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A MEMBER OF THE ENVIRONMENTAL RESOURCES MANAGEMENT GROUP

MARTIN MARIETTA CORPORATION

*1994 REMEDIAL INVESTIGATION AT THE
FARRELL ROAD PLANT
FINAL REPORT*

May 1995

Prepared for:

*Martin Marietta Corporation
Electronics Parkway
Syracuse, New York*

ERM-NORTHEAST, INC.
5788 Widewaters Parkway
Dewitt, New York 13214

ERM

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EXECUTIVE SUMMARY

ERM-Northeast, Inc was retained by Martin Marietta Corporation to conduct a remedial investigation at the former GE Aerospace, Farrell Road Plant. The investigation fulfills the requirements of Paragraph III Order on Consent INDEX #A7-0307-93-10 to conduct a remedial investigation at the site. The investigation was conducted in accordance with the New York State Department of Environmental Conservation approved Work Plan dated January 1994. During the investigation, soils were sampled from previously identified areas of concern, surface and ground water samples were collected from the wetland north of the site and site wide monitoring wells.

The investigation was conducted in two phases: The accelerated phase was completed in the Fall of 1993 to take advantage of the dry season to collect samples from the wetland; the remainder of the Work Plan was implemented in the Spring of 1994. Field work included the drilling of soil borings and the collection of soil cores. Borings were completed with standard drilling techniques and sediment cores were collected with hand augers and small diameter corers. A complete round of ground water samples were collected from all on-site ground water monitoring wells and piezometers.

The results indicate that the site soils are composed of medium to fine sand overlying a dense glacial till. Depth to ground water varies across the site but is generally less than 15 feet below grade. Ground water flows to the north and probably discharges to the wetland at the north end of the site. Background soil concentrations may be slightly elevated with respect to some metals. The soil and ground water in the vicinity of Building No. 2 is affected with solvents and petroleum and will require further evaluation in the feasibility study. Soil and ground water in the vicinity of the garage is affected with gasoline constituents and to a lesser extent solvents and will require further evaluation in the feasibility study. Some on-site storm sewer catch basins contain elevated concentrations of volatile organic compounds and metals and will require further evaluation in the feasibility study. Ground water site-wide contains volatile organic compounds that will require further evaluation in the feasibility study.

The results of the RI and data collected during previous investigations have been compiled into the following recommendations: 1) additional field investigation is required in the area of Outfall 003 to estimate the extent of PCBs in sediment; 2) further evaluation of soil and ground water data collected from AOC #10 is required to estimate whether site wide ground water could be the source of soil contamination detected in that area; and 3) remediation of affected sediment in the catch basin and sewer system at the site should be conducted as part of an interim remedial measure (IRM).

Concurrently with the implementation of the RI, MMC completed three IRMs at the site: 1) a soil remediation system at AOC #5; 2) an oil recovery system at AOC #7; and, 3) a soil and ground water remediation system in AOC #16. A non-aqueous phase liquid (NAPL) was encountered in monitoring wells at AOC #5 which may require further evaluation. MMC will prepare a separate scope of work in accordance with the MMC Letter of Response to NYSDEC dated 22 March 1995 to address the NAPL issues. The results of the NAPL investigation will be presented as an addendum to the Final RI Report.

All data collected from additional investigations will be presented as an addendum to the Final RI Report.

CERTIFICATION

ERM-Northeast certifies that all activities associated with the Remedial Investigation (RI) were performed in full accordance with the New York State Department of Environmental Conservation - approved RI/FS Work Plan. The signatures of the individual with primary responsibility for the day to day performance of the RI and the Project Director are found below.

Edward J. Hinchey

James F. Blasting

ACRONYMS

AMP	-Air Monitoring Pump
ASP	-Analytical Services Protocol
ASTM	-American Society for Testing and Materials
BTOC	-Below Top of Casing
CERCLA	-Comprehensive Environmental Response, Compensation, and Liability Act
cm/s	-Centimeters per Second
CRQL	-Contract Required Quantitation Limit
DQO	-Data Quality Objectives
ERM	-ERM-Northeast, Inc.
FRP	-Farrell Road Plant
GC	-Gas Chromatograph
GE	-General Electric Corporation
IRM	-Interim Remedial Measure
MMC	-Martin Marietta Corporation
NTU	-Nephelometric Turbidity Unit
NYSDEC	-New York State Department of Environmental Conservation
ml	-Milliliter
PID	-Photoionization Detector
ppb	-Parts per Billion
ppm	-Parts per Million
PCB	-Polychlorinated Biphenyl
PVC	-Polyvinyl Chloride
QA/QC	-Quality Assurance/Quality Control
RI	-Remedial Investigation
RI/FS	-Remedial Investigation/Feasibility Study
SCG	-Standards Criteria or Guidance
SVOC	-Semivolatile Organic Compound
TAL	-Target Analyte List
TCL	-Target Compound List
TIC	-Tentatively Identified Compound
TOC	-Top of Casing
TPH	-Total Petroleum Hydrocarbons
ug/Kg	-Micrograms per Kilogram
ug/l	-Micrograms per Liter
USEPA	-United States Environmental Protection Agency
UST	-Underground Storage Tank
VOC	-Volatile Organic Compound

1.0 INTRODUCTION

ERM-Northeast, Inc. (ERM) conducted a Remedial Investigation (RI) at the former General Electric Corporation (GE) Farrell Road Plant located on Farrell Road in the Town of Geddes, Onondaga County, New York. The property is referred to as "FRP" or the "site". The investigation was performed in two phases. In the Fall of 1993, tasks relating to the wetland and building interior were performed to take advantage of the dry Fall conditions and to facilitate building occupancy by the new owner. The 1993 portion of this investigation was summarized in a report entitled, "Accelerated RI/FS Tasks, Farrell Road Plant, field Summary Data Report", dated March 1994. The bulk of the investigatory activity was performed in the Spring of 1994. This RI report presents the data collected during both phases of the investigation.

Previous environmental investigations conducted in 1991 and 1992 determined that soil and ground water have been affected by past activities at FRP. As a result, the FRP site was listed by the New York State Department of Environmental Conservation (NYSDEC) on the Registry of Inactive Hazardous Waste Disposal Sites (Site No. 734055).

At a meeting attended by NYSDEC, Martin Marietta Corporation (MMC), and ERM on 11 May 1993, NYSDEC representatives indicated that additional environmental site characterization was needed to support finalization of a Remedial Investigation/Feasibility Study (RI/FS) and proposed Interim Remedial Measures (IRMs) for the site. Subsequently, an Order on Consent (#A7-0307-93-10) was entered on 9 December 1993 which required MMC to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the site. Significant site characterization and localized remediation had been conducted proactively prior to listing; therefore, all parties agreed that the RI should focus on filling in data gaps. This report presents the results of the 1994 RI at the site.

1.1 *PURPOSE AND APPROACH OF 1994 RI*

The objective of the RI is to: 1) evaluate the hydrogeologic and environmental setting of the site; 2) identify and delineate the occurrence and extent of constituents of concern in soil, sediment, surface water and ground water at the site; and 3) determine if the hydrogeologic setting of the site would allow off-site movement of any detected constituents.

Specific tasks performed to meet the objectives of the 1994 RI were as follows:

- collection of surface water, soil and sediment samples in locations where previous sampling indicated that affected media was present;

- collection of surface water samples from the wetlands area to estimate the effects of site conditions on this area;

- collection of ground water samples to evaluate ground water conditions at the site;

- performance of a Fish and Wildlife Impact Analysis to determine whether sensitive habitats are present within the site boundaries; and

- performance of a Qualitative Public Health Risk Assessment to determine whether site conditions pose a threat to human health.

1.2 *SITE ACTION LEVELS*

As requested by NYSDEC, all analyte concentrations were evaluated by comparing on-site concentrations with existing regulatory standards, criteria and guidance values (SCGs). The SCGs for the site are presented below.

- ***Soil*** - NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum #4046, Determination of Soil Cleanup Objectives and Cleanup Levels (NYSDEC DHWR TAGM #4046 Soil Cleanup Objectives, 24 January 1994);

- ***Water*** - TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values (NYSDEC TOGS 1.1.1, October 1993); and,

- ***Sediment*** - Criteria in the NYSDEC Division of Fish and Wildlife (DFW) Technical Guidance for Screening Contaminated Sediments (NYSDEC DFW sediment screening criteria, November 1993).

All data points that exceed the values set forth in the three guidance documents referenced above are highlighted in summary tables. MMC will propose remedial objectives in the Feasibility Study (FS). In determining appropriate remedial objectives, MMC will give consideration to guidance, which is determined, after the exercise of engineering judgement to be applicable to this site (See 6 NYCRR § 375-1.10 (c) (1) (ii)). For this reason, the guidance values referenced in the summary tables cannot be considered remedial objectives at this time.

1.3 *RI REPORT ORGANIZATION*

The remainder of this RI report describes each task that was performed during the 1994 RI and gives the purpose for each task. It presents the approach and specific procedures followed while implementing RI Work Plan tasks, describes the results of each task, presents and evaluates all analytical data generated during the 1994 RI, and presents conclusions and recommendations based on all available information.

