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**Delphi Interior & Lighting Systems Division
General Motors Corporation
1445 Parkway Avenue
Trenton, New Jersey 08650-1019**

Case No. 95-2-22-1407-48

**PRELIMINARY ASSESSMENT/SITE INVESTIGATION REPORT
PROPOSED REMEDIAL INVESTIGATION WORK PLAN**

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SECTION I

INTRODUCTION

1.0 INTRODUCTION

1.1 Purpose

This report was prepared by URS Consultants, Inc. (URS), at the request of General Motors Corporation (GM) Delphi Interior & Lighting Division (GM Delphi) to fulfill the requirements of the State of New Jersey Department of Environmental Protection (NJDEP) Division of Responsible Party Site Remediation, under Memorandum of Agreement Case No. 95-2-22-1407-48.

The site was previously regulated under the New Jersey Industrial Site Recovery Act (ISRA) when GM announced their intent to cease operations at the facility. Subsequent to the initiation of and ISRA site remedial investigation, GM Delphi announced their intent to continue operations at the facility. As a result, GM Delphi withdrew from the ISRA program, and entered into a Memorandum of Agreement with NJDEP.

The GM Delphi Trenton, New Jersey facility has undergone several previous investigations and two site visits by the NJDEP which identified eleven Potential Areas of Concern (PAOCs) caused by historical operations or possibly past releases at the facility. Four PAOCs were considered priority areas for remediation and are covered under the above mentioned Memorandum of Agreement (MOA). These four areas are identified as follows:

MOA Area A - Suspected Barium Chromate Drum Disposal Area

MOA Area B - Old Oil/Water Separator

MOA Area C - RCRA Drum Storage Pad

MOA Area D - Gasoline Underground Storage Tank (UST) Area

The scope of this document is to present the results of a new Preliminary Assessment/Site Investigation (PA/SI) conducted by URS and to present a work plan for a Remedial Investigation (RI) at these four areas. URS completed some of the ISRA site investigation elements prior to GM Delphi's withdrawal from ISRA, and those results have been incorporated into this new PA/SI Study at the site.

1.2 Report Organization

The report is divided into five (5) report sections and appendices. A set of 22" x 34" plates (Appendix E) also accompany the report. The following provides a description of the content of each of the report sections.

Section 1, Introduction, presents the purpose and organization of the report.

Section 2, General Site Information presents the description of the site, its history, a summary of previous investigations, and the results of a review of historical air photos done recently by URS.

Section 3, Physical Setting provides a description of the site topography, geology, general hydrogeology, and results of the well record search done recently by URS.

Section 4, Investigation/Findings provides a description of the four MOA Areas and results of field investigation programs conducted during previous investigations.

Section 5, Proposed Remedial Investigation Work Plan provides an area-by-area plan to conduct supplemental investigations of the four MOA areas. Included in this work plan are field sampling requirements, laboratory methods, and Quality Assurance/control procedures.

Figures and Tables are found in the text where cited. Plates are bound within this document in Appendix D.

SECTION 2

GENERAL SITE INFORMATION

2.0 GENERAL SITE INFORMATION

2.1 Site Location and Description

The GM Delphi facility is located at 1445 Parkway Avenue in Ewing Township, Mercer County, New Jersey (Figure 2-1).

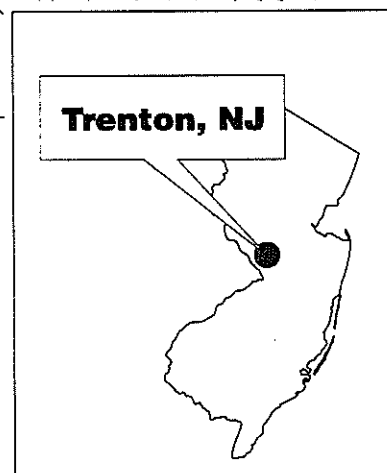
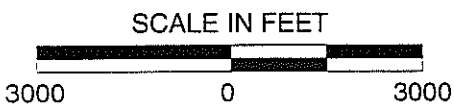
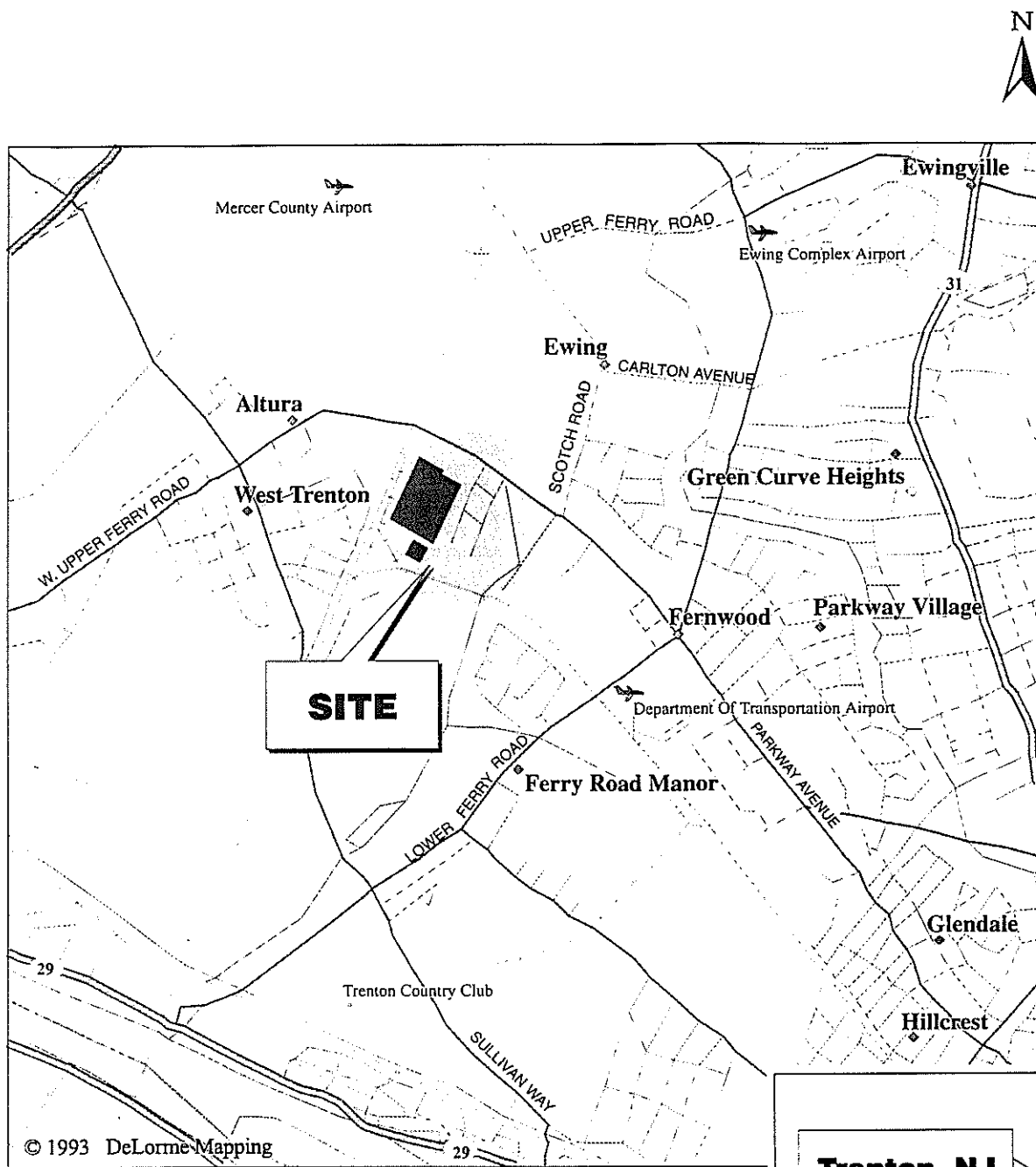
The total land area of the GM Delphi facility is approximately 84 acres. The facility is bound to the west by the New York Division - Delaware & Bound Brook Railroad; to the south by the Trenton Branch - Delaware & Bound Brook Railroad; to the north by Parkway Avenue and the United States Naval Reservation; and to the east by Sylvia Avenue. Structural development (Figure 2-2, Plate P-2) is generally limited to the southern and western portions of the property. The main structure present on the property is the manufacturing building, which occupies the northwestern quarter of the property. This building contains approximately 1 million square feet of space. The facility's administrative offices are located in the northernmost portion of the building, while the remainder of the building houses the manufacturing operations.

Two smaller structures near the southwest corner of the manufacturing building serve as the facility's company vehicle garage and paint storage building. The maintenance building, located near the southeast corner of the manufacturing building, houses the facility's support services and is also used for receiving.

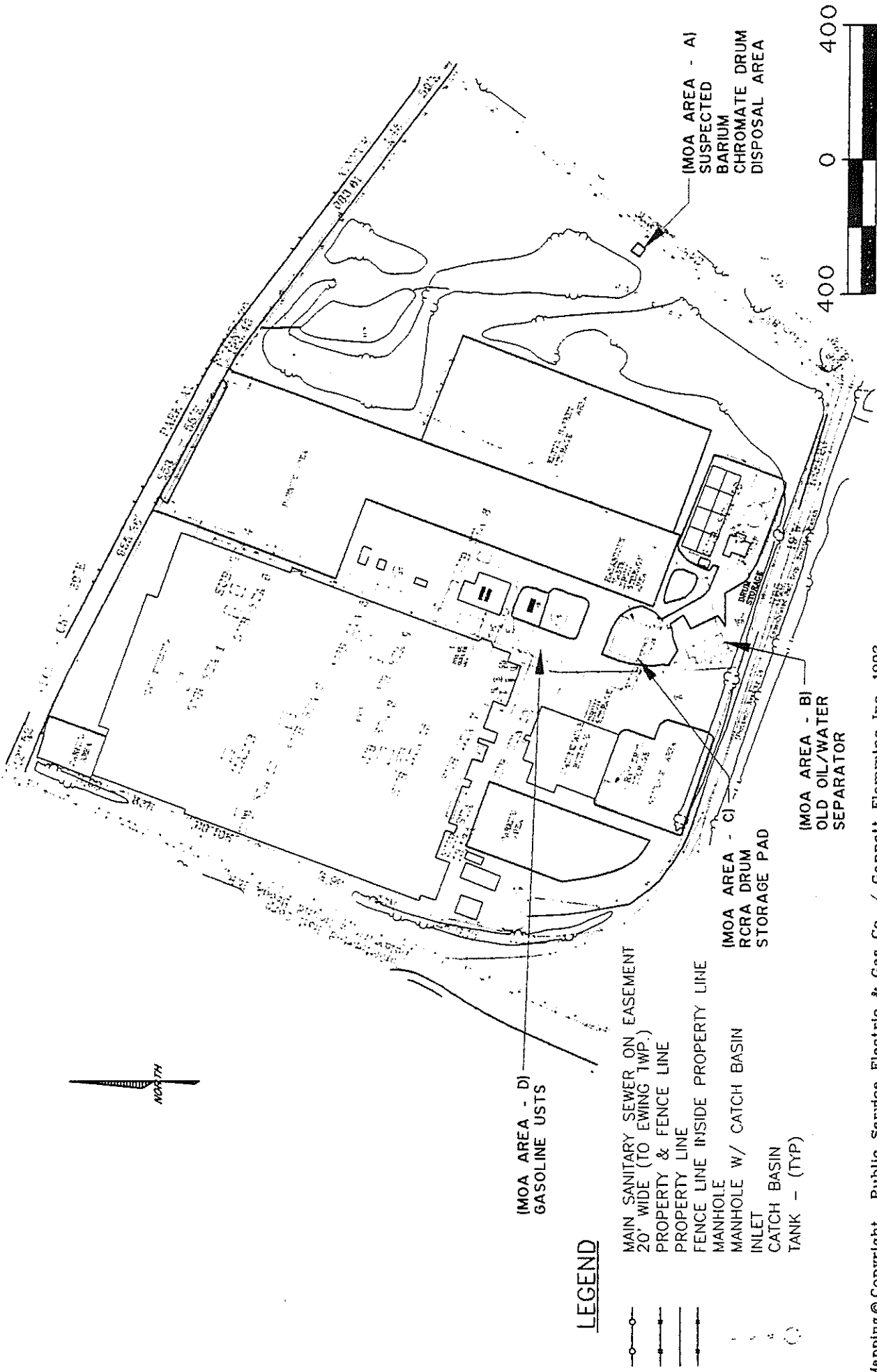
The facility's power plant is located to the east of the manufacturing building, along with the associated fuel tanks and cooling towers. The power plant uses #6 fuel oil to generate steam for the facility.

Three small structures located to the north of the power plant house the gas meters, bottled gas storage area, and electrical switches, respectively.

The facility's wastewater treatment plant (WWTP) is located on the southern portion of the property. All industrial process wastewater generated at the facility is routed to the plant via underground process sewers where it is pre-treated prior to discharge to the Ewing-Lawrence Sewerage Authority (ELSA) located on White Head Road. The WWTP includes an oil/water separator, sludge settling tanks, waste treatment tanks, and a small structure used for operation and control of the wastewater treatment plant.



SOURCE: BASEMAP FROM McLAREN/HART ENVIRONMENTAL ENGINEERING CORP. 8/31/93



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SITE PLAN/MOA AREAS

FIGURE 2-2

The facility's Resource Conservation and Recovery Act (RCRA) drum storage pad is located between the wastewater treatment plant and the #6 fuel tanks. This area is surrounded by a concrete berm with chain link fencing. Additional raw material drum storage areas were located to the south and east of the maintenance building but have since been relocated to inside the building. Miscellaneous materials are stored near the drum storage area in an open lot to the south of the maintenance building.

Four paved parking areas are located on the property. A small parking lot is located at the northwestern corner of the manufacturing building, adjacent to Parkway Avenue. The South Parking Lot, located to the south of the manufacturing building, has a total capacity of 406 cars. The East Parking Lot, located to the east of the manufacturing building and to the north of the power plant, has a capacity of 428 cars. The Power House Parking Lot, located to the east of the power plant and to the north of the wastewater treatment plant, has a total capacity of 1,540 cars.

Rail spurs connected to the Trenton Branch of the Delaware & Bound Brook Railroad enter the southern portion of the property in two locations and enter the manufacturing building at its southeast and southwest corners.

Five inactive sludge drying beds, located on the southeastern portion of the property, are presently covered with top soil. These sludge drying beds were previously operated in association with the wastewater treatment plant.

Gold Run Creek flows through the eastern portion of the property from north to south, including a small dammed section, located at the northeast corner of the property. The remainder of the undeveloped eastern area of the property is characterized by deciduous wooded areas. Surface runoff is collected in storm drains across the property which direct the stormwater to discharge points in Gold Run. Sanitary wastewater is channeled to the ELSA sewer in Parkway Avenue. As mentioned above, all industrial process wastewater is pre-treated on-site prior to discharge to the ELSA sewer.

As stated in Section 1.1 the previous site investigations have identified four Potential Areas of Concern (PAOCs) at the GM Delphi facility, which are targeted for investigation/remediation under the terms of Memorandum of Agreement Case No. 95-2-22-1407-48. The locations of the four PAOCs are shown in Figure 2-2 and Plate P-2, and include: a) Suspected Barium Chromate Drum Disposal Area; b) Old Oil/Water Separator; c) RCRA Drum Storage Pad; and d) Gasoline UST Area.

2.2 Site History

Most of the following information regarding the site history of the GM Delphi Trenton Plant was obtained from the Groundwater Impact Study Summary Report prepared by Lawler, Matusky & Skelly Engineering Consultants (LMS) dated May 1991. The information has been updated to reflect current conditions.

The GM Trenton Plant was constructed in 1937 and started manufacturing operations for the old Ternstedt Division in 1938. The plant produced one product, automotive window regulators for Fisher Body. Manufacturing operations included metal stamping and fabrication. During the period 1942-1945 the Trenton Plant stopped all automotive hardware production when, for wartime purposes, five area GM plants were recast into Eastern Aircraft Corporation. The plant re-tooled and produced 7,546 Avenger Torpedo Bombers during World War II. During this time the plant was operated by the Eastern Aircraft Corporation.

After the conclusion of World War II, the plant was returned to the Ternstedt Division, which operated from 1945-1968. The manufacturing operations were expanded to include window regulators, door handles, seat adjusters, and vent windows. Processes included metal stamping, plating (copper, nickel, and chrome), and painting operations.

In 1968 the Ternstedt Division was merged into Fisher Body. Manufacturing operations were expanded to include aluminum anodizing and plastic injection molding. Additional painting operations were added to paint plastic products, aluminum products, and seat adjuster components.

In 1970 there was a major production shift with the design elimination of the automobile's vent window. The loss of the vent window eliminated half of the zinc die cast operations, which resulted in the subsequent closure of several of the platers. The available floor space was filled with PVC plastic extruders used to manufacture body side moldings.

In 1976 aluminum fabrication and anodizing were consolidated by Fisher Body; these components of the Trenton Plant's operations were transferred to the Columbus, Ohio, plant. Consequently, Trenton's aluminum anodizer and associated paint area were shut down. Encapsulated glass operations were assigned to the manufacturing floor space.

Fisher Body was merged with the Guide Lamp division of GM to form Fisher Guide in 1984. Subsequently, the electrostatic paint operation was shut down in 1988 as a result of the designed phase-

out of the interior paint moldings operation. An ELPO primer and powder paint operation replaced the former electrostatic paint operation. The most recent addition to the Trenton Plant's manufacturing processes is the bi-laminate roll form and extrusion process. This process consists of an aluminum or stainless steel sheet being roll formed and coated with PVC in one operation. The bi-laminate roll form and extrusion process was initiated in 1986 and continues to this day.

Fisher Guide was merged with the Inland division of GM to form Inland Fisher Guide in 1989. No major changes to plant operations occurred as a result. In February of 1995, General Motors renamed the Inland Fisher Guide (IFG) Division to Delphi Interior and Lighting Systems, as the Trenton plant is now known. Production levels have been reduced in recent months, and some operations have been eliminated, but the Trenton plant is still open and actively seeking new operations.

2.3 Previous Investigations

Previous environmental investigations conducted at the GM Trenton facility include the following:

- INSTALLATION OF MONITORING WELLS AT THE FISHER GUIDE DIVISION GM PLANT, by Lawler, Matusky to Skelly Engineers, April 1986.
- GASOLINE CONTAMINATION ASSESSMENT IN SOIL SAMPLES TAKEN AT THE FISHER GUIDE DIVISION'S TRENTON, NEW JERSEY, PLANT, by Lawler, Matusky & Skelly Engineers, October, 1987.
- GROUNDWATER MONITORING WELL INSTALLATION, Wells Near Powerhouse, by O'Brien & Gere, June 1988.
- UNDERGROUND STORAGE TANK INVESTIGATION - PHASE 2, by Roy F. Weston, Inc., June 1988.
- UNDERGROUND STORAGE TANK INVESTIGATION - PHASE 3, by Roy F. Weston, Inc., May 1989.

- GROUNDWATER REMEDIATION PLAN, by Roy F. Weston, Inc., June 1989.
- PUMP TEST AND AQUIFER ANALYSIS, by Roy F. Weston, Inc., November 1989.
- GROUNDWATER IMPACT STUDY SUMMARY REPORT, by Lawler, Matusky & Skelly Engineers, May 1991.
- SOIL SAMPLING AND ANALYTICAL PLANS FOR RCRA CLOSURE OF HAZARDOUS MANAGEMENT SITES, by IFG Trenton, December 4 and December 21, 1990.
- CLOSURE PLAN FOR HAZARDOUS WASTE MANAGEMENT UNITS, by IFG Trenton, March 13, 1991.
- SITE INVESTIGATIONS AT THE SUSPECTED BARIUM CHROMATE DRUM DISPOSAL AREA (MOA Area A) AND AT THE GASOLINE UST AREA (MOA Area D), by URS, presented herein.

Each of these investigations is summarized below.

Installation of Monitoring Wells at the Fisher Guide Division GM Plant, by Lawler, Matusky & Skelly Engineers, April 1986

On March 5, 1986, 12 monitoring wells were drilled to the competent bedrock (12 to 20 feet). The wells were installed in response to NJDEP requirements related to GM's NJPDES Permit #NJ0053295, later changed to NJ0075469. Continuous split-spoon samples were collected during the drilling. The screened interval in each well was designed to extend from 5 feet above the measured water level to the bottom of the borehole. Flush-joint 4-inch diameter PVC casing and 20-slot well screen were used to construct the wells. Protective steel casings were installed (3-foot stickups) and the well number and NJDEP well permit number were stamped on each protective casing. Each well was developed for at least one hour in accordance with the NJDEP specification for construction of unconsolidated monitoring wells. Sampling was not conducted at the time of installation.

Gasoline Contamination Assessment in Soil Samples Taken at the Fisher Guide Division's Trenton, New Jersey, Plant, by Lawler, Matusky & Skelly Engineers, October 1987

During July 1987, 10 shallow test borings (B-1 through B-10) were drilled to assess the impact of a release from a former 4000-gallon gasoline UST at the site. The test borings encountered the weathered red sandstone bedrock surface at depths ranging from 15 to 19 feet below grade. The overburden was generally unsaturated in this area of the site, except in some borings where the water table was encountered at the approximate interface between the overburden and the weathered bedrock. Eight soil samples were collected from 6 of the 10 borings for analysis of total petroleum hydrocarbons (TPH), benzene, toluene, m-xylene, o,p-xylenes, and methyl tertiary butyl ether (MTBE). The results of the sampling indicated the presence of benzene, toluene and xylenes at elevated concentrations, primarily at the southeastern portion of the former UST location. Elevated concentrations of these compounds were identified predominantly at a depth of approximately 12 to 16 feet below grade. Because of the absence of groundwater in the overburden, a recommendation was made for the installation of five additional bedrock monitoring wells to assess the impact to groundwater in this area of the site.

Groundwater Monitoring Well Installation, Wells near Powerhouse, by O'Brien & Gere, June 1988

This well installation program, conducted as a requirement of GM's NJPDES Permit #NJ0053295, consisted of installation of four bedrock monitoring wells. A proposed overburden well was subsequently deleted from the program due to lack of overburden groundwater in the proposed area. The bedrock well design included installation of 6-inch steel casing through the overburden, grouted in place at a depth of 10 feet into the bedrock. Sampling was not conducted at the time of installation.

Underground Storage Tank Investigation - Phase 2, by Roy F. Weston, Inc., June 1988

In October 1987, GM completed tank closure activities for a 4,000-gallon gasoline UST. Post-excavation soil sampling results indicated the presence of gasoline constituents exceeding NJDEP action limits for soils. Based on analytical results for soil samples collected during tank closure activities, a Phase 2 groundwater investigation was completed.

Phase 2 investigative activities included the installation of four bedrock monitoring wells, one upgradient and three downgradient of the former location of the tank. The wells were sampled for TPH, benzene/toluene/ethylbenzene/xylene (BTEX), and total lead. The purpose of the Phase 2 Investigation was to further delineate the area of concern and to make recommendations for remediation. The results of the investigation indicated that the primary area impacted by the former leaking underground storage tank (LUST) was within 75 feet of the former LUST's location. Based upon the results of the investigation, Weston recommended resampling of two wells to confirm the BTEX results and acquire volatile organic compound (VOC) concentration information. Installation of a groundwater recovery and air stripping system to remediate the area was also recommended. The Underground Storage Tank Investigation - Phase 2 Report was submitted to NJDEP on July 12, 1988.

Underground Storage Tank Investigation - Phase 3, by Roy F. Weston, Inc., May 1989

As a result of the Phase 2 investigation, the NJDEP required additional wells to determine the vertical and areal extent of contamination prior to development of appropriate remedial activities. Five additional monitoring wells were installed. The wells included 2 shallow monitoring wells (20 feet deep), 2 bedrock wells (40 feet deep), and 1 deep bedrock well (125 feet deep). NJDEP required GM to sample all new and previous wells and analyze them for BTEX, TBA, MTBE, 1,2-dichloroethane, methanol, petroleum hydrocarbons, and total lead.

The Phase 3 Investigation indicated that the vertical extent of contamination was up to 80 feet below grade. Weston recommended that additional investigations be conducted in the area, including quantification of site-specific hydraulic conductivity, in order to finalize a design for a groundwater recovery and remediation system. The Underground Storage Tank Investigation -Phase 3 Report was submitted to NJDEP on May 11, 1989.

Groundwater Remediation Plan, by Roy F. Weston, Inc., June 1989

The Groundwater Remediation Plan was developed by Roy F. Weston, Inc. for GM in response to exceedances of groundwater limits specified in the facility's NJPDES Discharge to Groundwater (DGW) permit (#NJ0053295), detected during routine quarterly groundwater monitoring, the results of which were submitted to NJDEP on May 3, 1988. NJDEP required that GM develop and submit a groundwater remediation plan for several areas near the property boundaries as part of their "conditionally acceptable" rating of the facility. The plan summarized the groundwater sampling which had been completed at that time and estimated the horizontal extent of contamination in the overburden.

As part of the plan, Weston proposed a study to determine the extent of impact to the groundwater which included installation and sampling of additional wells, a pumping test, and sampling of surface water and sediment.

Pump Test and Aquifer Analysis, by Roy F. Weston, Inc., November 1989.

During the week of October 9, 1989, Roy F. Weston, Inc. conducted a pump test based on the Phase 3 Underground Storage Tank Investigation Report. The investigation included measurement of background static water levels for a period of 37 hours, completion of a step-drawdown test, completion of a constant pumping rate test, and completion of a recovery test. The activities were completed to obtain information to design a groundwater recovery system and support the groundwater recovery and treatment recommendations outlined in the Groundwater Remediation Plan. Based upon the flow conditions and levels of contaminants in the groundwater, Weston recommended that an air stripper be used for remediation. Weston recommended that a performance test be conducted upon completion of the remediation system to assure optimum operation. Time-series sampling was also recommended to evaluate the effectiveness of the recovery system.

Groundwater Impact Study Summary Report, by Lawler, Matusky & Skelly Engineers, May 1991.

