot, portions of the north parking lot, oil house, radiographic building, and approximately one half of the roof and internal drainage of the plant. This storm sewer disharges to a ditch located north of the plant which in turn discharges to the Saginaw River via a twin conduit under Veterans Memorial Highway. There are two (2) internal storm water pumping stations which discharge to this storm sewer, located at approximately column lines E-3 and C-28. Flow monitoring at these stations indicates that an average of approximately 700 gpm and 50 gpm of dry weather flow is currently being discharged to these stations, respectively. The source and quantity of each of the dry weather flow contributors has not been identified. However, it is suspected that these include ground water infiltration lines, cooling water lines, and miscellaneous process connections.

It should be noted that a flow of approximately 250 gpm was located discharging to a catch basin at approximately column line N-2. Plant personnel have indicated this flow to be city water, and that plans are being completed to re-route this line to the internal city water system.

Storm Sewer No. 2 - This system services the extreme northwest area of the north parking lot. Flow to this sewer is discharged to the ditch located north of the site, and ultimately to the Saginaw River via the above mentioned conduits. Site investigation indicates no dry weather flow to this system.

Storm Sewer No. 3 - This system is located east of the plant and runs generally in a north-south direction. This storm sewer services that area west of the eastern railroad tracks, including the area around the calcium carbide building, areas of the north parking lot, and approximately one half of the roof and internal drainage from the plant. This storm sewer discharges through a weir and baffle structure to the ditch located north of the site, and ultimately to the Saginaw River via the above mentioned conduits. There are two (2) internal storm water pumping stations which discharge to this storm sewer, located at approximately column lines R-24 and R-8. Flow monitoring at the discharge weir for this storm system indicates that an average of approxmately 20 gpm of dry weather flow is currently being discharged to this system. Site investigation indicates no source of dry weather flow to the station located at column lines R-8.

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However, visual inspection revealed a source,of dry weather flow being disharged to the station located at column lines R-24. To date, this is the single source of dry weather flow found to be discharged to storm sewer No. 3. While the source of this flow has not been identified, it is suspected that this flow may be due to miscellaneous process wastewater connections.

Storm Sewer No. 4 - This system is located at the southeastern corner of the plant, running generally in a west-east direction. This storm sewer services the area around the fire pump station, pump house, cooling towers, paint shop and electrical substation. Flow to this system is discharged to a ditch located east of the calcium carbide building. This ditch flows beneath Findley Street via twin conduits, discharging to the Dikeman Drain. From the Dikeman Drain flow is routed to a City of Saginaw storm water pump station, which discharges to the Saginaw River (see Exhibits A & B).

In addition to the above mentioned storm sewer system, the ditch which discharges to the Dikeman Drain receives the dry and wet weather flows from the north classified sand area. (See Exhibit C). Measurements indicate this dry weather flow to be approximately 20 gpm.

The remaining areas of the site are either unimproved (open field, wooded areas) or are serviced by drainage ditches which ultimately direct storm flows to the Dikeman Drain. Included is the south classified sand storage area (See Exhibit C). Preliminary measurements of the dry weather flow from the south classified sand storage area indicate an average discharge of approximately 120 gpm.

Currently, the only methods of treatment utilized on the storm sewer effluents are oil absorbing buoys, a line type skimmer located immediately upstream of the twin conduits which discharge to the Saginaw River under Veterans Memorial Parkway and a weir and baffle structure located at the discharge point of storm sewer No. 3.

No capacity currently exists for storage and subsequent treatment of storm sewer flows. Therefore, contaminated accidental spills to the storm sewer system are discharged without receiving adequate treatment to the Saginaw River.

000147

5.0 - ANALYSIS OF EXISTING STORM WATER FACILITIES

As previously discussed, several sources of dry weather flow were found to be present in the storm sewer systems of the NIP site. In order to qualitatively analize these dry weather flows, a sampling and testing program was conducted during mid December, 1982. All samples were analyzed by Chevrolet C.O. personnel. The results of these tests are shown in Table 1.0 through Table 4.0 below.

TABLE 1.0
DWF - EFFLUENT STORM SEWER
NO. 3 DISCHARGE WEIR
DECEMBER 1982

Parameter	Quantity
PH	6.69
TDS	1148.0 mg/L
COD	165.0 mg/L
OIL	(5.0) mg/L*
PHEN.	7.5 ug/L
CR	(0.05)mg/L
CU	(0.02)mg/L
FE	1.74 mg/L
NI	(0.04)mg/L
ZN	0.08 mg/L

* Visable Oil Sheen
() Below Detectable Limit

TABLE 2.0
DWF - NORTH CLASSIFIED SAND
STORAGE AREA
DECEMBER 1982

Parameter	Quantity
PH	7.65
TDS	385.0 mg/L
COD	55.0 mg/L
OIL	(5.0) mg/L*
PHEN.	4.0 ug/L
CR	(0.05)mg/L
CU	(0.02)mg/L
FE	4.2 mg/L
NI	(0.04)mg/L
ZN	0.19 mg/L

* Visable Oil Sheen
() Below Detectable Limit

000148

TABLE 3.0
DWF - SOUTH CLASSIFIED SAND
STORAGE AREA
DECEMBER 1982

Parameter	Quantity
PH	7.50
TDS	813.0 mg/L
COD	70.0 mg/L
OIL	(5.0) mg/L*
PHEN.	13.0 mg/L
CR	(0.05)ug/L
CU	(0.02)mg/L
FE	1.41 mg/L
NI	(0.04)mg/L
ZN	(0.01)mg/L

* Visable Oil Sheen
() Below Detectable Limit

TABLE 4.0
COOLING TOWER BLOWDOWN
DISCHARGING TO STORM SEWER NO. 4
DECEMBER 1982

Parameter	Quantity
PH	6.78
TDS	541.0 mg/L
COD	70.0 mg/L
OIL	(5.0) mg/L
PHEN.	12.0 ug/L
CR	(0.05)mg/L
CU	(0.02)mg/L
FE	3.18 mg/L
NI	(0.04)mg/L
ZN	0.28 mg/L

() Below Detectable Limit

Review of the above test results indicate relatively low quanties of oil present in the dry weather flow. However, these samples were either grab type, or collected via a sampling tube, both of which methods tend to cause lower than actual measurements of floating materials such as oil. The total dissolved solids (TDS) content varies from 385 mg/L to 1148 mg/L, per sample. These values are higher than what is associated with normal ground water infiltration, indicating the presence of process wastewater in the dry weather flow. Additionally, it is expected that during periods of wet weather flow substantially higher amounts of oil and solids would be present in the flow due to runoff from parking areas, and the scouring effect in storm sewers.

000149

Appendix A contains a copy of the existing Central Foundry Saginaw Nodular Iron Plant NPDES Permit (MI 0001139). This permit regulates the discharge of process wastewater flows through existing outfall 002 (see Exhibit B). It should be noted that this outfall discharges to the ditch in which storm sewers No. 1, 2 & 3 contribute.

Existing storm water treatment facilities consist of bags containing oil absorbing materials, one weir and baffle structure, and one line type skimmer. Oil particles floating on the water following these devices give visual evidence that treatment is not completely effective.

As previously discussed, there is currently no provision for storing and subsequent treatment of storm sewer flows.Therefore, any contaminated dry weather flows, wet weather flows, or accidental spill to the storm sewer system, is discharged, without receiving adequate treatment, to the Saginaw River.

Since the existing facilities provide inadequate collection and treatment of potentially contaminated dry weather flows, wet weather flows, and accidental spills it is recommended that a more effective form of collecting and treating storm sewer flows be employed.

000150

6.0 - ALTERNATIVES FOR STORM WATER COLLECTION AND TREATMENT

In view of the present state of stormwater collection and treatment, two (2) alternative plans have been developed for improvement of such conditions

The Major components of each Alternative are outlined as follows:

Alternative I	Alternative 2
- Separate Storm Water Pump Stations	- Centralized Storm Water Pump Station
- Turbine Type Pumps	- Archimedian Screw Type Pumps
- Force Main to Treatment Facilities	- Gravity Intercepter to treatment Facilities
- API Oil Separation	- CPI Oil Separation
- Storage Lagoon	- Storage Lagoon

In order to develop each of the above alternatives, it is necessary to evaluate the existing dry weather flow contributions. As discussed, there is substantial dry weather flow present in the storm sewer system. Two (2) of these sources of dry weather flow have been identified, and as per discussion with Plant personnel, it is anticipated that these sources will be rerouted out of the storm sewer system. Consideration was given to locating the remaining unidentified sources of dry weather flow, in order to evaluate the possibility of re-routing their flows from the storm sewer system. However, based upon the results of the site investigations, this approach is not considered feasible due to the time and resources involved in locating each source. Therefore, the alternatives for storm water collection and treatment will be developed utilizing existing dry weather flow quantities, minus the two (2) sources outlined above.

Alternative 1

Under this Alternative, a new storm water treatment facility would be constructed, capable of treating all dry weather flow and the storm runoff for a once in 10 year storm of 60 minutes duration. Dry and wet weather flows from each of the major storm sewer systems would be pumped to the treatment facilities via two (2) new pump stations utilizing Turbine type pumps. These stations would be located at the existing discharge points of storm sewers No. 3 and No. 4. Flow from storm sewer No. 1 and No. 2 would be redirected via a new gravity interceptor to the new pump station at the storm sewer No. 3 discharge. The dry and wet weather flows from the north and south classified sand storage areas would be routed to the new pump station, located at the storm sewer no. 4 discharge.

The new pump stations would be designed such that flows would be discharged to a new storage lagoon, capable of retaining the storm runoff for a once in a 10 year storm of 60 minute duration. From the storage lagoon, flow may be discharged in one of three manners. If no further treatment is necessary, flow will be discharged directly from the storage lagoon to the existing secondary lagoon. If additional removal of free oils and settleable solids are required, flow will be diverted by gravity to a new treatment facility consisting of API (American Petroleum Institute) oil seperators.

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Treated flow from the API's would then be discharged either to the existing secondary lagoon, for ultimate discharge to the Saginaw River, or re-pumped for further treatment, if necessary. Waste oils will be stored in a new oil holding tank and pumped, when required, to a tank truck, for final disposal. Solids collected from the API units would be pumped to the inlet flume of the existing primary lagoons. In the event of an accidental spill or if additional treatment is required, flow will be pumped via new transfer pumps to the existing process wastewater treatment plant.