Sections 2 and 3 of the 1994 RI report present details regarding the site background, facility description, and the physical setting of the site area. Sections 4 through 6 of the report present a description of the field activities performed during the 1994 RI. Analytical data collected during the 1994 RI are discussed and summarized in Section 7. Section 8 presents a summary of findings from the 1994 RI. The Fish and Wildlife Impact Analysis findings are detailed in Section 9. Work performed as part of the Qualitative Public Health Risk Assessment and a summary of the findings from this assessment is discussed in Section 10. Section 11 presents conclusions and recommendations from the 1994 RI.

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION

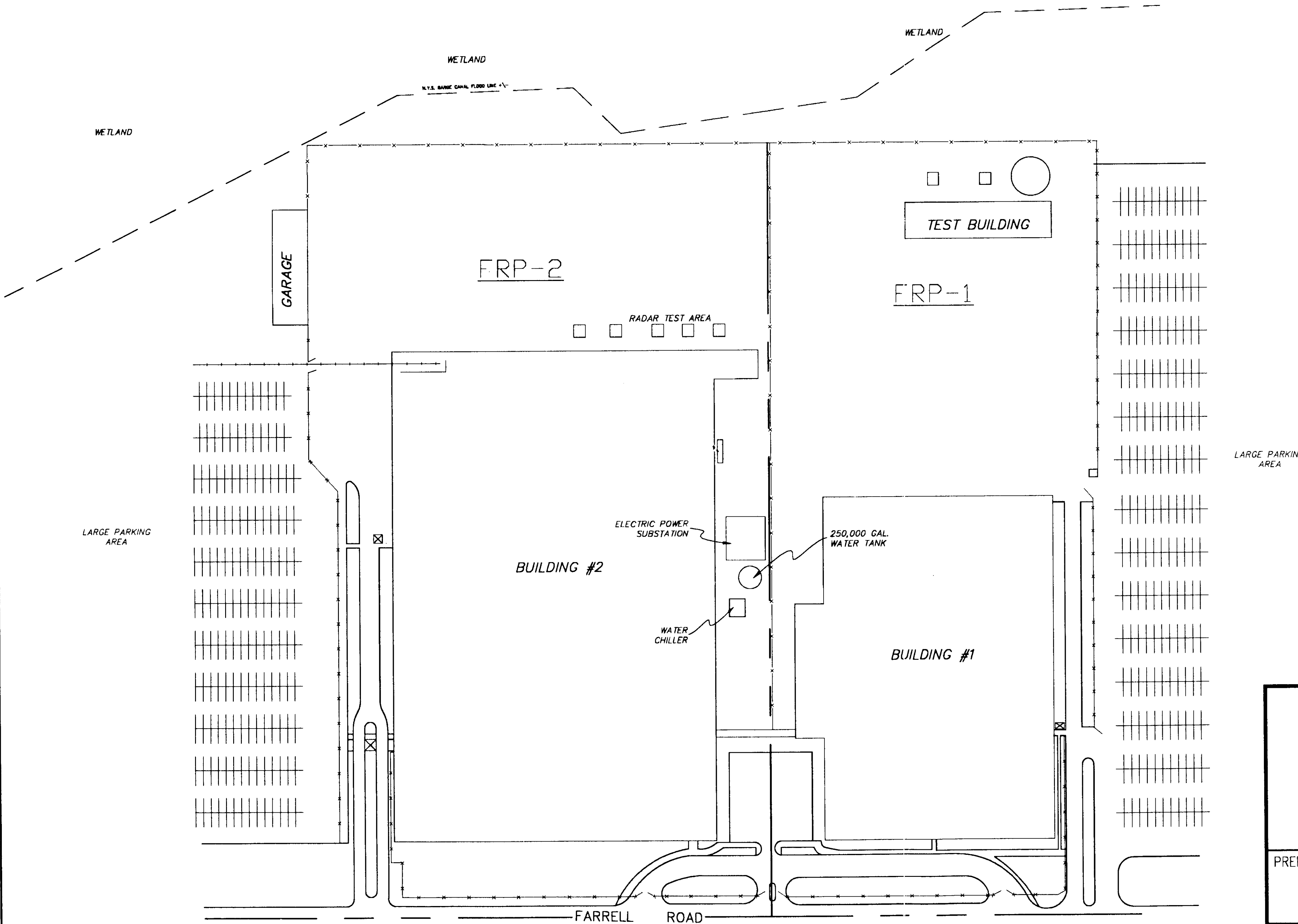
FRP is located northeast of the intersections of Routes 690 and 90 and south of the Seneca River (Figure 2-1). The 156-acre site includes the following four buildings (Figure 2-2); Building No. 1 was used as a design center; Building No. 2 was used as a manufacturing and assembly plant; the test building was used to test radar products; and the maintenance garage was used to service and house facility support vehicles.

Building No. 1 is approximately 175,000 square feet and Building No. 2 is approximately 300,000 square feet. The buildings are connected by a ground level walkway. The maintenance garage is approximately 6,500 square feet and is located at the northwest corner of the site. The test building is approximately 9,000 square feet and is located at the northeast corner of the site.

The four buildings are enclosed by a perimeter fence which is bordered by large paved parking areas on the east and west. The site is bordered on the south by Farrell Road, on the north and west by the Seneca River and on the east by John Glenn Boulevard.

2.2 SITE HISTORY

The site was developed in the early 1960's by General Electric Aerospace (GE) as a manufacturing center, and has been used as a design, manufacturing and assembly center for radar and sonar equipment. The site is divided into two separate properties; Farrell Road Plant 1 (FRP-1) and Farrell Road Plant 2 (FRP-2) (Figure 2-2). GE owned the FRP-2 property and leased the FRP-1 property. By December 1992, GE had



SITE LAYOUT MAP
FARRELL ROAD PLANT RI

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SCALE 1"=160'
DATE 8/94
FIGURE 2-2

moved all operations from FRP to other locations. In April 1993, GE sold FRP-2 to MMC, which includes Building No. 2 and the maintenance garage. At that time, MMC assumed the lease on the adjacent property, FRP-1, which includes Building No. 1 and the test building. Of the approximately 156 acres comprising the site, 81 acres have been classified as a Class One wetlands by NYSDEC. Currently, Syroco, Inc. owns the lands of both FRP-2 and FRP-1.

2.3 *PREVIOUS INVESTIGATIONS*

ERM conducted a Preliminary Hydrogeologic Investigation in June 1991. The investigation was designed to determine site-wide ground water flow direction, to estimate the extent of petroleum residuals near underground storage tank (UST) T-51 east of Building No. 2, and to determine the potential effects of septic leach fields near the maintenance garage and the test building. Results indicated that ground water generally flows in a north/northwest direction across the site and that ground water adjacent to UST T-51 has been affected by petroleum residuals and volatile organic compounds (VOCs).

As a follow-up investigation, ERM conducted a Phase II Hydrogeologic Investigation in November 1991. The purpose of the investigation was to estimate the extent of petroleum residuals and VOCs in the soil and ground water near UST T-51. The investigation determined that petroleum residuals were limited to the area proximal to the removed UST, and anomalous VOCs (predominantly freon) were present in ground water east of Building No. 2. ERM recommended additional ground water investigation.

Concurrent with the ground water investigations at the site, ERM conducted Phase I Environmental Site Assessment for FRP-1 and FRP-2. The site assessment included a review of all available site records with environmental implications, examination of site manufacturing processes, storage and disposal procedures and interviews with current and past employees.

Based on the Phase I reports, ERM identified 16 areas of FRP that needed further investigation. These areas are listed on Table 2-1 and illustrated in Figure 2-3. All areas of concern (AOC) were investigated in 1992. Field and analytical results of previous investigations are presented in the reports shown below. Data from these earlier reports were used in this RI report where appropriate. All referenced data will be cited as necessary.

1) Phase I Environmental Assessment of GE Farrell Road Plant One (FRP-1), Town of Geddes, New York;

2) 1992 Environmental Investigation, GE Farrell Road Plant One (FRP-1), Syracuse, New York;

3) Phase I Environmental Assessment of GE Farrell Road Plant Two (FRP-2), Syracuse, New York;