A Groundwater Impact Study was conducted by Lawler, Matusky & Skelly Engineers (LMS) at the request of GM. The report summarized most of the previous groundwater investigations by other contractors. The document considers that all discovered groundwater problems are associated with three probable source areas, including:

- UST Area
- Sludge Impoundment Area
- Naval Air Propulsion Center (NAPC)

LMS tabulated the data from all MW wells and listed the average, minimum, and maximum concentrations by individual compound for each well. LMS concluded that trichloroethene (TCE) and dichloroethene (DCE) are from an off-site source (NAPC), since these compounds were not detected in MW-4 through 7 yet these wells have the highest concentrations of compounds attributable to the Sludge Drying Beds. LMS stated that barium, manganese, and copper are naturally present in the groundwater. Arsenic, cadmium, lead, nickel and zinc have been detected in most of the wells above background levels. LMS concluded that significant interaction occurs between the Site's groundwater

and Gold Run. The Groundwater Impact Study Report was submitted to NJDEP on August 12, 1991. The UST Area is included in MOA Case No. 95-2-22-1407-48 (MOA Area D).

Soil Sampling and Analytical Plans for RCRA Closure of Hazardous Management Sites, December 4 and December 21, 1990; Closure Plan for Hazardous Waste Management Units, March 13, 1991.

In order to delist the GM Trenton plant from an approved Treatment, Storage, and Disposal Facility (TSDF) status to a "less than 90 days" generator status, GM initiated a RCRA closure of all hazardous waste management units operated at the facility. These units included:

- hazardous waste drum storage area;
- (3) aboveground dichlorobenzene solution storage tanks;
- 30,000-gallon underground waste oil storage tank;

A document certifying the completion of all waste removal and structure decontamination activities was prepared by GM and submitted to NJDEP on March 27, 1992. NJDEP accepted the closure certification and granted the plant generator status; however, complete delisting of the hazardous waste drum storage area and the waste oil UST are contingent upon the completion of soil sampling and remediation activities. NJDEP has delisted the dichlorobenzene tanks from hazardous waste facility status.

All closure activities were conducted in accordance with the above referenced soil sampling and analytical plans and the closure plan with the following exception. As approved by NJDEP, soil sampling activities in the vicinity of the former waste oil UST was deferred until demolition of the waste oil UST and adjacent old oil/water separator unit is complete. This area is now covered under MOA Case No. 95-2-22-1407-48 (MOA Area B).

Results of the soil sampling investigation conducted around the hazardous waste drum storage area have revealed the presence of elevated base neutral and/or metals concentrations. NJDEP has stated that based on the results, "all soil sampling and remediation deemed necessary" shall be completed. This area is now covered under MOA Case No. 95-2-22-1407-48 (MOA Area C).

URS Site Investigations at the Suspected Barium Chromate Drum Disposal Area (MOA Area A) and at the Gasoline UST Area (MOA Area D) not previously submitted.

URS completed several work elements in February through April 1994 prior to GM Delphi's withdrawal from the ISRA program. This work was performed in accordance with work plans approved by NJDEP for the ISRA program and included soil borings, groundwater sampling, review of aerial photographs, a well search and a geophysical survey. The results from these studies in the MOA Areas are presented in detail in Section 4 and are summarized below.

The investigation at the suspected barium chromate disposal area consisted of a magnetometer survey across a slightly mounded portion of an undeveloped parkland area where the drum disposal was suspected. The geophysical survey results showed a magnetic anomaly, which could be caused by buried drums or other metal debris, beneath the mounded area.

Investigations at the gasoline UST area included 11 soil borings for environmental soil samples and two rounds of groundwater sampling at 6 nearby monitoring wells. The sampling showed fuel-related compounds in soil and groundwater.

2.4 Review of Aerial Photographs

The following is a summary of observations made by URS during a review of aerial photographs dating from 1932 through 1991.

- 1932- The GM Delphi plant had not been constructed yet. The site property was being used for farming at this time. What appear to be fruit tree orchards are present in the northwest and southeast corners of the site. The rail lines to the south and west are present at this time. The property to the north of Parkway Avenue (the future location of the NAPC and Airport) also appears to be farmland at this time.
- 1947- The GM Delphi main building, paint storage building and maintenance garage were all present at this time. However, the maintenance building appears to be smaller in size. The south and east side parking areas were not constructed yet. The undeveloped areas of the site appear to be moderately vegetated, except the future area of Gold Run Pond which was heavily vegetated. A small area of disturbed vegetation was present in the vicinity of present monitoring well MW-15. The current wastewater treatment building, neutralization tanks and waste treatment tanks were

not present. The Powerhouse was constructed by this time, however, the above ground oil storage tanks were not constructed yet (the boilers were coal fired until 1957). The NAPC north of Parkway Avenue was present at this time.

- 1951 - The East Side parking/Basket Storage areas were constructed by this time. The area of disturbed vegetation (near present well MW-15) appeared to be overgrown, but was still slightly visible. The heavily vegetated area near the future site of Gold Run Pond was still undisturbed. The wastewater treatment plant area was still undeveloped.
- 1954 - Gold Run Pond is present at this time. The East and South Side parking areas were expanded and appear to be close to their current size. Two areas of disturbed vegetation were present east of Gold Run Pond and Creek. One is located east of present monitoring well MW-15 in the same general location of the area noted in the 1947 photograph. The second area of disturbed vegetation is located east of Gold Run Pond just south of Parkway Avenue. This area has the approximate dimensions and shape of a baseball diamond. Based upon information obtained from GM Delphi personnel, it appears that this area of disturbed vegetation was, in fact, a baseball diamond.
- 1957 - The maintenance building appears to have been expanded or replaced with a larger building. The two areas of disturbed vegetation east of Gold Run Creek were still visible. The wastewater treatment area was still not developed. The 500,000-gallon fuel oil above ground storage tank (AGST) was present.
- 1961 - Parking areas appear to be fully constructed and were being used extensively. The wastewater treatment neutralization tanks appear to be under construction, but the two wastewater treatment tanks and main building have yet to be constructed. Sludge bed 5 appears to be present. Sludge bed 1 appears to be in use.
- 1965 - The wastewater treatment neutralization tanks appear to be completed and in use. The two areas of disturbed vegetation, previously noted, are completely overgrown. Sludge beds 1 through 4 appear to be expanded and in use. The die storage area south of the maintenance building and the two 30,000-gallon fuel oil AGSTs are present at this time.

- 1977 - The wastewater treatment tanks and building are present at this time. It appears that the facility was in the process of filling in the sludge beds. The area surrounding Gold Run Pond appears to be overgrown.
- 1986 - The sludge beds are completely filled in at this time. The vegetation surrounding Gold Run Pond is less dense and the pond more visible than in the 1977 photograph.
- 1991 - Little change in site features from the 1986 photograph.

SECTION 3

PHYSICAL SETTING

3.0 PHYSICAL SETTING

The following information regarding the environmental setting of the GM Delphi Trenton Plant was obtained from the various previous investigation reports listed in Section 2.3

3.1 Site Topography and Drainage

The GM Delphi Trenton Plant (Site) is located in Ewing Township, Mercer County, north of Trenton, New Jersey. The Site is located in a fluvial drainage basin to the north and east of the Delaware River. The watershed general topographic dip and stream flow are all south to southwest. This region exhibits generally subdued relief and low topography (e.g., 50 to 350 feet of elevation). Land use ranges from moderate to intense development, especially near the major highways and rail rights-of-way. Two streams, the Shabakunk and Gold Run Creeks, provide surface drainage for the area in the vicinity of the Site. Both streams flow toward the south and west and terminate in the Delaware River. Gold Run Creek enters GM Delphi's property from the north by way of a culvert beneath Parkway Avenue. The Creek flows south-southwest through the property and separates the developed portion of the Site to the west from that which is undeveloped to the east.

Mercer County includes parts of two geomorphic provinces: the Piedmont lowlands and the Atlantic coastal plain. The contact between these two provinces is identified by a ridge of Paleozoic and Precambrian metamorphic rocks that outcrop well south of the Site and along the banks of the Delaware River. The ridge is exposed at the falls (i.e. the fall line) at Trenton.

3.2 Site Geology

3.2.1 Surficial Soils

Surface and near-surface soils at this Site are reported to be mixed "cut and fill" of undefined identity and composition. In addition to fill material obtained from local sources, these soils are likely to include local soils that have been reworked by construction activities. The original soils on-site and/or the local sources of fill probably consisted of deeply weathered, well-drained upland soils. Site boring logs show that the native soils, where undisturbed, comprise the uppermost 1 to 2 feet of unconsolidated sediment onsite. In general, the soil horizon is least disturbed in the northern and eastern portions of the Site in the vicinity of Gold Run. By comparison, the heavily reworked areas within the southern and central portions of GM Delphi's complex contain as much as 4 to 15 feet of mixed fill, soil, and overburden sediments.

The Mercer County New Jersey Soil Conservation Service identifies the local soil types as Sassafras and Matapeake soils (Tedrow [1986] uses the name Galestown for Matapeake). Regardless of their nomenclature, these soils were developed from pre-existing fluvial and glacial outwash sediments. The uppermost sandy facies of these sediments were reworked and developed into the Sassafras soils. The finer-grained sediments associated with the generally broad, flat, and periodically flooded areas developed the Matapeake (or Galestown) soil cover.

Both the Sassafras and Matapeake soils are generally well-drained. The shallow horizons of the Sassafras display permeabilities of up to 2 in./hr. (=1500 ft./yr.). The deeper Matapeake soils display significantly lower permeabilities of ≤ 0.2 in./hr. (=150 ft./yr.). Barriers to infiltration into the underlying overburden and/or bedrock are unknown and/or undescribed for these soils. Given the well-drained and generally permeable nature of these soils, they are likely to provide significant recharge to the overburden groundwater beneath them.

3.2.2 Overburden Geology

Overburden geology in the vicinity of the GM Delphi facility is reported to include a complex mix of preglacial riverine and floodplain deposits. These unconsolidated sediments include interbedded fluvial sandy silts and clays, sands, and gravels, which unconformably overlie bedrock of Triassic age.

The fluvial overburden sediments observed beneath the GM Delphi facility have been investigated and mapped by Bowman and Lodding (1969), Minard and Rhodehamel (1969), and Owens and Minard (1962, 1975). Outwash sands and gravels are found to the south and west of the Site, and are associated with deglaciation. They were deposited by meltwater streams flowing usually generally southward from the receding glaciers (Owens and Minard 1975). The fluvial sediments are those associated with interglacial or preglacial time, when streams other than those produced by glacial meltwater were depositing sediment in a subaerial environment.

The overburden sediments observed at the GM Delphi facility strongly reflect the composition of the bedrock beneath them. The Stockton Formation beneath the Site is comprised of arkosic, hematite-stained sedimentary rocks of Triassic age. As the layer of fluvial overburden material overlying the Stockton is relatively thin, the initial hypothesis, based upon a knowledge of soil development, would be that it is likely to reflect a mineral composition similar to that of the Stockton. The lithology of the overburden sediments noted in Site boring logs confirms this hypothesis.

3.2.3 Bedrock Geology

The uppermost bedrock unit beneath the overburden of the Site and its immediate surroundings has been identified, through previous investigations, as the Stockton Formation (LMS 1987; O'Brien & Gere 1987; Weston 1988a; Weston 1988b; Weston 1989a; Weston 1989b; Weston 1989c). The Stockton Formation is part of the larger Newark Group of Triassic-aged sedimentary rocks which originated within the depositional system of an ancestral stream system draining an upland to the southeast (Widmer, 1964). The Stockton Formation consists of "cycled" strata of fine-to-medium grained sandstones, coarser-grained sandstones and conglomerates, and finer-grained siltstones and mudstones (shales). However, strata of conglomerates and cemented coarse-grained sandstones are not as common as the other lithologies within the Stockton Formation. The strata of the Stockton Formation (as well as other formations in the Newark Group) are typified by their nearly homogeneous rust to deep red-brown coloration caused in part by hematite (iron) staining. However, some Stockton-age subunits exhibit the blue-green coloration indicative of copper staining. While the iron-rich staining is dominant in the Stockton Formation (Degens, 1965), which underlies the site, the boring advanced for MW-17A (as well as for several previous borings) encountered 1 to 2 feet of copper-stained strata. Therefore, it is likely that the concentrations of iron and copper detected in the Site's soils and groundwater are representative of background concentrations.

The Stockton Formation occurs as outcrops and bedrock as far north of Trenton as Rockland County, New York, and south to its contact with the ridge of Paleozoic and Precambrian metamorphic rocks found along the Delaware River. LMS' review of boring logs for monitoring wells completed into the bedrock at the Site has shown that fine-to-medium grained sandstones and shales dominate the strata of the Stockton Formation observed on-site. Borings logs indicate the zone of moderate to heavily weathered bedrock ranges from 2 to 10 feet thick. The transition from fractured to competent bedrock in the subsurface is typically marked by a compositional change from the sandstone to harder, finer-grained siltstone and mudstone strata. The competent bedrock surface slopes from the northwest (approximately 117 feet above mean seal level (Amsl) at MW-17A) to the southeast (approximately 94 feet Amsl at MW-7A at the southern end of the property). Well locations are shown in Plate P-2.

The Stockton Formation plunges at low angles under the Lockatong Argillite Formation to the north and west. The Stockton and the Lockatong Formations are both deformed and dip in that direction, although the angles of dip vary depending on degree of structural deformation. The bedding planes in the Stockton beneath the GM Delphi site dip to the northwest at approximately 8 to 10° (Widmer 1965). It is noteworthy that the dip of the bedding planes is in the opposite direction of the slope of the competent bedrock surface, which is toward the southeast.

3.3 Site Hydrogeology

URS has reviewed boring logs and hydrogeologic data from the wells installed during this investigation as well as from previous investigations to evaluate the hydrogeologic conditions of the GM Delphi Trenton Site. Two aquifers have been identified as a result of this evaluation which are generally consistent with those identified during previous investigations (Weston, 1989 and LMS, 1991). The aquifers identified by URS include a shallow aquifer occurring in the overburden and weathered bedrock, and a bedrock aquifer occurring in the underlying bedrock of the Stockton Formation. Additional information regarding the hydrogeologic conditions of the site based upon the findings of this investigation and previous investigations is included in Section 4.6.

3.4 Well Records Search

The locations of wells within a one mile radius of the GM Delphi Trenton site were identified by URS utilizing information from NJDEP, Division of Water Resources, and the United States Geological Survey. The information obtained from this well search is summarized in Table 3-1.

A total of 173 domestic wells, 233 monitoring wells, and 15 other special purpose wells were identified as being located within a 1-mile radius of the Site. The other special purpose wells may include one of the following usage types: irrigation, light industrial, swimming pool, lawn sprinklers, cooling, school, air conditioning, or office. Of the wells identified, 58 domestic, 99 monitoring wells, and 6 special purpose wells are located within a ½-mile radius of the Site. These wells are further divided by location in four quadrants for the ½ mile radius and the 1 mile radius on Table 3-2.

The locations of the wells were plotted using the New Jersey Rectangular Coordinate Grid System for Location of Wells. The rectangular coordinate system is a seven digit number based upon the New Jersey State Atlas Sheets. The first two digits of the number refers to the number of the State Atlas Sheet. The second two digits represent one of twenty-five blocks, each made up six minutes of latitude and longitude. The fifth digit represents one of nine rectangles (contained within each block) each consisting of two minutes of latitude and longitude. The sixth digit represents one of nine smaller rectangles (contained within each rectangle) called a square. The seventh digit represents one of nine even smaller rectangle units (contained within each square) called a unit. The approximate locations of the domestic/industrial and monitoring wells within a one mile radius as plotted using the above outlined system are shown in Figure 3-1. All locations shown in Figure 3-1 are approximate since the New Jersey Rectangular Coordinate Grid system only locates wells down to a given unit. The well location marks shown have been placed within the units based upon street addresses or have been marked adjacent to buildings within the given units. Thus, the locations of the wells shown should only be used to obtain a general indication of the location and distribution of wells surrounding the GM Delphi facility.

TABLE 3-1
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
78	6	C. Wilson	Van Dyne Dr.	27-15-776	70	Domestic
79	6	Mrs. Driver	16 Van Dyne Dr.	27-15-776	80	Domestic
53	6	Edward & Mary Pietras	Pennington, NJ	27-15-777	100	Domestic
56	8	Robert R. Green	46 Carlton Ave.	27-15-777	60	Domestic
72	6	John Laverio Co., Inc.	Reed Rd.	27-15-777	103	Domestic
53	6	Earl W. Aker Co.	Carlton Ave.	27-15-778	55	Domestic
55	6	John E. Cashel	Lower Ferry Rd.	27-15-778	86	Domestic
51	6	Walker Johnson	Reed Ave.	27-15-779	79	Domestic
*	6	Earl Allen	Main Blvd.	27-15-779	63	Domestic
*	6	Michael Derrico	Main Blvd.	27-15-779	71	Domestic
54	6	Giallilla Sebastian	Penn. Wash. Cross Rd. near Circle	27-15-779	160	Domestic
57	6	George F. Tingo	78 Main Blvd.	27-15-779	63	Domestic
57	6	W.C. Reed	Carlton Ave.	27-15-779	56	Domestic
51	6	Chester S. Pietruck	West Trenton, NJ	27-24-312	25	Domestic
56	6	Paul Buck	Upper Ferry Rd.	27-24-313	95	Domestic
56	6	Frank Shiro	W. Trenton	27-24-313	80	Domestic
58	6	Carl Jacabello	River Rd. near Lower Ferry Rd.	27-24-313	95	Domestic
59	6	Carl W. Zigrand		27-24-313	90	Domestic
72	6	Michael Pelleringo		27-24-313	778	Domestic
53	6	Chester Grainger		27-24-315	69-90	Domestic
57	6	James Moragues		27-24-315	75	Domestic
89	6	Our Lady of Good Council	137 W. Upper Ferry	27-24-315	195	Light Irrigation
53	6	Clemend C. Marine	528 Lafayette St.	27-24-316	94	Domestic
54	6	E.S. Koenig		27-24-316	50	Domestic
58	6	Richard Hutchinson	Federal City Rd.	27-24-316	104	Domestic
53	6	John Herrington	149 5th St.	27-24-318	80	Domestic
52	6	M. Fazlone	Wilburtha Rd.	27-24-318	95	Domestic
56	6	George White	Washington Ave.	27-24-318	70	Domestic
56	6	A.M. Merang		27-24-318	100	Domestic
58	6	John D. Bradford	State Police Rd.	27-24-318	135	Swimming pool

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
65	6	W.M. Dennis	191 W. Upper Ferry Rd.	27-24-318	113	Lawn Sprinklers
52	6	A. Chmielewski	Lafayette Ave.	27-24-319	70	Domestic
53	6	William A. DeSantis	505 Walker Ave.	27-24-319	70	Domestic
55	6	Frank Shino	526 Lafayette Ave.	27-24-319	72	Domestic
55	6	Edward Ginger	Davis Ave.	27-24-319	60	Domestic
55	6	Peter Deflesco	Wilburtha Rd.	27-24-319	50	Domestic
53	6	Mark Cemil	Broad Ave.	27-24-319	70	Domestic
48	6	Peter J. & Mildred E. Klim	7 Hinckle Ave.	27-24-321	110	Domestic
52	6	W.J. Driver	Lower Ferry Rd.	27-24-321	80	Domestic
53	6	Michael Toter	Sunset Ave.	27-24-321	82	Domestic
54	6	Stephen Ture	Sunset Ave.	27-24-321	80	Domestic
56	6	Sayer & Zargiel	Sunset Ave.	27-24-321	80	Domestic
54	6	Donald Weigand	Sunset Ave.	27-24-322	65	Domestic
54	6	George Smith	Irvin St.	27-24-322	71	Domestic
59	6	E.P. Weasnor	Green Lane	27-24-323	60	Domestic
59	6	Samuel Kirkham	Scudden Ave.	27-24-323	156	Domestic
86/91	6	Trenton Elks	Decau Ave.	27-24-323	140	Public non-community
78	6	Frank Defrancesco	24 Raihood Ave.	27-24-324	150	Drinking
55	6	A. Bortoline	Scudding Falls	27-24-325	120	Domestic
56	6	H. Reed	Crest Ave. Penn.	27-24-325	80	Domestic
57	6	Richard Hutchinson		27-24-325	100	Domestic
53	6	Guering Mami	River Rd.	27-24-326	130	Domestic
54	6	Chester Pietruch	40 Sunset Ave.	27-24-326	76	Domestic
54	6	Donald Richardson	Keswick Ave.	27-24-326	72	Domestic
55	6	Robert Cooper		27-24-326	90	Domestic
56	6	Paul's Liquor Store	Pennington Rd.	27-24-326	90	Domestic
58	6	John Honnyak	Florance Ave.	27-24-326	65	Domestic
59	6	Sinsberry Harris	Browing Ave.	27-24-326	80	Domestic
60	6	Basil Diguiseppe	Crest Ave.	27-24-326	175	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
54	6	Raymond E. Procassini	Walker Ave.	27-24-328	70	Domestic
58	6	M. Toter		27-24-328	60	Domestic
58	6	John B. Conebs, Jr.		27-24-328	90	Domestic
59	6	Joe Waskio	Malage Dr.	27-24-328	88	Domestic
76	6	J. Graziano	Bear Tavern Rd.	27-24-328	150	Domestic
56	6	Walter Moize	85 Green Lane	27-24-329	90	Domestic
56	6	Leon Cohn		27-24-329	80	Domestic
56	6	Gayler S. Trisweld		27-24-329	70	Domestic
57	6	George E. Marshall		27-24-329	100	Domestic
57	6	V. Gallego		27-24-329	60	Domestic
58	6	Sam Lentini	N. Willow St.	27-24-329	69	Domestic
58	6	Shabackienki Dept. Co.	Bull Run Rd.	27-24-329	97	Domestic
58	6	Shabakmi Hill Inc.	Bull Run Rd.	27-24-329	83	Domestic
58	6	Vince Terraro	Central Ave.	27-24-329	65	Domestic
60	6	Harry Owens		27-24-329	80	Domestic
70	6	General Sullivan Corp.	Lot 6A Block 341	27-24-329	70	Light Industrial
81	6	Roller Bearing Co.	Lot 3 Block S-341	27-24-329	100	Light Industrial and Cooling
92	6	Baker Properties	Sullivan Way and Silvia St.	27-24-329	200	Irrigation
57	6	Mary Hallio	Mercer County Airport	27-24-331	80	Domestic
59	6	Geo. Brawster & Son		27-14-979	90	Domestic
54	6	J. Wilson Noden	Penn. Wash. Cross Rd.	27-14-982	195	Domestic
54	6	Michael Bapinski	Penn. Wash. Cross Rd.	27-14-982	145	Domestic
53	6	Mrs. V. Cahill		27-14-983	158	Domestic
57	6	Peter T. Cwenzon		27-14-985	197	Domestic
88	6	Carl A. Benedetti		27-14-985	100	Domestic
64	6	Gerald Pondinselli	Wash Crossing Pennington	27-14-986	113	Domestic
53	6	James Sharp	Upper Ferry Rd.	27-14-991	76	Domestic
	6	Vincent Dresser	Channccey Ave.	27-14-994	72	Domestic
89	6	Richard Menichelli	72 Ferry Rd.	27-14-994	257	Domestic
57	6	Mrs. M.H. Basford		27-14-999	100	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
51	6	George Most		27-15-771	88	Domestic
52	6	Conrad Ezoqbid		27-15-772	90	Domestic
53	6	C. Warznak	Engleside Ave.	27-15-772	100	Domestic
70	8	Mortindell Molding Co.	L. Ferry Rd.	27-15-772	200	Domestic
71	6	O Cross Construction	U. Ferry Rd.	27-15-772	70	Domestic
62	6	Robert Berwick		27-15-772	86	Domestic
55	6	David Atchley	U. Ferry Rd.	27-15-775	105	Domestic
	6	William Gill	Main Blvd.	27-15-775	68	Domestic
53	6	L.R. Smytha		27-15-775	75	Domestic
53	6	L.R. Smytha		27-15-775	70	Domestic
53	6	Frank Ciesielski		27-15-775	65	Domestic
54	10/8	Board of Education		27-15-775	191	School
55	6	George Gorish	Engleside Ave.	27-15-775	110	Domestic
57	6	J. Kurfuss	Upper Ferry Rd.	27-15-775	74	Domestic
64	6	A. DiCocco		27-15-775	150	Domestic
	6	Howard Morris	Main Blvd.	27-15-776	70	Domestic
	6	Columbus Development	King St.	27-24-332	85	Domestic
	6	Columbus Development	King St.	27-24-332	78	Domestic
	6	Columbus Development	King St.	27-24-332	72	Domestic
59	6	Lenora Kellow		27-24-334	60	Domestic
55	6	Shedrick Caskins		27-24-334	60	Domestic
56	6	J.E. Allen	River Rd.	27-24-334	125	Domestic
56	6	John Moore		27-24-334	85	Domestic
57	6	Lillian Cruse		27-24-334	80	Domestic
57	6	Sidney Hayes	Louisiana Ave.	27-24-334	60	Domestic
57	6	J. Williams		27-24-334	70	Domestic
58	6	Mark A. Cermela		27-24-334	90	Domestic
57	6	William P. Shappell		27-24-334	137	Domestic
59	6	P. Nance	Louisiana	27-24-334	60	Domestic
61	6	Louis Maio	Bennard Terrace	27-24-334	100	Domestic
87	6	Helimut Fuerstuer		27-24-334	125	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
54	6	Karl Brenfleck		27-24-335	85	Domestic
55	6	J.T. Smeddor, Jr.	King St.	27-24-335	60	Domestic
55	6	Enrest Huff		27-24-335	125	Domestic
56	6	Charles L. Robinson		27-24-335	90	Domestic
56	6	Mrs. C. Johnson		27-24-335	90	Domestic
57	6	F. Kovacs	River Rd.	27-24-335	152	Domestic
57	6	Stanley Zargiel		27-24-335	89	Domestic
57	6	Alex Wargon	97 Green Lane	27-24-335	85	Domestic
59	6	Mr. E. Harris		27-24-335	72	Domestic
59	6	C. Convery		27-24-335	71	Domestic
58	6	Mark Adams		27-24-336	61	Domestic
58	6	Joseph T. Higgins		27-24-336	90	Domestic
78	6	Mike Strano	Ravine Rd.	27-24-336	126	Domestic
81	6	H. Jones (Jones' Greenhouse)	16 Scotch Rd.	27-24-336	100	Domestic and Light Irrigation
53	6	Stanley Gill		27-24-337	110	Domestic
54	6	James Mellodge		27-24-337	85	Domestic
55	6	Carmen Chiacchio	King St.	27-24-337	75	Domestic
55	6	Carmen Chiacchio	Cresant Ave.	27-24-337	70	Domestic
56	6	James Eisher		27-24-337	60	Domestic
56	6	Wardell Smith		27-24-337	90	Domestic
56	6	John E. Hartman		27-24-337	126	Domestic
57	6	Radder W. Anderson	Garth Ave.	27-24-337	102	Domestic
57	6	Martin Stargenski		27-24-337	82	Domestic
58	6	Norman Waters		27-24-337	75	Domestic
58	6	Stewart O. Donnel		27-24-337	75	Domestic
58	6	Glenwood H. Davis		27-24-337	70	Domestic
59	6	Robert Bailey		27-24-337	75	Domestic
59	6	Witherson Ross	Pennsylvania Ave.	27-24-337	70	Domestic
61	6	Tomas Domanski	Flower Hill Rd.	27-24-337	93	Domestic
61	6	J.C. Lampard	River Rd.	27-24-337	150	Domestic
61	6	Richard Haines	King St.	27-24-337	70	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
60	6	Frank Shino		27-24-337	70	Domestic
55	6	Robert Lee	Ravine Rd.	27-24-338	85	Domestic
55	6	L.S. Smytha		27-24-338	70	Domestic
57	6	A.G. Ferguson	Crescent Ave.	27-24-338	90	Domestic
58	6	William & Wini Drew	Up land Ave.	27-24-338	87	Domestic
61	6	William Mason	Cluffton Ave.	27-24-338	61	Domestic
56	6	Walter A. Rixson	5 Ardsley Ave.	27-24-339	91	Domestic
57	6	F. Russo		27-24-339	75	Domestic
65	6	Basil diGuiseppe	Hillman Ave.	27-24-339	136	Domestic
76	6	John Laverio Co., Inc.	Forrest Hill Dr.	27-24-343	225	Domestic
59	6	Alice Corbin		27-24-352	64	Domestic
76	6	Builder: Frank Druba	Broad Ave.	27-24-352	70	Domestic
58	6	DaMato Lamans	Bull Run Rd.	27-24-353	97	Domestic
59	6	Shahakunk Hills, Inc.	Bull Run Rd.	27-24-353	95	Domestic
59	6	Peter Huzwa	Malaga Dr.	27-24-353	82	Domestic
60	6	Charlene Homes, Inc.		27-24-353	145	Domestic
59	6	Maurice Quadagno	Malaga Drive	27-24-354	81	Domestic
53	6	Herman N. Levenson	24 Broadway Avenue	27-24-355	80	Domestic
55	6	Edward H. Kottke	Jacob Creek Rd.	27-24-355	55	Domestic
57	6	V.J. Matin	Bull Run Rd.	27-24-355	80	Domestic
58	6	Ralph Keener	Malago Ave.	27-24-355	87	Domestic
59	6	W. Hannisch		27-24-355	70	Domestic
55	6	Lewis Eschinger	Pennsylvania Ave.	27-24-356	75	Domestic
55	6	Morris Hunt 3rd		27-24-356	205	Domestic
59	6	R. Depalola	Bull Run Rd.	27-24-356	75	Domestic
60	6	Charlene Homes, Inc.	Brandon Rd.	27-24-356	80	Domestic
55	6	A.R. Fasalino	Scotch Rd.	27-24-361	80	Domestic
56	6	Suburban Lunch Co.	Scotch Rd.	27-24-361	80	Domestic
56	6	Paul Skreener	Green Lane	27-24-361	80	Domestic
57	6	William A. Dolton	Bear Tavern Rd.	27-24-361	168	Domestic
57	6	S. Novak		27-24-361	100	Domestic
55	6	William Grover	Bear Tavern Rd.	27-24-362	113	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
56	6	Statler Builders	Bear Tavern Rd.	27-24-361	110	Domestic
57	6	F. Russo		27-24-362	75	Domestic
58	6	Angelo Chionise	Lower Ferry Rd.	27-24-362	96	Domestic
61	6	Stuart O'Donnell	Florance Ave.	27-24-362	60	Domestic
61	6	Nevins & Benke	Bull Run Rd.	27-24-362	90	Domestic
53	6	Steve G. Mokacsi	Wilburtha Rd.	27-24-363	65	Domestic
57	6	F. Russo		27-24-363		Domestic
54	6	Mrs. T.A. Brown	Pennington Rd.	27-24-364	125	Domestic
55	6	John Hoffman	Bear Tavern Rd.	27-24-364	140	Domestic
59	6	R.J. Ryan		27-24-364	105	Domestic
59	6	Edna Nelson		27-24-364	80	Domestic
61	6	Robert A. Blayer, Jr.	Hopatcong Drive	27-24-364	96	Domestic
53	6	H.E. Maloney	River Dr.	27-24-365	83	Domestic
54	6	Frank M. Russo	7 Wakefield	27-24-365	60	Domestic
55	6	William A. Sanders	824 River Rd.	27-24-365	100	Domestic
56	6	J. Alfred	Bull Run Rd.	27-34-365	70	Domestic
56	6	Statler Builders, Inc.	Bear Tavern Rd.	27-24-365	115	Domestic
58	6	Louis F. Campanila	Bear Tavern Rd.	27-24-365	93	Domestic
59	6	O. Woodward	Bull Run Rd.	27-24-365	80	Domestic
59	6	Benke Builders	Bull Run Rd.	27-24-365	100	Domestic
59	6	George Briehler's	N. Olden Ave.	27-24-365	250	Domestic
61	6	Charles Hides	Modaga Dr.	27-24-365	85	Domestic
61	6	Louis Maio	Nursery Rd.	27-24-366	115	Domestic
54	6	State of NJ Highway Dept.	Parking Ave.	27-25-111	200	Private
54	6	State of NJ Highway Dept.	Parking Ave.	27-25-111	200	Private
63	6	Sam Analore	Ferry Rd. & Carlton	27-25-112	80	Domestic
69	6	Mr. P. Damage		27-25-113	60	Domestic
53	6	John A. Basic		27-25-114	60	Domestic
55	6	Anthony Knoop		27-25-114	92	Domestic
52	6	Phyllis Cerate	Ewingville Rd.	27-25-115	73	Domestic
57	8	Martindell Plastic Co.	Olden Ave.	27-25-116	200	Industrial
72	6	Towne Builders	Johnson Rd.	27-25-116	75	Domestic