Alternative 2

Under this alternative, a new storm water treatment facility would be constructed, capable of treating all dry weather flows and the storm runoff for a once in a 10 year storm of 60 minute duration. Dry and wet weather flows form each of the major storm sewer systems would be collected via a new gravity interceptor, and directed to a centralized pump station, utilizing Archimedian screw type pumps. The dry and wet weather flows from the north and south classified sand areas would also be directed to the interceptor system.

The new pump station would be designed such that flows would be discharged to a new storage lagoon, capable of retaining the storm runoff for a once in 10 year storm of 60 minute duration. From the storage lagoon, flow may be discharged in one of three manners. If no further treatment is necessary flow will be discharged directly from the storage lagoon to the existing secondary lagoon. If additional removal of free oils and settleable solids is required, flow will be diverted, by gravity, to a new treatment facility consisting of CPI (Corrugated Plate Intercepter) oil seperators. Treated flow from the CPI's would then be either discharged to the existing secondary lagoon, for ultimate discharge to the Saginaw River, or re-pumped for further treatment, if necessary. Waste oils will be stored in a new oil holding tank, and pumped, when required, to a tank truck, for final disposal. Solids collected from the CPI units would be pumped to one of the existing primary lagoons. In the event of an accidental spill or if additional treatment is required, flow will be pumped via new transfer pumps to the existing process wastewater treatment plant.

Analysis of Alternatives

Turbine pumps, due to their turbulant pumping nature, tend to emulsify oils present in water. This inhibits the oil separation process. Additionally, in order to pump varying flows with a turbine type pump, various rotational speeds or intermittent operation at fixed speeds must be used to prevent running the pump under dry conditions. None of these properties is characteristic of a screw pump in which pumping is done under relatively quiescent conditions, the flow is self regulating, and no damage is done by running the pump under dry conditions.

To evaluate the use of API versus CPI separators, a study was made which concluded that for similiar treatment 12 CPI packs or 2 API tanks 45 ft. Long, 14 ft. wide and 4 ft. deep would be needed.

000152

The use of API oil separation would thus require a larger area than required for treatment by CPI units. API separators would also involve the use of additional mechanical devices such as drag out mechanisms and drivers, which require regular maintenance. The housing structure, which is recommended for either alternative, would also be larger for API units.

In view of the potential operational and maintenance difficulties associated with the use of turbine pumps, force mains and API separator units, Alternative No. 2 has been selected as the most suitable plan.

000153

7.0 - PROPOSED STORM WATER COLLECTION AND TREATMENT FACILITIES

In order to effectively treat the dry and wet weather flow present in the storm water system, a new gravity interceptor system, storage lagoon, and treatment plant are to be constructed, and located as shown on Exhibit D. The treatment facility will employ CPI oil separation, single 800 gpm, dry weather flow (DWF) screw pump, and twin 29,000 gpm, wet weather flow (WWF) screw pumps.

The new interceptor sewer would consist of two (2) main branches (See Exhibit D). Branch No. 1 would run in a generally east-west direction, intercepting the flows tributary to storm sewers No. 1, No. 2 and No. 3. The existing discharge points of storm sewers No. 2 and No. 3 would be bulkheaded. A new overflow structure will be constructed at the existing storm sewer No. 1 discharge location. The structure will contain a weir and baffle constructed such that when the storage lagoon is full, or the total pumping capacity is exceeded, flows will be disharged directly to the Saginaw River. In the event of this extreme flow occurring, free oil will be retained behind the baffle and subsequently drained to the treatment facility. A backwater gate would prevent flood stage flows in the Saginaw River from entering the storm sewer system.

Branch No. 2 would run in a generally north-south direction, intercepting the flow tributary to storm sewer No. 4, and the dry and wet weather flows from the north classified sand storage area. Additionally, the drainage ditch which currently handles the dry and wet weather flows from the south classified sand storage area will be redirected such that all flows from this area are discharged to the interceptor. Since the runoff from both the classified storage areas is anticipated to contain a significant amount of solids, a new sedimentation basin would be constructed prior to the interceptor, as shown on Exhibit D. This sedimentation basin will minimize the amount of solids entering the interceptor and treatment plant pump station. It is expected that periodic removal of settled solids will be necessary at the sedimentation basin. The existing discharge point of storm sewer No. 4 will be bulkheaded.

All existing dry weather flows, with the exception of the cooling water blowdown discharging to storm sewer No. 4 and the city water discharging to storm sewer No. 1 will be collected and treated. Table 5.0 outlines the major storm sewer systems, and the various dry weather flows discharging to each.

TABLE 5.0
EXISTING STORM SEWER SYSTEM
DRY WEATHER FLOWS (DWF)

Storm Sewer No.	Total Existing DWF (gpm)	Flow to be Removed (gpm)	DWF (gpm)(1)	Design DWF (gpm)
1	750	250	500	750
2	-	-	-	-
3	20	-	20	50
4	140	-	140	200
			Total DWF = 660 gpm	

Total Design DWF = 1000 gpm

000154

(1) Dry weather flows from the classified sand storage areas are based upon measurements taken during December 1982 and January 1983. Since much of the affected area was observed to be frozen, the measurements were conservatively increased to account for flows which may occur during the warmer months.

As indicated, a total dry weather flow of approximately 660 gpm is expected to be contributed to the storm sewer systems. This figure has been increased to a design dry weather flow of 1000 gpm, in order to address possible future Dry Weather Flow contributions.

Flow in the existing sewers will discharge to the new interceptor and flow to a new centralized pump station containing the dry and wet weather pumps.The facility would be designed so that flow will first pass through a coarse bar screen where any objects which may cause damage to the pumps will be removed, and then pumped to a new storage lagoon.

Dry weather flow will be pumped by a single, 30 inch dia., 1000 gpm DWF screw pump.

During a storm event, when flow exceeds the DWF pump capacity of 1000 gpm, twin wet weather flow (WWF) pumps will be activated. Flow from these pumps will also be discharged directly into the storage lagoon.

To determine the capacity of the wet weather flow (WWF) pumps, and the size of the proposed interceptors, runoff rates were calculated for a once in 10 year storm. Using existing conditions of areas and imperviousness, a maximum runoff rate of approximately 130 cfs (58,000 GPM) was obtained. Therefore twin 108 inch dia., 29,000 gpm WWF screw pumps will be utilized.

The storage lagoon inlet structure is designed in such a manner that flow will first pass through a gravity separation tank before being discharged to the lagoon. The detention time in the tank is approximately 30 minutes for the average dry weather flow of 660 gpm. This detention time will allow substantial quantities of free oil to be removed from the storm water before being discharged to the storage lagoon thereby improving the quality and quantity of recovered oil as well as the lagoon aesthetics. During periods of wet weather flow, the storm water will be discharged directly into the storage lagoon over a concrete weir, by-passing the gravity separation tank. Inlet and outlet piping for the tank will be designed to retain free oil present in the gravity separtation tank during wet weather events.

To retain the normal dry and wet weather flows, or dry weather flow which is known to contain an accidental spill, a new storage lagoon is to be constructed.

This new storage lagoon will be designed to handle the runoff for the existing conditions at the NIP plant. Under these conditions, approximately 36 acres are impervious (roof and parking lots), and 70 acres are unimproved (lawn, fields classified sand storage areas).

000155

Table 6.0 shows volumes associated with various durations and rainfall intensities for a once in 10 year storm. Rainfall intensities are from City of Saginaw rainfall formulas.

TABLE 6.0
RUNOFF - VOLUME FIGURES

Duration (min. hrs.)	Intensity (in./hr)	Volume (million gal.)
10 min.	4.53	0.883
20 min.	3.40	1.330
30 min.	2.72	1.590
1.0 hr.	1.70	2.000
2.0 hr.	0.97	2.270
3.0 hr.	0.68	2.390
4.0 hr	0.52	2.430

Exhibit D shows the location of a proposed storage lagoon. The lagoon has been located in the area of what was to be a fifth primary lagoon. Site investigation has revealed that much of the lagoon excavation and backfill was completed prior to work being halted. Plant personnel have indicated that no plans are being considered for reactivating this project, therefore this area is available. The lagoon is 11 feet deep from top of bank to bottom, with a useable depth of 5.0 feet. The bottom 3 feet would contain storm water at all times in order to inhibit weed growth, while the top 3 feet of the lagoon provides freeboard.

Storage volume of the lagoon is approximately 2,080,000 gallons. From table 6.0 this corresponds to approximately the volume generated by a 10 year storm of 60 minute duration. The additional volume necessary for a storm duration longer than 60 minutes will require a substantial increase in earthwork. Therefore, a design criteria of once in 10 year storm of 60 minutes duration is considered adequate.

In the event that the storm runoff exceeds the capacity of the lagoon with a resulting overflow, the overflow will occur after the "cleansing" effect of the rainfall has swept most of any pollutants into the lagoon.

The contents of the lagoon may be discharged in one of three manners, depending upon the degree and type of treatment required.

If no further treatment is necessary, flow will be discharged directly from the storage lagoon to the existing secondary lagoon. Exhibit F shows a schematic flow diagram of this condition.

If additional removal of free oils and settable solids is required, flow will be diverted, by gravity, to a new treatment facility consisting of CPI (Corrugated Plate Inteceptor) separators.

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When the runoff flow exceeds the total pumping capacity or the runoff volume is larger than the lagoon capacity, excess flow will be discharged to the Saginaw River at a new overflow chamber, as shown on Exhibit D. The overflow chamber will contain a baffle and weir constructed so that in the event of this extreme flow occurring, free oil will be retained behind the baffle and subsequently drain to the proposed storage lagoon.

Exhibits I, shows a schematic flow diagram for this condition.

Exhibit E shows a hydraulic profile of the proposed interceptor, storage lagoon, and treatment facilities.