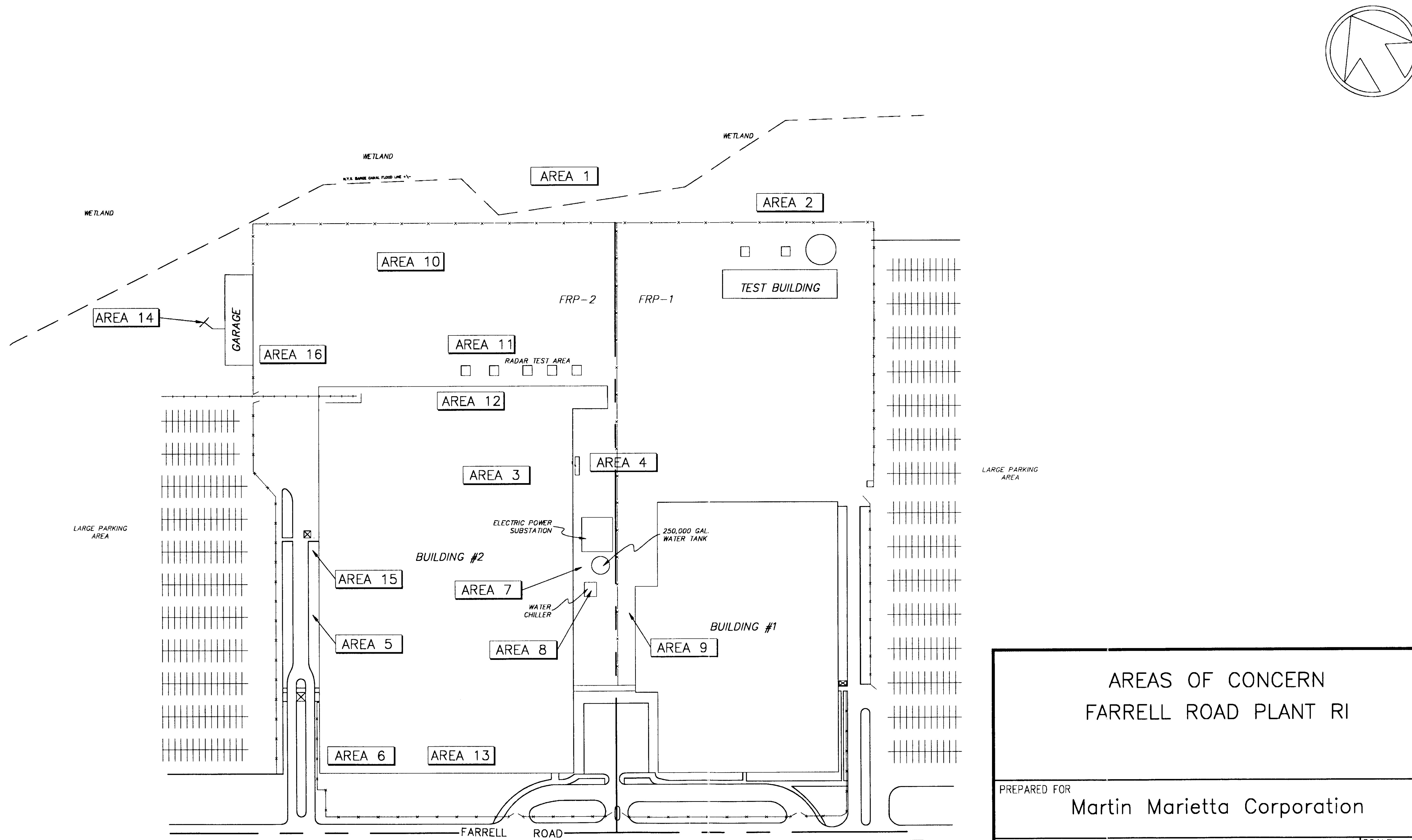
4) 1992 Environmental Investigation, GE Farrell Road Plant Two (FRP-2), Syracuse, New York;

5) A letter report dated 15 September 1992; Re: PCB Sampling at Farrell Road Plant Two;

6) A letter report dated 15 September 1992, Re: Soil Remediation at Farrell Road Plant Two;

TABLE 2-1
AREAS OF CONCERN IDENTIFIED IN PREVIOUS INVESTIGATIONS
MMC - FARRELL ROAD PLANT RI

Area 1	Debris Pile North of FRP-2.
Area 2	Septic Leach Field North of Test Building.
Area 3	Former Above Ground Solvent Tanks in FRP-2.
Area 4	Removed Above Ground Tanks East Side of FRP-2.
Area 5	Removed USTs and Drywell West Side of FRP-2.
Area 6	Printed Wire Board (PWB) Assembly.
Area 7	Removed UST T-51.
Area 8	Area of Freon Residuals.
Area 9	Removed UST T-50.
Area 10	Temporary Hazardous Material Storage Area.
Area 11	Radar Test Area.
Area 12	Paint Booth Area.
Area 13	Chemical Laboratory and Associated Underground Septic Tank.
Area 14	Septic and Storm Drainage Headwall West of the Garage.
Area 15	USTs Near Old Metal Finishing Room.
Area 16	Removed Gasoline UST Near the Garage.



AREAS OF CONCERN
FARRELL ROAD PLANT RI

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FIGURE	2-3

7) Garage Area Investigation, GE Farrell Road Plant Two, Addendum to the 1992 Environmental Investigation;

8) Debris Pile Excavation, GE Farrell Road Plant Two; Addendum to the 1992 Environmental Investigation; and

9) A letter report dated 23 October 1992; Re: Ground Water Sampling North of the Farrell Road Plant.

The 1992 environmental investigations assessed each area of concern and included IRMs at two locations (Area 1 and Area 5). The 1992 investigations found that there were no environmental issues in Area 6, Area 13, and Area 15. However, environmental issues remained unresolved at other areas. The areas that required additional investigation and were investigated during this RI are presented below:

- debris pile north of FRP-2 (Area 1);
- septic leach field north of test building (Area 2);
- former above ground solvent tanks in FRP-2 (Area 3);
- removed above ground storage tanks, east side of FRP-2 (Area 4);
- removed USTs and drywell, west side of Building No. 2 (Area 5);
- removed UST T-51 (Area 7/Area 8 combined);
- removed UST T-50 (Area 9);
- temporary hazardous material storage area (Area 10);
- radar test area (Area 11);
- paint booth area (Area 12);
- septic and storm drainage headwall west of the garage (Area 14); and
- removed gasoline UST near the garage (Area 16).

In addition to these specific areas that were investigated, several other site-wide investigation/evaluation tasks were performed during the 1994 RI including:

- investigation of the site's storm sewer system;
- additional wetland hydrogeologic investigation;
- a bedrock aquifer investigation;
- a round of ground water sampling and analysis;
- performance of a Qualitative Public Health Risk Assessment; and
- performance of a Fish and Wildlife Impact Analysis.

2.4 *INTERIM REMEDIAL MEASURES*

2.4.1 *Completed IRMs*

Several areas of concern were identified that required source control actions during the 1992 Environmental Investigation performed at FRP (ERM 1992a and ERM 1992b). IRMs were performed in these areas to eliminate or minimize potential analyte source points. The IRMs were conducted at Areas 1, 5, and 11.

Area 1 was identified during the 1992 Environmental Investigation as a debris pile located north of FRP-2. Soil in this area was affected by volatile organic compounds (VOCs) and metals. An IRM was implemented at this location between 25 May and 7 June, 1992. The IRM performed at Area 1 involved the excavation and disposal of approximately 658 yd^3 of soil and fill (ERM 1992c).

Area 5 was identified during the 1992 Environmental Investigation as a location of former USTs and a drywell. The soil in the vicinity of Area 5 along the west side of Building No. 2 was found to have elevated VOC concentrations. An IRM (source control action) was conducted during the 1992 Environmental Investigation and included the excavation of an abandoned "paint drippings" drywell (ERM 1992b).

Area 11 was identified in the vicinity of the radar test area north of Building No. 2 during the 1992 Environmental Investigation. Three test pits were excavated in Area 11 as part of an IRM conducted on 29 July 1992 (ERM 1992d) and approximately 15 cy^3 of affected soil were removed from the site.

2.4.2 *Pending IRMs*

IRMs have been designated for implementation at Area 5, Area 7 and Area 16 on the site. Work Plans for the performance of these IRMs have been prepared and submitted to NYSDEC. The Work Plan for Area 7 has been approved and is currently being implemented. NYSDEC has conditionally approved the Work Plans for Area 5 and Area 16. The construction phase of the IRMs will be implemented in 1994; however, system start-up will await final Work Plan approval.

3.0 FACILITY DESCRIPTION/PHYSICAL SETTING

3.1 LOCATION AND DESCRIPTION

The site is located within the Erie-Ontario Lowland geological province of New York State. The lowlands are characterized by large areas of low relief interrupted by streamlined hills called drumlins. Surficial geology at the site is composed of modern and glacial-aged lake sediments (Muller and Cadwell, 1986) underlain by Silurian (>400 million years old) shales and evaporates (Rickard and Fisher, 1970).

A shallow unconfined aquifer was mapped in the area by Kantrowitz (1970) and Winkley (1989). The shallow aquifer is composed of glacial sand and gravels and has been reported to produce usable quantities of water. Shallow ground water is between two feet and seven feet beneath the ground surface, and flows to the north. Bedrock beneath the site is likely to produce low-yielding wells with salty water (Kantrowitz, 1970).

3.2 DEMOGRAPHY

The population of Onondaga County as reported in the 1990 Census of Population and Housing was 468,973 persons (USDC, 1991). There were 17,677 persons living in the Town of Geddes. The City of Syracuse which is located approximately 5.5 miles from the site had a population of 163,860 persons in 1990.