TABLE 3-1 (Continued)
DOMESTIC/INDUSTRIAL WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
54	10	State Hwy Office Bldg.		27-25-117	500	Private
54	10	State Hwy Office Bldg		27-25-117	300	Private
54	10	State Hwy Office Bldg.		27-25-117	200	Private
54	10	State Hwy Office Bldg.		27-25-117	200	Private
54	10	State Hwy Office Bldg.		27-25-117	200	Private
56	6	J. Nortini	Poland Ave.	27-25-117	100	Domestic
65	6	D. Kruzuk	Upper Ferry Rd.	27-25-117	70	Domestic
64	6	D. Tamanes'	Lower Ferry Rd.	27-24-118	70	Domestic
54	6	Phillip Matthews		27-25-141	107	Domestic
67	6	Calnrite Co. Howard Anderson, Builder	Upper Ferry Rd.	27-25-141	200	Office
57	6	Rocco Iatesta		27-25-142	173	Domestic
69	6	Harter & Andreas Tool Co.	Rte. 31	27-25-142	125	Domestic
52	6	A.R. Fasoline	250 Lexington Ave.	27-25-143	60	Office

MONITORING WELLS LOCATED WITHIN A ONE-MILE RADIUS OF THE SITE

92	3	Amoco/Chicago	1252 Parkway	27-15-778	30-35	
91	1	Mobil/Valley Forge	Grand & Upper Ferry Rd.	27-24-313	40	
90	3	Mobil/Valley Forge		27-24-316	15-17	
90-92	21	Mobil/Valley Forge	Grand Ave. and Upper Ferry Rd.	27-24-321	5-14	
89	10	Exxon Service Station (Houston)	Grand Ave. and Upper Ferry Rd.	27-24-322	18-24	
92	1	Exxon USA	53 Grand Ave. & Upper Ferry Rd.	27-24-325	18.5	
92	2	General Sullivan Group In.	Sullivan Way	27-24-322	18-24	
88	4	GM-Fisher Guide Plant	1445 Parkway Ave.	27-24-328	65, 80	
89-90	6	Roller Bearing of America	Sullivan Way	27-24-329	20-23	Sullivan Way
86	13	Fisher Guide Div. of GM	Lot 1 Block 343		8-17.5	
92	2	Bristol Meyers Squibb Co.	West Chester County Airport	27-14-981	25, 35	
87,89	4	Caldwell Supply Co.	1515 Parkway Ave.	27-14-982	12	
90	45	Inland Fisher Guide Div	1445 Parkway Ave.	27-14-982	28-40	
92-93	13	Air Hangar Inc.	Mercer County Airport	27-14-982	10-25	
88	9	U.S. Gov't/Dept. of Navy	1440 Parkway Ave.	27-14-983	7-24.5	

TABLE 3-1 (Continued)
MONITORING WELLS LOCATED WITHIN A ONE-MILE RADIUS OF SITE

Date Installed	Casing Diam. (in.)	Owner	Address	Location	Depth	Type
90	7	U.S. Gov't/Dept. of Navy	1440 Parkway Ave.	27-14-983	17.5-60	
93	1	U.S. Gov't/Dept. of Navy	1440 Parkway Ave.	27-14-983	27-9	
92	2	Air Hangar Inc.	Mercer Co. Airport	27-14-983	15	
87	4	RCA Flight Operations	Mercer Co. Airport	27-14-986	9-13.5	
92	20	U.S. Navy	1440 Parkway Ave.	27-14-986	39-84	
88	2	Mercer Co. Airport	Scotch Rd.	27-14-991	23, 30	
92	3	Mobil Oil	Pennington & Upper Ferry Rd.	27-14-991	28	
88	9	U.S. Navy	Pennington & Upper Ferry Rd.	27-14-994	8-19	
90	1	U.S. Navy	Pennington & Upper Ferry Rd.	27-14-991	60	
89	1	GM - Fishers Guide Div.	1445 Parkway	27-14-331	14	
93	2	Trenton Oil Co.	1252 Parkway Ave.	27-24-333	30	
89	6	CMC-Fisher Guide Div.		27-24-334	20-51	
90/91	16	General Sullivan Group	Sullivan Way	27-24-334	10-30	
88	4	Fisher Guide Div.	1440 Parkway	27-24-335	40	
91	10	General Sullivan Group	Sullivan Way	27-24-336	17-27	
91	5	General Sullivan Group	810 Sullivan Way	27-24-352	21-100	
91	11	General Sullivan Group		27-24-353	23-250	
91	1	Exxon		27-25-117	17	
94	12	U.S. Navy		27-25-118	15-115	
92	1	Henry & Maria McNeil	1334 Edgewood	27-25-142	11	
89	1	N.J. Bell		27-25-143	17.5	
91	10	Mobil Oil		27-25-143	19-25	
92	17	Amoco	1496 Pennington Ave.	27-25-143	17	

TABLE 3-2

**SUMMARY OF WELLS LOCATED WITHIN A 1-MILE RADIUS
AND A 1/2-MILE RADIUS OF THE SITE**

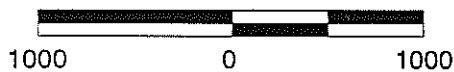
1 MILE RADIUS	Domestic/ Industrial Wells	Monitoring Wells	Other Special Purpose Wells*
NE QUAD	28	5	2
SE QUAD	38	20	9
NW QUAD	26	127	1
SW QUAD	81	81	3
TOTAL	173	233	15
1/2 MILE RADIUS			
NE QUAD	4	2	2
SE QUAD	10	15	
NW QUAD	5	20	1
SW QUAD	39	62	3
TOTAL	58	99	6

* Other special purpose wells may be for irrigation, light industrial, private club, air conditioning, swimming pool, lawn sprinklers, cooling, school, office, or public non-community uses.

24-33-



SCALE IN FEET



■ - approximate well locations

SECTION 4

INVESTIGATIONS/FINDINGS

4.0 INVESTIGATIONS/FINDINGS

4.1 Introduction

This Section provides a description of each of the four MOA Areas and results of the field investigation programs conducted during previous investigations. Soil sample results and stratigraphic conditions are discussed as they apply to individual MOA Area or vary from general site conditions. Further detailed information on soil borings and sample descriptions are given in the boring logs found in Appendix A. Boring logs from previous investigations are also provided in Appendix A. Monitoring well construction and groundwater well development purging information, are reported in Appendix B and C, respectively.

4.2 Sampling and Analysis for URS Investigations

The site investigation elements conducted by URS were completed in accordance with work plan procedures prepared for the ISRA program and approved by NJDEP as noted in their work plan approval letter dated December 17, 1993. Soil samples and first round groundwater samples were analyzed by Coast-to-Coast Analytical Services of Westbrook, Maine. The second round groundwater samples were collected and analyzed by EMSL Analytical Services of Westmont, New Jersey.

4.2.1 Analytical Methods

The analyses were performed in accordance with the following documents: Test Methods for Evaluating Solid Waste. Physical/Chemical Methods, SW-846, 3rd Edition, November 1990. Methods for Chemical Analysis of Water and Waste, USEPA 600/4-79-020, revised March 1983, and United States Environmental Protection Agency, 40 CFR Part 136, June 30, 1986. The deliverable data packages were consistent with the requirements outlined in NJDEP Technical Requirements for Site Remediation: N.J.A.C. 7:26 (New Jersey Register, June 7, 1993). The following methods were used for the analysis of samples collected:

Volatile Organic Compounds (VOC) - USEPA Methods 8240 for soils and 624 for aqueous samples.

Base Neutrals (BN) and Acid Extractables (AE) - USEPA Methods 8270 for soils and 625 for aqueous samples.

Priority Pollutant Metals (Metals) - USEPA's 6000 and 7000 series of methods.

Corrosivity (pH) - USEPA Method 9045.

Polychlorinated Biphenyls (PCBs) and Pesticides - USEPA Methods 8080 for soils and 608 for aqueous samples.

Total Petroleum Hydrocarbons (TPH) - USEPA Method 481.1 for aqueous samples. Method 418.1 is also used for soils, per modification in The ECRA GUIDE.

Total Cyanide - USEPA Methods 9012 for soils and 355.3 for aqueous samples).

The data was reviewed against the appropriate methods as well as the general guidelines established in NJDEP "Quality Assurance Data Validation of Analytical Deliverables -TCL-Organics and -TAL- Inorganics," October 1991 and February 1992, respectively.

4.2.2 Analytical Deviations

An analytical deviation, for the purpose of this report, is an activity that is not conducted in accordance with established plans or procedures (i.e., analytical methods).

Analytical deviations were encountered during the analysis of samples, which could not be resolved prior to laboratory submission of the results. Table 4-1 is a summary of analytical problems encountered during sample analysis. This table identifies the sample ID, medium, fraction and analytical deviation encountered and how the data was qualified as a result of the data review. Analytical deviations presented in Table 4-1 are associated with soil samples obtained from MOA Area D - Gasoline UST Area.

TABLE 4-1
ANALYTICAL DEVIATIONS AND DATA QUALIFICATION

Sample ID	Medium	Fraction	Deviation	Qualifications
SB-3-S0-18 (14.0')	SB	VOC	Internal Standard Outlier due to Matrix Interference	Data Estimated
SB-3-S0-19 (10.0')	SB	VOC	Analyzed Outside Holding Time - 1 day	Data Estimated
SB-3-S0-20 (8.5')	SB	VOC	Analyzed Outside Holding Time - 7 days	Data Estimated
SB-3-S0-23 (11.0')	SB	VOC	Internal Standard Outlier due to Matrix Interference	Data Estimated
SB-3-S0-24 (18.0')	SB	VOC	Analyzed Outside Holding Time - 3 days	Data Estimated
SB-3-S0-25 (9.0')	SB	VOC	Analyzed Outside Holding Time - 3 days	Data Estimated
SB-3-S0-25 (16.0')	SB	VOC	Analyzed Outside Holding Time - 8 days	Data Estimated
SB-3-S0-26 (10.5')	SB	VOC	Analyzed Outside Holding Time - 3 days	Data Estimated
SB-3-S0-26 (15.0')	SB	VOC	Analyzed Outside Holding Time - 4 days	Data Estimated
SB-3-S0-27 (12.0')	SB	VOC	Analyzed Outside Holding Time - 4 days	Data Estimated
SB-3-S0-27 (15.0')	SB	VOC	Analyzed Outside Holding Time - 8 days	Data Estimated
SB-3-S0-28 (11.0')	SB	VOC	Analyzed Outside Holding Time - 8 days	Data Estimated
SB-3-S0-28 (16.5')	SB	VOC	Analyzed Outside Holding Time - 4 days	Data Estimated

Abbreviations

SB-Subsurface Soil

VOA-Volatiles

Eleven soil samples analyzed for VOCs exceeded the analytical holding times as shown in Table 4-1. Using New Jersey's validation guidelines (NJDEP, October 1991) as a reference, analytical results from samples exceeding holding times by more than five days should not be used. Four samples were analyzed more than five days beyond analytical holding times: SB-3-SO-20(8.5') -- 7 days, SB-3-SO-25(16') -- 8 days, SB-3-SO-27(15') -- 8 days, and SB-3-SO-28(11') -- 8 days. However, based on professional judgement and the intended use of the data, which is to examine the impact to groundwater of these soils, data for these four samples is usable with caution. These samples were analyzed at a detection limit in the ppb range. The lowest impact to groundwater criteria for the VOCs analyzed is a concentration of 1 ppm (NJDEP, February 3, 1994). Since the samples were properly preserved at 4 degrees C, containers were sealed, QA/QC parameter results were acceptable, and the maximum holding time exceedence was 8 days, losses in the ppm range is not expected.

Additionally, the following observations regarding the analytical results from these four samples with respect to other data obtained further supports data usability. Two of the four samples, SB-3-SO-27(15') and SB-3-SO-28(11'), were obtained outside of the area in which the former USTs were located. It is doubtful that concentrations of VOCs in these samples would exceed those of samples obtained within the area formerly occupied by the USTs. Several samples obtained within the area formerly occupied by the USTs were analyzed within required holding times. VOC concentrations did not exceed the impact to groundwater criteria.

Two samples were submitted for analysis from each boring and, therefore, data was obtained from an additional depth interval within each boring that should not have been impacted by holding time exceedences. For example, sample SB-3-SO-20(8.5') was obtained from similar material as a discrete sample within 1 foot of sample SB-3-SO-20(7.5'). Results from SB-3-SO-20(7.5') and other samples from the borings that were analyzed within the five day holding time criteria, except SB-3-SO-25 (9'), did not exceed impact to groundwater criteria.

4.2.3 Explanation of Data Qualifiers

The following provides definitions of the data qualifiers assigned to results by the laboratory and by URS during the data review process.

- < - The analyte was analyzed for but was not detected.
- J - Indicates an estimated concentration because results are either below the sample quantitation limit or quality control (QC) criteria was not met.
- R - The sample results are estimated due to inability to meet holding time requirements. The presence or absence of the analyte cannot be verified.
- B - The compound was detected in the associated method blank, but the sample concentration is greater than ten times the concentration of the associated method blank. Therefore, the data is reported.
- * - The compound was detected, but was determined to be estimated (R) due to contamination in the associated QC blank.
- E - The reported result exceeds the linear range of calibration.

4.3 MOA Area A - Suspected Barium Chromate Drum Disposal Area

4.3.1 Description of Area

A parcel of undeveloped parkland is located along the northeastern and far eastern edge of the GM Delphi property (Plate P-3). This area is intersected along its length by Gold Run Creek. A picnic area and former baseball diamond were located in the northeast corner of the area. Information obtained from facility personnel indicate that this area has never been used for any manufacturing purposes.

Recently obtained information from a former employee suggests that one location was used for the disposal of approximately forty 55-gallon drums containing barium chromate waste. A geophysical survey was conducted as part of an initial site assessment to evaluate if any subsurface materials of anomalous magnetic properties (i.e., metal) are present in the suspected drum disposal area.

4.3.2 Geophysical Survey

A geophysical survey was conducted on February 10, 1994. The survey was conducted of the slightly mounded portion of undeveloped parkland area (Plate P-3) where the drums were reportedly disposed.

The magnetic survey was conducted using an EG&G Model G-856 Proton Precession Magnetometer with a gradiometer option. The G-856 is a microprocessor controlled instrument with a resolution of 0.1 gamma, an accuracy of 1 gamma, and a memory capable of storing the data for over 2,000 stations. With the gradiometer option, two sensors are mounted on a staff at 4 ft. 5¾ in. and the other at 9 ft. ¾ in. above the surface. The magnetometer records data from both sensors sequentially. Magnetic data was collected at 176 stations. Because of the small number of stations occupied and the short duration of the magnetic survey, a magnetic base station was not utilized.

The magnetic stations were surveyed by first surveying a 150-foot baseline parallel to the eastern property boundary (along Sylvia Avenue). Sixteen survey lines were staked at 10-foot intervals along the baseline. Each of the 16 lines were staked at 10-foot intervals, perpendicular to the baseline. This resulted in a survey grid measuring 150 x 100 feet with 10-foot grid node spacing for a total of 176 magnetic stations.

Magnetic data obtained by the G-856 was downloaded to a personal computer and processed by EG&G MAGLOC data location software. MAGLOC data location software allows for the separation of top and bottom sensor data, input of survey data, and calculation of the vertical magnetic gradient. Total magnetic field data was obtained from the top sensor. Vertical magnetic data was obtained by subtracting the top sensor value from the bottom sensor value and dividing by the distance between sensors. Subtracting the top sensor from the bottom sensor results in a generally accepted positive gradient anomaly associated with high gradients. Magnetic data was then contoured using the commercial geological contouring software program Gridzo. The following contour maps were produced:

- Total magnetic field
- Vertical gradient

Figure 4-1 is a contour map of the total magnetic field and Figure 4-2 is a contour map of the vertical magnetic gradient for the suspected drum disposal area. The total magnetic field data are presented as total intensity relative to 56,000 gammas, an arbitrary value near the "normal" total magnetic field for the area. The contour interval of the total magnetic field map is 40 gammas. The vertical magnetic gradient map is plotted with a contour interval of 10 gammas/foot.

The magnetic technique is limited to detecting ferrous metal objects. Neither the particular type of metallic objects causing a disturbance nor its contents can be determined from the magnetic data. Magnetic data can be strongly influenced by surface features such as power lines and fences.

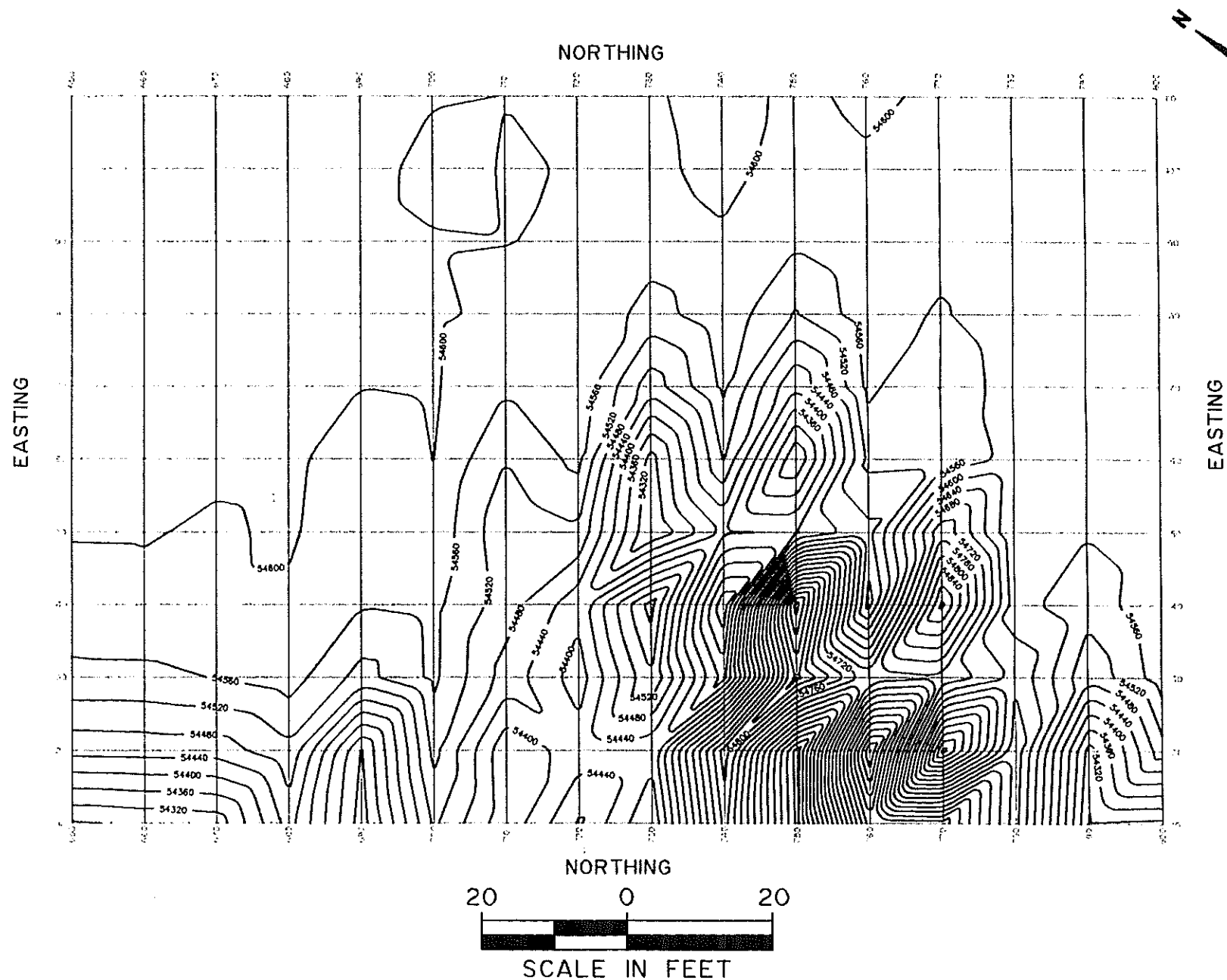
In interpreting total magnetic field data, several factors should be considered. The width, gradient, and amplitude of a magnetic disturbance are useful in estimating the mass and depth of the metallic objects. Total magnetic field disturbances, or anomalies, with steep horizontal gradients are caused by objects at or near the surface.