000157

Estimated Cost

The estimated capital and operation/maintenance costs of the proposed facilities outlined in this report are as follows:

Site Work

Excavation and Backfill	$547,000
Gravel Road	15,000
Ditch Work	12,000

Sewer Work

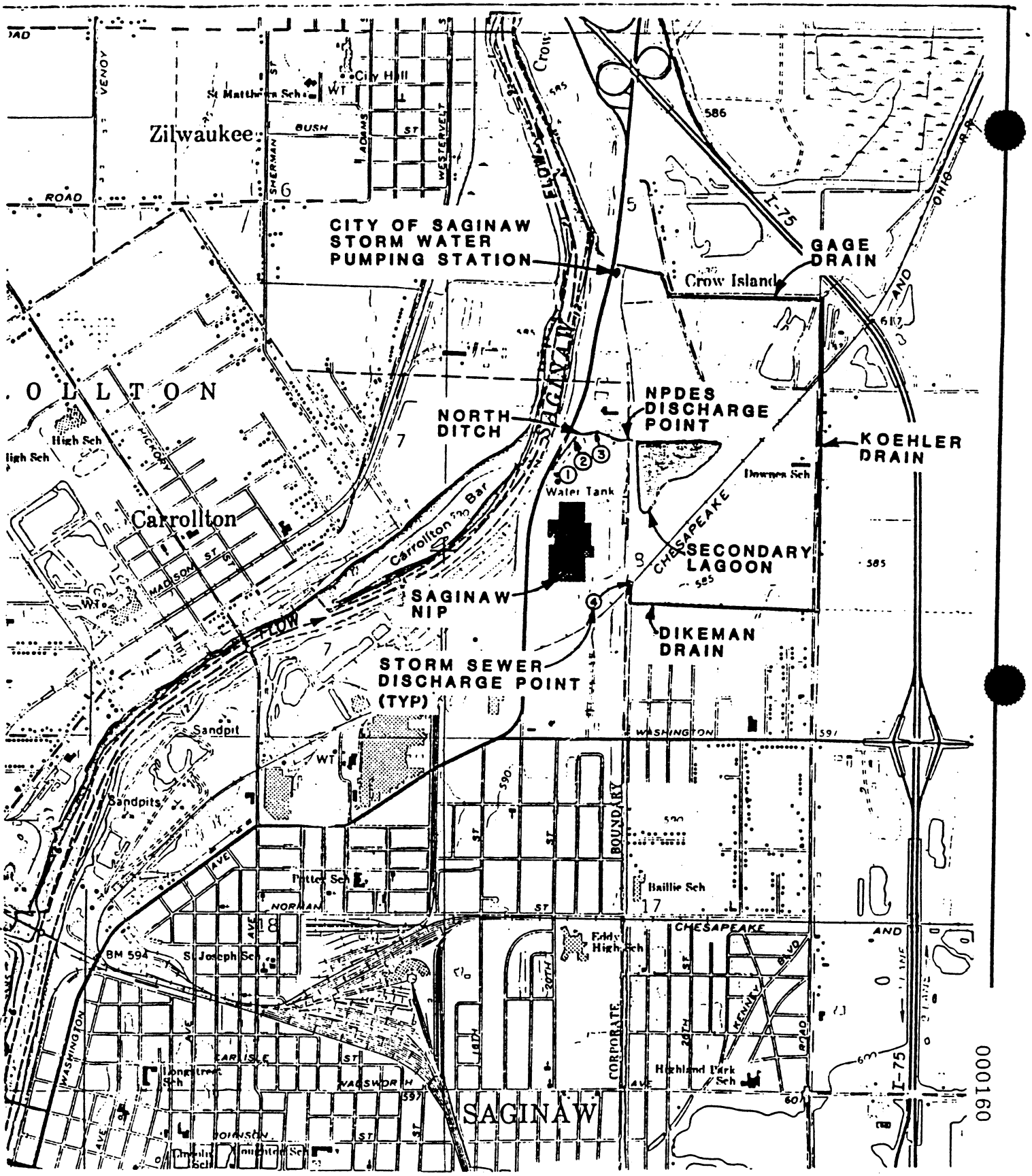
6'-0" Dia. RCP Pipe	$ 85,000
5'-0" Dia. RCP Pipe	136,000
24" Dia. RCP Pipe	57,000

Treatment Facilities Work

Structural Work	$320,000
Electrical Work, including Site Lighting & Instrumentation	150,000
Process Piping, Pumping, Valves, Gates, Misc. Metals, etc	150,000
Architectural Work	72,000
Heating & Ventilating Work	13,000
CPI Units	125,000
Two - 29,000 GPM 108" Screw Pumps	302,000
Single - 1000 GPM 30" Screw Pumps	28,000
Sub-Total	$2,012,000
Engineering, Inspection, Administration & Contingencies	503,000
TOTAL ESTIMATED CAPITAL COST	$2,515,000
TOTAL ESTIMATED OPERATION & MAINTENANCE COST	$24,000/yr.

000158

8.0 EXHIBITS



SCALE: 1" = 2000'

CENTRAL FOUNDRY-NIP SAGINAW, MICH.
STORMWATER TREATMENT FACILITIES

LOCATION MAP

Hubbell, Roth & Clark, Inc.
Consulting Engineers

EXHIBIT
A

9.0 APPENDIX

EXISTING NPDES PERMIT

STATE OF MICHIGAN

ESOURCES COMMISSION
JOHNSON
ITALA
RIDGEON
F SNELL
H WHITELEY
WOLFE
S G YOUNGLOVE

WILLIAM G. MILLIKEN, Governor

DEPARTMENT OF NATURAL RESOURCES

STEVENS T. MASON BUILDING, LANSING, MICHIGAN 48926

Howard A. Tanner, Director

WATER RESOURCES COMMISSIO
C WILLIAM COLBURN
CHARLES D HARRIS
JOHN H KITCHEL M D
CLEAMON E LAY
STANLEY QUACKENBUSH
JOHN E VOGT
JOHN P WOODFORD

July 15, 1975

FACILITIES DEPT.
'75 JUL 22 AM 11 14
PLANT ENGINEERING SECTION

CERTIFIED MAIL

Mr. G.E. Calhoun
Chevrolet Central Office
Warren Annex-Rm. 381-21
30007 VanDyke
Warren, MI 48090

Re: NPDES Permit No. MI 0001139
Chevy Metal Casting
Saginaw

Gentlemen:

Your application for a National Pollutant Discharge Elimination System (NPDES) Permit has been processed in accordance with appropriate State and Federal regulations.

All discharges authorized from this facility shall be consistent with the terms and conditions of this permit.

Your reporting forms will be transmitted to you in the near future.

Very truly yours,

WATER RESOURCES COMMISSION
Robert J. Courchaine
Chief Engineer

Roy E. Schrameck

Roy E. Schrameck, Chief
Permit Section

RES:bl
Enclosure: Permit
cc: A. H. Manzardo (2)
R. J. Courchaine
Comp. Studies
Planning
Files
T.K. Wu
C. Odin
R. Schaffer
R. Christensen
John Bohunsky
John Cosens

000168

2 10/74

Permit No. _____

PART I

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. Initial Effluent Limitations

During the period beginning on the effective date of this permit and lasting until June 30, 1977, the permittee is authorized to discharge from outfall(s) 001 & 002. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Average	Discharge Limitations kg/day (lbs/day) Daily Maximum	Other Limitations Daily Average	Other Limitations Daily Maximum	Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
M³/Day (MGD)	-	-	-	-	Weekly	-
Suspended Solids						
ril 1 - Nov. 30	3,968 Net (8,760)Net	7,936 Net (17,520)Net			Weekly	Grab
t. 1 - Mar. 31	5,534 Net (12,260)Net	11,108 Net (24,520)Net			Weekly	Grab
Iron	-	-	-	5 mg/l Net	Weekly	Grab
Grease	-	-	No Visible Film		Daily	Visual Observ.
³/Day (MGD)	-	-	-	-	Weekly	-
ended Solids	136(300)Net	272(600)Net	-	-	Weekly	Grab
n	-	-	-	10 mg/l Net	Weekly	Grab
Grease	-	-	No Visible Film		Daily	Visual Observ.
e						
Suspended Solids	-	-	-	-	Weekly	Grab
Iron	-	-	-	-	Weekly	Grab
002						
ol	-	-	-	-	Weekly	Grab
ides	-	-	-	-	Monthly	Grab
	-	-	-	-	Monthly	Grab
de	-	-	-	-	Monthly	Grab

Net is defined as the difference between discharge and intake values.

a. The pH shall not be less than 6.5 nor greater than 9.5. The pH shall be monitored as follows: weekly; grab.

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

c. The discharge shall not contain oil or other substances in amounts sufficient create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken at the outlet weirs, 001 & 002, prior to discharge to the Saginaw River.

000169

Final Effluent Limitations

During the period beginning July 1, 1977 and lasting until the expiration of this permit, the permittee is authorized to discharge from outfall(s) 001, 002. Such discharge shall be limited and monitored by the permittee as specified below:

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Average	Daily Maximum	Other Limitations Daily Average	Daily Maximum	Monitoring Requirements Measurement Frequency	Sample Type
002						
Flow M^3/Day (MGD)	-	-	-	-	Daily	-
Total Suspended Solids	3174 Net (7000)Net	6242 Net (10500)Net	20 mg/l Net	30 mg/l Net	Twice Weekly	24 hr comp.
Total Iron	-	624(1050)Net	-	3 mg/l Net	Weekly	24 hr. comp.
Oil & Grease	-	-	No Visible Film		Daily	Visual Obser
001						
Flow M^3/Day (MGD)	-	-	-	-	Daily	-
Total Suspended Solids	109 Net (240)Net	163 Net (360)Net	20 mg/l Net	30 mg/l Net	Twice Weekly	24 hr. comp.
Total Iron	-	16(36)Net		3 mg/l Net	Weekly	24 hr. comp.
Oil & Grease	-	-	No Visible Film		Daily	Visual Obser
Intake						
Total Suspended Solids	-	-	-	-	Twice Weekly	Grab
otal Iron	-	-	-	-	Weekly	Grab
001 & 002						
Phenol	-	-	-	-	Weekly	24 hr. comp.
PCB	-	-	-	-	Monthly	24 hr. comp.
Flourides	-	-	-	-	Monthly	24 hr. comp.
Cyanide	-	-	-	-	Monthly	Grab

Net is defined as the difference between discharge and intake values.

a. The pH shall not be less than 6.5 nor greater than 9.5. The pH shall be monitored as follows: Twice weekly; grab

b. The discharge shall not cause excessive foam in the receiving waters. The discharge shall be essentially free of floating and settleable solids.

c. The discharge shall not contain oil or other substances in amounts sufficient to create a visible film or sheen on the receiving waters.

d. Samples taken in compliance with the monitoring requirements above shall be taken at the outlet weirs, 001 & 002, prior to discharge to the Saginaw River.