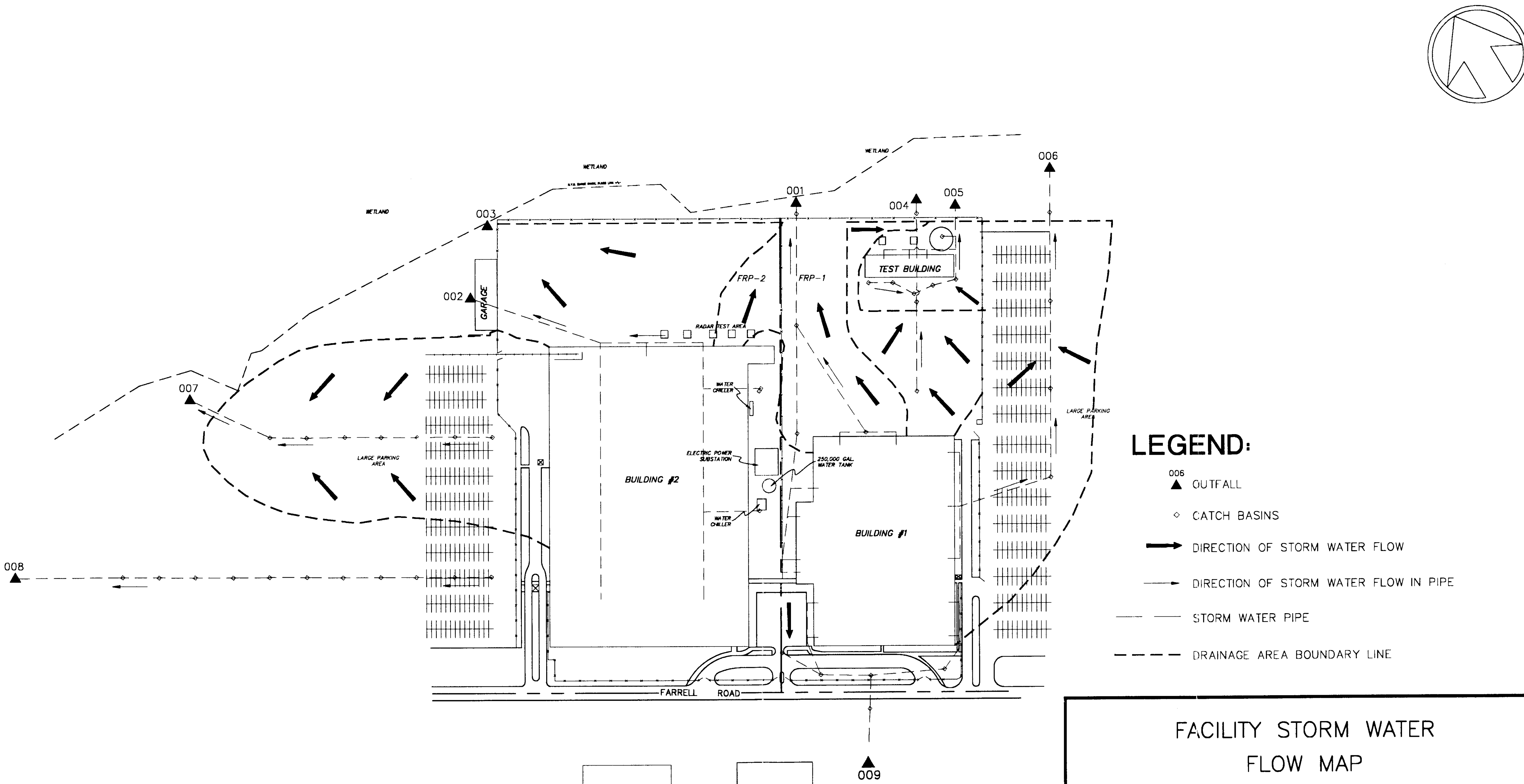
3.3 LAND USE

Land use within a 0.5 mile radius of the site included industrial and extractive, commercial and service, transportation, forestland, residential, open public land, and water and wetlands (Pagano et al., 1984). The site is classified as industrial and extractive. Lands adjacent to and south of the site are also classified as industrial and extractive. The area adjacent to the site's northern property line is classified as water and wetlands.

3.4 *TOPOGRAPHY/DRAINAGE*

The site is situated within the Erie-Ontario Lowlands physiographic province of New York State. This lowland area is characterized by low relief and consists of a lake plain covered with glaciolacustrine sediments, and drumlin fields underlain by molded lodgement till (Winkley, 1989). Land forms of the lowlands are associated with Glacial Lake Iroquois. Elevations in the area range from 375 feet to 450 feet. The lowlands are occupied by well-developed drumlin fields having a variety of shapes, from oval to elongate. Individual drumlins commonly have an average relief ranging from 50 to 80 feet.

Topographic relief within a 0.5 mile radius of the site ranges from approximately 360 feet to 400 feet. Topography of the site is relatively flat and relief is estimated to be less than 20 feet. Site topography has been altered by past facility construction and site elevations range from approximately 370 feet to 390 feet. Drainage at the site has been affected by previous construction as well. Most storm water runoff is directed to catch basins located across the site where the water is carried to and discharged to the wetlands. A small area of the site drains through catch basins and southward through a storm sewer system. Figure 3-1 illustrates the drainage areas of the site and flow patterns of storm water runoff at the site.



Outfall "009" is a catch basin located south of the site

FACILITY STORM WATER
FLOW MAP
FARRELL ROAD PLANT RI

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SCALE 1"=220'
DATE 8/94
FIGURE 3-1

3.5 CLIMATOLOGY

The climate of Onondaga County is classified as humid-continental (Hutton and Rice, 1977). Most weather systems moving across the continent affect Onondaga County as these systems follow a normal pathway toward the northeastern United States. The weather is variable. Temperature, humidity, wind, and other meteorologic parameters typically change noticeably within a few days. Lake Ontario influences the climate of the area by moderating temperatures and providing a source of moisture to winter storms. Summer temperatures generally range from the upper seventies to the middle eighties. Winters are long and cold with the coldest temperatures typically between -5 degrees and -20 degrees Fahrenheit. Average annual precipitation ranges from 36 inches in the lake plain to 39 to 40 inches in the southern and southeastern border areas of the county. Approximately 45 percent of the annual precipitation is received from May through September. Average annual snowfall ranges from 90 inches to 120 inches.

3.6 REGIONAL GEOLOGY AND ENVIRONMENTAL SETTING

3.6.1 Unconsolidated Deposits

FRP is located within the Erie-Ontario Lowlands physiographic province of New York State (Isachsen et al., 1991). The lowlands are characterized by large areas of low relief interrupted by streamlined hills called drumlins. The general soil type near FRP is the Collamer-Niagara association. This soil association occupies gently sloping lakeplains and valley areas and is dominated by deep soils that formed in silty or clayey glaciolacustrine sediment. These soils are typically moderately well drained to somewhat poorly drained (Hutton and Rice, 1977). Surficial geology in this area is composed of modern and glacial lake sediments. Pagano et al. (1984)

classified the surficial deposits of the area as lake silt and/or clay. This classification includes thinly bedded to massive offshore deposits that were deposited in preglacial and postglacial lakes and are generally of low permeability.

3.6.2 *Bedrock*

The FRP area is characterized by sedimentary rock types which are generally gently dipping to the south due to stresses from mountain building events. Bedrock in the vicinity of the site is mapped as the Vernon Formation which is part of the Salina Group (Rickard and Fisher, 1970). This formation is composed of dolostones and shales of Upper Silurian age. These sedimentary strata are typically cut by glacial and fluvial erosion, forming deep valleys which are partially filled with sediments deposited during glacial recession and subsequent alluvial processes. Bedrock is buried beneath overburden deposits and does not crop out anywhere near the site.

3.6.3 *Hydrology*

3.6.3.1 *Surface Water*

The Town of Geddes is situated in the Seneca River Basin which is part of the Eastern Oswego River Drainage Basin. Surface water from this area eventually flows to Lake Ontario through the Seneca and Oswego Rivers.

3.6.3.2 *Ground Water*

A shallow unconfined aquifer was mapped in the area by Kantrowitz (1970) and Winkley (1989). The shallow aquifer is composed of glacial sands and gravels and has been reported to produce usable quantities of water. Shallow ground water is reported by the authors from two to seven feet beneath the ground surface, generally flowing northward.

3.7 *FACILITY HYDROGEOLOGY*

3.7.1 *Unconsolidated Deposits*

Previous investigations have characterized the geology of the site and have revealed a relatively uncomplicated site geology and hydrogeology. The near surface soils at the site are a medium- to fine-grained sand with silt and a trace of clay. The fine sand and silt continues in the subsurface where it overlies a dense red clay till found at a depth of 9 feet on the west side of Building No. 2 to greater than 40 feet at the northeast end of the property. The fine sand and silt has thin silt partings and other stratigraphic horizons such as sand lenses, old soil zones and thin clay layers. Discontinuously throughout the site, a coarse sand and/or gravel layer separates the top of the red clay from the fine sand and silt above.

3.7.2 *Glacial Till*

A dense red clay was previously identified at the site. This red clay unit underlies the fine sand and silt surficial deposits and was found at a depth of 9 feet on the west side of Building No. 2 and greater than 40 feet northeast of the property. The red clay is massive with no apparent structure and contains a gravel matrix of angular clast ranging in size from 0.5 cm to 2 cm in diameter. A discontinuous coarse sand and/or gravel layer separates the top of the red clay from the fine sand and silt at the site.

3.7.3 *Bedrock*

Bedrock has not been encountered at the site during previous investigations. Literature indicates that bedrock underlying the site is the Vernon Formation, a portion of the Salina Group (Rickard and Fisher 1970). This formation is composed of dolostones and shales of Upper Silurian age.

3.7.4 *Hydrology*

3.7.4.1 *Surface Water*

The developed portion of the site is comprised of pavement and buildings. Surface water runoff flows to roof drains and catch basins and is directed to the site storm sewer system. Water from the storm sewer system is discharged to the wetlands area to the north of the site through eight outfall locations and through one discharge point on the south side of the site.