Anomalies in the vertical magnetic gradient data are produced by objects at or near the surface. Magnetic bodies of small vertical extent (i.e. flat) located on or near the surface produce a large vertical magnetic gradients for those stations located near them. The contour plot commonly displays a diagnostic pattern of a lows surrounding a high, or highs around a low, provided stations are sufficiently closely spaced. Magnetic bodies of "large" vertical extent above the ground, such as buildings, trailers, and steel fencing, are likely to produce small vertical gradients because those objects may be equally close to both magnetic sensors. Since such bodies can be observed, their magnetic effects cause no interpretation problems.

By comparing the contour maps of the total magnetic field and the vertical magnetic gradient, one can distinguish the anomalies that are produced by more deeply buried objects.

The total magnetic field contour map displays several areas of surface magnetic noise concentrating along the baseline of the survey (650N, 20E through 800N, 20E). This magnetic noise is the result of the fence along the property line, overhead powerlines along Sylvia Avenue, and two pole mounted transformers located at 680N, 0E and 770N, 0E.

An area of severe magnetic disturbances can be seen in a circular pattern bounded by 740N, 30E through 60E to 770N, 30E through 60E covering an area approximately 900 square feet. This





circular pattern is reflected by the topography. A slight mound can be detected on the surface. The disturbance correlates with anomalies in the vertical magnetic gradient map. As described above, good correlation between total field and the vertical gradient indicates the disturbance is normally found at or near the earth's surface. Since there are no metallic objects on the surface in the area, we can infer that the objects causing the disturbances are buried a few feet from the surface.

A total field magnetic profile is presented in Figure 4-3. This east-west profile crosses directly over the magnetic anomaly describe above. Figure 4-4 present a vertical magnetic profile of the same line. Good correlation can be noted between these profiles.

The remainder of the site surveyed is anomaly free, indicating the absence of any buried metallic objects.

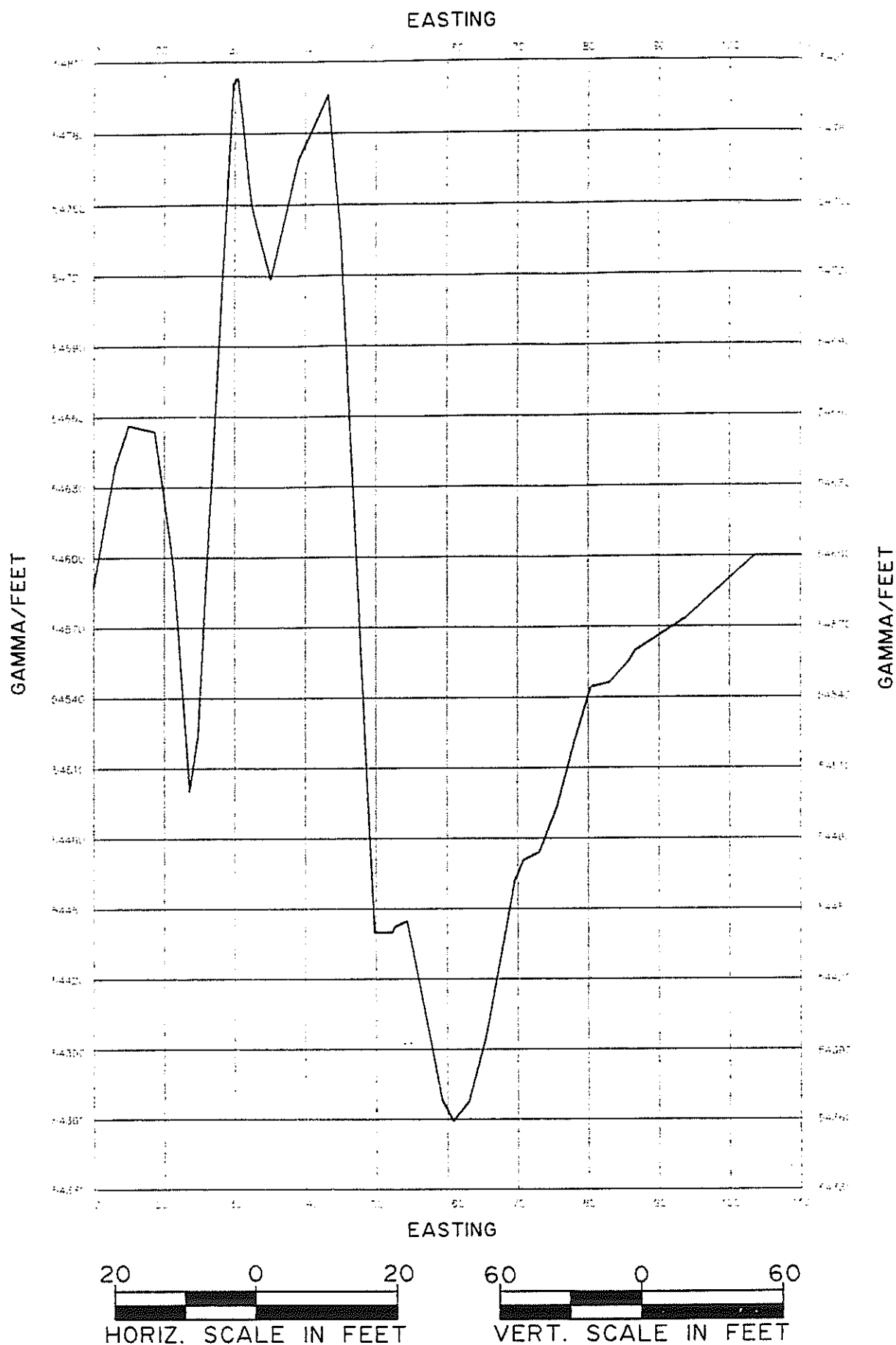
On the basis of the magnetic geophysical survey conducted at the suspected drum disposal area at the GM Delphi Interior Lighting Plant, we conclude that:

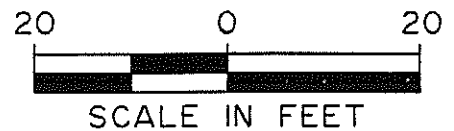
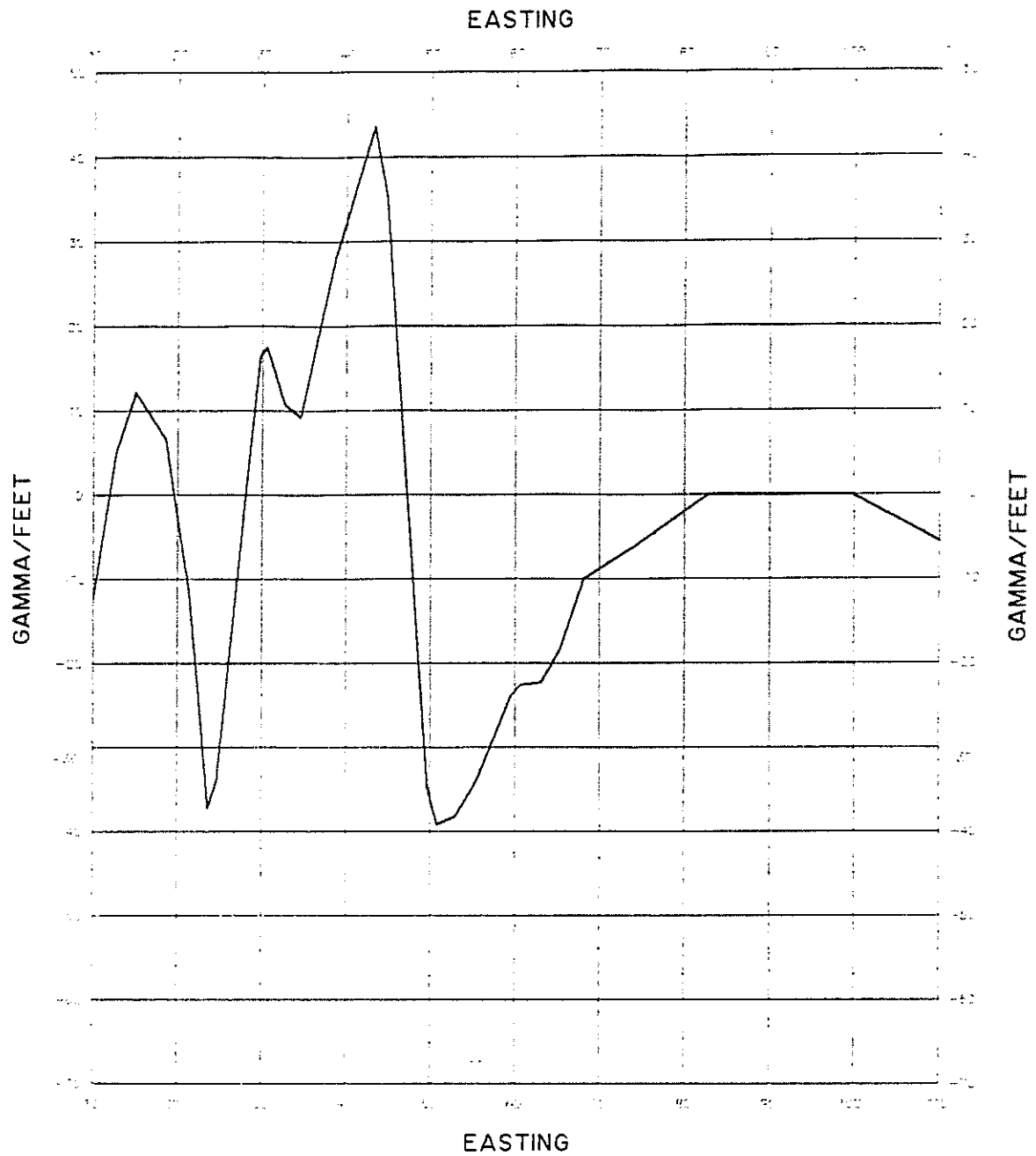
- Buried metallic objects, some of which may be drums appear to be located in the suspected area.
- The magnetic anomaly encompasses an area of approximately 900 square feet, large enough for burial of the reported forty drums
- URS recommends an additional investigation consisting of test pits or trenches to determine the exact nature of the buried metallic objects and the condition of those objects. The proposed test trenching plan is included in Section 5.1.1.

4.4 MOA Area B - Old Oil/Water Separator

4.4.1 Description of Area

The old oil/water separator is part of the wastewater treatment plant located southeast of the power house and the hazardous waste containment area (Figure 2-2, Plate P-4). The old oil/water





separator was removed from service in 1990 following the installation of a new oil/water separator. Under the MOA, GM plans to investigate and remove the old oil/water separator and associated waste oil tank.

Oil/Water Separator

The new oil/water separator is located northwest of the waste oil AGST and west of the old oil/water separator. According to records the new oil/water separator was installed in September 1990 in order to replace the adjacent old oil/water separator.

Before the initial excavation for the construction of the new oil/water separator, Delphi installed a series of soil borings to assess the subsurface conditions. These borings, designated BH-1 through BH-9, were sampled at various depths for a variety of parameters, including VOCs, base neutral compounds, selected metals, PCBs and cyanides. Results of the sample analyses were generally below NJDEP guidelines, with the exception of borehole BH-2, samples from which contained elevated concentrations of base neutral compounds, particularly polynuclear aromatic hydrocarbons (PAHs). Three further boreholes, BH-2A, BH-2B and BH-2C were installed alongside the location of BH-2, but all failed to identify the same elevated concentrations. When the area was excavated, there was evidence of a railroad tie within the fill in that location and it appeared that the boring had pushed part of the tie down the borehole. The elevated concentrations of PAHs are attributed to the railroad tie as a source. URS has summarized the data from the 1990 borings and has included it as Plate P-4.

Old Oil/Water Separator (also called *Former Primary Sludge Settling Tank*)

The old oil/water separator and waste oil UST are located west of the wastewater treatment plant and east of the new oil/water separator. The entire unit consists of an oil skimming unit, two 160,000-gallon sludge settling tanks, and a 30,000-gallon waste oil tank. The waste oil tank shares a common wall with the eastern primary sludge settling tank. The primary sludge settling and waste oil tanks are constructed of reinforced concrete extending to a depth of approximately eleven feet below grade.

This unit was installed in 1938 for the purpose of removing process waste cyanide from neutralization of wastewaters prior to further pretreatment. The oils typically consisted of spent

lubricating or metal working fluids and hydraulic oils. All oils from the manufacturing plant were either transported to the waste oil storage tank by a honey wagon specifically designated for this purpose or discharged to the in-plant industrial process sewer system. All oils discharged directly to the sewer were removed at these two primary sludge treatment tanks. At the south end of these two tanks was an isolated "calm" zone. In this zone, a skimming apparatus was used to remove any oil from the surface of the water and gravity discharged directly through a sheet metal screen to the waste oil storage tank. Since the system had two functions, it is called by two names: *Old Oil/Water Separator*, and *Former Primary Sludge Settling Tanks*.

In order to delist the GM Trenton plant from an approved TSDF status to a "less than 90 days" generator status, GM initiated a RCRA Closure of the 30,000-gallon waste oil UST. All closure activities were conducted in accordance with the Soil Sampling and Analytical Plans (December 4 and 21, 1990) and Closure Plan (March 13, 1991) submitted to NJDEP.

Prior to decommissioning, all waste oil was removed from the waste oil tank for recycling at an off-site oil reclamation facility. The tank was then decontaminated using a biodegradable alkaline cleaner and triple rinsed. Subsequent to decontamination, each wall of the tank was sand blasted. In order to determine if soils may have been impacted during historical operation of the waste oil tank, a Soil Sampling and Analytical Plan (SSAP) was developed. Subsequent to decontamination and demolition, post-excavation samples would be collected and analyzed for target compound list (TCL) VOCs, chromium, copper, nickel, and lead, PCBs, cyanide, and TCLP base neutral compounds. Soil sampling associated with the closure of the waste UST was not completed however. As approved by NJDEP, sampling has been deferred due to the proximity of the two adjacent former primary sludge settling tanks.

Upon decommissioning, each former primary sludge settling tank contained approximately 500 cubic yards of F006 plating sludge. Sludges were removed from the former primary settling tanks and processed into the wastewater sludge treatment facility in quantities which did not exceed the facility's treatment capacity. GM Delphi anticipates demolition and removal of the former primary settling tanks and waste oil UST by early summer of 1996. Sampling of the underlying soils will be conducted as proposed in the RI Work Plan (see Section 5.1.2) following the removal of the settling tanks and waste oil tanks. This sampling will also fulfill the RCRA closure requirements.

Soil Piles

Soils which were excavated during the construction of the new oil-water separator have been stockpiled east of the wastewater treatment plant. It is anticipated that the pile will be used to backfill the excavation of the old oil/water separator following the post-excavation sampling.

4.5 MOA Area C - RCRA Drum Storage Pad

The RCRA drum storage area is located south of the 500,000-gallon No.6 fuel oil tank and northeast of the wastewater treatment plant. The storage area originally consisted of a concrete pad. In 1985, a bermed concrete secondary containment system was constructed. A catch basin, located at the southeast corner of the containment area, discharges stormwater runoff directly to the waste water treatment system. Both hazardous and nonhazardous wastes, including oils, solvents, adhesives, paints, and metal bearing sludges, have historically been staged at this location. In order to re-classify the GM Delphi Trenton Plant from an approved TSDF status to a "less than ninety (90) days" generator status, GM completed a RCRA Closure of the drum staging area. All closure activities were conducted in accordance with the SSAP (December 4, 1990) and Closure Plan (March 13, 1991) submitted to NJDEP. Closure activities included decontamination of the concrete containment system and soil sampling. An SSAP findings report was prepared by GM Delphi and submitted to NJDEP on April 27, 1992. URS has summarized the data from the 1990 findings report and has included it as Plate P-5. Results of the soil sampling investigation around the hazardous drum staging area revealed the presence of elevated BN and/or metals concentrations in 11 of 12 samples collected.

GM Delphi has continued to stage hazardous wastes in the drum staging containment area within the less than ninety day time frame.

Waste roll-off containers have been previously observed to be located on the pavement surrounding the hazardous waste staging area and in an unpaved area adjacent to the northwest corner of the hazardous waste area. Facility waste previously observed to be staged in the containers include buffing dirt, asphalt and wood floor blocks with oily debris removed from the manufacturing area, industrial construction debris, and phosphate sludges. All materials were non-hazardous with the exception of the asphalt and wood floor blocks, which are classified as "New Jersey Hazardous". Appropriate off-site disposal has been used for each of the waste streams.

GM Delphi wishes to maintain the use of the hazardous drum staging area because of operational requirements. Based upon the NJDEP comments from the ISRA work plan approval letter, (NJDEP, December 1993) GM Delphi proposes to delineate the horizontal and vertical extent of contamination in this area. The proposed sampling plan for this area is outlined in Section 5.1.3.

4.6 MOA Area D - Gasoline UST Area

4.6.1 Description of Area

The gasoline UST area (Plates P-6 and P-7, Figure 2-2) is the former location of steel 4,000 and 2,000-gallon gasoline USTs.

The 4,000-gallon gasoline UST was installed in 1976 and was used for fueling fleet vehicles. Eight post excavation samples were collected in the vicinity of the former 4,000-gallon gasoline UST by LMS during July 1987. The soil samples were analyzed for TPH, BTEX and MTBE. The LMS analytical results indicated a localized area of elevated concentrations of TPH, BTEX, and MTBE.

The 2,000-gallon UST was installed in 1979 and used for fueling on-site vehicles and equipment. The UST was removed in 1989 with no evidence of past releases from the tank. Post-excavation soil sampling supported the conclusion that no leakage occurred from the 2,000-gallon UST.

4.6.2 Gasoline UST Area Soil Sampling Results

Eleven soil borings were advanced at the gasoline UST Area during an investigation conducted by URS. Six of the eleven borings advanced in the location of the former gasoline tanks encountered backfill to depths ranging from 4 to 8 feet (boring logs are provided in Appendix A). The backfill primarily consists of fine to medium sand. Silt with variable amounts of sand and clay was encountered below the backfill to depths ranging up to 17 feet (the depth of weathered bedrock). The remaining five borings primarily encountered silt with variable amounts of sand and clay.

Twenty-two (22) soil samples were collected from the eleven borings for VOC analysis. Two samples were collected from each boring to delineate the vertical extent of petroleum contamination

if any was present. The results of these analyses, including all detected compounds, are presented on Plate P-6.

Sixteen (16) VOCs were detected in the samples collected from this area at concentrations ranging from 1 to 13,000 ppb. Acetone was detected in 13 of the 22 samples analyzed and appears to be a remnant from field and/or laboratory decontamination procedures.

All samples collected from the immediate area of the former USTs except SB-3-SO-25(9') revealed VOC results below NJDEP impact to groundwater criteria. Sample SB-3-SO-25(9') revealed a total xylenes concentration of 12 ppm which marginally exceeds the NJDEP impact to groundwater criteria of 10 ppm.

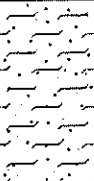
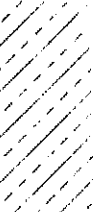
Results from Sample SB-3-SO-24(13') indicate the BTEX compounds extend to the approximate depth of the water table (approximately 14 feet below ground surface). Based upon the results from Sample SB-3-SO-24(18') and SB-3-SO-25(16') the vertical extent of the BTEX compounds appears to be limited to between 16 and 18 feet below ground surface in the immediate tank area.

Based upon the BTEX soil results, it appears that petroleum constituents have migrated primarily vertically in the area of the USTs and have migrated in a southern direction once the constituents encountered the water table. The extent of the VOCs detected in this area by location and depth are depicted on Plate P-6.

4.6.3 Gasoline UST Area Hydrogeology/Groundwater Sampling Results

URS has reviewed borings logs and hydrogeologic data from the wells installed during this investigation as well as from previous investigations to evaluate the hydrogeologic conditions of the UST area. Two aquifers have been identified as a result of this evaluation which are generally consistent with those identified during previous investigations (Weston, 1989 and LMS, 1991). The aquifers identified by URS include a shallow aquifer occurring in the overburden and weathered bedrock, and a bedrock aquifer occurring in the underlying bedrock of the Stockton Formation. One monitoring well (UST-7) appears to have been installed in a deeper water bearing zone within bedrock which could possibly represent a third aquifer beneath the site. Figure 4-5 presents a generalized geologic/hydrogeologic column for the site.

GM-DELPHI Trenton Generalized Geologic/Hydrogeologic Column

Hydrogeologic Unit	Lithologic Unit	Stratigraphic Profile	Material Description	Hydrogeologic Properties	Origin
Shallow Aquifer	Fill		Ranges from silt to sand and gravel. In portions of the site fill contains wood, concrete, brick and metal.	Low to high hydraulic conductivity.	Man emplaced.
	Fluvial Overburden		Sandy silt (clays, sands, and gravel.	Low to moderate hydraulic conductivity. Published values for silty sand-sandy silt range from 10^{-6} to 10^{-3} cm/sec (ref. 1).	Preglacial fluvial and floodplain deposits.
	Weathered Bedrock		Highly weathered siltstone, sandstone, and mudstone. Silt, sand, and clay contained in fractures.	Moderate hydraulic conductivity on the order of $K=10^{-3}$ (based on URS slug tests).	Near-surface bedrock decomposition.
Bedrock Aquifer	Bedrock		Stockton Formation sandstone, siltstone, and mudstone (shale). Fractured zone at elevations ranging from approximately 90 to 70 feet AMSL.	Flow along fractures. Competent zones provide barriers to vertical groundwater flow. Monitoring wells estimated to yield 1 to 15 gpm.	Triassic-age sedimentary rock suspected to have originated within the depositional system of the ancestral Hudson River.
Confining Unit *	Bedrock		Stockton Formation massive siltstone unit. No vertical or horizontal fractures observed.	Not tested, however, published values for unfractured shale and sandstone range from 10^{-9} cm/sec to 10^{-4} cm/sec. (ref. 18)	Triassic-age sedimentary rock suspected to have originated within the depositional system of the ancestral Hudson River.
Lower Bedrock Aquifer *	Bedrock		Stockton Formation fractured zone of sandstone and siltstone at elevations ranging from approximately 33 to 17 feet AMSL.	Not tested, however, published values for fractured rocks range from 10^{-6} cm/sec to 10^{-1} cm/sec. (ref. 18)	Triassic-age sedimentary rock suspected to have originated within the depositional system of the ancestral Hudson River.

* These units were only identified by one deeper monitoring well installed (UST-7). The lateral extent of these units have not been confirmed.

Groundwater in the shallow aquifer appears to flow toward the south-southeast and discharge to Gold Run Creek. Groundwater in the bedrock aquifer appears to flow to the east-southeast. There appears to be limited capacity for vertical migration between the two aquifers.

Groundwater samples were collected from six of the UST monitoring wells (UST-1, UST-2, UST-4, UST-5, UST-7, UST-8). Well UST-5 monitors the shallow aquifers, UST-2, UST-4 and UST-8 monitor the bedrock aquifer, and UST-7 monitors the potential deeper bedrock zone. Two rounds of groundwater sampling and analyses were conducted from these wells. The first round of groundwater samples was collected by URS on March 24, 1994 and samples were analyzed by Coast-to-Coast Analytical of Westbrook Maine. The second round of groundwater samples was collected on May 5, 1994 by EMSL Analytical Services and samples were analyzed by EMSL in their Westmont, New Jersey Laboratory. During each sampling round, the groundwater samples were analyzed for BTEX compounds as well as total and dissolved lead. A summary of the analytical results, by well, are shown on Plate P-7.

BTEX volatile compounds were detected in the first and second round samples at concentrations ranging from 1.2 to 590 ppb. The first round samples revealed benzene at concentrations ranging from N.D. (< 5 ppb) to 440 ppb, ethylbenzene at N.D. (< 5 ppb) to 190 ppb, toluene at N.D. (< 5 ppb) to 150 ppb, and xylene at N.D. (< 5 ppb) to 590 ppb. The second round samples revealed benzene, ethylbenzene, toluene, and xylene at concentrations ranging from 1.2 to 330 ppb, 1.3 to 140 ppb, 5 to 250 ppb, and 1.8 to 270 ppb, respectively.

Benzene was detected in both samples from well UST-1 at concentrations of 10 and 8.8 ppb which exceed the NJDEP Groundwater Quality Standard of 1 ppb. The probable source of the BTEX contamination in this areas was the former 4,000-gallon gasoline UST. The benzene criteria of 1 ppb was also exceeded in first round samples from UST-2, UST-5 and UST-8 and in all samples collected during the second round. The xylene results from both sample rounds from wells UST-2, UST-5 and UST-8 exceed NJDEP groundwater criteria of 40 ppb.

Lead was detected in the first round unfiltered samples from wells UST-1, UST-5, and UST-8 at 7, 7 and 6 ppb, respectively. Lead was detected in all of the second round unfiltered samples at concentrations ranging from 5.7 to 41 ppb. Lead was not detected in any of first or second round filtered samples.

Lead results from the first round unfiltered samples from UST-1, UST-5 and UST-8 exceed the NJDEP Groundwater Quality Criteria of 5 ppb. All of the unfiltered sample results from the second round exceed the NJDEP criteria. However, since lead was not detected in any of the filtered samples, it appears that lead concentrations detected in the unfiltered samples are the result of suspended solids.

The proposed RI includes a statistical evaluation of all previously collected quarterly data to determine trends (if any) in levels of compounds in groundwater through time. Based on the results of the statistical evaluation, recommendations will be made for additional groundwater monitoring if necessary.