000170

PART I

B. MONITORING AND REPORTING

1. Representative Sampling

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. Reporting

The permittee shall submit monitoring reports containing results obtained during the previous month and shall be postmarked no later than the 10th day of the month following each completed report period. The first report shall be submitted within 90 days of the date of issuance of this permit.

3. Definitions

a. The daily average discharge is defined as the total discharge by weight, or concentration if specified, during a calendar month divided by the number of days in the month that the production or commercial facility was operating.

b. The daily maximum discharge means the total discharge by weight, or concentration if specified, during any calendar day.

c. The Regional Administrator is defined as the Region V Administrator, EPA, located at 230 South Dearborn, 13th Floor, Chicago, Illinois 60604.

d. The Michigan Water Resources Commission is located in the Stevens T. Mason Building, Lansing, Michigan.

4. Test Procedures

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. Recording of Results

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. Additional Monitoring by Permittee

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monthly Operating Report. Such increased frequency shall also be indicated.

7. Records Retention

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the Michigan Water Resources Commission.

C. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for outfall(s) 001 & 002 in accordance with the following schedule:

a. Submit progress report to the Chief Engineer of the Michigan Water Resources Commission on or before N/A

b. Submit a preliminary engineering report and basis of design for said facilities to the Chief Engineer of the Michigan Water Resources Commission and obtain his approval thereof on or before July 31, 1975.

c. Submit progress report to the Chief Engineer of the Michigan Water Resources Commission on or before N/A.

d. Submit final plans and specifications for said facilities to the Chief Engineer of the Michigan Water Resources Commission and obtain his approval thereof on or before December 31, 1975

e. Commence construction of said facilities on or before March 31, 1976.

f. Submit progress report to the Chief Engineer of the Michigan Water Resources Commission on or before December 31, 1976.

g. Complete construction of said facilities on or before June 30, 1977.

h. Attain operational level necessary to meet the limitations specified herein on or before July 1, 1977.

000172

2. The permittee shall comply with the requirements of Section 9, Part II in ccordance with the following:

a. Submit plans for approval to the Chief Engineer of the Michigan Water Resources Commission necessary to comply with the primary power provision of Section 9 in Part II on or before N/A.

b. The permittee shall comply with the requirements of items 9a or 9b contained in Part II on or before N/A. Not withstanding the preceding sentence the permittee shall at all times halt, reduce, or otherwise control production in order to protect the waters of the State of Michigan upon the reduction or loss of the primary source of power.

3. No later than 14 calendar days following a date identified in the bove schedule of compliance, the permittee shall submit either a report f progress or, in the case of specific actions being required by identified ates, a written notice of compliance or noncompliance. In the latter case, he notice shall include the cause of noncompliance, any remedial actions aken, and the probability of meeting the next scheduled requirement.

PART II

A. MANAGEMENT REQUIREMENTS

1. Change in Discharge

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. Containment Facilities

The permittee shall provide approved facilities for containment of any accidental losses of concentrated solutions, acids, alkalies, salts, oils, or other polluting materials in accordance with the requirements of the Michigan Water Resources Commission Rules, Part 5.

3. Operator Certification

The permittee shall have the waste treatment facilities under the direct supervision of an operator certified by the Michigan Water Resources Commission, as required by Section 6a of the Michigan Act.

4. Noncompliance Notification

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

5. Facilities Operation

The permittee shall at all times maintain in good working order and operate as efficiently as possible, all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

6. Adverse Impact

The permittee shall take all reasonable steps to minimize any adverse impact to navigable waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

7. By-passing

Any diversion from or by-pass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Michigan Water Resources Commission and the Regional Administrator, in writing, of such diversion or by-pass.

8. Removed Substances

Solids, sludges, filter backwash, or other pollutants removed from or resulting from treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

9. Power Failures

In order to maintain compliance with the effluent limitations and prohibitions of this permit, the permittee shall either:

a. Provide an alternative power source sufficient to operate facilities utilized by permittee to maintain compliance with the effluent limitations and conditions of this permit which provision shall be indicated in this permit by inclusion of a specific compliance date in each appropriate "Schedule of Compliance for Effluent Limitations", or

b. Upon the reduction, loss, or failure of one or more of the primary sources of power to facilities utilized by the permittee to maintain compliance with the effluent limitations and conditions of this permit, the permittee shall halt, reduce or otherwise control production and/or all discharge in order to maintain compliance with the effluent limitations and conditions of this permit.

B. RESPONSIBILITIES

1. Right of Entry

The permittee shall allow the Executive Secretary of the Michigan Water Resources Commission, the Regional Administrator and/or their authorized representatives, upon the presentation of the credentials:

000175

6. Civil and Criminal Liability

Except as provided in permit conditions on "By-passing" (Part II, A-7) and "Power Failures" (Part II, A-9), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance, whether or not such noncompliance is due to factors beyond his control, such as accidents, equipment breakdowns, or labor disputes.

7. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. State Laws

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. Property Rights

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, or infringement of Federal, State or local laws or regulations.

10. Severability

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstances, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

11. Corps of Engineers

The U.S. Corps of Engineers has the authority to assess the permittee for the Corps' reasonable cost incurred in dredging materials attributable to the permittee's discharge. Acceptance of this permit does not obviate reaching an agreement with the Corps of Engineers as to assessment of these costs.

It is further made a condition of this permit that the applicant give notice to public utilities in accordance with Act No. 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.

APPENDIX 12.6

G.12 Former Nodular Iron Plant
Oil House USTs South (N.I #3, N.I. #4, N.I. #5, and N.I. #6)
Laboratory Data

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43881
Client I.D.:	E87-2693-25 Waste Oil Tank East End 9-2-88
Physical Description:	100% Soil

As Received:

Total Solids @ 104°C, %	82
Oil & Grease, mg/kg	1300
Volatile Organic Analysis:	No Compounds Detected

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.24
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.05
Nickel, Ni, mg/l	0.03
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 100 mls of 0.5 N acetic acid, the final pH was 5.0.

WA/8L

Susan K. Scott

ADDITIONAL SOILS REMOVAL CONTRACT THAT IS PENDING.

THE MICHIGAN DNR WAS NOTIFIED AND A REMEDIATION PLAN WAS SUBMITTED FOR REVIEW AND APPROVAL (SEE ATTACHED CORRESPONDENCE).

BASED ON THE ANALYSIS RECEIVED AND THE DNR APPROVAL, THE CONTAMINATED SOIL WAS REMOVED AND DISPOSED OF AT PEOPLES LANDFILL (SEE ADDITIONAL FOLDER CONTAINING SOILS REMOVAL INFORMATION).

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43884
Client I.D.:	E87-2693-28 Waste Oil Tank West End 9-2-88
Physical Description:	100% Soil

Total Solids @ 104°C, %	86
Oil & Grease, mg/kg	150
Volatile Organic Analysis:	No Compounds Detected
PCB's, mg/kg	
Aroclor 1242	<1
Aroclor 1254	--
Aroclor 1260	<1

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.15
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.20
Nickel, Ni, mg/l	0.03
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 70 mls of 0.5 N acetic acid, the final pH was 5.1.

WA/11L

Susan K. Scott

Pierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 9/2/88

Sample No. E87-2693-a

Sampled by: Stan

Sample Type: Water ☐ Soil ☒ Sludge ☐ Other _____

Customer: Central Foundry Div GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

Waste oil tank (East End)

BES Job Number E87-2693

Analysis requested: EP Tox, RCRA & MI
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 313-334-4747 Date delivered 9/2/88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 667

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43890
Client I.D.:	E87-2693-34 Air Line Lube Oil Tank East End 9-2-88
Physical Description:	100% Soil

As Received:

Total Solids @ 105°C	87
Oil & Grease, mg/kg	2400
Volatile Organic Analysis:	No Compounds Detected

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.05
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.06
Nickel, Ni, mg/l	0.02
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 43 mls of 0.5 N acetic acid, the final pH was 5.1.

WA/17L

Susan K. Scott
Laboratory Supervisor

Bierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 7/2/88

Sample No. E87-2693-32

Sampled by: Stan

Sample Type: Water ☐ Soil ☑ Sludge ☐ Other _____

Customer: Central Foundry Div GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

Air line lube oil tank West End

BES Job Number E87-2693

Analysis requested: EP Tox, RCRA & MI
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 334-4747 Date delivered 9-2-88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 670

[redacted]

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43888
Client I.D.:	E87-2693-32 Air Line Lube Oil Tank West End
Physical Description:	100% Soil

As Received:

Total Solids @ 104°C, %	82
Oil & Grease, mg/kg	110
Volatile Organic Analysis:	No Compounds Detected

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.20
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.06
Nickel, Ni, mg/l	0.02
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 80 mls of 0.5 N acetic acid, the final pH was 5.1.

WA/15L

Susan K. Scott
Laboratory Supervisor

Bierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 7 & 01

Sample No. EB7-2693-33

Sampled by: Stan

Sample Type: Water ☐ Soil ☑ Sludge ☐ Other _____

Customer: Central Foundry Div. GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

South Pattern Spray tank
(East End) EB7-2693

BES Job Number

Analysis requested: EP Tox RCRA, MI
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 334-4747 Date delivered 9/2/88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 708

[redacted]

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number: 43882

Client I.D.: E87-2693-26
South Pattern
Spray Tank
West End
9-2-88

Physical Description: Wet Soil

As Received:

Total Solids @ 104°C, %	90
Oil & Grease, mg/kg	5400
Volaitle Organic Analysis:	No Compounds Detected

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.12
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.10
Nickel, Ni, mg/l	0.03
Cyanide, CN, mg/l	0.05

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 80 mls of 0.5 N acetic acid, the final pH was 5.1.