3.7.4.2 *Ground Water*

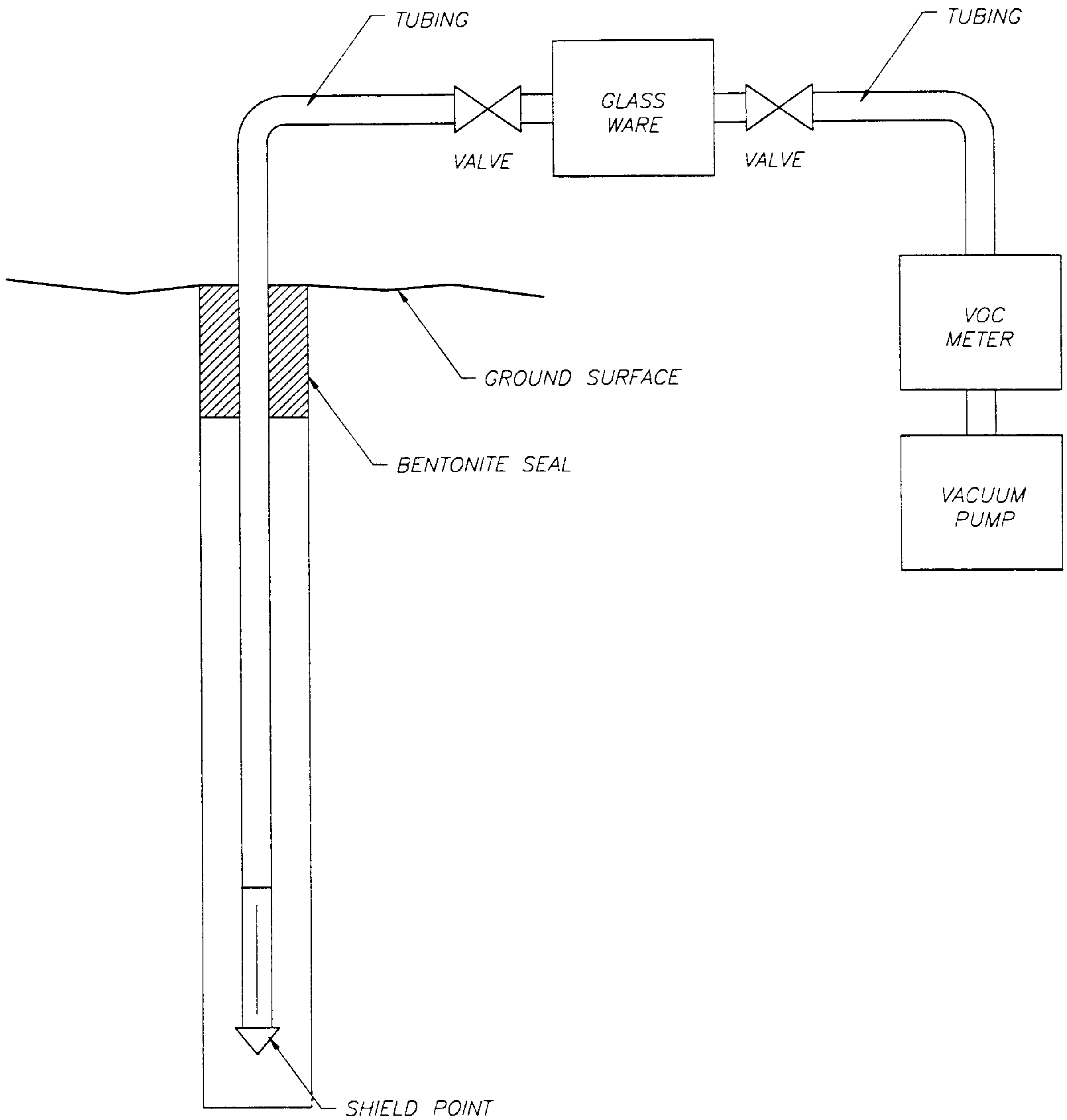
Ground water flow directions determined from previous investigations have indicated that the direction of ground water flow at the site is predominantly to the north. The hydraulic conductivity of the saturated overburden was previously calculated from slug tests performed at the site (ERM, 1992a). Hydraulic conductivities in the saturated overburden ranged from 4.9×10^{-2} cm/s to 6.63×10^{-4} cm/s across the site. The higher hydraulic conductivities were found to be associated with the wells completed in the coarse sand and gravel on top of the red clay. The lower permeabilities were associated with the fine sand and silt material that is more common of the overburden at the site. The saturated thickness varies across the site from approximately one foot on the west side of Building No. 2 to greater than five feet on the east side of Building No. 2. The saturated thickness exceeds 20 feet in monitoring well MW-16 on the north side of the site.

4.0 RI FIELD INVESTIGATION METHODS

4.1 SOIL VAPOR SURVEY

A soil vapor survey was conducted along storm sewer lines associated with outfalls 001, 002, 004, and 005 and the sanitary sewer line from the west side of Building No. 2 to Farrell Road. The purpose of the survey was to identify areas of soil potentially affected by VOCs. Sampling locations were measured with a 100-foot measuring tape and spaced at 50-foot intervals on alternating sides of the sewer lines. The location and designation of each sampling point was marked on the adjacent ground with paint. All sampling locations were identified and placed prior to the installation of any soil vapor sampling points.

Because most sample points were located on blacktop, an electric hammer drill with a concrete bit was used to drill through blacktop (approximately six inches at most locations) to underlying soil. Sampling points, consisting of four-inch long slotted, hollow-stem aluminum shield points connected to one-eighth inch inside-diameter polyethylene tubing, were driven into the ground at each sampling location. Lengths of tubing were cut to allow approximately one foot of tubing to protrude above grade to facilitate sampling. The sampling points were installed using a KVA Model 14 Soil Gas Probe System (hollow-stemmed slam bar with hollow steel rods) to the estimated depth of the sewer line at each sampling location. After removal of the steel rods from the borehole, a sand pack consisting of Morie #1 sand was added to within two inches of grade to facilitate the entry of soil gas into the sampling point. Each borehole was then sealed from two inches below grade to the ground surface with bentonite powder and hydrated with potable water. A typical soil vapor sampling point installation is illustrated in Figure 4-1. A galvanized steel nail was placed into the end of the tubing to prevent the escape of soil



TYPICAL SOIL VAPOR SAMPLING INSTALLATION FARRELL ROAD PLANT RI

PREPARED FOR
Martin Marietta Corporation

ERM-Northeast Environmental Resources Management 5788 Widewaters Parkway, Dewitt, NY 13214 Tel.(315)445-2554 Fax(315)445-2543	SCALE NTS DATE 8/94	FIGURE 4-1

vapors from the formation. A total of 72 soil vapor sampling points were installed along sewer lines during this investigation. Installation depths for sampling points ranged from 14 to 60 inches. All sampling points were installed prior to initiation of any soil vapor sampling activities. The hollow steel rods used to install sampling points were decontaminated between uses with the following procedure:

1.) phosphate-free detergent wash (Liquinox™)
2.) potable water rinse
3.) methanol rinse, followed by hexanes rinse
4.) deionized, analyte-free water rinse
5.) air dry.

Soil vapor samples were collected using 125-ml glass sampling bulbs with one end of the glass sampling bulb connected to tubing from the borehole and the other end of the bulb connected to tubing which lead to a setup consisting of a Photovac Microtip MP-100 photoionization detector (PID) and a SKC Aircheck Sampler Model 224-PCXR3 air monitoring pump (AMP) calibrated to draw vapor through the system at a rate of 200 ml/min. Each end of the glass sampling bulb had a Teflon™ stop-cock valve to control vapor flow through the bulb. The PID and the AMP were turned on with both bulb valves open for two minutes or until equilibrium (relatively constant PID readings) was obtained. The equilibrium PID reading was recorded in the field notebook. Upon reaching equilibrium, the valve between the PID and the bulb was closed and the AMP was turned off. The bulb was left connected to the tubing (from the borehole) with the valve open for two minutes to allow pressure equilibrium to develop between the sampling point and the bulb. The valve between the bulb and the sampling tubing was then closed and the bulb was removed and labeled with sampling location number and PID reading. Sample bulbs were then transported to the on-site field office for analysis.

Soil vapor samples were analyzed in the field by a field chemist with a Photovac 10S50 gas chromatograph (GC) equipped with a photoionization detector and calibrated to benzene, trichloroethene, toluene, and trans-1,2-dichloroethene as indicator compounds for the site. Upon completion of each analysis, the glass sampling bulbs were decontaminated by triple rinsing with methanol followed by heating in an oven to approximately 110°C until visibly dry. A new silicone septum was added to each bulb, and then ultra-pure air was passed through each bulb for approximately 30 seconds.

4.2 SEDIMENT SAMPLING

Sediment was sampled from three areas of the site: 1) outfalls draining industrial areas of the facility, 2) catch basins located within the facility, and 3) the wetlands north of the site. The methodologies employed to collect sediment samples in each of these areas were unique, given their different physical settings and characteristics, as described below.

4.2.1 Outfalls

All surface and subsurface outfall samples collected during this investigation were sampled by an ERM geologist with a stainless steel spoon, ladle, or scoop. Samples were transferred directly into laboratory-supplied clean glass jars which were labeled prior to sampling. All samples were stored in coolers with ice for shipment (by Federal Express) to the laboratory at the end of the sampling day. Appropriate chain of custody documentation was maintained for all samples.

Upon completion of sampling activities at a particular sampling location, sampling equipment was decontaminated utilizing the following procedures which follow guidelines established by the United States Environmental

Protection Agency (USEPA) Region II Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Quality Assurance Manual dated October, 1989:

1.) phosphate-free detergent wash (Liquinox™)
2.) potable water rinse
3.) 10% nitric acid rinse*
4.) potable water rinse*
5.) methanol rinse, followed by a hexanes rinse
6.) deionized, analyte-free water rinse
7.) allow to air dry, wrap in aluminum foil.