SECTION 5

PROPOSED REMEDIAL INVESTIGATION WORK PLAN

5.0 PROPOSED REMEDIAL INVESTIGATION WORK PLAN

Based on the results obtained from previous investigations performed in the four MOA Areas at the GM Delphi Trenton facility, an RI of these areas is warranted. The following sections describe the proposed scope of work to be performed associated with each of the four MOA Areas. Additionally, Quality Assurance/Quality Control (QA/QC) procedures are provided in this section that will be implemented to ensure the quality, representativeness, and completeness of data generated during the proposed sampling activities. A schedule for the proposed activities and reporting requirements are also provided. All field activities will be performed in accordance with a Site-Specific Health and Safety Plan (SSHASP). This work plan incorporates the Technical Requirements For Site Remediation N.J.A.C. 7:26E.

5.1 Investigation Activities

5.1.1 MOA Area A - Suspected Barium Chromate Drum Disposal Area

As described in Section 4.3, results of the geophysical survey conducted in MOA Area A indicate that a significant magnetic anomaly is present. The anomaly encompasses an area large enough for burial of the rumored 40 drums containing barium chromate sludge. Based on these findings, further investigation is proposed for this area which will consist of a test pit/trench exploration program in the area of the magnetic anomaly to determine the exact nature of the buried metallic objects and the condition of these objects. Four test pits/trenches will be initiated in the area of the magnetic anomaly as shown on Plate P-3. Actual test trench locations may be changed based on field observations. The trenches will be excavated beginning from outside of the magnetic anomaly area extending toward the center of the area. Based on the dimensions of the magnetic anomaly (approximately 30 ft. x 30 ft.), the proposed length for each trench is 15 feet. The maximum depth of each trench will be the water table which is estimated to occur at a depth of 6 feet below ground surface. Drums, if encountered during excavation, and surrounding soils will be removed from the pit/trench and staged for disposal. The following procedures will be used to conduct this investigation.

Excavation

Trenches will be excavated using a backhoe equipped with a landscaping blade. Trenching activities will be initiated with Level B personal protection; however the level of personal protection

may be downgraded as warranted based on air monitoring conducted during excavation. Plastic sheeting will be placed on the ground adjacent to each trench for temporary placement of excavated materials. Excavation will be performed in shallow (6-inch) lifts. Test pits/trenches will be excavated through fill materials until natural/native soil or groundwater is encountered, whichever is encountered first. The field personnel will continuously monitor the excavation in accordance with the SSHASP using a photoionization detector (PID) or a flame ionization detector (FID) and a combustible gas indicator. If drums are encountered in the trenches, they will be removed, overpacked, and staged for disposal as described below. The contents of one drum will be sampled and a soil sample will be obtained adjacent to the drums and submitted for laboratory analysis as shown on Table 5-1 from each of the four test trench areas. If drums are not encountered in the excavations, one sample of fill soil will be obtained and submitted for laboratory analysis from each of the four test trench areas. Soil samples submitted for laboratory analysis will be obtained based on the presence of soil discoloration, elevated PID/FID readings or other visual observations.

Drum Removal and Storage

Drums will be removed if encountered in the trenches using the excavator equipped with a landscaping blade and/or a drum grapppler, depending upon the physical condition of the drum. Once a drum is removed from the trench, field personnel will inspect the drums and determine whether they are empty, partially full, or full by physically moving the drum. If possible, the contents of the drums will be observed to aid in assessing potential hazards.

Full or partially full drums will be overpacked into 85-gallon USDOT-approved overpack containers. If the condition of the drum warrants this, the drum grapppler will squeeze and reshape the drum to fit into the 85-gallon overpack. When reshaping the drum can not be accomplished, the 55-gallon damaged drum will be placed into a 110-gallon overpack. All drums will be overpacked on a temporary staging area located adjacent to the excavation. Plastic sheeting, spill booms, and Speedi-Dry will be used to cover the ground and prevent spills at the staging area. Once the drums are overpacked, they will be staged at the RCRA storage pad pending disposal.

Overpack containers will be assigned an individual alpha-numeric code and the information recorded on a drum inventory log. The drum inventory log will include an alpha-numeric code, a description of the container, date, time, location of container, its condition, volume and type of contents, and any pertinent or legible information on the exterior.

TABLE 5-1
PROPOSED SAMPLES
GM-DELPHI TRENTON REMEDIAL INVESTIGATION

page 1 of 2

Location	No. of Samples	Medium	Sample Depth	Analyses	Sampling Method
MOA AREA A - Suspected Barium Chromate Drum Disposal Area					
Trench Soil Samples					
S-1 through S-4	4	Soil	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Backhoe
Field Blank	1	Water	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Backhoe
Duplicate	1	Soil	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Backhoe
MS/MSD	1/1	Soil	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Backhoe
Drum/Waste Samples					
DR-1 through DR-4	4	Waste (liquid/solid)	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Coliwasa or Scoop
Duplicate*	1	Waste (liquid/solid)	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Coliwasa or Scoop
MS/MSD*	1/1	Waste (liquid/solid)	NA	VOA, BN + 15, PPM+Ba, PCB, CN	Coliwasa or Scoop
Drum Samples					
(if encountered)	Unknown	Waste (liquid/solid)	NA	Haz. Characteristics - TCLP	Coliwasa or Scoop
MOA AREA B - Old Oil/Water Separator					
Separator Excavation					
S-1 through S-10	10	Soil	Base of Excavation Below Invert	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
S-11 through S-20	10	Soil	Sidewalls - 5.5 to 6.0 feet	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
Waste Oil Tank Excavation					
S-1 through S-2	2	Soil	Base of Excavation Below Invert	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
S-3 through S-5	3	Soil	Sidewalls - 5.5 to 6.0 feet	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
Field Blank	1	Water	NA	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
Duplicate	2/2	Soil	Same as Samples	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
MS/MSD	2/2	Soil	Same as Samples	VOA, BN + 15, PPM , PCB, CN	Backhoe or Remote Sampler
MOA AREA C - RCRA Drum Storage Pad					
Soil Borings					
B-1 through B-17	51	Soil	Depths 1,2,3	PAH and PPM	Split spoon
Field Blank	2	Water	NA	PAH and PPM	Split spoon
Duplicate	3	Soil	Same as Samples	PAH and PPM	Split spoon
MS/MSD	3/3	Soil	Same as Samples	PAH and PPM	Split spoon

TABLE 5-1 (continued)
PROPOSED SAMPLES
GM-DELPHI TRENTON REMEDIAL INVESTIGATION

page 2 of 2

Notes:

1.) Laboratory Analyses

- Volatile Organic Analyte (VOA) - USEPA Target Compound List VOAs, USEPA Method 8240.
- Base Neutrals and Acid Extractables (BN + 15) - USEPA Target Compound List BN, USEPA Method 8270.
- Priority Pollutant Metals (PPM) and Barium (Ba) - Refers to USEPA's 6010A and 7000 series of methods.
- Hazardous Characteristics
 - Corrosivity (pH) - USEPA Method 9045.
 - Ignitability - USDOT Method in 49CFR Part 173, Appendix E.
 - Reactivity - USEPA Method in SW-846 Section 7.3.
- Polychlorinated Biphenyls (PCBs) - USEPA Method 8080.
- Total Cyanide (CN) - USEPA Method 9012.
- Toxicity Characteristic Leaching Procedure (TCLP) - The extraction will be performed using USEPA Method 1311. Extracts of samples will be analyzed using the methods listed above for full TCLP list analytes.
- Polynuclear Aromatic Hydrocarbons (PAH) - PAHs will be analyzed using BN+15 analytical methods.

2.) QA/QC Samples will be collected as follows:

- Field rinsate blanks - one field rinsate blank will be collected per/day, per/matrix and will be analyzed for the same parameters as their associate matrix.
- Duplicate (blind) samples and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected and analyzed from each matrix for 5% of the regular samples.
- All analyses may not require the same QA/QC samples.

3.) * = Indicates quantity of QA/QC samples will be increased if different matrices are present.

As previously discussed, if drums are found to contain a chemical waste, samples will be obtained from drums encountered in each of the four test trench areas to characterize their contents. Rapid turnaround will be requested for the analysis. If the laboratory analytical results indicate the contents of the drums are not similar, compatibility testing will be performed on the contents of all drums. Compatibility testing will consist of a determination of the RCRA hazardous characteristics of ignitability, corrosivity and reactivity. Rapid turnaround will be requested for these analyses. Based on the results of compatibility testing, the drums will be separated according to their classifications for staging and storage. Examples of a drum segregation scheme based on compatibility classification are as follows:

- Reducer, pH < 7, Not Flammable
- Reducer, pH > 7, Not Flammable
- Reducer/Flammable, Flammable, Other regulated materials not otherwise specified
- Oxidizer/Flammable

A hazardous waste label, if applicable, will be applied to the tops of all overpacks. The label will contain the generator's name, address, and telephone number, USEPA ID No., accumulation start date, waste classification, UN or NA number, and sample ID number. The overpacks will be segregated by classification. Composite waste samples from each classification group will be submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis to further characterize the waste materials as hazardous/nonhazardous based on the RCRA toxicity characteristic.

In the event the initial four drum sample results reveal that the drum contents are the suspected barium chromate sludge, the excavated drums may be consolidated into sealed rolloff containers. Composite waste samples from each rolloff container (if used) will be submitted for RCRA toxicity characteristics.

Soils Handling

Soils excavated with the drums may be temporarily staged on plastic sheeting adjacent to the trench and transferred to a lined RCRA box or other approved water-tight container. Soils may be

placed directly into the box from the trench by the excavator while the box is being pulled/moved along the length of the trench.

As previously discussed, one soil sample from each trench area will be submitted for laboratory analysis. The laboratory analytical results obtained will be used for waste characterization of the soils for disposal purposes.

Drummed Waste Sampling Procedures

Drummed waste removed during trench excavation will be sampled by field personnel in accordance with procedures in the NJDEP Field Sampling Procedures Manual (NJDEP, May 1992) and with QA/QC procedures described in Section 5.2. Containers containing liquid waste or with identifiable labels will be sampled using a dedicated coliwasa or glass drum thief. Sealed, intact containers will be opened with a non-sparking bung-wrench or punch. If a container is expanded or bulging, a non-sparking remote container punch will be used to punch a hole large enough to extract a sample from the container. Solids or sludges will be sampled using dedicated scoops.

5.1.2 MOA Area B - Old Oil/Water Separator

The old oil/water separator, consisting of two 160,000-gallon sludge settling tanks and a 30,000-gallon waste oil UST are proposed to be demolished and removed. GM has currently scheduled the removal and demolition of these structures for June 1996. The sampling activities described below will be performed within the excavation after the structures have been removed.

Samples will be collected and submitted for laboratory analysis from the sidewalls and base of the excavations remaining after removal of the oil/water separator and the waste oil UST to confirm the presence/absence of contamination associated with these structures. A total of 25 samples will be collected at the locations shown on Plate P-4 and submitted for laboratory analysis as shown in Table 5-1. QA/QC requirements for sampling and laboratory analysis are described in Section 5.2. Samples will be obtained from the sidewalls of the excavation from an equivalent depth interval of 5.5 to 6.0 feet using a backhoe and/or remote sampling device. Samples will be collected from the base of the excavation representative of materials encountered at depths below the invert of the structures. The depth of each sample will be noted at the time of sample collection.

The results obtained from previous investigations in this area are described in Section 4.4. Concentrations of VOCs, BNs, selected metals, PCBs, and cyanide were below NJDEP guidelines except for elevated concentrations of PAHs detected in samples from one borehole advanced at the location of the new oil/water separator installed adjacent to the old oil/water separator. However, the elevated concentrations of PAHs detected in the soil sample can be attributed to a creosote-soaked railroad tie encountered at this location. Therefore, soil that was removed and stockpiled during the excavation for installation of the new oil/water separator is not indicated to have concentrations of contaminants above the NJDEP guidelines and can be used as backfill for the excavation from removal of the old oil/water separator. The remainder of the excavation will be backfilled with soil fill material if the excavation volume exceeds the stockpiled soil volume.

5.1.3 MOA Area C - RCRA Drum Storage Pad

Previous investigations associated with this area are described in Section 4.5. Surface soil samples obtained around the perimeter of and beneath the pad indicate soils contain elevated concentrations of metals and PAHs. Based on these results and observed pad deterioration, soil borings are proposed to be conducted in this area to delineate the horizontal and vertical extent of apparent contamination.

The dimensions of the pad are approximately 100 feet by 110 feet. Based on the size of the pad, the proposed investigation in this area will consist of advancing 11 soil borings spaced every 40 feet around the perimeter of the pad, 5 soil borings through the pad (one boring per 2200 square feet), biased toward cracks in the pad, and 1 boring adjacent to the sump that discharges to the facility's wastewater treatment plant. A total of 17 borings will be advanced at the approximate locations shown on Plate P-5 using hollow-stem auger and split-spoon sampling techniques in accordance with the procedures described in the NJDEP Field Sampling Procedures Manual (May 1992). Samples will be collected continuously during drilling and will be screened using a PID or FID. A geologist will describe and log the samples in the field on a boring log form.

Soil borings will be advanced to a depth of 10 feet below ground surface or to the water table, whichever is shallower. Three soil samples will be obtained from each boring. Samples will be obtained from discrete soil (or fill) strata. The first sample of each boring will be obtained from the interval that exhibits the highest apparent level of contamination based on visual observations and/or elevated PID readings. The second sample from each boring will be obtained from the interval

immediately below the interval that exhibits the highest apparent level of contamination. The third sample will be obtained from the first encountered natural material below the pad or immediately above the water table. The samples will be submitted for laboratory analysis in accordance with the QA/QC procedures described in Section 5.2 and the analyses listed on Table 5.1.

5.1.4 MOA Area D - Gasoline UST Area

Results obtained from previous investigations in the areas associated with a former 2,000-gallon UST and a former 4,000-gallon gasoline UST are described in Section 4.6. All soil samples collected from the immediate area of the former USTs, except sample SB-3-S0-25 (9 ft.), revealed VOC concentrations below NJDEP Impact to Groundwater Criteria. However, groundwater sampling results revealed benzene and xylene concentrations above NJDEP Groundwater Quality Criteria. Based on these findings, GM proposes to perform a statistical evaluation of historical groundwater data using the Mann Whitney - U Test.

A statistical evaluation will be performed on all previously collected quarterly data in order to determine trends (if any) in levels of compounds in groundwater through time. The method of the Mann Whitney - U Test will be used to determine statistically significant increase or decrease in compound levels with time. The procedures for performing the Mann Whitney - U Test are presented in Appendix E. This test will be used to evaluate BTEX data from the following monitoring wells at the site: UST-2, UST-4, UST-5, UST-7 and UST-8.

Based on the results of the statistical evaluation, recommendations will be made for additional groundwater monitoring if necessary.

5.2 QA/QC Procedures

This section documents the procedures that will be implemented to ensure the quality, representativeness, and completeness of data generated from the proposed sampling activities conducted at the GM Delphi Trenton facility.

All collection and analysis of soil samples will be performed using current NJDEP (NJDEP, May 1992) or USEPA accepted field and laboratory protocol.

5.2.1 Sampling Equipment/Decontamination

All sampling equipment (e.g., trowels and hand augers) will be constructed of stainless steel. To reduce the possibility of cross-contamination of samples, all sampling and measuring equipment will be decontaminated prior to use. Sampling equipment will be decontaminated in the field using the following method: non-phosphate detergent and water wash; tap water rinse; distilled, deionized water rinse; 10% nitric acid rinse; distilled, deionized water rinse; acetone rinse; air dry; distilled, deionized water rinse. All drilling equipment will be steam cleaned between soil borings. The backhoe blade will be steam cleaned between trenches.

5.2.2 Field Quality Control Samples

Quality Control (QC) samples will be collected through the field investigation. These samples will serve as controls to check on cross-contamination which may occur in sample handling, storage, or shipment. In particular, the QC samples will provide quality checks on bottle preparation, equipment decontamination, ambient conditions, and blank water quality.

Aqueous samples are not currently proposed to be collected during the RI; however, if groundwater is encountered in excavations, it may be decided to submit groundwater samples for laboratory analysis. Trip blanks, if required, will accompany samples at a rate of one per shipment or two-day sampling event. Trip blanks, consisting of analyte-free water in 40 milliliter (ml) vials, will be provided by the laboratory. Trip blanks will travel to the site with the empty sample bottles and will be shipped back to the laboratory from the site with the collected samples. The trip blanks will be analyzed for VOCs only and will be required only when aqueous samples are collected for VOC analysis.

Field blanks for all matrices will be aqueous rinsate blanks. Analyte-free water from the laboratory will be passed through decontaminated sampling equipment and collected in the appropriate empty sample bottle. At a minimum, one field blank will be collected per day per matrix and will be analyzed for the same parameters as their associated matrix.

Duplicate samples will be collected from each matrix for five percent of the regular samples. The duplicate samples will be collected at the same location and, if possible, from the same sample aliquot as the original sample. The duplicate samples will be labeled so the laboratory is not aware that they are duplicates. Extra sample volume will be collected for matrix spike/duplicate analysis.

5.2.3 Sample Bottles/Preservation

Sample bottles (containing preservatives as required) will be supplied by the laboratory. Sample bottle and preservation requirements are listed below.

<u>Analyte Preservatives</u>	<u>Sample Bottle (Aqueous/Solid)</u>
VOCs	Glass vial with teflon-lined septum/HCl (aq. only) wide-mouth glass jar with teflon liner. Cool 4 deg. C.
Base Neutrals and Acid Extractables	Amber glass bottle with teflon liner/wide mouth glass jar with teflon liner. Cool 4 deg. C.
Metals	Plastic or glass bottle HNO ₃ (aq. only). Cool 4 deg. C.
Cyanide	Glass or plastic bottle NaOH (aq. only). Cool 4 deg. C.
PCBs	Glass bottle. Cool 4 deg. C.

5.2.4 Sample Custody and Shipment

Sample custody will be documented by the field team from the time the samples are collected until the samples are shipped to the laboratory. Sample bottles will be labeled, sealed, and packed on ice for shipment to the laboratory. Chain-of-custody forms (Figure 5-1) will accompany the samples. All pertinent sample information will also be recorded in the field notebook. Samples will be shipped to the laboratory on the same day they are collected whenever possible.

5.2.5 Analytical Laboratory and Methods

All samples will be analyzed by a NJDEP-certified laboratory. Analysis of all samples will be performed according to USEPA SW-846 methods. For GC/MS methods, library searches will be performed for tentatively identified compounds (TICs).

CHAIN OF CUSTODY RECORD

PROJECT NO. SITE NAME CLIENT

SAMPLERS (PRINT)

DELIVERY SERVICE: AIRBILL NO.:

TURNAROUND: ☐ NORMAL ☐ RUSH NUMBER OF DAYS:

LOCATION IDENTIFIER	DATE	TIME	COMP	GRAB	SAMPLE ID	MATRIX
---------------------	------	------	------	------	-----------	--------

TOTAL NUMBER OF CONTAINERS

TESTS

BOTTLE TYPE AND PRESERVATIVE

URS

CONSULTANTS, INC.

LAB _____

COOLER _____ of _____

PAGE _____ of _____

REMARKS

IRPIMS

SAMPLE TYPE

FIELD LOT #

BEGINNING DEPTH (IN FEET)

ENDING DEPTH (IN FEET)

MATRIX CODES

AA - AMBIENT AIR
SE - SEDIMENT
SH - HAZARDOUS SOLID WASTE
LH - HAZARDOUS LIQUID WASTE

SL - SLUDGE
ST - SOLID WASTE
WP - DRINKING WATER

WG - GROUND WATER
SO - SOIL
DC - DRILL CUTTINGS

WL - LEACHATE
GS - SOIL GAS
WC - DRILLING WATER

WO - OCEAN WATER
WS - SURFACE WATER
WW - WASTE WATER
LF - FLOATING/FREE PRODUCT ON GW TABLE

RELINQUISHED BY (SIGNATURE)

DATE

TIME

RECEIVED BY (SIGNATURE)

DATE

TIME

SPECIAL INSTRUCTIONS

RELINQUISHED BY (SIGNATURE)

DATE

TIME

RECEIVED FOR LAB. BY (SIGNATURE)

DATE

TIME

Distribution: Original accompanies shipment, copy to coordinator field files

Analytical results and associated quality assurance (QA) information will be supplied consistent with reduced deliverable requirements outlined in the N.J.A.C.7:26E, Appendix A, Section IV. The data packages will include results summary sheets, chain-of-custody forms, laboratory chronicles, methodology summaries, non-conformance summaries and other required analytical documentation (method blanks, tuning, calibration, spike recovery, detection limits).

Unless otherwise specified, analytical parameters referred to in the sampling plan will follow a uniform format. Analytical methods are outlined below.

- Volatile Organic Compounds (VOC) refer to USEPA Method 8240
- Base Neutrals (BN) and Acid Extractables (AE) refer to USEPA Method 8270
- Priority Pollutant Metals (Metals) refer to USEPA's 6010A and 7000 series of methods
- Polychlorinated Biphenyls (PCBs) refer to USEPA Method 8080
- Total Cyanide refers to USEPA Method 9012
- Corrosivity (pH) refers to USEPA Method 9045
- Ignitability refers to USDOT Method in 49 CFR Part 173, Appendix E
- Reactivity refers to USEPA Method in SW-846, Section 7.3
- Toxicity Characteristic Leaching Procedure (TCLP) refers to USEPA Method 1311 extraction procedure

5.3 Schedule

The proposed schedule for performing the scope of work proposed for the RI is presented in Figure 5-2. Assuming the NJDEP completes their review of the RI workplan by the end of May 1996, RI activities are scheduled to begin in June 1996. Field activities are scheduled to be completed in July 1996. The final report on the RI activities is scheduled to be submitted in November 1996.

5.4 Reporting

Following the completion of RI activities at the site, data obtained will be summarized and presented in a RI report in accordance with N.J.A.C. 7:26E. This report will include descriptions of historical information and the site physical setting, a technical overview, and findings and recommendations. Laboratory analytical data and other information obtained during the RI will be submitted with the RI report and analytical results will be summarized in tabular format as described in N.J.A.C. 7:26E. Site maps will be provided showing each area of concern and sample locations within these areas and soil isopleth maps as appropriate.

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APPENDIX A

BORING LOGS

MOA AREA - B

OIL/WATER WATER SEPARATOR BORING LOGS

GEOTECH, INC.

FIELD RECORD OF SOIL EXPLORATION
GM PLANT

JOB NO. E1822 PROJ. GM DIRT BORING NO. 2 DEPTH 05' ELEV.
DATE STARTED 10-5-90 DATE COMPLETED 10-5-90 DATUM
CASING HAMMER WT. LBS. DROP SAMPLER HAMMER WT. 140 LBS. DROP 30

METHOD OF ADVANCING BORING		DEPTH
1	WALSH STEEL	0 - 6 1/2'
		1
		1

SAMPLE CONDITION

SAMPLE TYPES

☒ DISTURBED
☒ FAIR
☒ GOOD
☒ LOST

SS - 2" O.D. SPLIT SPOON
TW - 3" O.D. THIN WALLED TUBE
AS - AUGER SAMPLE
RS - ROCK CORE
WS - WASH SAMPLE
CS - CHUNK SAMPLE

[illegible]

GEOTECH, INC.

FIELD RECORD OF SOIL EXPLORATION

JOB NO. E1822 PROJ. EMPALE BORING NO. 4 DEPTH 14.0' ELEV. _____
DATE STARTED 10-5-90 DATE COMPLETED 10-5-90 DATUM _____
CASING HAMMER WT. _____ LBS. DROP _____ " SAMPLER HAMMER WT. 140 LBS. DROP 30 "

METHOD OF ADVANCING BORING		DEPTH	SAMPLE CONDITION	SAMPLE TYPES
1	CONTINUOUS SAMPLING	0' - 14.0'	 DISTURBED	SS - 2" O.D. SPLIT SPOON
2	WALLING STEM AUGER	0' - 12.0'	 FAIR	TW - 2" O.D. THIN WALLED TUBE
3	SPLIT SPOON SAMPLER	12.0' - 14.0'	 GOOD	AS - AUGER SAMPLE
			 LOST	RS - ROCK CORE
				WS - WASH SAMPLE
				CS - CHUNK SAMPLE

SOIL DESCRIPTION	DEPTH ELEV.	CAS. BLOWS FT.	DEPTH SCALE	SAMPLES				BLOWS / 6" FORCE	NOTES
				S.C.	S.T.	NO.	REC.		
TOP SOIL, BROWN SILT, TRACE OF FINE TO COARSE SAND, GRASS ROOTS	0.16'			X	SS	1		2-8-15-11	TIME DURING DEPTH 14.0' W.L. 13.5'
				X	SS	2		8-4-3-2	
BROWN SILT, TRACE OF FINE TO COARSE SAND, SOME ROCK FRAGMENTS, SOME SHALE, POSSIBLE FILL	6.0'		5	X	SS	3		3-2-2-3	
				X	SS	4		2-3-5-7	
RED BROWN, DECOMPOSED SHALE, TRACE OF FINE SAND	10.0'		10	X	SS	5		8-10-5-5	
				X	SS	6		5-10-10-7	
BROWN CLAYEY DECOMPOSED SHALE, TRACE OF FINE SAND	14.0'			X	SS	7		10-4-4-5	
END OF BORING			18						
			20						
			0						
			0						
			0						
			0						
			0						
			0						
			0						
			0						
			0						

INSP. _____
 DRLR. KG
 HLPR. JW
 TIME COMPLETION _____
 DEPTH 14.0'
 W.L. 13.5'

GEOTECH, INC.