WA/9L

Susan K. Scott
Laboratory Supervisor

Pierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 9/2/88

Sample No. E87-2693-29

Sampled by: Stan

Sample Type: Water ☐ Soil ☑ Sludge ☐ Other _____

Customer: Central Foundry Div GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

North Pattern Spray tank (west End)

PES Job Number: E87-2693

Analysis requested: EP Tox RCRA, M1
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 334-4747 Date delivered 9/2/88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 704

[redacted]

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43889
Client I.D.:	E87-2693-33 South Pattern Spray Tank East End 9-2-88
Physical Description:	100% Soil

As Received:

Total Solids @ 104°C, %	89
Oil & Grease, mg/kg	4700
Volatile Organic Analysis:	
Ethyl Benzene, mg/kg	10-15
Xylenes, mg/kg	30-35

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.15
Cadmium, Cd, mg/l	<0.02
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.08
Nickel, Ni, mg/l	<0.02
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 70 mls of 0.5 N acetic acid, the final pH was 5.1.

WA/16L

Susan K. Scott

Bierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 9/2/88

Sample No. E87-2693-26

Sampled by Stan

Sample Type: Water ☐ Soil ☑ Sludge ☐ Other _____

Customer: Central Foundry Div GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

South Pattern Spray Tk (West End)

BEE Job Number: E87-2693

Analysis requested: EP Tox RCRA & MI
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 313 334-4747 Date delivered 9/2/88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 668

[redacted]

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43883
Client I.D.:	E87-2693-27 North Pattern Spray Tank Front End
Physical Description:	100% Soil

As Received:

Total Solids @ 104°C, %	86
Oil & Grease, mg/kg	430
Volatile Organic Analysis:	No Compounds Detected

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.20
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	0.02
Zinc, Zn, mg/l	0.15
Nickel, Ni, mg/l	0.02
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 100 mls of 0.5 N acetic acid, the final pH was 5.0.

WA/10L

Susan K. Scott
Laboratory Supervisor

Bierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 8-23-88

Sample No. 007 2693-17

Sampled by: Jeff Roseberry

Sample Type: Water ☐ Soil ☒ Sludge ☐ Other _____

Customer: Nadular Iron

3' deep @ excavation 4k farm

South side

Contact: Stan Baker

Phone: 517-781-1810

BES Job Number: ES7 2693-17

Analysis requested: 601, 602, EP Tox, O.'s

grease

Laboratory: Waiste compliance

Phone: _____ Date delivered 8-23-88

WHITE – Customer Copy
YELLOW – Job File Copy
PINK – Laboratory Copy
GOLD – Numerical File Copy

№ 579

Burmah

Bierlein Environmental Services
Attn: Stanley Baker

September 20, 1988

PROGRAM: CFD - SNI

Date Received: 9-2-88

ALD Number:	43885
Client I.D.:	E87-2693-29 North Pattern Spray Tank West End 9-2-88
Physical Description:	100% Soil

As Received:

Total Solids @ 104° C, %	
Oil & Grease, mg/kg	350
Volatile Ogranic Analysis:	
Xylenes, mg/kg	25-30

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.25
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.05
Nickel, Ni, mg/l	0.03
Cyanide, CN, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 140 mls of 0.5 N acetic acid, the final pH was 5.0.

WA/12L

Susan K. Scott
Laboratory Supervisor

Pierlein
ENVIRONMENTAL SERVICES

2903 SOUTH GRAHAM
SAGINAW, MICHIGAN 48603

Date: 9/2/88

Sample No. E87-2693-27

Sampled by: Stan

Sample Type: Water ☐ Soil ☑ Sludge ☐ Other _____

Customer: Central Foundry Div GMC
Nodular Iron

Contact: Stan Baker

Phone: 517-781-1810

North Pattern Spray tank (East End)

Analysis requested: EP Tox RCRA & M1
601, 602, Oil & Grease

Laboratory: Burmah

Phone: 334-4747 Date delivered 9/2/88

WHITE — Customer Copy
YELLOW — Job File Copy
PINK — Laboratory Copy
GOLD — Numerical File Copy

№ 669

[redacted]

WASTE COMPLIANCE SERVICES

Specialists in Industrial Waste Analysis

12255 WORMER • REDFORD, MI 48239 • (313) 255-9600

REPORT OF ANALYSIS

July 20, 1988

SAMPLE SUBMITTED BY: Bierlein Environmental, Inc.

ATTN: Stan Baker

DATE RECEIVED: July 15, 1988

PROJECT NUMBER: P-4195

ANALYSIS REQUESTED: PCB Analysis

RESULTS: Expressed in mg/kg (ppm)

CUSTOMER ID	WCS ID	TOTAL PCB RESULT	DETECTION LIMIT
Central Foundry Div. Nodular Iron Waste Oil Tank 7/13/88 Sample #E87-2693-1	S-11240	< 1.0	1.0
Central Foundry Div. Nodular Iron Fuel Oil Composite of 3 Tanks Sample #E87-2693-2	S-11241	< 1.0	1.0

WASTE COMPLIANCE SERVICES
Analysis by Vishu Peketi
Vishu Peketi
Chemist

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE

ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

Form Approved. OMB No. 2050-0039 Exp. 9-30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. MIDO417933401 Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Central Foundry Division - GMC - Nodular Iron
2100 Veterans Memorial Parkway, Saginaw, Michigan
4. Generator's Phone (517) 757-0223 48605-5073

A. State Manifest Document Number MI 1419823

B. State Generator's ID

5. Transporter 1 Company Name: Bierlein Environmental Services, Inc
6. US EPA ID Number: MIDO173584411

C. State Transporter's ID 464

D. Transporter's Phone 517-781-1811

7. Transporter 2 Company Name
8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
General Oil Company
12680 Beech Daly Road
Redford, Michigan 48239
10. US EPA ID Number: MIDO47189568

G. State Facility's ID

H. Facility's Phone 313-535-2530

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/I
GENERATOR 3.	Waste Oil, N.O.S., Combustible Liquid, NA 1993			TT	2500	G	029L	N
c.	Nodular Shipper # 34-2334							
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above: a/ / b/ / c/ / d/ /

15. Special Handling Instructions and Additional Information
E87-2699

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR; if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

	Printed/Typed Name	Signature	Date (Month Day Year)
GENERATOR	Kenneth T. Pelletier		05 05 89
TRANSPORTER 17.	Transporter 1 Acknowledgement of Receipt of Materials: SCOTT D KRAWER		050589
TRANSPORTER 18.	Transporter 2 Acknowledgement or Receipt of Materials: Timothy J Jahr		050589

19. Discrepancy Indication Space

FACILITY 20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Date (Month Day Year)
Bradley J Bradham		06 05 89

EPA Form 8700-22 (Rev. 9/86)

PR 5

SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

APPENDIX 12.7

G.16 01/26/89 Possible Chlorobenzene Release

Laboratory Report
MDNR Conversation Records

Burmah

Bierlein Environmental Service
Attn: Kevin Overly

January 4, 1989

Additional Work
Requested 11-30-88

PROGRAM: GM CENTRAL FOUNDRY - NODULAR IRON

Date Received: 11-30-88

ALD Number:	47664
Client I.D.:	#38 Under Concrete Pad
Physical Description:	100% Black Soil

As Received:

Total Solids @ 104°C, %	88
Volatile Organic Analysis: Chlorobenzene, mg/kg	55-60

EP Toxicity:

Arsenic, As, mg/l	<0.005
Barium, Ba, mg/l	0.24
Cadmium, Cd, mg/l	<0.01
Chromium, Cr, mg/l	<0.02
Lead, Pb, mg/l	<0.05
Mercury, Hg, mg/l	<0.0005
Selenium, Se, mg/l	<0.005
Silver, Ag, mg/l	<0.02
Copper, Cu, mg/l	<0.02
Zinc, Zn, mg/l	0.02
Nickel, Ni, mg/l	<0.02

100 grams of sample was leached into 1600 mls of deionized water and brought to a final volume of 2000 mls. After the addition of 200 mls of 0.5 N. acetic acid, the final pH was 4.9.

Please see attached sheet for additional notes, detection limits, and complete listing of compounds included in the volatile organic analysis.

Q/2r

USEPA FOIA REQUEST
RIN 768 FEBRUARY 14, 1994

9 0282

CONVERSATION RECORD

TIME 10:00 | DATE 1/26/89

☐ VISIT ☐ CONFERENCE ☒ TELEPHONE ☐ INCOMING ☒ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Jim Sygo-Saginaw	MDNR	517-771-1731

ROUTING

NAME/SYMBOL	INT

SUBJECT GMC - Nodular Iron and Grey Iron PHC
MID 041 793 340

SUMMARY
1/26/89 - Spoke with Jim about documentation of release. told him to send in anything that showed documentation of release he said he had evidence of a chloro benzene spill. Also gwm data showing release.

(Ground Water Monitoring)

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Rebecca Strom? (per Sue Brauer)		

ACTION TAKEN

SIGNATURE	TITLE	DATE

USEPA FOIA REQUEST

9 0281

RIN 768 CONVERSATION RECORD

FEBRUARY 14, 1994

TIME 2:15 | DATE 2/10/89

☐ VISIT ☐ CONFERENCE ☒ TELEPHONE ☐ INCOMING ☒ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO.
Jim Sygo	MDNR	(517) 771-1731

ROUTING

NAME/SYMBOL	INT

SUBJECT

GMC (Central Foundry Div. Nodular Iron MID 041 793 340

SUMMARY

2/10/89 — hydrogeo. results — will be sent in — Back lot near tri-city refuse — Solid Waste Processing Station — Surface water D.V.i.s.i.o.n. 4 sump areas in basement — phenols and metals — Nodular Iron requested to have NPDES permit terminated because going to recycle. Copy of results from sump — to River — Hazardous constituents in discharge — Chlorobenze release near — oil house.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE

'N TAKEN

SIGNATURE	TITLE	DATE

50271-101 ☆ GPO : 1985 0 - 461-275 (20090) CONVERSATION RECORD OPTIONAL FORM 271 (12-76) DEPARTMENT OF DEFENSE

APPENDIX 12.8

G.4 Former (Original) Desulfurization Slag RCRA Treatment Unit, "Weathering Slab"

Groundwater Analytical Summary

RMT INC.
RMT, Inc.
Suite 124
1406 East Washington Ave.
Madison, WI 53703-3009
Phone: 608-255-2134

Great Lakes Office
325 S. Clinton Street
P.O. Box 447
Grand Ledge, MI 48837-0447
Phone: 517-627-4044

June 17, 1988

Mr. William Hudson
Engineering Department
GMC-CFD Saginaw Nodular Iron Plant
2100 Veterans Memorial Parkway
Saginaw, MI 48605-5073

Dear Bill:

RMT has recently completed four phases of a Preliminary Site Evaluation for the old and existing calcium carbide desulfurization slag treatment areas at your facility. We are preparing the final report which summarizes the soil and ground water data, and which may eventually be submitted to the Michigan Department of Natural Resources.