* These steps were omitted if sampling for metals was not conducted.

4.2.2 *Catch Basins*

All catch basins sampled at the site were probed at several points with a fiberglass rod to determine the average depth of sediment present (if any). The diameter of each catch basin was noted to allow an estimate of the volume of catch basin sediment to be calculated. While many of the catch basins encountered at the site were shallow enough (less than four feet deep) to be entered and sampled with hand-held equipment (i.e. stainless steel spoon, ladle, or scoop), several were too deep to permit safe entry. Therefore, the deeper catch basins were sampled by attaching a stainless steel ladle to the end of a stainless steel hand auger section, lowering the assembly to the bottom of the catch basin, and collecting any sediment present. Deeper catch basins required the joining of two or three hand auger sections, each being three feet long. Collected sediment was transferred directly into clean, laboratory-supplied glass jars and stored in coolers with ice for shipment to the laboratory at the end of the sampling day. Appropriate chain of custody documentation was maintained for all samples. All sampling equipment was decontaminated using the same procedure outlined above for outfall sampling.

4.2.3 *Wetlands*

Wetlands sediment samples were collected from 12 locations during performance of accelerated RI/FS tasks at the site during the Fall of 1993 (ERM, 1994). Samples were obtained utilizing a two-inch diameter stainless steel Wildco™ sediment core sampler equipped with a 2.5-foot core barrel lined with clean butyrate plastic tubing. The core barrel was manually driven through the sediment to the desired sample collection depth (two feet) and a valve was closed at the top of the corer which facilitated extraction of the core from the ground. At three sampling locations, sediment samples were collected using an Environmentalist's Sub-soil Probe (ESP) corer. Sediment samples were collected for all cores from depth intervals of zero to one and one to two feet and immediately transferred into clean, laboratory-supplied jars using clean stainless steel spoons and/or scoops. Samples were transferred into chilled coolers for storage and shipping to the laboratory. Appropriate chain of custody documentation was maintained for all samples. All sampling equipment was decontaminated using the procedure described for outfall sampling, with omission of the nitric acid rinse because no sampling for metals occurred.

4.3 *SOIL BORINGS*

Forty-one soil borings were advanced at FRP as part of the RI. Thirty-six of these soil borings were advanced solely for the collection of soil samples. Two borings were drilled for overburden monitoring well installations and three were drilled as a part of the bedrock/till investigation. Soil borings were advanced by four different methods: 1) truck mounted hollow stem auger (HSA) drill rig; 2) hand auger; 3) small diameter corer, (ESP); and 4) mud rotary. Table 4-1 indicates each boring and the method that was used to advance the boring.

4.3.1 *Hollow Stem Auger Drilling*

Soil borings that were drilled using a truck mounted hollow stem auger drill rig were performed with a Mobile B-57. Aquifer Drilling and Testing, Inc. of Albany, New York conducted all drilling at the site during the RI. Drill rigs were decontaminated by steam washing prior to performing work on site, between sample locations and subsequent to site activities. Soil borings were conducted by advancing the hollow stem augers and center plug to the desired soil sample depth. Following the removal of the center plug, soil samples were obtained by driving a two-inch outside diameter by two-foot long split-spoon sampling device ahead of the augers. Split-spoon sampling was performed in general accordance with American Society for Testing and Materials (ASTM) Method D 1586-84. Upon retrieval from the borehole, each soil sample was logged by an ERM geologist. Split-spoon soil samplers were opened and immediately scanned for the presence of VOCs with a PID. Soil color, grain size, moisture content, structure, PID reading, and other pertinent observations were recorded on boring logs.

Upon completion of sampling activities at a particular sampling location, sampling equipment was decontaminated utilizing the following procedures which follow guidelines established by the USEPA Region II CERCLA Quality Assurance Manual dated October, 1989:

1.) phosphate-free detergent wash (Liquinox™)
2.) potable water rinse

TABLE 4-1
SUMMARY OF SOIL BORINGS
MMC-FARRELL ROAD PLANT 1994 RI

AREA	BORING	BORING METHOD	TOTAL DEPTH	AREA	BORING	BORING METHOD	TOTAL DEPTH
Area 01	B-111	HSA	12	Area 10	B-110	HSA	37
Area 01	B-113	HSA	12	Area 10	B-112	HSA	39
Area 01	B-121	Hand Auger	3	Area 10	MW-26D	HSA	34
Area 02	B-115	Hand Auger	6	Area 10	MW-26S	HSA	15
Area 02	B-126	ESP	6	Area 11	B-114	HSA	33
Area 02	B-127	ESP	6	Area 11	B-129	HSA	27
Area 02	B-128	ESP	6	Area 11	B-130	HSA	31
Area 03	B-122	ESP	1	Area 11	B-131	HSA	29
Area 03	B-123	ESP	1	Area 11	B-132	HSA	29
Area 04	B-124	HSA	27	Area 12	B-106	ESP	9
Area 04	B-125	HSA	23	Area 12	B-107	ESP	6
Area 05	B-120	HSA	20	Area 16	B-104	HSA	21
Area 07	B-116	HSA	16	Area 16	B-105	HSA	21
Area 07	B-117	HSA	14	Storm Sewer	B-133	HSA	11
Area 07	B-118	HSA	17	Storm Sewer	B-134	HSA	49
Area 07	B-119	HSA	17	Storm Sewer	B-135	HSA	11
Area 09	B-101	HSA	19	Storm Sewer	B-136	HSA	11
Area 09	B-102	HSA	18.6	Bedrock	BR-1	HSA/Mud	141
Area 10	B-103	HSA	27	Bedrock	BR-2	HSA/Mud	101
Area 10	B-108	HSA	33	Bedrock	BR-3	HSA/Mud	101
Area 10	B-109	HSA	33				

NOTES:

HSA - Hollow Stem Auger
ESP - Environmentalist's Sub-soil Probe
MUD - Mud Rotary Drilling
Depths reported in feet.

3.) 10% nitric acid rinse*
4.) potable water rinse*
5.) methanol rinse, followed by a hexanes rinse
6.) deionized, analyte-free water rinse
7.) allow to air dry, wrap in aluminum foil.

* These steps were omitted if sampling for metals was not conducted.

4.3.2 Hand Auger

The hand auger utilized in this investigation was a 3.25-inch diameter, combination high carbon/stainless steel sand auger. Two borings, completed exclusively for soil sampling, (B-115 and B-121) were completed during this investigation with a hand auger. An ERM geologist assembled the auger system and manually rotated the system into soil at each boring. The auger was advanced approximately one foot into soil and then pulled up to the surface to empty the contents of the auger into a stainless steel sampling bowl. This process continued until the maximum desired sampling depth was achieved. The sample bowl was immediately screened with a PID to determine the potential presence of VOCs. The soil sample was then described as to its color, texture, structure, competence, and moisture content. A representative soil sample was transferred into clean, laboratory-supplied jars and placed into a chilled cooler. Prior to initiation and upon completion of sampling activities, the auger system was decontaminated according to the following procedure:

1.) phosphate-free detergent wash (Liquinox™)
2.) potable water rinse
3.) methanol rinse, followed by hexanes rinse
4.) deionized, analyte-free water rinse
5.) allow to air dry, wrap in aluminum foil.

4.3.3 ESP Corer

The ESP (Environmentalist's Sub-soil Probe) corer utilized in this investigation was a Model PN150 JMC ESP corer. A total of seven soil borings were completed with the ESP corer; Area 2 (test building leach field); Area 3 (former above ground solvent tanks, FRP-2); Area 12 (paint booth area, FRP-2); and, Area 16 (Garage Building). An ERM geologist placed a clean, copolyester plastic liner (3.0 feet long by 0.8-inch diameter) into the stainless steel sampling tube. A 12.5 pound hammer was placed on top of the probe and used to pound the sampling tube into the soil to a depth of three feet. A foot-operated jack was unlatched and used to extract the sampling tube(s) out of the ground. The sampling tube head was then removed to reveal the soil core within the copolyester liner. The liner ends were sealed with plastic caps to prevent the escape of VOCs (if any). For borings deeper than three feet, three-foot long extensions were added to the sampling tube to achieve the total depth desired. Soil cores were described by an ERM geologist for color, texture, structure, competence, and moisture content. The liner was then cut open and scanned along its length with a PID to evaluate the potential presence of VOCs in the sample. Soil samples were transferred into clean, laboratory-supplied jars and placed into coolers with ice.

Based on soil appearance and PID readings, certain samples were selected for shipment to the laboratory for appropriate analyses. Sample tools were decontaminated following the same procedure outlined in the preceding section with the addition of a 10% nitric acid rinse (followed by a potable water rinse) prior to the solvent rinses if sampling for metals at a particular location occurred.

4.3.4 *Mud Rotary Drilling*

Borings that were drilled using a truck mounted mud rotary drill rig were performed using a Schramm Rotadrill operated by Aquifer Drilling and Testing, Inc. of Albany, New York. The drill rig was decontaminated by steam washing prior to performing work on site and subsequent to site activities. Soil borings were conducted by advancing a tricone roller bit at the end of the drill rods. Drilling fluid was circulated in the borehole and through a "mud" pan set at the top of the borehole. Drilling fluid consisted of potable water obtained from on site and Bariod Quick-gel® mixed to a consistency suitable for keeping the borehole open.