FIELD RECORD OF SOIL EXPLORATION S.M. PLANT

JOB NO. 21822 PROJ. _____ BORING NO. 5 DEPTH 14.0' ELEV. _____
 DATE STARTED 10-5-90 DATE COMPLETED 10-5-90 DATUM _____
 CASING HAMMER WT. _____ LBS. DROP _____ SAMPLER HAMMER WT. 140 LBS. DROP 30 "

METHOD OF ADVANCING BORING	DEPTH
1 CONTINUOUS SAMPLING	0' - 40'
2 HOLLOW STEM AUGER	0' - 120'
3 SPLIT SPOON SAMPLER	120' - 140'

SAMPLE CONDITION	SAMPLE TYPES
☒ DISTURBED	SS - 2" O.D. SPLIT SPOON
☒ FAIR	TW - 3" O.D. THIN WALLED TUBE
☒ GOOD	AS - AUGER SAMPLE
☒ LOST	RS - ROCK CORE
	WS - WASH SAMPLE
	CS - CHUNK SAMPLE

SOIL DESCRIPTION	DEPTH ELEV.	CAS. BLOWS FT.	DEPTH SCALE	SAMPLES				BLOWS / 8" FORCE	NOTES
				S.C.	S.T.	NO.	REC.		
BROWN SILT, TRACE OF FINE TO MEDIUM SAND. GRASS ROOTS	5.0'		5	X	SS	1		6-7-7-7	TIME DURING DEPTH 14.0' W.L. DRY
				X	SS	2		8-15-13-10	
BROWN SHALE, TRACE OF FINE SAND, TRACE TO SOME ROCK FRAGMENTS POSSIBLE FILL	10.0'			X	SS	3		5-3-2-1	
				X	SS	4		4-12-10-3	
				X	SS	5		2-2-2-2	
BROWN CLAY, TRACE OF FINE SAND	2.0'			X	SS	6		1-1-2-2	
BROWN CLAYEY DECOMPOSED SHALE, TRACE OF FINE SAND, WITH SHALE FRAGMENTS	14.5'			X	SS	7		2-4-6-8	
END OF BORING			15						
			0						
			5						
			0						
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MOA AREA - D

GASOLINE UST AREA

BORING LOGS

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-50-18

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

DATE STARTED: 2/18/94

DATE FINISHED: 2/18/94

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				P I D PAM	REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS			
	~~XXXX~~	S-1	SS	28 12	11 6	85	GRAY GRAY/BLACK	MED DENSE MED DENSE	F-M GRAVEL & F-C SAND ASH, CINDERS MIXED WITH F-SAND	ALL FILL	5	↓ MOIST
	SSC	S-2	SS	11 14	12 14	70	RED BROWN	VERY STIFF	SILT, SOME F-SAND, TRACE CLAY	ML	10	
5	SSS	S-3	SS	8 9	8 10	40		↓			6	
	SSS	S-4	SS	8 9	8 8	60		↓			12	
	SSS	S-5	SS	6 3	5 4	60	OLIVE GRAY	STIFF ↓	SILT	ML	12	
10	SSS	S-6	SS	17 4	4 5	50	RED BROWN OLIVE GRAY	MED DENSE STIFF ↓	F-SAND, SOME SILT SILT, TRACE CLAY	SP ML	9	
	SSS	S-7	SS	4 4	4 7	85		↓			3	
15		S-8	SS	8 27	18 30	90	RED BROWN	DENSE ↓	FINE SAND	SP	1	
									E.O.B.			
20									SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 10' & 14'			
25												
30												
35												

E.O.B.

SOIL SAMPLES
COLLECTED FOR
VOLATILE ANALYSIS
FROM DISCRETE
INTERVALS @ 10' & 14'

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-3-50-18

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-50-19

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA 3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

30"

DATE STARTED: 2/18/94

DATE FINISHED: 2/18/94

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				PH D RPM	REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
	XXX			30 14		GRAY	DENSE	F-C GRAVEL & F-C SAND	FILL		
	SS	S-1	SS	9 8	65	RED BROWN	VERY STIFF	SILT, SOME F-SAND	ML	6	Moist
	SS	S-2	SS	7 15	45					20	
5	SS	S-3	SS	26 15						6	
	SS			14 10							
	SS	S-4	SS	7 9	45					5	
	SS			9 8							
	SS			8 8	85						
10	SS	S-5	SS	6 5	65	RED BROWN	STIFF	SILT, SOME CLAY	ML	5	
	SS			3 4							
	SS	S-6	SS	4 4	100						
	SS			4 4		DRK GRAY BROWN	STIFF ↓ MED STIFF	SILT, SOME CLAY	ML	15	
	SS	S-7	SS	3 3	85					6	
	SS			3 4							
15	SS	S-8	SS	9 10	90	RED BROWN	MED DENSE	FINE SAND	SP	1	
	SS			13 13							
20								E.O.B.			
25								SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 10' & 14'			
30											
35											

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-3-50-19

URS CONSULTANTS, Inc.

TEST BORING LOG
BORING NO. SB-3-20-20

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE TIME LEV TYPE

TYPE

SS

DATE STARTED: 2/18/94

DIA.

2"

DATE FINISHED: 2/18/94

WT.

140lb

DRILLER: BILL SHINN

FALL

30"

GEOLOGIST: JOHN TOMASELLO

POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				P T B PPM	REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
		S-1	SS	20 8 5	11 5 3	70	MED DENSE	F-C SAND AND FC GRAVEL			
		S-2	SS	5 4 4	3 4 4	60	LT BROWN GRAY BROWN	F-M-C SAND F-M SAND SOME C-SAND			Moist
5		S-3	SS	3 2 3	2 3 3	35	↓				
		S-4	SS	3 2 2	2 1 2	50	ORANGE BROWN RED BROWN	SILT, TRACE CLAY	ML		
10		S-5	SS	2 2 2	2 3 3	60	RED BROWN MED STIFF	FINE SAND, SOME SILT			
								E.O.B.			
15								SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 7.5' & 8.5'			
20											
25											
30											
35											

COMMENTS

PROJECT NO.

35355

BORING NO.

SB-3-20-20

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-2-SO-21

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DATE STARTED: 2/18/94

DIA.

WT.

DATE FINISHED: 2/18/94

FALL

30"

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE					DESCRIPTION				P I D PPM	REMARKS
		NO.	TYPE	BLOWS PER 6"		RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
		S-1	SS	32	20	85	DARK GRAY	DENSE ↓ LOOSE ↓ LOOSE ↓ SOFT ↓ MED STIFF ↓ MED STIFF	TOP 3" FC GRAVEL F-M-C SAND	FILL	MOIST ↓	
				14	4							
		S-2	SS	4	4	40						
				2	2							
5			S-3	SS	2	2	25	BROWN	LOOSE ↓ LOOSE ↓ SOFT ↓ MED STIFF ↓ MED STIFF	FINE SAND, SOME SILT, TRACE M-C SAND		FILL
					2	2						
		S-4	SS	2	2	35						
				2	2							
10		S-5	SS	2	2	40	ORANGE BROWN	SOFT ↓ MED STIFF ↓ MED STIFF	SILT, TRACE CLAY	ML		
				2	2							
		S-6	SS	3	3	85	RED BROWN GRAY	MED STIFF ↓ MED STIFF	SILT, SOME FINE SAND, TRACE CLAY	ML		
				3	4						SILT, SOME CLAY	ML
15									E.O.B			
									SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 8.5' & 8'			
20												
25												
30												
35												

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-2-SO-21

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-30-22

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

DATE STARTED: 2/21/94

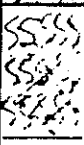
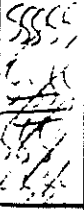
DATE FINISHED: 2/21/94

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				REMARKS	
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
		S-1	SS	25 18 10 7	60	LT BROWN	MED DENSE	TOP 3" GRAVEL F-M SAND, SOME SILT		MOIST ↓ VERY MOIST ↓	
		S-2	SS	5 7 7 4	50	↓	↓				25
5		S-3	SS	4 4 3 4	35	RED BROWN	MED STIFF	SILT, SOME F-SAND, TRACE CLAY			3
		S-4	SS	7 8 6 7	60	↓	↓ STIFF				4
10		S-5	SS	3 2 3 2	50	BROWN ↓ DRK BROWN	MED STIFF ↓ SOFT	SILT, SOME CLAY			5
		S-6	SS	1 1 2 4	100	↓	↓	TRACE ORGANICS (ROOTS, PEAT)			25
		S-7	SS	4 2 2 3	70	↓	↓				25
15		S-8	SS	3 4 6 22	85	RED BROWN	STIFF ↓	SILT, SOME F-SAND, TRACE CLAY, TRACE ROCK FRAGMENTS			3
								E.O.B.			
20								SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 10.5' & 15'			
25											
30											
35											

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-3-30-22

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-SO-23

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

30"

DATE STARTED: 2/18/94

DATE FINISHED: 2/18/94

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				P T B PPM	REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS		
	XXX	S-1	SS	20 18 6 8	70	GRAY LT BROWN	DENSE LOOSE ↓	F-C SAND & GRAVEL F-M SAND, SOME SILT	FILL	12	
		S-2	SS	5 3 3 3	40					40	
5		S-3	SS	2 4 4 6	35					9	
	SSS	S-4	SS	7 5 5 6	85	BROWN	MED STIFF	SILT, SOME CLAY		10	
10	SSS	S-5	SS	4 3 3 4	85					9	
	SSS	S-6	SS	3 4 4 5	100	ORANGE BROWN	MED STIFF	SILT, TRACE CLAY		15	
	SSS	S-7	SS	2 3 2 2	40	BROWN	MED STIFF	SILT, SOME F-SAND, TRACE CLAY		15	
15	SSS	S-8	SS	4 6 6 7	25	RED BROWN	STIFF	SILT AND FINE SAND		1	
								E.O.B			
20								SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 11' & 14'			
25											
30											
35											

COMMENTS

PROJECT NO.

35355

BORING NO.

SB-3-SO-23

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-SO-24

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA 3

GROUND WATER:

GROUND ELEVATION:

DATE TIME LEV TYPE TYPE

DATE STARTED: 2/22/94

DIA.

DATE FINISHED: 2/22/94

WT.

DRILLER: BILL SHINN

FALL

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				CLASS USCS	DEPTH FT PPM	REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION				
						Brown ↓	Loose ↓	FM-C SAND MIXED WITH CONCRETE FRAGMENTS FROM 4'-8'	Fill		MAST ↓	
5		S-1	SS	2 4 3 2	55							6
		S-2	SS	2 2 2 3	30							3
10		S-3	SS	1 3 3 2	40	ORANGE BROWN/ OLIVE	MED STIFF	SILT, SOME CLAY		NO		
		S-4	SS	4 4 6 6	90	RED BROWN	LOOSE	F-SAND, SOME SILT		11		
		S-5	SS	2 4 4 5	70	OLIVE GRAY	STIFF ↓	SILT, SOME CLAY		120		
15		S-6	SS	5 7 7 12	80	RED BROWN	STIFF	SILT, SOME CLAY		60		
		S-7	SS	5 100	100			DECOMPOSED ROCK		4		
20								E.O.B				
								SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 13' & 18'				
25												
30												
35												

COMMENTS

PROJECT NO.
BORING NO.

35355
SB-3-SO-24

URS CONSULTANTS, Inc.										TEST BORING LOG	
										BORING NO. SB-3-SO-25	
PROJECT: IFG TRENTON										SHEET NO. 1 OF 1	
CLIENT: GENERAL MOTORS										JOB NO.: 35355	
BORING CONTRACTOR: TABASCO										BORING LOCATION: AREA-3	
GROUND WATER:										GROUND ELEVATION:	
DATE	TIME	LEV	TYPE	TYPE	CAS.	SAMP	CORE	TUBE	DATE STARTED: 2/22/94		
				DIA.		2"			DATE FINISHED: 2/22/94		
				WT.		140lb			DRILLER: BILL SHINN		
				FALL		30"			GEOLOGIST: JOHN TOMASELLO		
* POCKET PENETROMETER READING										REVIEWED BY:	

DEPTH FT	STRATA	SAMPLE				COLOR	CONSISTENCY HARDNESS	DESCRIPTION MATERIAL DESCRIPTION	CLASS USCS	DPT PPM	REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %						
	[Hatched Pattern]					BROWN ↓	LOOSE ↓	F-M-C SAND	FILL	4	MOIST ↓
5		S-1	SS	4 2	45						
				2 1							
				1 2							
		S-2	SS	2 1	40					12	
10	SSS [Hatched Pattern]	S-3	SS	1 1	65	OLIVE BROWN ↓	MED STIFF ↓	SILT, SOME CLAY	ML	120	
				2 2							
		S-4	SS	2 2	45						
				2 2							
		S-5	SS	2 3	5						
15	SSS [Hatched Pattern]	S-6	SS	10 12	70	RED BROWN ↓	VERY STIFF ↓	SILT, TRACE F-SAND	ML		
				15 30							
		S-7	SS	40 30	100						
20								E.O.B. SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 9' & 16'			
25											
30											
35											

COMMENTS

PROJECT NO.
BORING NO.

35355
SB-3-SO-25

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SB-3-50-26

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-3

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

DIA.

WT.

FALL

30"

DATE STARTED: 2/22/94

DATE FINISHED: 2/22/94

DRILLER: BILL SHINN

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				RECOVERY RQD %	COLOR	CONSISTENCY HARDNESS	DESCRIPTION		CLASS USCS	P + PAM	REMARKS
		NO.	TYPE	BLOWS PER 6"					MATERIAL DESCRIPTION				
							RED BROWN	STIFF	SILT, TRACE F-SAND				
5		S-1	SS	3	8	30	↓	↓	↓			6	DRY ↓ MOIST
				10	14								
		S-2	SS	7	6	70	OLIVE BROWN	STIFF	SILT, SOME CLAY			7	
				7	10								
10		S-3	SS	6	5	65	↓	↓	GRAY MOTTLING			7	
				5	6								
		S-4	SS	3	5	70	↓	↓				8	
				7	8								
		S-5	SS	3	6	70	RED BROWN	VERY STIFF	SILT, SOME CLAY			20	
				12	18		↓	↓					
15		S-6	SS	6	22	65	↓	↓	DECOMPOSED SILTSTONE			20	
				60	60								
									E.O.B.				
20									SOIL SAMPLES COLLECTED FOR VOLATILE ANALYSIS FROM DISCRETE INTERVALS @ 10.5' & 15'				
25													
30													
35													

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-3-50-26

URS CONSULTANTS, Inc.

TEST BORING LOG

BORING NO. SE-3-SO-28

PROJECT: IFG TRENTON

SHEET NO. 1 OF 1

CLIENT: GENERAL MOTORS

JOB NO.: 35355

BORING CONTRACTOR: TABASCO

BORING LOCATION: AREA-B

GROUND WATER:

CAS.

SAMP

CORE

TUBE

GROUND ELEVATION:

DATE

TIME

LEV

TYPE

TYPE

SS

DATE STARTED: 2/22/94

DIA.

2"

DATE FINISHED: 2/22/94

WT.

140 lb

DRILLER: BILL SHINN

FALL

30"

GEOLOGIST: JOHN TOMASELLO

* POCKET PENETROMETER READING

REVIEWED BY:

DEPTH FT	STRATA	SAMPLE				DESCRIPTION				REMARKS
		NO.	TYPE	BLOWS PER 6"	RECOVERY ROD %	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION	CLASS USCS	
						Brown	Loose ↓	Silt, some F-Sand		
5	SS	S-1	SS	3 2 5 7	15	RED BROWN	Stiff ↓	Silt, some clay	NL	9
	SS	S-2	SS	8 2 5 2	40		↓			8
10	SS	S-3	SS	3 1 2 1	35	ORANGE BROWN	SOFT ↓ MED STIFF	Silt, some clay TRACE ORGANICS (ROOTS PLANTS)	NL	9
	SS	S-4	SS	0 2 2 2	65	OLIVE GRAY	MED STIFF ↓	Silt, some clay	NL	7
	SS	S-5	SS	3 2 2 4	70		↓			7
15	SS	S-6	SS	4 6 9 19	90	RED BROWN	STIFF ↓	Silt, TRACE CLAY ROCK FRAGMENTS	NL	
								E.O.P.		
20										
25										
30										
35										
								</		

COMMENTS

PROJECT NO.

BORING NO.

35355

SB-3-SO-28

APPENDIX B

UST MONITORING WELL CONSTRUCTION LOGS

193.5 gallons

Casing
Purge

36 gallons

472.8
Total
Purge

Purge = 472.8 gall.

GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION

GMC-Fisher Guide, Trenton, New Jersey

PAGE NO. HOLE NO.

1 of 1 UST-1

START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH
4/18/88	4/18/88	W.C. Services	Pneumatic hammer	10"	6"	60.00'
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED		
S. Clough			131.54	17.28'/114.26' 2/16/89		

SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE SLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASS- IFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				130	5					0 to 14 ft. <u>TOPSOIL</u> : some rock fragments, moist, reddish brown	No Hnu detections.
				125	10					14 to 39 ft. <u>SILTSTONE</u> : dry, brick red	
				120	15					Casing set at 25 ft.	
				115	20					39 to 60 ft. <u>SHALE</u> : a little very fine sand, moist, dark red. Dry between 42 to 55 ft. Moist below 55 ft.	
				110	25					End of boring @ 60 ft.	
				105	30						
				100	35						
				95	40						
				90	45						
				85	50						
				80	55						
				75	60						

ASTM D1586 ST = SHELBY TUBE
 SS = SPLIT SPOON C = CORE CS = CONTINUOUS SAMPLER
 D = DENNISON CT = CUTTINGS OT = OTHER

GMC-Fisher Guide
 Trenton, New Jersey

PAGE NO. HOLE NO.
 1 of 1 UST-1

Purge = 103.5 gallons Purge = 223.2 gallons

GEOLOGIC DRILL LOG				PROJECT NAME AND LOCATION				PAGE NO.	HOLE NO.		
				GMC-Fisher Guide, Trenton, New Jersey				1 of 1	UST-2		
DATE	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH					
4/21/88	4/21/88	W.C. Services	Pneumatic hammer	10"	6"	40.00'					
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED							
S. Clough			131.58	17.35'/114.23' 2/16/89							
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				130						0 to 0.5 ft. <u>CONCRETE</u>	
					5					0.5 to 5 ft. <u>FILL</u> : some gravel, silt, clay, sand, moist, brown to red	
				125						5 to 15 ft. <u>SILT</u> : some clay, some rock fragments at base, moist, red	Hnu=3 to 5 units
				120							
				115						15 to 37 ft. <u>SILTSTONE</u> : massive, dry, red	Hnu=20 units
				110							Hnu=35 units
				105						Casing set at 25 ft.	
				100						Fracture at 31 and 37 ft. producing water.	
				95							
				40						37 to 40 ft. <u>SHALE</u> : wet, brick red	
										End of boring @ 40 ft.	

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 Trenton, New Jersey

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Range = 462.78 gallons

GEOLOGIC DRILL LOG										PROJECT NAME AND LOCATION		PAGE NO. HOLE NO.	
										GMC-Fisher Guide, Trenton, New Jersey		1 of 1 UST-3	
ST	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH							
4/21/88	4/21/88	W.C. Services	Pneumatic hammer	10"	6"	61.00'							
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED									
S. Clough			132.25	22.10'/110.15' 2/16/89									
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES		
				130	5					0 to 0.5 ft. CONCRETE			
				125	10					0.5 to 15 ft. SILT : some clay, a little cobbles, moist, brown. Color change to brownish red at 7 ft.	Hnu=3 units		
				120	15					15 to 40 ft. SILTSTONE : massive (no fractures), dry, red	Hnu=3 units Hnu=50 units		
				115	20					Fracture at 22 ft., producing no water.	Hnu=1 units		
				110	25					Casing set at 25 ft.			
				105	30								
				100	35								
				95	40					40 to 61 ft. SHALE : fissile, fracture at 51 to 52 ft.(appears dry), some fine grain sand, dry, brick red			
				90	45								
				85	50					Fractures at 51 and 52 ft.			
				80	55								
				75	60					End of boring @ 61 ft.			

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 CT = CUTTINGS QT = OTHER

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PAGE NO. HOLE NO.
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Purge = 90 gal/hr Purge = 161,76 gallons

GEOLOGIC DRILL LOG			PROJECT NAME AND LOCATION			PAGE NO.	HOLE NO.
GMC-Fisher Guide, Trenton, New Jersey						1 of 1	UST-4
START	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH	
4/20/88	4/20/88	W.C. Services	Pneumatic hammer	10"	6"	40.00'	
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED			
S. Clough			131.80	20.00'/111.80' 2/16/89			

SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS"	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				130						0 to 0.5 ft. <u>CONCRETE</u>	No Hnu detections.
					5					0.5 to 15 ft. <u>SILT</u> : very clayey, moist, brown, some olive-gray mottling. Color change to reddish brown at 11 ft.	
				125	10						
				120	15						
				115	20					15 to 40 ft. <u>SILTSTONE</u> : soft until 18 ft. (top of competent rock), dry, red	
				110	25						
				105	30					Casing set at 28 ft.	
				100	35					Fracture at 35 ft., producing water.	
				95	40					End of boring @ 40 ft.	

*ASTM D1586
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 C = CORE
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 CS = CONTINUOUS SAMPLER
 OT = OTHER

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 HOLE NO.
 UST-4

Purge = 1.55 gallons

GEOLOGIC DRILL LOG										PROJECT NAME AND LOCATION		PAGE NO.	HOLE NO.
GMC-Fisher Guide, Trenton, New Jersey										1 of 1		UST-5	
DATE		FINISH		DRILLER		DRILL METHOD		BOREHOLE DIAMETER		WELL DIAMETER		TOTAL DEPTH	
2/3/89		2/3/89		W.C. Services		Pneumatic hammer		6"		2"		20.00'	
LOGGER				TOP OF CASING ELEV.		GROUND ELEVATION		DEPTH/ELEVATION GROUNDWATER - DATE MEASURED					
S. Clough				131.47		131.83		17.80'/114.03' 2/16/89					
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES		
				130	5					0 to 0.5 ft. <u>CONCRETE</u>	No HNu detections.		
				125	10					0.5 to 15 ft. <u>FILL</u> : silty, sandy, clayey, moist, red			
				120	15					15 to 20 ft. <u>SILTSTONE</u> : massive, dry, red			
				115	20					End of boring @ 20 ft.			

*ASTM D1586

SS = SPLIT SPOON
D = DENHISON

ST = SHELBY TUBE

C = CORE

CT = CUTTINGS

CS = CONTINUOUS SAMPLER
OT = OTHER

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HOLE NO.

UST-5

GEOLOGIC DRILL LOG				PROJECT NAME AND LOCATION				PAGE NO.	HOLE NO.		
				GMC-Fisher Guide, Trenton, New Jersey				1 of 1	UST-6		
DATE	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH					
2/3/89	2/3/89	W.C. Services	Pneumatic hammer	6"	2"	20.00'					
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED							
S. Clough		131.36	131.50	12.41'/119.09' 2/16/89							
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				130						0 to 0.5 ft. <u>CONCRETE</u>	No Hnu detections.
				125	5					0.5 to 15 ft. <u>FILL</u> : silty, clayey, sandy, moist, red	
				120	10						
				115	15					15 to 20 ft. <u>SILTSTONE</u> : massive, dry, red	
					20					End of boring @ 20 ft.	

*ASTM D1586
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HOLE NO.
 UST-6

GEOLOGIC DRILL LOG										PROJECT NAME AND LOCATION		PAGE NO. HOLE NO.	
GMC-Fisher Guide, Trenton, New Jersey										1 of 2 UST-7			
ST.	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH							
2/1/89	2/3/89	W.C. Services	Pneumatic hammer	10"	6"	115.00'							
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED									
S. Clough		131.96	132.09	23.25'/108.84' 2/16/89									
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES		
				130						0 to 0.5 ft. <u>CONCRETE</u>			
					5					0.5 to 15 ft. <u>SILT</u> : some clay, a little cobbles, moist (below 7 ft.) brown to red-brown			
				125									
				120									
				115						15 to 42 ft. <u>SILTSTONE</u> : massive, dry, red, fuel odor	Hnu=1 unit Hnu=5 units Hnu=2 units		
				110									
				105							Hnu=1 unit		
				100									
				95									
				90						42 to 60 ft. <u>SHALE</u> : hard, dry, brick red	Hnu=1 unit Hnu=1 unit		
				85									
				80									
				75									
				70						60 to 68 ft. <u>SILTSTONE</u> : massive, micaceous, cuttings are angular fragments about 2 cm. in diameter, dark red	Hnu=1 unit		
				65						Fracture producing about 20 GPM at 65 ft.			

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 SS = SPLIT SPOON C = CORE CS = CONTINUOUS SAMPLER
 D = DENNISON CT = CUTTINGS OT = OTHER

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GEOLOGIC DRILL LOG

PROJECT NAME AND LOCATION

GMC-Fisher Guide, Trenton, New Jersey

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HOLE NO.

2 of 2

UST-7

SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				65	70					68 to 80 ft. SANDSTONE : fine grain, massive, quartz rich, producing 20 GPM at 70 ft.	
				60	75					As above, grain size increasing to medium, and poorly cemented	
				55	80					80 to 109 ft. SILTSTONE : massive, cuttings are angular fragments, about 1 cm. in size, sandy below 93 ft. (very fine grain) dark red.	
				50	85						
				45	90						
				40	95						
				35	100					Casing set at 100 ft.	
				30	105						
				25	110					Fracture at 108.5 ft. producing approximately 2 GPM.	
				20	115					109 to 115 ft. SANDSTONE : medium grain, massive, quartz rich, well cemented, red, making about 15 to 20 GPM	
										End of boring @ 115 ft.	

*ASTM D1586

SS = SPLIT SPOON
D = DENNISON

ST = SHELBY TUBE

C = CORE

CT = CUTTINGS

CS = CONTINUOUS SAMPLER

QT = OTHER

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Trenton, New Jersey

PAGE NO.

HOLE NO.

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UST-7

Surge = 144 gallons

GEOLOGIC DRILL LOG		PROJECT NAME AND LOCATION GMC-Fisher Guide, Trenton, New Jersey				PAGE NO. 1 of 1	HOLE NO. UST-8
DATE 1/31/89	FINISH 1/31/89	DRILLER W.C. Services	DRILL METHOD Pneumatic hammer	BOREHOLE DIAMETER 10"	WELL DIAMETER 6"	TOTAL DEPTH 50.00'	
LOGGER S. Clough		TOP of CASING ELEV. 131.27	GROUND ELEVATION 131.44	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED 17.75'/113.69' 2/16/89			

SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION	SAMPLE INTERVAL	DESCRIPTION	NOTES
				130						0 to 0.5 ft. <u>CONCRETE</u>	No Hnu detections.
					5					0.5 to 2.5 ft. <u>FILL</u> : wood, railroad tie, gravel	
				125	10					2.5 to 12 ft. <u>SILT</u> : a little clay, moist, dark red. Below 9.5 ft. color changes to red-brown, clay content increases	
				120	15					12 to 50 ft. <u>SILTSTONE</u> : micaceous, gray laminae or nodules, dry, brick red, lightens at 22 ft. to gray-red.	
				115	20					Casing set at 21 ft.	
				110	25						
				105	30						
				100	35						
				95	40						
				90	45					Cuttings moist at 44 ft.	
				85							
				50						End of boring @ 50 ft.	