As you know, we will meet on June 24, 1988, to discuss the findings of the Preliminary Site Evaluation, and to discuss the next plan of action. In preparation for that meeting, we have prepared portions of the final report, for your review prior to the meeting. We will prepare a meeting agenda and several additional items for distribution at the meeting.

We look forward to meeting with you and everyone involved with this project on the 24th. If we can be of additional assistance, please call.

Very truly yours,

Rick

Richard C. Krueger
Project Engineer

Tom

Thomas J. Jancek
Project Manager

tme

Enclosure

cc: Ron Anderson
George Baumann
Phil Gerwert
Dave Hersh
Joe Medved
Steve Song
Gary Toth
Jim Wheeler

001336

RMT STUDY

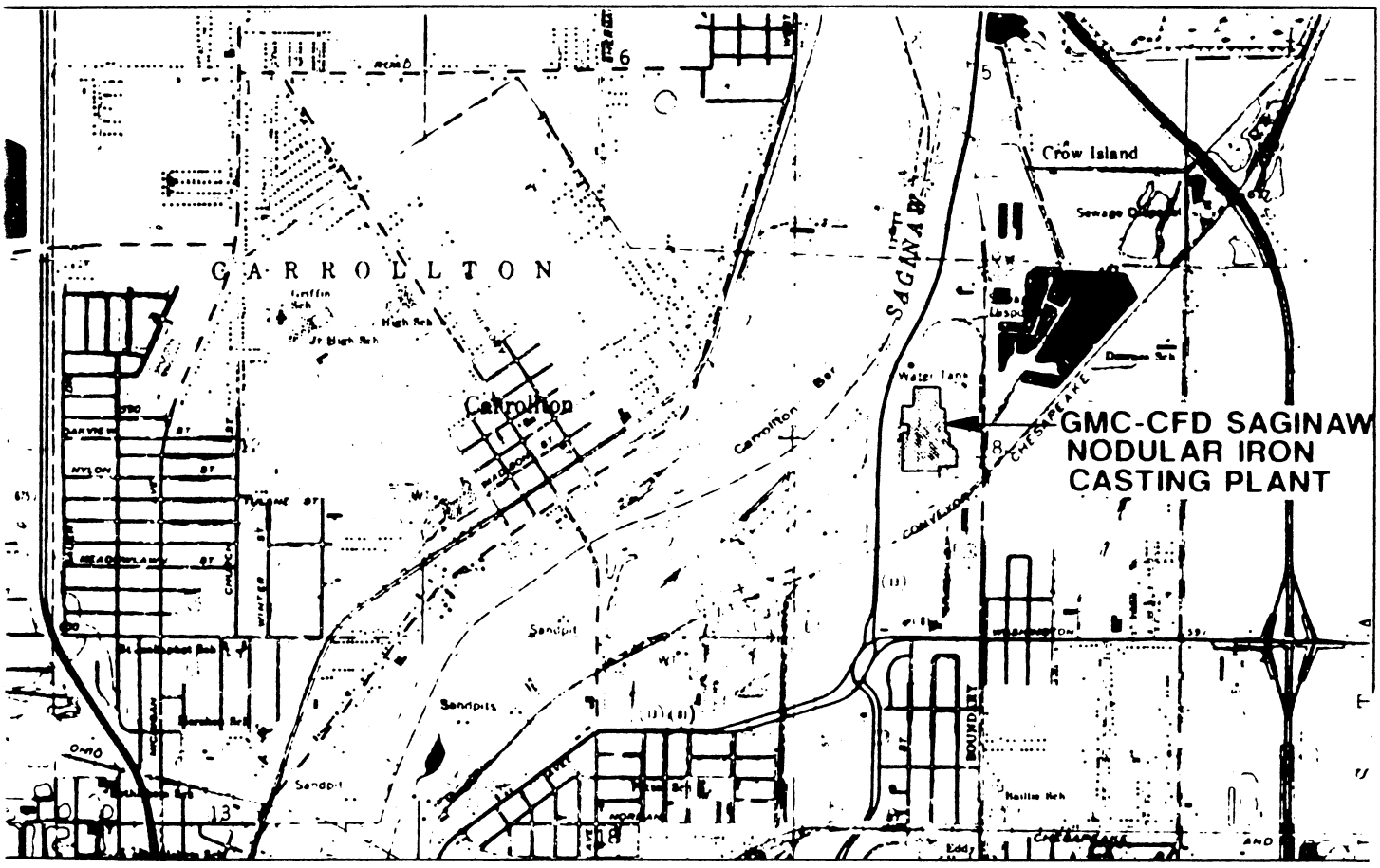
central foundry

GM

SAGINAW NODULAR IRON CASTING PLANT
SAGINAW, MICHIGAN

PRELIMINARY SITE EVALUATIONS

AT OLD AND EXISTING CALCIUM CARBIDE DESULFURIZATION SLAG TREATMENT AREAS



001335

RMT

RMT INC.

Great Lakes Office
325 S. Clinton Street
P.O. Box 447
Grand Ledge, MI 48837-0447
Phone: 517-627-4044

RMT, Inc.
Suite 124
1406 East Washington Ave.
Madison, WI 53703-3009
Phone: 608-255-2134

PRELIMINARY SITE EVALUATIONS AT THE OLD AND EXISTING CALCIUM CARBIDE DESULFURIZATION SLAG TREATMENT AREAS

FOR

SAGINAW NODULAR IRON CASTING PLANT
CENTRAL FOUNDRY DIVISION
GENERAL MOTORS CORPORATION
SAGINAW, MICHIGAN

JUNE 1988

PRELIMINARY

Richard C. Krueger
Project Engineer

Thomas J. Jancek
Project Manager

Mark E. Smith, P.E.
Director, Technical Operations

Stephen D. Johannsen
Manager, Hydrogeologic Services

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001337

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TABLE OF CONTENTS

Title	Page
EXECUTIVE SUMMARY	i
1. INTRODUCTION	1
1.1 Background	1
1.2 Purpose and Scope	5
2. FINDINGS AND CONCLUSIONS	7
3. GENERAL FACILITY INFORMATION	
3.1 Site Location and Setting	
3.2 Topography and Drainage	
3.3 Geology	
3.4 Hydrogeology	
4. METHODS	
4.1 Soil Sampling	
4.2 Ground Water Sampling	
4.3 Analytical Methods	
5. PRELIMINARY SITE EVALUATIONS	
5.1 Approach	
5.3 Soil Sample Results and Assessment	
5.4 Ground Water Flow Directions	
5.5 Ground Water Sample Results and Assessment	

List of Diagrams

Diagram 1 - Closure Decision Diagram

List of Tables

Table 5-1 - Old Calcium Carbide Desulfurization Slag Treatment Area Soil Analyses

Table 5-2 - Existing Calcium Carbide Desulfurization Slag Treatment Bunker Soil Analyses

Table 5-3 - Ground Water Results for Old and Existing Treatment Areas

Table 5-4 - Ground Water Results for Eastern, Southern, and Western Areas and Sump Pumps

List of Figures

Figure 1 - General Facility Map

Figure 2 - Ground Water Table Map

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001338

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1. INTRODUCTION

1.1 Background

The General Motors Corporation Central Foundry Division Saginaw Nodular Iron (CFD-SNI) Plant manufactures nodular iron castings. During the manufacturing process, CFD-SNI added calcium carbide to reduce the sulfur content in the molten iron. This step was necessary to produce ductile iron with appropriate metallurgical properties. The slag generated by this process was known as calcium carbide desulfurization slag, and contained small quantities (one to three percent) of unreacted calcium carbide. When unreacted calcium carbide in the slag came in contact with water, acetylene gas was formed as a reaction product. Therefore, calcium carbide desulfurization slag was a hazardous waste by the characteristic of reactivity.

The treatment technique used to render the slag nonhazardous involved eliminating the ability of the slag to generate acetylene gas. This was accomplished by placing waste in a waste pile, spraying the waste with a mixture of water, potassium permanganate, and a surfactant, and allowing the acetylene to dissipate into the atmosphere.

The CFD-SNI Plant began preparing a RCRA Closure Plan for each of the two calcium carbide desulfurization slag treatment units in mid-1987, and submitted the Closure Plans to the Michigan Department of Natural Resources (MDNR) in December 1987. The two treatment units are known as follows:

- Old Calcium Carbide Desulfurization Slag Treatment Area
- Existing Calcium Carbide Desulfurization Slag Treatment Bunker

The Closure Plans described the activities, tests, and closure performance standards which would be used to document "clean closure" of

001339

PRELIMINARY
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the two RCRA units. The Closure Plans also described the decision-making process which would be used during closure. In order to expedite the closure process for the two RCRA waste management units, CFD-SNI conducted a series of four preliminary site evaluations beginning in September 1987.

Preliminary Site Evaluation (Phase I)

The objectives of conducting the Preliminary Site Evaluation (Phase I) were as follows:

- To obtain fundamental soil and ground water data in the two calcium carbide desulfurization slag treatment areas.
- To obtain background soil data in areas that have not been impacted by the calcium carbide desulfurization slag treatment process, but that are representative of the general, industrial area.
- To determine whether "clean closure" of the two RCRA units appears feasible by comparing the laboratory data from each of the two units to background soil concentrations, typical concentrations in "natural" soils, and to regulatory ground water levels.

During the Preliminary Site Evaluation (Phase I), twenty soil samples were collected near the two calcium carbide desulfurization slag treatment areas, and analyzed for total metals (arsenic, cadmium, lead, selenium). The soil sample results indicate that "substantial" soil contamination was not apparent in the vadose zone at either of the treatment areas.

Four shallow ground water monitoring wells were installed immediately downgradient of the two treatment areas (two wells in each treatment area). Ground water samples were analyzed for various organic and inorganic chemicals, and the results were compared to regulatory

001340

PRELIMINARY
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standards. The results indicated that the ground water samples contained several parameters (e.g., chloride, fluoride, pH) at concentrations above the comparison standards.