4.4 *MONITORING WELLS AND PIEZOMETERS*

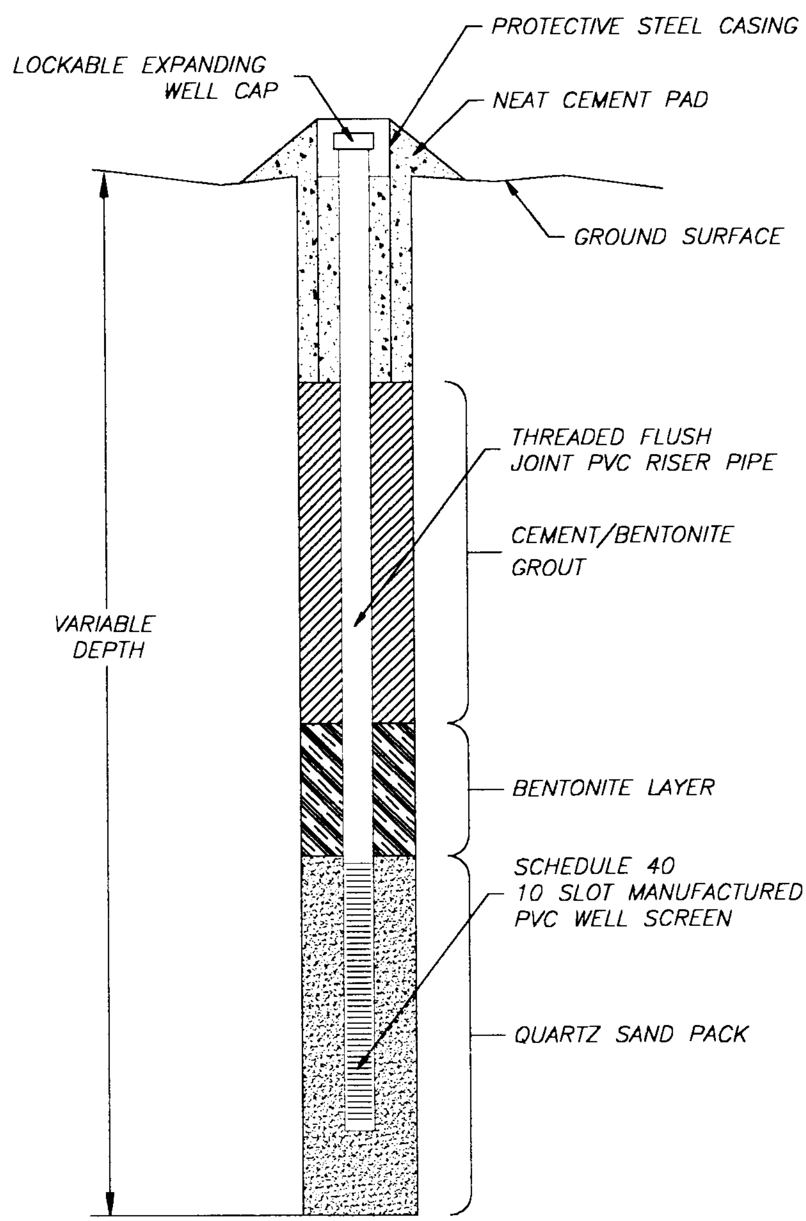
A total of 25 permanent overburden monitoring wells had been installed on the FRP site and in the wetland area north of the site as part of investigations previous to the RI. Numerous ground water samples have been obtained from those wells and several other temporary wells placed in soil borings drilled throughout the site. A fairly complete characterization of the overburden aquifer ground water has been established with regard to VOC constituents, however, data gaps remained. Therefore, two additional permanent monitoring wells were installed in the former hazardous materials storage area (Area 10) as a shallow and deep well pair. Additionally, three permanent monitoring wells were installed in the red clay unit underlying the site as part of the bedrock investigation.

4.4.1 *Monitoring Well Installation*

Five ground water monitoring wells were installed during the RI. Two of the monitoring wells (MW-26S and MW-26D) were installed during the RI to provide additional data regarding the ground water quality of the overburden aquifer at FRP. Three wells (BR-1, BR-2, and BR-3) were intended to be installed bedrock. However, the thickness of overburden resulted in completion in the glacial till. A typical monitoring well construction diagram is illustrated in Figure 4-2. In addition, six piezometers were installed in the wetland area north of the site during accelerated RI/FS tasks completed in October and November 1993. Details of well installations are presented on Monitoring Well Construction Logs in Appendix A.

Soil borings for monitoring wells MW-26S and MW-26D were advanced using 4.25-inch inside diameter hollow stem augers. Monitoring well MW-26D was drilled first and split-spoon soil samples were collected continuously from the ground surface to the bottom of this boring, which terminated in a red clay unit. Soil samples were not collected during the drilling of the adjacent soil boring for MW-26S. A two-inch outside diameter split-spoon sampler two feet in length was used to collect the soil samples from soil boring MW-26D in general accordance with ASTM Method D-1586-84. Each split-spoon soil sample was screened immediately following the retrieval of the split-spoon from the borehole with a PID for VOCs. The moisture content, color, grain size, structure, and other pertinent observations were noted by an ERM geologist on a boring log.

Monitoring wells were constructed with two-inch inside diameter polyvinyl chloride (PVC) well materials. MW-26D was constructed with a ten foot long screen at the bottom of the overburden materials directly overlying the red clay unit. MW-26S was also constructed with a ten foot long screen such that the screen straddled the water table at the time of well construction. Each of these well screens has a slot size of 0.01-inches (10 slot). A clean medium-grained silica sand (Morie #0 equivalent) was installed in the annular space from the base of the well screen to at least



TYPICAL MONITORING WELL CONSTRUCTION DIAGRAM FARRELL ROAD PLANT RI

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FIGURE 4-2

one foot above the top of the screen. Bentonite seals 1.5 and 2.0 feet thick (MW-26S and MW-26D, respectively) were placed above the sand pack in each well. The remainder of the annular space was filled with a grout mixture composed of one bag of cement, approximately seven gallons of potable water, and five pounds of bentonite. Both wells were completed with 8-inch diameter flush mounted protective casings. Lockable compression type well caps were placed on the PVC riser pipe.

Previous investigations at the site suggested that the red clay till unit observed at depth in many of the borings may be an impermeable, confining unit. Previous investigations had not specifically studied this unit or the underlying bedrock to assess the hydrogeology of the bedrock system. The installation of three bedrock monitoring wells was proposed as part of the 1994 RI. Field conditions and observations made during the drilling of the borings for these wells prompted a modification of the designated completion depths of these wells. Bedrock was not encountered within 140 feet of the ground surface at BR-1, nor was bedrock encountered within 100 feet at BR-2 and BR-3. Following discussions and approval by NYSDEC representatives, the borings were terminated at BR-2 and BR-3 at 100 feet and 140 feet at BR-1. The three proposed bedrock wells were completed as glacial till wells in the red clay unit that overlies the bedrock at the site.

Soil borings for monitoring wells BR-1, BR-2, and BR-3 were drilled using both a truck mounted hollow stem auger drill rig and a truck mounted mud rotary drill rig. A pilot hole was drilled to the red clay unit (33 feet below the ground surface) at boring BR-1 using 3.25-inch inside diameter hollow stem augers advanced with a Mobile B-61 drill rig. Split-spoon soil samples were obtained from the pilot hole boring at BR-1 at five foot intervals. A two-inch outside diameter split-spoon sampler two feet in length was used to collect the soil samples from soil borings BR-2 and BR-

3 in general accordance with ASTM Method D-1586-84. Each split-spoon soil sample was screened immediately following the retrieval of the split-spoon from the borehole with a PID for VOCs. The moisture content, color, grain size, structure, and other pertinent observations were noted by an ERM geologist on a boring log. Following the drilling of the pilot hole at BR-1, the boring was overdrilled to 36.5 feet below the ground surface using 10.25-inch hollow stem augers advanced with the Mobile B-61. An 8-inch diameter steel casing was installed in the boring and sealed in place with a cement-bentonite grout mixture. After allowing the casing and grout in BR-1 to cure, the boring was advanced using the mud rotary technique. The mud rotary boring was accomplished with a 6.25-inch diameter tricone roller bit advanced with a Shramm Rotadrill drill rig. The 6.25-inch mud rotary boring was drilled to 140 feet below the ground surface. A 3-inch diameter Denison™ core sample was obtained from this boring for classification purposes from a depth interval of 140 feet to 142 feet. A Denison™ is a thin walled coring devise designed to collect samples from glacial till and soft or weathered bedrock.