ASTM D1586
SS = SPLIT SPCON
= DENNISON

ST = SHELBY TUBE
C = CORE
CT = CUTTINGS

CS = CONTINUOUS SAMPLER
OT = OTHER

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HOLE NO.
UST-8

GEOLOGIC DRILL LOG				PROJECT NAME AND LOCATION				PAGE NO.	HOLE NO.	
				GMC-Fisher Guide, Trenton, New Jersey				1 of 1	UST-9	
DATE	FINISH	DRILLER	DRILL METHOD	BOREHOLE DIAMETER	WELL DIAMETER	TOTAL DEPTH				
1/30/89	1/31/89	W.C. Services	Pneumatic hammer	8"	6"	55.00'				
LOGGER		TOP OF CASING ELEV.	GROUND ELEVATION	DEPTH/ELEVATION GROUNDWATER - DATE MEASURED						
S. Clough		131.91	130.37	21.85'/108.52' 2/16/89						
Six inch open hole below casing.										
SAMPLE NO.	SAMPLE TYPE	RECOVERY %	SAMPLE BLOWS*	ELEV	DEPTH	GRAPHIC LOG	WELL CONSTRUCTION	CLASSIFICATION SAMPLE INTERVAL	DESCRIPTION	NOTES
				130					0-15 ft. <u>PILL</u> : silty, slightly clayey, some wood fragments, and fiber-glass insulation, brown	No Hnu detections.
				125	5					
				120	10					
				115	15				15-33 ft. <u>SANDSTONE</u> : very fine, dry	
				110	20				Drilling slow at 20 ft. Competent rock.	
				105	25					
				100	30					
				95	35				33 to 55 ft. <u>SILTSTONE</u> : hard, dry, brick red	
				90	40				Drilling slightly slower at 40 ft., color lightens.	
				85	45					
				80	50				As above, with laminae, still dry.	
									Fractures at 51 to 55 ft., producing about a GPM.	
					55				End of boring at 55 ft.	
*ASTM D1586 ST = SHELBY TUBE SS = SPLIT SPCON C = CORE CS = CONTINUOUS SAMPLER D = DENNISON CT = CUTTINGS OT = OTHER										
GMC-Fisher Guide Trenton, New Jersey							PAGE NO.	HOLE NO.		
							1 of 1	UST-9		

APPENDIX C

UST WELL PURGE LOGS

FIRST ROUND UST WELL PURGE LOGS

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/24/94

WELL NO.: UST-1

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 59.7'
(OPEN ROCK HOLE)

1" 0.04

2" 0.17

② CASING INTERNAL DIAMETER (in.): 6"

3" 0.38

4" 0.66

③ WATER LEVEL BELOW TOP OF CASING (FT.) 14.21'

5" 1.04

6" 1.50

④ VOLUME OF WATER IN CASING (GAL.) 66.8

8" 2.60

$$V = 0.0408 (2)^2 \times (1) - (3) = \underline{66.8} \text{ GAL. (3 casings) } 200.44$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	210 gal	AFTER SAMPLING							
pH	6.9	6.0	5.8							
Spec. Cond. (umho)	947	824	827							
Visual Turbidity	SLIGHTLY TURBID	CLEAR	CLEAR							
Temperature (°C)	16.7	16.3	16.8							

COMMENTS:

TIME: 0830 WATER LEVEL PRIOR TO PURGING 14.21'

0915 WATER LEVEL FOLLOWING PURGING 21.2'

1030 WATER LEVEL AT TIME OF SAMPLING 14.25'

WELL PURGED USING A GRUNFOS SUBMERSIBLE PUMP, PURGE RATE 7gpm TOTAL VOLUME PURGED 210

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/23/94

WELL NO.: UST-2

① TOTAL CASING AND SCREEN LENGTH (FT.): 39.6
(OPEN ROCK HOLE)

② CASING INTERNAL DIAMETER (in.): 6"

③ WATER LEVEL BELOW TOP OF CASING (FT.) 14.2'

④ VOLUME OF WATER IN CASING (GAL.) 37.3

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$$V = 0.0408 (②)^2 \times (① - ③) = \underline{37.3} \text{ GAL. (3 casings) } 111.9 \text{ gal}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	120 gal	AFTER SAMPLING							
pH	6.41	6.42	6.5							
Spec. Cond. (umho)	343	177	177							
Turbidity VISUAL	Slightly Turbid	Clear	Clear							
Temperature (°C)	20.4	16.9	15.9							

COMMENTS:

TIME: 1118 WATER LEVEL PRIOR TO PURGING 14.2'

1135 WATER LEVEL FOLLOWING PURGING 14.2'

1235 WATER LEVEL AT TIME OF SAMPLING 14.2'

⊙ WELL PURGED USING A GRUNFOS SUBMERSIBLE PUMP
PURGE RATE $\approx$ 7 gpm, 120 gal TOTAL VOL PURGED

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/23/94

WELL NO.: UST-4

① TOTAL CASING AND SCREEN LENGTH (FT.): 39.6
(OPEN ROCK HOLE)

② CASING INTERNAL DIAMETER (in.): 6"

③ WATER LEVEL BELOW TOP OF CASING (FT.) 15.63

④ VOLUME OF WATER IN CASING (GAL.) 35.2

WELL I.D.

VOL.
GAL./FT.

1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$$V = 0.0408 (2)^2 \times (1) - (3) = \underline{35.2} \text{ GAL. (3 casings) } 105.62$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	120 gal	AFTER 2 SAMPLING							
pH	6.3	6.2	6.5							
Spec. Cond. (umho)	536	551	533							
Visual Turbidity	SLIGHTLY TURBID	CLEAR	CLEAR							
Temperature (°C)	15.5	15.2	15.7							

COMMENTS: TIME:

1445 WATER LEVEL PRIOR TO SAMPLING 15.63'

1530 WATER LEVEL FOLLOWING. PURGE 15.70'

1555 WATER LEVEL FOLLOWING SAMPLING 15.68'

WELL PURGED USING A GRUNPOS SUBMERSIBLE PUMP, PURGE RATE 7 gpm, TOTAL VOLUME PURGED 120 gal

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/23/94

WELL NO.: UST-5

① TOTAL CASING AND SCREEN LENGTH (FT.): 20'

② CASING INTERNAL DIAMETER (in.): 2"

③ WATER LEVEL BELOW TOP OF CASING (FT.) 14.38'

④ VOLUME OF WATER IN CASING (GAL.) 0.92

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$$V = 0.0408 (2")^2 \times (20' - 14.38') = 0.92 \text{ GAL. (3 casings) } 2.76 \text{ gal}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	3gal	AFTER SAMPLING							
pH	7.27	7.18	6.83							
Spec. Cond. (umho)	365	300	245							
Visual Turbidity	SLIGHTLY TURBID	SLIGHTLY TURBID	CLEAR							
Temperature (°C)	15.1	15.3	15.8							

COMMENTS:

TIME: 1030 WATER LEVEL PRIOR TO PURGING 14.38'
 1046 WATER LEVEL FOLLOWING PURGING 14.98'
 1210 WATER LEVEL AT TIME OF SAMPLING 14.20'
 WELL WAS PURGED USING A WATERRA HYDROLIFT PUMP,
 PURGE RATE $\approx$ 1 gpm.

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/23/94

WELL NO.: VST-7

WELL I.D.

VOL.
GAL./FT.

① TOTAL CASING AND SCREEN LENGTH (FT.): 115'

1" 0.04

② CASING INTERNAL DIAMETER (in.): 6"

2" 0.17

③ WATER LEVEL BELOW TOP OF CASING (FT.) 14.3'

3" 0.38

④ VOLUME OF WATER IN CASING (GAL.) 65

4" 0.66

5" 1.04

6" 1.50

8" 2.60

$$V = 0.0408 (2)^2 \times (1) - (3) = \underline{147.9} \text{ GAL. (3 casings) } 433.7$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	463 gal	AFTER SAMPLING							
pH	7.06	6.91	6.83							
Spec. Cond. (µmho)	602	476	381							
Visual Turbidity	CLEAR	CLEAR	CLEAR							
Temperature (°C)	15.3	15.2	15.1							

COMMENTS:

Time: 1000 WATER LEVEL PRIOR TO PURGING 14.30'
1055 WATER LEVEL FOLLOWING PURGING 19.30'
1150 WATER LEVEL AT TIME OF SAMPLING 19.05'
WELL PURGED USING A GRUNFOS SUBMERSIBLE PUMP, PURGE RATE 20 gpm, TOTAL VOLUME PURGED 463 gal

PROJECT TITLE: GM TRENTON

PROJECT NO.: 35355

STAFF: B. KREUZER / A. DESHPANDE

DATE: 3/23/94

WELL NO.: UST-8

- ① TOTAL CASING AND SCREEN LENGTH (FT.): 50'
- ② CASING INTERNAL DIAMETER (in.): 6"
- ③ WATER LEVEL BELOW TOP OF CASING (FT.) 14.5'
- ④ VOLUME OF WATER IN CASING (GAL.) 52.1

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$$V = 0.0408 (2)^2 \times (1) - (3) = \underline{52.1} \text{ GAL. (3 casings) } 156.3 \text{ gal}$$

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	175gal	AFTER SAMPLING							
pH	6.8	6.2	6.3							
Spec. Cond. (umho)	1252	589	512							
Turbidity ^{Visual}	CLEAR	CLEAR	CLEAR							
Temperature (°C)	16.7	16.5	16.6							

COMMENTS:

TIME: 1410 WATER LEVEL PRIOR TO PURGING 14.5'
 1445 WATER LEVEL FOLLOWING PURGING 16.38'
 1525 WATER LEVEL AT TIME OF SAMPLING 14.3'
 ○ WELL PURGED USING A GRUNFOS SUBMERSIBLE PUMP. PURGE RATE ≈ 7.0 gpm, TOTAL VOL PURGED 175gal

SECOND ROUND UST WELL PURGE LOGS

SAMPLING COLLECTION AND PRESERVATION FORM
(to be completed by the sampling crew)

Please type or complete with a ball point pen.

Test Report Number (s) 9402333 + 9402319

BACKGROUND

(1) Facility Name: General Motors

(2) NJPDES No 0075469

(3) Facility Address 1445 Parkway Avenue, Trenton, NJ 08650

(4) Consultant Name: _____

(5) Consultant Address: _____

SAMPLING PLAN

(6) Has a sampling and analysis plan been developed for this facility as stipulated under N.J.A.C. 7:14A-6.9?
Yes X No _____

(7) If yes, has the sampling plan been approved by the Department? Yes X No _____

(8) If the sampling plan has not been submitted to the Department, attach with these completed forms.

SAMPLING COLLECTION

(9) Sample Date/Time: 2/2/94 / 2/3/94 / 10:30-11:00 / 9:15-13:50

(10) Sampling Personnel (Name/Title)	Affiliations	Phone
Stephen Palmisano Field Technician	EMSL	609-858-9573
Mark LaMorte Field Technician	Arecon	609-228-0770

	A	B	C	D	X
(12) Is there a designated level of protection and if so indicate					

(13) What method as utilized to determine the static water level?:

Electrical (m-scope)	X	Stainless Steel Tape	Sonic
----------------------	----------	----------------------	-------

Other	Explain
-------	---------

(15) Model # **200** Manufacturer **Solinst**

(16) Was the water level indicator deconed between wells? **Yes**

(17) Describe the decontamination procedure: Tap scrub with nonphosphate detergent. Tap rinse, deionize water rinse.

Wells are to be purged three to five times prior to sampling. If wells are not purged as stated, explain and the exact purge method used. N/A

(19) Method used for well evacuation:	Pump	X	Bailer	X
---------------------------------------	------	---	--------	---

(20) If bailed to evacuate, what are the dimensions of the bailer? 3"/39"

(21) What is the volume capacity of the bailer? **1 Gallon**

(22) Pump Type Submersible X Bladder Gas Displacement Gas Piston

Centrifugal Other Explain: N/A

(23) Pump Model #/Flow Rate: **T554108P-S2 / 5-10 gpm**

(24) Pump Manufacturer: **Jacuzzi**

(25) Describe decontamination method used to clean the pump between wells:

Same as Item 17

Power Source for Pump: Gasoline Powered Generator X Gasoline Powered Compressor
Gasoline Engine Driven Pump

(27) Was the gasoline transported in the same vehicle as the sample bottles, field and trip blanks or bailers?
Yes No X

(28) Refer to the following chart for volume capacity for various wells per linear foot.

Casting Diameter	Gallons/Linear Foot
1.5"	0.092
2"	0.163
4"	0.66
6"	1.47
8"	2.61

(29) Complete the below chart regarding evacuation measurements.

Well Permit and Identification Number	Depth to Water	Well Depth	Water Column	Purge Volume	Well Size	Gallons/Linear Ft.	Time of Sampling
UST 6 2-2-94	6.65	19.50	12.85	6.28	2"	.163	1030
MW 16A 2-3-94	11.55	45.70	34.15	150.60	6"	1.47	09:15
MW 7A	14.50	43.35	28.85	127.22	6"	1.47	10:00
MW 9A	16.00	43.00	27.00	119.07	6"	1.47	10:45
MW 1A	10.60	42.40	31.80	140.23	6"	1.47	11:20
MW 15A	4.20	32.90	28.70	126.56	6"	1.47	11:45
MW 13	5.15	46.50	41.35	182.35	6"	1.47	12:25
MW 17A	2.18	34.20	32.02	141.20	6"	1.47	13:10
MW 14	2.90	49.24	46.34	204.35	6"	1.47	13:50

(30) Matrices Sampled: Aqueous: Potable Well _____ Monitoring Well X Surface Water _____

Leachate _____ Other _____

Explain _____

(31) Dedicated Hose: Yes X No _____

(32) Hose Construction: PVC _____ Teflon _____ Tygon _____ Butyl _____ Vinyl _____

Polyethylene X Other _____ Explain _____

(33) Sample Collection (Time of Collection) 09:15 - 13:50

A) Bailer X Construction: Teflon X Stainless Steel _____ PVC _____

Size: 34 oz. Construction 1.25" / 36"

B) Becon Bomb N/A

C) Other _____ Explain _____

(34) Lines Used to Lower Bailer

Teflon Coated Stainless Steel Cable/Leader _____ Teflon _____ PVC Rope _____ Cotton Rope _____

Polypropylene X Other _____ Explain _____

(35) Are dedicated bailers used for each well?: Yes X No _____

(36) Are bailers: Laboratory Cleaned? Yes X No _____

Laboratory Name EMSL Analytical

Field Cleaned Yes X No _____

Describe Decontamination Method: Tap Water/Nonphosphate Detergent Scrub, Tap Rinse. Deionized Water Rinse, 10% Nitric Rinse, Deionized Water Rinse. Methanol rinse, Deionized Water Rinse. Air Dry

(37) Prior to use, are bailers, sample bottles, hoses, etc. kept clean, (i.e. not placed in direct contact with ground, etc) Yes X No _____

(38) Are sample bottles supplied by laboratory? Yes X No _____

(39) Are sample preservation instructions supplied by laboratory Yes X No _____

(39) Are sample preservations supplied by laboratory? Yes X No

(41) Sample Preservation:

Constituent	Teflon Top in Contact with sample Yes or No	Head Space Free Yes or No	Refrigerated Yes or No	Acidified Yes or No	Alkalized Yes or No	Sterile Bottles Yes or No
Volatile Organics	Yes	Yes	Yes	Yes	Yes	Yes
TOX	N/A	N/A	N/A	N/A	N/A	N/A
Extractable Organics	N/A	N/A	Yes	N/A	N/A	N/A
Metals	N/A	N/A	Yes	Yes	N/A	N/A
Cyanide	N/A	N/A	Yes	N/A	Yes	N/A
Phenols	N/A	N/A	Yes	Yes	N/A	N/A
Biological	N/A	N/A	N/A	N/A	N/A	N/A

(42) Indicates below any other constituents to be analyzed and their forms of preservation.

pH, Conductivity performed in Field, TDS and Hexavalent Chromium

(43) Were samples for metals analysis filtered in field? Yes No X

(44) Were samples for metals analysis filtered in lab? Yes X No

(45) Field Blanks: Yes X No

(46) Trip Blanks: Yes X No

(47) Parameters/analysis for field and trip blanks; Volatile Organics X Semi-Volatiles X
Pesticides PCB's Metals X Other X

(48) Prior to sampling, was an equipment blank performed?: Yes No X

(49) Prior to sampling each well are disposable gloves worn? Yes X No

(50) If yes, are the gloves changed between wells? Yes X No

CHAIN OF CUSTODY

- (51) Laboratory Name/Certification Number EMSL Analytical, Inc. / 04653
- (52) Laboratory Address: 3 Cooper Street
Westmont, NJ 08108
- (53) Laboratory receipt date and time: 2/2/94 / 2/3/94 / Approx. 12:00 / 15:00
- (54) Attached Chain of Custody: Yes X No

Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information contained in this report, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete and meets the description specified in N.J.A.C. 7:14 possibility of fine and imprisonment.

SAMPLER

Name/Title (printed) Stephen Palmisano - Field Technician

Signature *Stephen E. Palmisano* Date 2.14.94

Company Name EMSL Analytical, Inc.

Address: 3 Cooper Street
Westmont, NJ 08108

SAMPLING COLLECTION AND PRESERVATION FORM

(to be completed by the sampling crew)

Please type or complete with a ball point pen.

Test Report Number (s) 9402348

BACKGROUND

(1) Facility Name: General Motors

(2) NJPDES No 0075469

(3) Facility Address 1445 Parkway Avenue, Trenton, NJ 08650

(4) Consultant Name: _____

(5) Consultant Address: _____

SAMPLING PLAN

(6) Has a sampling and analysis plan been developed for this facility as stipulated under N.J.A.C. 7:14A-6.9?
Yes X No _____

(7) If yes, has the sampling plan been approved by the Department? Yes X No _____

(8) If the sampling plan has not been submitted to the Department, attach with these completed forms.

SAMPLING COLLECTION

(9) Sample Date/Time: 2/4/94 / 09:50-13:05

(10) Sampling Personnel (Name/Title)	Affiliations	Phone
Stephen Palmisano Field Technician	EMSL	609-858-9573
Mark LaMorte Field Technician	Arecon	609-228-0770

- (11) Weather conditions at time of sampling. Cloudy, Cold
- (12) Is there a designated level of protection and if so indicate A B C D X

STATIC WATER LEVEL MEASUREMENT AND WELL EVACUATION

- (13) What method as utilized to determine the static water level?:
- Electrical (m- X Stainless Steel Tape Sonic
scope) _____ _____ _____
- Other Explain _____
- (14) Measuring device precise to: .01'
- (15) Model # 200 Manufacturer Solinst
- (16) Was the water level indicator deconed between wells? Yes
- (17) Describe the decontamination procedure: Tap scrub with nonphosphate detergent. Tap rinse, deionize
water rinse.
- (18) Wells are to be purged three to five times prior to sampling. If wells are not purged as stated, explain and the exact purge method used. N/A
- (19) Method used for well Pump X Bailer
evacuation: _____ _____
- (20) If bailed to evacuate, what are the dimensions of the bailer? N/A
- (21) What is the volume capacity of the bailer? N/A
- (22) Pump Type Submersible X Bladder Gas Displacement Gas Piston
Centrifugal Other Explain: N/A
- (23) Pump Model #/Flow Rate: T554108P-S2 / 5-10 gpm
- (24) Pump Manufacturer: Jacuzzi
- Describe decontamination method used to clean the pump between wells:
- Same as Item 17

Power Source for Pump: Gasoline Powered Generator X Gasoline Powered Compressor
Gasoline Engine Driven Pump

(27) Was the gasoline transported in the same vehicle as the sample bottles, field and trip blanks or bailers?
Yes No X

(28) Refer to the following chart for volume capacity for various wells per linear foot.

Casting Diameter	Gallons/Linear Foot
1.5"	0.092
2"	0.163
4"	0.66
6"	1.47
8"	2.61

(29) Complete the below chart regarding evacuation measurements.

Well Permit and Identification Number	Depth to Water	Well Depth	Water Column	Purge Volume	Well Size	Gallons/Linear Ft.	Time of Sampling
UST 9	17.90	56.55	38.65	170.44	6"	1.47	09:50
UST 1	16.00	59.00	43.00	189.63	6"	1.47	10:25
UST 8	16.30	42.50	26.20	115.54	6"	1.47	11:00
UST 4	17.40	39.20	81.80	96.13	6"	1.47	11:30
UST 2	16.00	40.44	24.44	107.78	6"	1.47	12:10
UST 7	20.80	111.00	90.20	397.78	6"	1.47	12:40
UST 3	19.80	61.20	41.40	182.57	6"	1.47	13:20
UST 5	*	*	*	*	*	*	*

* "NO SAMPLING, WELL "INACCESSIBLE"

J) Aqueous: Potable Well _____ Monitoring Well X Surface Water _____

Leachate _____ Other _____

Explain _____

(31) Dedicated Hose: Yes X No _____

(32) Hose Construction: PVC _____ Teflon _____ Tygon _____ Butyl _____ Vinyl _____

Polyethylene X Other _____ Explain _____

33) Sample Collection (Time of Collection) 09:50 - 13:05

A) Bailer X Construction: X Stainless Steel _____ PVC _____
Teflon _____

Size: 1000 ml Construction Disposable

B) Becon Bomb N/A

C) Other _____ Explain _____

(34) Lines Used to Lower Bailer
Teflon Coated Stainless Steel Cable/Leader _____ Teflon _____ PVC Rope _____ Cotton Rope _____

Polypropylene X Other _____ Explain _____

(35) Are dedicated bailers used for each well?: Yes X No _____

(36) Are bailers: Laboratory Cleaned? Yes X No _____

Laboratory Name EMSL Analytical

Field Cleaned Yes X No _____

Describe Decontamination Method: Tap Water/Nonphosphate Detergent Scrub, Tap Rinse. Deionized Water

Rinse, 10% Nitric Rinse, Deionized Water Rinse. Methanol rinse, Deionized Water Rinse. Air Dry

J) Prior to use, are bailers, sample bottles, hoses, etc. kept clean, (i.e. not placed in direct contact with ground, etc)

Yes X No _____

(38) Are sample bottles supplied by laboratory? Yes X No _____

(39) Are sample preservation instructions supplied by laboratory Yes X No (40) Are sample preservations supplied by laboratory? Yes X No (41) **Sample Preservation:**

Constituent	Teflon Top in Contact with sample Yes or No	Head Space Free Yes or No	Refrigerated Yes or No	Acidified Yes or No	Alkalized Yes or No	Sterile Bottles Yes or No
Volatile Organics	Yes	Yes	Yes	Yes	Yes	Yes
TOX	N/A	N/A	N/A	N/A	N/A	N/A
Extractable Organics	N/A	N/A	Yes	N/A	N/A	N/A
Metals	N/A	N/A	Yes	Yes	N/A	N/A
Cyanide	N/A	N/A	Yes	N/A	Yes	N/A
Phenols	N/A	N/A	Yes	Yes	N/A	N/A
Biological	N/A	N/A	N/A	N/A	N/A	N/A

(42) Indicates below any other constituents to be analyzed and their forms of preservation.

pH, Conductivity performed in Field, TDS and Hexavalent Chromium(43) Were samples for metals analysis filtered in field? Yes No X(44) Were samples for metals analysis filtered in lab? Yes X No (45) Field Blanks: Yes X No (46) Trip Blanks: Yes X No (47) Parameters/analysis for field and trip blanks; Volatile Organics X Semi-Volatiles XPesticides PCB's Metals X Other X(48) Prior to sampling, was an equipment blank performed?: Yes No X(49) Prior to sampling each well are disposable gloves worn? Yes X No (50) If yes, are the gloves changed between wells? Yes X No

CHAIN OF CUSTODY

- (51) Laboratory Name/Certification Number EMSL Analytical, Inc. / 04653
- (52) Laboratory Address: 3 Cooper Street
Westmont, NJ 08108
- (53) Laboratory receipt date and time: 2/4/94 / Approx. 16:00 pm
- (54) Attached Chain of Custody: Yes X No

Sample Number	Relinquished By	Received By	Time	Date	Reason for Change of Custody

AUTHENTICATION

I certify under penalty of law that I have personally examined and am familiar with the information contained in this report, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I beleive the submitted information is true, accurate and complete and meets the description specified in N.J.A.C. 7:14 ossibility of fine and imprisonment.

SAMPLER

Name/Title (printed) Stephen Palmisano - Field Technican

Signature *Stephen E Palmisano* Date 2.14.94

Company Name EMSL Analytical, Inc.