Phase II Ground Water Evaluation

Based on the results of the Phase I Evaluation, a Phase II Ground Water Evaluation was conducted. The objective of Phase II was to compare ground water quality in the vicinity of the existing treatment bunker to ground water collected approximately 250 feet downgradient of the bunker.

For the Phase II evaluation, two shallow ground water samples were collected and analyzed for ammonia, arsenic, benzene, chloride, cyanide, fluoride, pH, sulfide, total kjeldahl nitrogen, and total organic carbon. The results indicated that ammonia, arsenic, chloride, fluoride, and pH were present at both locations in excess of the comparison standards. Generally, the results indicated higher concentrations near the treatment bunker compared to the downgradient location.

Phase III Ground Water Evaluation

The objectives of Phase III were to determine ground water flow directions in the vicinity of the existing calcium carbide desulfurization slag treatment bunker, and to compare the ground water quality in the vicinity of the bunker to ground water quality along the southeastern portion of the SNI plant property. The wells along the southeastern portion of the plant were assumed to be hydraulically upgradient of the existing treatment bunker.

001341

PRELIMINARY
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Ground water table elevation data indicated that the General Motors wastewater treatment plant (or the classified sand pile near the treatment plant) and the pumping activity in the basement of the SNI Plant were causing ground water in the shallow sand aquifer on the eastern side of the Plant to flow in a westerly direction beneath the old treatment area and the existing treatment area.

Ground water samples were collected from three monitoring wells located near the existing treatment bunker, and from five monitoring wells located along the southern and eastern portion of the SNI property. The southern and eastern monitoring wells were thought to represent "background" ground water quality. The analytical results indicated that ground water near the existing treatment bunker contained elevated concentrations of ammonia, fluoride, total kjeldahl nitrogen, and total organic carbon, compared to the southeastern monitoring wells.

Phase IV Ground Water Evaluation

The objectives of Phase IV were as follows:

- Determine whether ground water along the SNI western property boundary, ground water in the four SNI Plant basement sump pumps, or ground water at depth near the two treatment areas contained elevated concentrations of selected parameters.
- Determine ground water flow directions for the SNI Plant property.
- Present a comprehensive report which summarizes the findings from the four phases of the Preliminary Site Evaluation.

The ground water sample results indicated that ground water along the SNI western property boundary did not contain elevated concentrations of the chemical parameters analyzed, with the possible

001342

PRELIMINARY
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exception of chloride which may be from road salt. The results also indicated that ground water at depth near the two treatment areas did not contain elevated concentrations of the chemical parameters analyzed, with the possible exception of total organic carbon beneath the existing treatment bunker. For the four sump pump samples, the highest concentrations were detected in the sample collected from the pump in the southeastern corner of the SNI Plant. That sump pump is located near one of the previously sampled monitoring wells (MW-6 on Figure ___) and is approximately 250 feet west of the existing treatment bunker. The remaining three sump pump samples contained slightly elevated concentrations of some parameters, such as chloride, ammonia, and total organic carbon.

Ground water elevations indicated a ground water "high" associated with the GM wastewater treatment settling lagoons, and a ground water "low" associated with the pumping activity of the SNI Plant basement sump pumps.

1.2 Purpose and Scope

The purposes of this report are to summarize the four phases of the ground water monitoring program, as they relate to closure of the two calcium carbide desulfurization slag treatment areas, and to provide an assessment of the data obtained during the four phases.

The scope of the report includes the following:

- Descriptions of the geologic and hydrogeologic setting.
- Descriptions of the collection and analytical methods used for ground water and soil samples.
- Presentation of the soil and ground water analytical data.

001343

PRELIMINARY
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- Presentation of the ground water elevation data.
- Assessments of the soil and ground water data.

001344

PRELIMINARY
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2. FINDINGS AND CONCLUSIONS

1. The Phase I soil analyses indicate that the near-surface soil surrounding the old treatment area and the existing treatment bunker have not been significantly impacted by waste management activities in the areas, based on total metal analyses for arsenic, cadmium, lead, and selenium.

2. Phase II and III ground water elevations indicated a ground water "high" near the GM wastewater treatment plant and the classified sand pile, and a "low" beneath the SNI Plant production building. Ground water is flowing away from the treatment plant and sand pile, and being drawn toward the SNI Plant by the basement sump pumps for discharge to the storm sewer.

3. The following chemicals were detected at concentrations above their drinking water Maximum Contaminant Level (MCL):

Location	Chemical
Old Treatment Area	Benezene Fluoride
Existing Treatment Bunker	Arsenic Benzene Fluoride
Sump Pumps	Arsenic Benzene Fluoride
Western Portion of Plant	Fluoride
Eastern Portion of Plant	Fluoride

4. Generally, concentrations in the deeper wells near the old treatment area and the existing treatment bunker are substantially lower than in the shallow wells, indicating that surface contaminants have not migrated vertically to the depth sampled.

5. Generally, concentrations along the western property boundary of the SNI Plant are substantially lower than near the old and existing treatment units, and are similar to the concentrations in the eastern and southern portions of the property, indicating that surface contaminants have not migrated to those areas.

6. For the four sump pumps in the plant basement, the sample collected from one of the sumps contained substantially higher concentrations than the other sump samples. The sump with the higher concentrations is located in the southeast portion of the plant, about 250 feet hydraulically downgradient of the existing treatment bunker.

001345

PRELIMINARY
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7. Based on ground water flow directions and chemical concentrations in the monitoring wells and sump pumps, it appears that chemical constituents from the treatment units are migrating with the shallow ground water toward the sump pumps.

001346

PRELIMINARY
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TABLE 5-1

OLD CaC_2 DESULFURIZATION SLAG TREATMENT AREA
SOIL ANALYSES
TOTAL METAL RESULTS

Parameter	Background Concentration Range (mg/kg)	Typical Natural Soil Concentration Range (ppm)*	Preliminary Site Evaluation Boring Location	Sample Depth (ft)	Sample Concentration (mg/kg)
Arsenic	1.8 - 14	1 - 50	MW-1	3 - 4	6.4
			MW-1	6 - 7	3.9
			MW-2	1 - 2	7.8
			MW-2	5 - 6	6.5
			B-9	1 - 2	9.1
			B-9	3.5 - 4.5	8.3
			B-10	1 - 2	16
			B-10	4 - 5	15
Cadmium	< 1.0 - 1.2	0.01 - 7	MW-1	3 - 4	< 1.0
			MW-1	6 - 7	< 1.0
			MW-2	1 - 2	< 1.0
			MW-2	5 - 6	< 1.0
			B-9	1 - 2	< 1.0
			B-9	3.5 - 4.5	< 1.0
			B-10	1 - 2	< 1.0
			B-10	4 - 5	< 1.0
Lead	< 10 - 120	2 - 200	MW-1	3 - 4	< 10
			MW-1	6 - 7	24
			MW-2	1 - 2	< 10
			MW-2	5 - 6	< 10
			B-9	1 - 2	23
			B-9	3.5 - 4.5	13
			B-10	1 - 2	10
			B-10	4 - 5	14
Selenium	< 0.60 - 0.78	0.1 - 2	MW-1	3 - 4	< 0.60
			MW-1	6 - 7	< 0.60
			MW-2	1 - 2	< 0.60
			MW-2	5 - 6	< 0.60
			B-9	1 - 2	< 0.60
			B-9	3.5 - 4.5	< 0.60
			B-10	1 - 2	< 0.60
			B-10	4 - 5	< 0.60

*Bohn, H., B. McNeal and G. O'Conner. 1979.
Soil Chemistry. New York, N.Y.: John Wiley & Sons, Inc.,

**Sample concentration was greater than both the background range and the typical natural soil range.

001347

PRELIMINARY
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TABLE 5-2

EXISTING CaC_2 DESULFURIZATION SLAG TREATMENT BUNKER
SOIL ANALYSES
TOTAL METAL RESULTS

Parameter	Background Concentration Range (mg/kg)	Typical Natural Soil Concentration Range (ppm)*	Preliminary Site Evaluation Boring Location	Sample Depth (ft)	Sample Concentration (mg/kg)
Arsenic	1.8 - 14	1 - 50	B-5	1 - 2	11
			B-5	4.5 - 5.5	4.9
			B-6	1 - 2	5.2
			B-6	3 - 4	5.0
			B-7	3 - 4	3.1
			B-7	5 - 6	13
			B-8	1 - 2	9.0
			B-8	3 - 4	9.0
			MW-3	1 - 2	13
			MW-3	3 - 4	5.4
			MW-4	1 - 2	5.9
			MW-4	3 - 4	6.0
Cadmium	< 1.0 - 1.2	0.01 - 7	B-5	1 - 2	< 1.0
			B-5	4.5 - 5.5	< 1.0
			B-6	1 - 2	< 1.0
			B-6	3 - 4	< 1.0
			B-7	3 - 4	< 1.0
			B-7	5 - 6	< 1.0
			B-8	1 - 2	< 1.0
			B-8	3 - 4	< 1.0
			MW-3	1 - 2	< 1.0
			MW-3	3 - 4	< 1.0
			MW-4	1 - 2	< 1.0
			MW-4	3 - 4	< 1.0
Lead	< 10 - 120	2 - 200	B-5	1 - 2	18
			B-5	4.5 - 5.5	< 10
			B-6	1 - 2	< 10
			B-6	3 - 4	13
			B-7	3 - 4	< 10
			B-7	5 - 6	220**
			B-8	1 - 2	12
			B-8	3 - 4	< 10
			MW-3	1 - 2	< 10
			MW-3	3 - 4	< 10
			MW-4	1 - 2	< 10
			MW-4	3 - 4	< 10

001348

PRELIMINARY
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TABLE 5-2 (Cont'd)

Parameter	Background Concentration Range (mg/kg)	Typical Natural Soil Concentration Range (ppm)*	Preliminary Site Evaluation Boring Location	Sample Depth (ft)	Sample Concentration (mg/kg)
Selenium	< 0.60 - 0.78	0.1 - 2	B-5	1 - 2	< 0.60
			B-5	4.5 - 5.5	< 0.60
			B-6	1 - 2	< 0.60
			B-6	3 - 4	< 0.60
			B-7	3 - 4	< 0.60
			B-7	5 - 6	< 0.60
			B-8	1 - 2	< 0.60
			B-8	3 - 4	< 0.60
			MW-3	1 - 2	< 0.60
			MW-3	3 - 4	< 0.60
			MW-4	1 - 2	< 0.60
			MW-4	3 - 4	< 0.60