Address: 3 Cooper Street
Westmont, NJ 08108

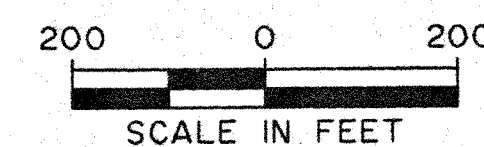
APPENDIX D

SITE PLATES

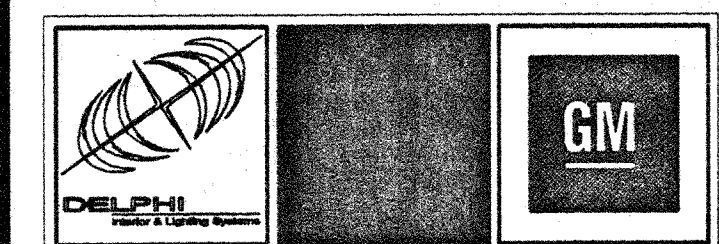


200 0 200

SCALE IN FEET



URS URS Consultants, Inc.
CONSULTING ENGINEERS
BUFFALO NEW YORK



DELPHI INTERIOR &
LIGHTING DIVISION
TRENTON FACILITY

(MOA CASE NO. 95-2-22-1407-48)

SITE PLAN
AND MOA AREA
LOCATION MAP

SHEET TITLE

OWNER'S IDENTIFICATION

DATE APRIL 1996

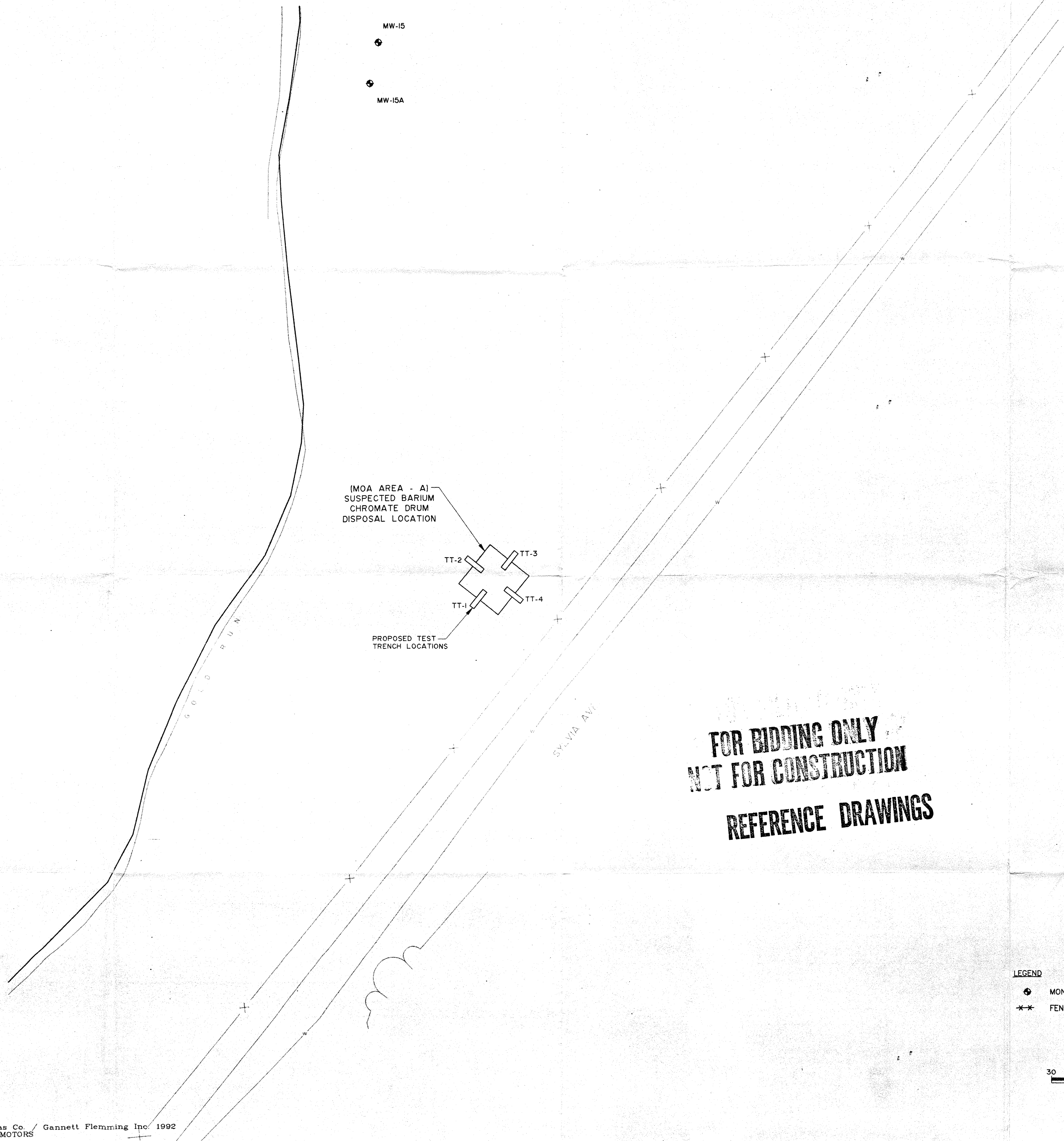
CHECKED BY

PROJ. MANAGER RT

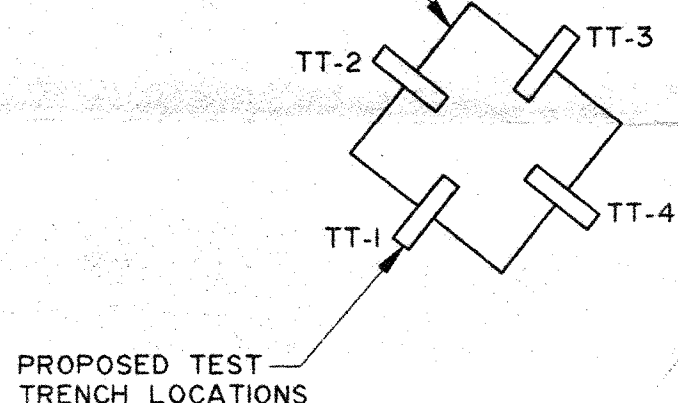
92713

PLATE
P-2

SHEET NUMBER

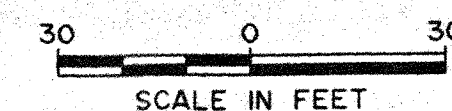


(MOA AREA - A)
SUSPECTED BARIUM
CHROMATE DRUM
DISPOSAL LOCATION



FOR BIDDING ONLY
NOT FOR CONSTRUCTION
REFERENCE DRAWINGS

- LEGEND
- MONITORING WELL LOCATION
 - FENCE LINE

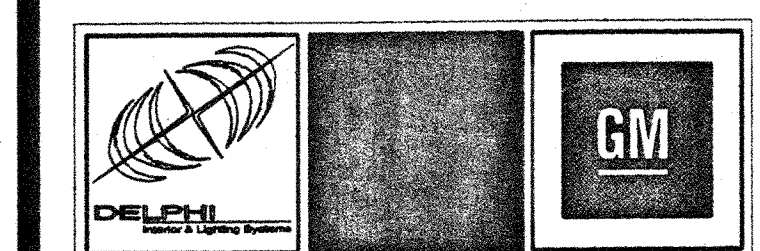


DATE	ISSUED FOR	APPROVAL	APPROVAL

NO.	DATE	BY	APPROVAL	APPROVAL

REVISIONS	
CONTRACT SIGNATURES	CERTIFIED BY
FOR THE OWNER	
FOR THE CONTRACTOR	DATE

URS URS Consultants, Inc.
CONSULTING ENGINEERS
BUFFALO NEW YORK



REMEDIAL
INVESTIGATION PLAN
DELPHI INTERIOR &
LIGHTING DIVISION
TRENTON FACILITY
(MOA CASE NO. 95-2-22-1407-48)
PROJECT TITLE

MOA AREA - A
SUSPECTED BARIUM
CHROMATE DRUM DISPOSAL
AREA PROPOSED TEST
TRENCH LOCATIONS
SHEET TITLE

OWNER'S IDENTIFICATION	92713 PROJECT NUMBER
DATE APRIL 1996	PLATE P-3 SHEET NUMBER
CHECKED BY RK	
DRAWN BY RAL	
PROJ. MANAGER RT	

SAMPLE	BH-4	BH-4	UNITS
DEPTH FT.	8-10	12-14	ug/kg
PHENANTHRENE	NA	40J	ug/kg
FLUORANTHENE	NA	49J	ug/kg
PYRENE	NA	59J	ug/kg
BIS(2-ETHYLHEXYL)PHTHALATE	NA	300J	ug/kg
METHYLENE CHLORIDE	NA	2UB	ug/kg
TRICHLOROFLUOROMETHANE	NA	1JB	ug/kg
CHROMIUM	46	NA	mg/kg
COPPER	340	NA	mg/kg
LEAD	34	NA	mg/kg
NICKEL	87	NA	mg/kg
CYANIDE	1.6	NA	mg/kg

SAMPLE	BH-3	BH-3	UNITS
DEPTH FT.	13.5-14.5	7.5-8.5	
METHYLENE CHORIDE	6	NA	ug/kg
CHLOROFORM	IJ	NA	ug/kg
CHROMIUM	NA	7	mg/kg
COPPER	NA	6.5	mg/kg
LEAD	NA	10U	mg/kg
NICKEL	NA	6.8	mg/kg

SAMPLE	BH-7	BH-8	UNITS
DEPTH FT.	7.5-8.5	13.5-14.5	
METHYLENE CHLORIDE	NA	2J	ug/kg
CHLOROFORM	NA	IJ	ug/kg
CHROMIUM	II	NA	mg/kg
COPPER	8.7	NA	mg/kg
NICKEL	8.2	NA	mg/kg

SAMPLE	BH-5	BH-5	UNITS
DEPTH FT.	8-10	12-14	
METHYLENE CHLORIDE	NA	2JB	ug/kg
TRICHLOROFUOROMETHANE	NA	1JB	ug/kg
TOLUENE	NA	2J	ug/kg
CHROMIUM	13	NA	mg/kg
COPPER	9B	NA	mg/kg
LEAD	10A	NA	mg/kg
NICKEL	17	NA	mg/kg

SAMPLE	BH-7	BH-7	UNITS
DEPTH FT.	7.5-8.5	13.5-14.5	
METHYLENE CHLORIDE	NA	3J	ug/kg
CHLOROFORM	NA	1J	ug/kg
CHROMIUM	3i	NA	mg/kg
COPPER	48	NA	mg/kg
LEAD	44	NA	mg/kg
NICKEL	29	NA	mg/kg

SOIL PILE FROM EXCAVATION FOR NEW OIL/WATER SEPARATOR
TO BE USED FOR BACK FILL AFTER EXCAVATION OF OLD
OIL/WATER SEPARATOR

ORGANIC COMPOUND RESULTS ARE REPORTED IN ug/kg
METALS/CYANIDE RESULTS ARE REPORTED IN mg/kg

PROPERTY LINE
FENCE LINE
● APPROXIMATE HISTORIC BORING LOCATION

(BORINGS ADVANCED IN OCTOBER OF 1990
BY GEOTECH, INC. PRIOR TO THE INSTALL.
OF THE NEW OIL/WATER SEPARATOR.
ANALYTICAL WORK DONE OCTOBER - NOV
1990 BY NORTHEASTERN ANALYTICAL CORP.)

- ### EXPLANATION OF DATA QUALIFIERS

NA - NOT ANALYZED

[illegible]

NO.	DATE	BY	APPROVAL	APPROVAL
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CONTRACT SIGNATURES	CERTIFIED BY
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FOR THE OWNER

FOR THE CONTRACTOR DATE

URS URS Consultants, Inc.
CONSULTING ENGINEERS
BUFFALO NEW YORK



DELPHI INTERIOR &
LIGHTING DIVISION
TRENTON FACILITY

[MOA CASE NO. 95-2-22-1407-48]

PROJECT TITLE

MOA AREA - B
OLD OIL/WATER
SEPARATOR SOIL BORING
ANALYTICAL DATA
SUMMARY AND PROPOSED
NEW SAMPLES
SHEET TITLE

OWNER'S IDENTIFICATION	PROJECT NUMBER
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DATE APRIL 1996 PLATE

DRAWN BY RAL

PROJ. MANAGER RT	SHEET NUMBER
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92713

PLATE
P-4

SB-3-SO-25				
SAMPLE DEPTH	COMPOUND	CONC.	UNITS	
9.00	1,1,1-Trichloroethane	28	RJ	ug/kg
9.00	2-Butanone	61	RJ	ug/kg
9.00	4-Methyl-2-pentanone	370	RE	ug/kg
9.00	Acetone	1900	RBE	ug/kg
9.00	Ethylbenzene	2500.	R	ug/kg
9.00	Toluene	133	R	ug/kg
9.00	Total solids	77		%
16.00	Total solids	90.		wt %
9.00	Total xylenes	12000	RB	ug/kg

SB-S-30-23				
SAMPLE DEPTH	COMPOUND	CONC.		UNITS
11.00	1,1,2,2-Tetrachloroethane	5.	J	ug/kg
11.00	1,2-Dichloroethene	17.	J	ug/kg
11.00	2-Butanone	27.	J	ug/kg
14.00	2-Hexanone	18.	J	ug/kg
11.00	Acetone	3600	EB	ug/kg
14.00	Acetone	1800	EB	ug/kg
11.00	Methylene chloride	12.	J	ug/kg
14.00	Methylene chloride	10.	J	ug/kg
11.00	Tetrachloroethene	13.	J	ug/kg
11.00	Total solids	78.		wt %
14.00	Total solids	83.		wt %

SB-3-SO-18			
SAMPLE DEPTH	COMPOUND	CONC.	UNITS
10.00	1,2-Dichloroethene	35.	ug/kg
10.00	2-Butanone	52.	ug/kg
10.00	Acetone	2800	EB ug/kg
10.00	Benzene	24.	ug/kg
10.00	Ethylbenzene	17.	ug/kg
10.00	Toluene	11.	ug/kg
10.00	Total solids	84.	wt %
10.00	Total xylenes	46.	ug/kg
14.00	Methylene chloride	190	JB ug/kg
14.00	Total solids	87.	wt %

SB-3-SO-19				
SAMPLE DEPTH	COMPOUND	CONC.		UNITS
10.00	2-Butanone	15.	RJ	ug/kg
14.00	2-Butanone	4.		ug/kg
10.00	2-Hexanone	16	RB	ug/kg
10.00	Acetone	55	NR	ug/kg
10.00	Benzene	9.	R	ug/kg
10.00	Ethylbenzene	29.	R	ug/kg
10.00	Methylene chloride	<12	NR	ug/kg
10.00	Toluene	9	RB	ug/kg
10.00	Total solids	81.	R	wt %
10.00	Total xylenes	<6		ug/kg
10.00	Vinyl Acetate	10	B	ug/kg
14.00	Acetone	800	EB	ug/kg
14.00	Methylene chloride	<11		ug/kg
14.00	Total solids	87.		wt %

SB-3-SO-22			
SAMPLE DEPTH	COMPOUND	CONC.	UNITS
15.00	1,1-Dichloroethane	7.	ug/kg
15.00	1,1-Dichloroethene	7.	ug/kg
15.00	1,2-Dichloroethane	7.	ug/kg
10.50	1,2-Dichloroethene	60.	ug/kg
15.00	1,2-Dichloroethene	7.	ug/kg
10.50	2-Butanone	23.	ug/kg
10.50	4-Methyl-2-pentanone	54.	ug/kg
10.50	Acetone	<210	ug/kg
10.50	Benzene	23.	ug/kg
15.00	Carbon disulfide	420	ug/kg
15.00	Chloroform	7.	ug/kg
10.50	Ethylbenzene	9.	ug/kg
10.50	Toluene	8.	ug/kg
10.50	Total solids	78.	wt %
15.00	Total solids	80.	wt %
10.50	Total xylenes	10.	ug/kg

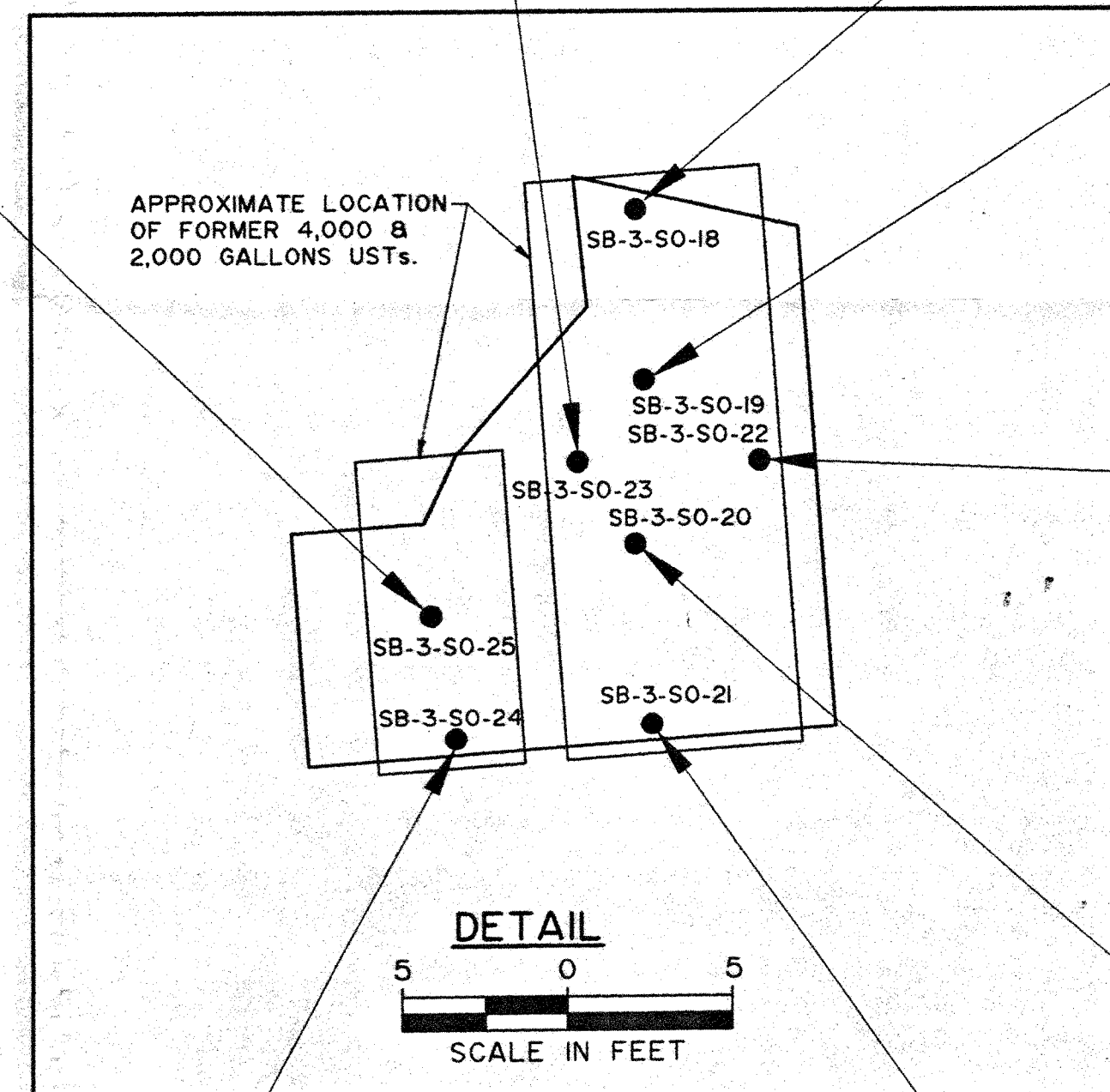
SB-3-30-20				
SAMPLE DEPTH	COMPOUND	CONC.		UNITS
7.50	Methylene chloride	<11	* R	ug/lg
7.50	Total solids	88.		wt %
7.50	Vinyl Acetate	2		ug/lg
8.50	Methylene chloride	5		ug/lg
8.50	Total solids	79.		wt %

SB-3-SO-2I			
SAMPLE DEPTH	COMPOUND	CONC.	UNITS
7.50	2-Butanone	14	J ug/kg
7.50	Acetone	1300	BE ug/kg
7.50	Acetone	<18	* ug/kg
7.50	Methylene chloride	<12	* ug/kg
8.00	Methylene chloride	<12	* ug/kg
7.50	Total solids	80.	wt %
8.00	Total solids	81.	wt %
7.50	Vinyl Acetate	2	J ug/kg
8.00	Vinyl Acetate	2	J ug/kg

SB-3-SO-24				
SAMPLE DEPTH	COMPOUND	CONC.		UNITS
18.00	1,1,1-Trichloroethane	5	RJ	ug/kg
18.00	1,1,2,2-Tetrachloroethane	1	RJ	ug/kg
13.00	2-Hexanone	310.		ug/kg
13.00	4-Methyl-2-pentanone	280.		ug/kg
13.00	Acetone	13000	EB	ug/kg
18.00	Acetone	17	R	ug/kg
13.00	Benzene	32	J	ug/kg
13.00	Ethylbenzene	380.		ug/kg
13.00	Methylene chloride	2	RJ	ug/kg
13.00	Toluene	240.		ug/kg
13.00	Total solids	78.		wt %
13.00	Total solids	96.		wt %
13.00	Total xylenes	380.		ug/kg

SB-3-SO-28				
SAMPLE DEPTH	COMPOUND	CONC.	UNITS	
16.50	1,1,1-Trichloroethane	4	RJB	ug/kg
11.00	2-Hexanone	14	RJB	ug/kg
16.50	4-Methyl-2-pentanone	4	RJB	ug/kg
16.50	Acetone	17	RJB	ug/kg
11.00	Methylene chloride	15	RB	ug/kg
11.00	Total solids	79.		wt %
16.50	Total solids	82.		wt %
11.00	Total xylenes	3	RB	ug/kg
16.50	Total xylenes	3	RB	ug/kg

SB-3-SO-27					
SAMPLE DEPTH	COMPOUND	CONC.			UNITS
12.00	1,1,1-Trichloroethane	21	RJB		ug/kg
15.00	1,1,1-Trichloroethane		RJ		ug/kg
12.00	2-Hexanone	69	RJ		ug/kg
12.00	4-Methyl-2-pentanone	110	RB		ug/kg
12.00	Acetone	88	RJB		ug/kg
12.00	Acetone	57	RB		ug/kg
12.00	Benzene	<32	R		ug/kg
15.00	Ethylbenzene	85.	R		ug/kg
15.00	Methylene chloride	4.	RJ		ug/kg
12.00	Toluene	18	RJ		ug/kg
12.00	Total solids	78			wt %
15.00	Total solids	87.			wt %
12.00	Total xylenes	130	RB		ug/kg



**FOR BIDDING ONLY
NOT FOR CONSTRUCTION
REFERENCE DRAWINGS**

< - THE ANALYTE WAS ANALYZED FOR BUT WAS NOT DETECTED.

J - INDICATES AN ESTIMATED CONCENTRATION BECAUSE RESULTS ARE EITHER BELOW THE SAMPLE QUANTITATION LIMIT OR QUALITY CONTROL CRITERIA WAS NOT MET.

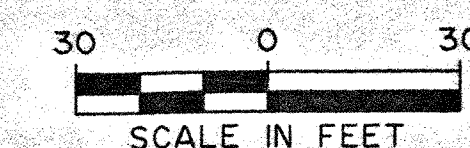
R - THE SAMPLE RESULTS ARE ESTIMATED DUE TO INABILITY TO MEET HOLDING TIME REQUIREMENTS. THE PRESENCE OR ABSENCE OF THE ANALYTE CANNOT BE VERIFIED.

B - THE COMPOUND WAS DETECTED IN THE ASSOCIATED METHOD BLANK, BUT THE SAMPLE CONCENTRATION IS GREATER THAN TEN TIMES THE CONCENTRATION OF THE ASSOCIATED METHOD BLANK. THEREFORE, THE DATA IS REPORTED.

* - THE COMPOUND WAS DETECTED, BUT WAS DETERMINED TO BE ESTIMATED (R) DUE TO CONTAMINATION IN THE ASSOCIATED QC BLANK.

E - THE REPORTED RESULT EXCEEDS THE LINEAR RANGE OF CALIBRATION.

● MONITORING WELL LOCATION
● SOIL BORING LOCATION

[illegible][illegible]

NO.	DATE	BY	APPROVAL	APPROVAL
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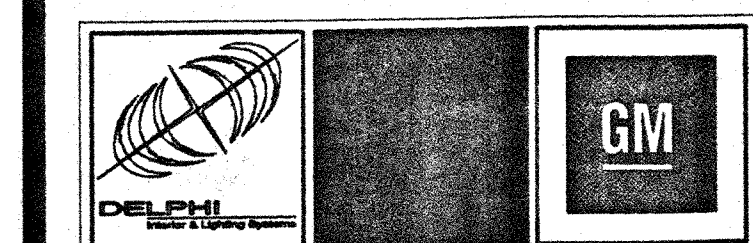
CONTRACT SIGNATURES

CONTRACT SIGNATURES

FOR THE OWNER

FOR THE CONTRACTOR

URS URS Consultants, Inc.
CONSULTING ENGINEERING
BUFFALO NEW YORK



DELPHI INTERIOR &
LIGHTING DIVISION
TRENTON FACILITY

(MOA CASE NO. 95-2-22-1407-48)

PROJECT TITLE

MOA AREA - D
GASOLINE
UST'S SOIL BORING
ANALYTICAL DATA
SUMMARY

SHEET TITLE

OWNER'S IDENTIFICATION

DATE APRIL 1996

DRAWN BY RAL

PROJ. MANAGER RT

92713
PROJECT NUMBER

PLATE
P-6

SHEET NUMBER

UST-7		
ANALYTE	3/24/94 Units µg/l	5/5/94 Units µg/l
Benzene	<5	1.2 J
Ethylbenzene	<5	1.3 J
Toluene	<5	5.0
Xylenes	<5	1.8J
Lead (total)	<5	26
Lead (dissolved)	<5	<5

UST-8		
ANALYTE	3/24/94 Units µg/l	5/5/94 Units µg/l
Benzene	440	330
Ethylbenzene	180	110
Toluene	52	25
Xylenes	230	90
Lead (total)	6	17
Lead (dissolved)	<5	<5

UST-4		
ANALYTE	3/24/94 Units ug/l	5/5/94 Units ug/l
Benzene	<5	3.9J
Ethylbenzene	2J	1.3J
Toluene	<5	5
Xylenes	<5	1.8J
Lead (total)	<5	5.7
Lead (dissolved)	<5	<5

UST-2		
ANALYTE	3/24/94 Units ug/l	5/5/94 Units ug
Benzene	18	6.8
Ethylbenzene	55	28
Toluene	39	14
Xylenes	160	56
Lead (total)	<5	16
Lead (dissolved)	<5	<5

**FOR BIDDING ONLY
NOT FOR CONSTRUCTION**

REFERENCE DRAWINGS

EXPLANATION OF DATA QUALIFIERS:

< = THE ANALYTE WAS ANALYZED FOR BUT WAS NOT DETECTED

J = INDICATES AN ESTIMATED CONCENTRATION BECAUSE RESULTS ARE EITHER BELOW SAMPLE QUANTITATION LIMIT OR QUALITY CONTROL CRITERIA WAS NOT MET.

A horizontal scale bar with a central zero point. To the left of zero is a mark for 200, and to the right is a mark for 200. The bar is divided into alternating black and white segments. Below the bar, the text "SCALE IN FEET" is printed.