*Bohn, H., B. McNeal and G. O'Conner. 1979.
Soil Chemistry. New York, N.Y.: John Wiley & Sons, Inc.,

**Sample concentration was greater than both the background range and the typical natural soil range.

001349

Table 5-3
Cumulative Ground Water Monitoring Results For the Two Treatment Areas at the GMC-CFD-SNI Plant

	Near Old Treatment Area			Near Existing Treatment Bunker							
Parameter and Regulatory Standard	MW-1 10-1-87	MW-2 10-1-87	MW-10 5-12-88	Basement Pit 6-24-86	MW-3 10-1-87	MW-3 3-07-88	MW-4 10-1-87	MW-4 1-11-88	MW-7 3-07-88	MW-8 3-07-88	MW-9 5-12-88
Alkalinity	220	270		2,180	130		9,300				
Arsenic 0.05(2)	0.046	0.046	0.010	1.52	0.011	0.014	2.3	5.5(est)	< 0.004	0.010	< 0.008
Cadmium 0.01(2)	< 0.0002	< 0.0002		< 0.0002	< 0.0002		< 0.0004				
Chloride 250(3)	400	330	38	4,140	470	380	15,000	6,500	970	720	48
Chromium 0.05(2)	< 0.002	< 0.002		0.0031	< 0.002		< 0.004				
Fluoride 4.0(2)	21	21	1.5	14.2	14	21	4.2	6.4	10	39	2.0
Lead 0.05(2)	< 0.005	< 0.005		< 0.005	< 0.005		< 0.010				
pH 6.5 - 8.5(3)	10.4	10.3	8.0	12.1	9.9	9.3	10.5	10.3	7.0	10.2	9.6
Phenol	0.060	8.8	< 0.005	2.1	< 0.05		4.8				0.006
Selenium 0.01(2)	< 0.003	< 0.003		0.005	< 0.003		< 0.006				
TOC	38	47	2.9	1,540	8.0	6.1	3,800	1,500	42	29	1700
Ammonia 0.14(4)			0.4			19		700	4.4	17	0.75
Nitrate				< 5.0							
Nitrite											
Sulfide			< 1			< 1		7	< 1	< 1	< 1
TKN			1.6			21		3,800	4.9	25	1.6
Cyanide						< 0.33		< 2.5	< 0.50	< 0.20	
Benzene 0.005(2)			0.0061			< 0.001		16.0	0.025	0.0078	< 0.001

NOTES: (1) All units in milligrams per liter, except pH.
(2) Maximum Contaminant Level.
(3) Secondary Maximum Contaminant Level.
(4) Based on 20°C and 9.0 pH units for a 4-day average total ammonia (surface) water quality criteria.

001350

1125.16 101:RTE:sagi0411T

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Table 5-4
Cumulative Ground Water Results for the SNI Plant Sump Pumps and
Eastern, Southern, and Western Portions of the GMC-CFD-SNI Plant

	Eastern and Southern Portions of SNI Plant						Western Portion of SNI Plant		Sump Pumps and Monitoring Well in SNI Plant Basement					
Parameter and Regulatory Standard	MW-5 10-1-87	SB-A 3-07-88	SB-19 3-07-88	SB-37 3-07-88	SB-40 3-07-88	SB-42 3-07-88	MW-11 5-12-88	MW-12 5-12-88	SP-1 5-12-88	SP-2 5-12-88	SP-3 5-12-88	SP-4 5-12-88	MW-6 10-1-87	MW-6 1-11-88
Alkalinity														
Arsenic 0.05(2)		< 0.004	< 0.004	< 0.004	< 0.004	< 0.004	< 0.003	< 0.003	0.019	1.2	< 0.003	0.027		0.76(est)
Cadmium 0.01(2)														
Chloride 250(3)		51	63	66	40	56	520	900	190	2,800	100	330		1,600
Chromium 0.05(2)														
Fluoride 4.0(2)		10	0.65	2.0	1.9	1.6	6.1	0.72	2.5	6.3	2.1	7.8		18
Lead 0.05(2)														
pH 6.5 - 8.5(3)		9.6	7.3	8.8	7.6	7.4	9.2	7.2	9.3	9.6	7.8	7.3		9.4
Phenol							< 0.005	< 0.006	0.028	1.6	0.012	0.090		
Selenium 0.01(2)														
TOC		2.5	7.9	2.5	9.2	6.9	10	7.5	17	480	4.9	18		460
Ammonia 0.14(4)		0.28	< 1.0	< 1.0	< 1.0	< 1.0	0.70	0.84	13	220	1.2	18	400	170
Nitrate	< 0.05												4.7	
Nitrite	< 0.02												< .02	
Sulfide	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	4.9	2
TKN	5.1	1.2	0.86	0.35	1.2	0.65	1.4	1.1	98	1700	2.4	65	3,500	1,400
Cyanide		< 0.25	< 0.25	< 0.25	< 0.25	< 0.25								< 2.5
Benzene 0.005(2)	< 0.001	< 0.001	< 0.001	0.0011	0.019	< 0.001	< 0.001	< 0.001	< 0.001	0.035	< 0.001	< 0.001	0.025	0.0046

NOTES: (1) All units in milligrams per liter, except pH.
(2) Maximum Contaminant Level.
(3) Secondary Maximum Contaminant Level.
(4) Based on 20°C and 9.0 pH units for a 4-day average total ammonia (surface) water quality criteria.

001351

PRELIMINARY
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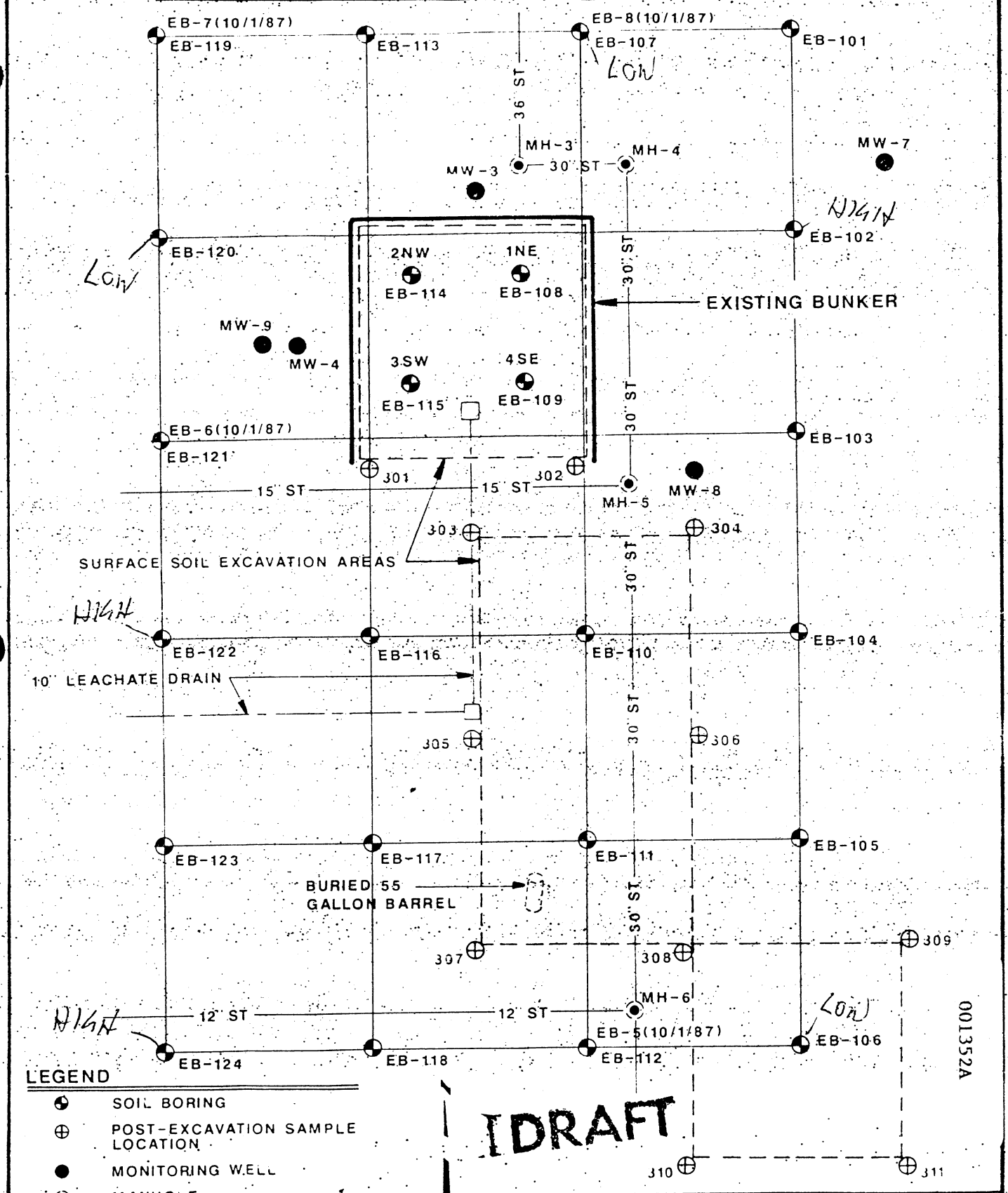
1125.16 101:RTE:sagi0411T

GMC - CFD - SNI EXISTING TREATMENT BUNKER
CLOSURE DOCUMENTATION SAMPLE LOCATIONS



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LEGEND

- SOIL BORING
- POST-EXCAVATION SAMPLE LOCATION
- MONITORING WELL
- MANHOLE
- ST — STORM SEWER
- CATCH BASIN
- LEACHATE DRAIN

0 13 26 FEET

APPROXIMATE SCALE

DRAFT

RMT INC

Dwn. by:	SKB
Date	SEPT, 1989
Proj.#	1125.28

SEP 6 1989

FIGURE 1

APPENDIX 13.1

December 27, 1994 MDNR Correspondence to GM
Subsurface Investigation Work Plan for Water Recycle System
July 29, 1997 MDEQ Correspondence to GM
July 25, 1997 GM Telephone Memo
September 18, 1997 GM Correspondence to MDEQ