Pilot holes for borings BR-2 and BR-3 were drilled using 3.25-inch hollow stem augers advanced with a Mobile B-57 truck mounted drill rig. Split-spoon soil samples were obtained from each boring at five foot intervals. A two-inch outside diameter split-spoon sampler two feet in length was used to collect the soil samples from soil borings BR-2 and BR-3 in general accordance with ASTM Method D-1586-84. Each split-spoon soil sample was screened immediately following the retrieval of the split-spoon from the borehole with a PID for VOCs. The moisture content, color, grain size, structure, and other pertinent observations were noted by an ERM geologist on a boring log. The pilot holes for these borings were drilled to the red clay unit, the top of which was identified at 31.9 feet in BR-2 and at 44 feet in BR-3. Subsequent to drilling the pilot holes at BR-2 and BR-3, the borings were overdrilled from the ground surface to four feet (BR-2) and five feet (BR-3) into the red clay unit. Overdrilling was accomplished using a 12.25-inch diameter tricone roller bit that was advanced with a Schramm mud rotary drill rig. An 8-inch diameter steel casing was set in the 12.25-inch borehole and the annulus was seal with a cement-bentonite grout mixture. After allowing the casing and grout in BR-2 and BR-3 to cure, the borings were advanced using the mud rotary drilling technique. The mud rotary boring was accomplished with a 6.25-inch diameter tricone roller bit advanced with a Shramm Rotadrill drill rig. A Denison core soil sample was obtained of the red clay unit at BR-2 from 40 feet to 43 feet below the ground surface. This relatively undisturbed section of the red clay unit was submitted to Parratt-Wolff's geotechnical laboratory for hydraulic conductivity testing by ASTM Method D-5084-90 (triaxial hydraulic conductivity). The 6.25-inch mud rotary borings were drilled to a total depth of 100 feet below the ground surface at each location. A Denison core sample was obtained from each boring for classification purposes from a depth interval of 100 feet to 103 feet.

Ground water monitoring wells were installed in borings BR-1, BR-2, and BR-3. Monitoring wells were constructed with two-inch inside diameter PVC well materials. Each of these wells was constructed with ten foot long screens having slot sizes of 0.02-inches (20 slot). A clean medium-grained silica sand (Morie #2 equivalent) was installed in the annular space from the base of the well screen to approximately ten feet above the top of the screen. Bentonite seals ten feet thick were tremied in place above the sand pack in each well. The remainder of the annular space was filled with a grout mixture consisting of one bag of cement, to approximately seven gallons of potable water, and five pounds of bentonite. Each well was completed with 12-inch diameter flush mounted protective casings. Lockable compression type well caps were placed on the PVC riser pipe.

4.4.2 *Piezometer Installation*

Three piezometers couplets were installed in the wetland area north of the site during the accelerated RI. The couplets were installed by coring a hole using either a sediment corer, ESP, or a hand driven bucket auger, depending on the soil type. Each piezometer was constructed of one-inch diameter schedule 40 PVC casing. The lower portion of the PVC was field slotted at 2-inch increments and a threaded bottom cap was placed on the casing. The shallow piezometers (P-17S, P-18S, and P-19S) were installed to a depth of approximately 3 feet. Deep piezometers (P-17D, P-18D, and P-19D) were installed to a depth of between 7.25 and 7.75 feet. All piezometers received a surface seal of approximately 12-inches of bentonite chips. Horizontal distance between the screened portions of shallow and deep piezometers is approximately 2 to 3 feet.

4.4.3 *Well Development*

New and existing site monitoring wells were developed as part of the RI. The purpose of well development was to restore the formation material adjacent to the well screen to its natural condition to allow for the collection of representative ground water samples. Newly installed wells were not disturbed for a minimum of 24 hours following their completion to allow the annular space grout to cure properly.

Wells were developed using either a small diameter submersible pump or a Waterra footvalve pump system. During development, the pH, conductivity, temperature, and turbidity were measured to monitor water quality. These field parameters were used to indicate when the wells had been developed adequately enough to provide representative ground water samples. Development was considered complete when turbidity measurements became 50 NTUs or less or when, after removing five well volumes, field parameters had stabilized and there was no apparent improvement in turbidity. Following the removal of five well volumes, field parameters were measured from each 2000 ml volume removed and stabilization was defined as three successive measurements in which pH and conductivity did not vary by more than ten percent of the previous value. Monitoring wells BR-1, BR-2, and BR-3 were developed using a Grunfos Redi-Flo II submersible pump. Development of these three wells was accomplished by pumping each well dry three times.

4.4.4 *Monitoring Well Sampling*

The primary purpose of the ground water investigation was to evaluate ground water flow conditions (gradient, flow rate, etc.) at and below the facility and estimate the effect, if any, of facility activities on ground water conditions. This included determining the characteristics of the ground water flow regime below and proximal to the facility and the presence and extent of selected analytes in the overburden aquifer. Ground water investigative work already completed during previous facility investigations was assessed. Resampling of all existing monitoring wells provided a valid data set by which to evaluate the representativeness of previously obtained sampling data.

Ground water samples were collected from each of the new and existing wells and analyzed for specified chemical parameters. Each well was purged of stagnant water prior to sampling which involved the measuring of basic indicator parameters during the purging process to insure that the ground water in the wells had stabilized. Subsequent to purging, ground water samples were collected and submitted to Adirondack Environmental Services, Inc. for chemical analyses.

A total of 30 ground water monitoring wells were sampled during the RI. The wells sampled included those installed during previous site investigative activities and newly installed monitoring wells. Monitoring wells were installed in soil borings and well numbers correspond to soil boring numbers. However, all ground water samples collected from the wells are designated with a (0594) suffix to avoid confusion between ground water samples and soil samples.

Sampling of the ground water monitoring wells commenced on 16 May 1994 and was completed on 20 May 1994. The static water level was measured in each well and the volume of standing water determined. Each well was sounded to verify total well depth. Water levels were recorded to the nearest one-hundredth of a foot using a SINCO Model 51453 electronic water level indicator. Soundings were completed to the nearest one-hundredth of a foot also using the SINCO water level meter.

After the initial observations and measurements were made at each well location as described above, each well was then purged using dedicated disposable polyethylene bailers. During the purging process, a minimum of five well volumes of water was removed from each well to ensure that all stagnant water was evacuated from the well casing. Conductivity, temperature, pH, and turbidity were measured after the removal of each additional well volume of water subsequent to the removal of the five well volumes. The purging process was continued at each well location until conductivity, temperature, and pH stabilized for at least three consecutive measurements. Conductivity and temperature were measured with a factory calibrated YSI model 3000 TLC meter. A Hanna Instruments model HI 8314 portable pH meter utilizing a two-point calibration was used to measure pH. Turbidity was measured using a HF Scientific, Inc. model DRT-15CE turbidimeter.

Immediately after purging was completed at each well location, the well was sampled using the same dedicated disposable polyethylene bailer used for purging. Samples were decanted directly from the bailer into clean laboratory-supplied containers. The sample portion to be analyzed for volatile organic compounds was collected first without unnecessary agitation. Samples for metals analyses were collected as unfiltered samples only with the exception of those collected from six monitoring wells; MW-12, MW-17, MW-18, BR-1, BR-2, and BR-3, where filtered metals samples were collected in addition to unfiltered metals samples. Filtering was accomplished by pumping ground water collected from the designated wells through a 0.45 micron in-line disposable filter. Ground water samples to be analyzed for metals were collected after all other sample portions had been obtained.

Each sample was assigned a unique sample identification number describing the location from which the sample was collected. A three character prefix was assigned to identify the project site. A four digit code followed which designates the sample location (eg. MW-15). A four digit suffix completed the sample identification and indicated the month and year that the sample was collected. Field filtered samples were given an additional identifier (FILT) to indicate that the sample was filtered. An example of this sample identification procedure is "FRP-MW15 (05/94)", which is Farrell Road Plant, monitoring well MW-15, collected in May 1994. "FRP-MW15 (05/94) (FILT)" would be a field filtered sample collected from monitoring well MW-15 in May 1994.

All samples were immediately placed in a thermally insulated cooler with double bagged ice. Samples were shipped to Adirondack Environmental Services via Federal Express overnight service under chain-of-custody documentation with custody seals on each shipment package. The ground water samples were analyzed by Adirondack Environmental Services according to NYSDEC Analytical Services Protocol (ASP) protocols for the following parameters:

- Target Compound List (TCL) VOCs
- TCL Semi-Volatile Organic Compounds (SVOCs)
- TCL Pesticides/PCBs
- Target Analyte List (TAL) Metals
- TAL Cyanide

In addition, two duplicate ground water samples, two matrix spike/matrix spike duplicates and one equipment rinsate blank were collected and analyzed for the appropriate parameters under the same protocols as the ground water samples. Duplicate ground water samples (FRP-DUPE-10 and FRP-DUPE-11) were obtained from FRP-MW26S (05/94) and FRP-MW25 (05/94), respectively.

All new and existing wetlands piezometers were sampled during the accelerated RI task performed in the Fall of 1993. These water samples were analyzed for TCL VOCs. Only seven of the ten pre-existing piezometers were located in the field (piezometers P-14, P-15 and P-16 were not located).

4.5 SURFACE WATER SAMPLING

Three surface water samples (SW-1, SW-2, SW-3) were collected from areas of standing water in the wetlands north of the site. At each location, a suitable volume of surface water was collected into a clean, disposable container inverted to a 45º angle and lowered to one-half of water depth at each location. The sample was brought back to a staging area located near each sampling location for field measurements of pH (gm eq/ L = gram equivalents per liter), temperature (°C), and conductivity (mΩ/cm =

milliohms per centimeter). A field portable Hanna Instruments Model HI 8314 membrane pH meter was used for pH measurements. The pH meter was field calibrated with Fisher Scientific buffers of pH=7.00 and pH=4.00 and has an accuracy of ±0.01. Temperature and conductivity were measured with a factory-calibrated YSI Model 3000 T-L-C (temperature-level-conductivity) meter which has an accuracy of ±0.3°C and ±0.06 mΩ/cm, respectively.. Field instruments were decontaminated between sampling locations according to the following procedure:

1.) phosphate-free detergent wash (Liquinox™)
2.) potable water rinse
3.) deionized, analyte-free water triple rinse.

5.0 1994 REMEDIAL INVESTIGATION FIELD WORK

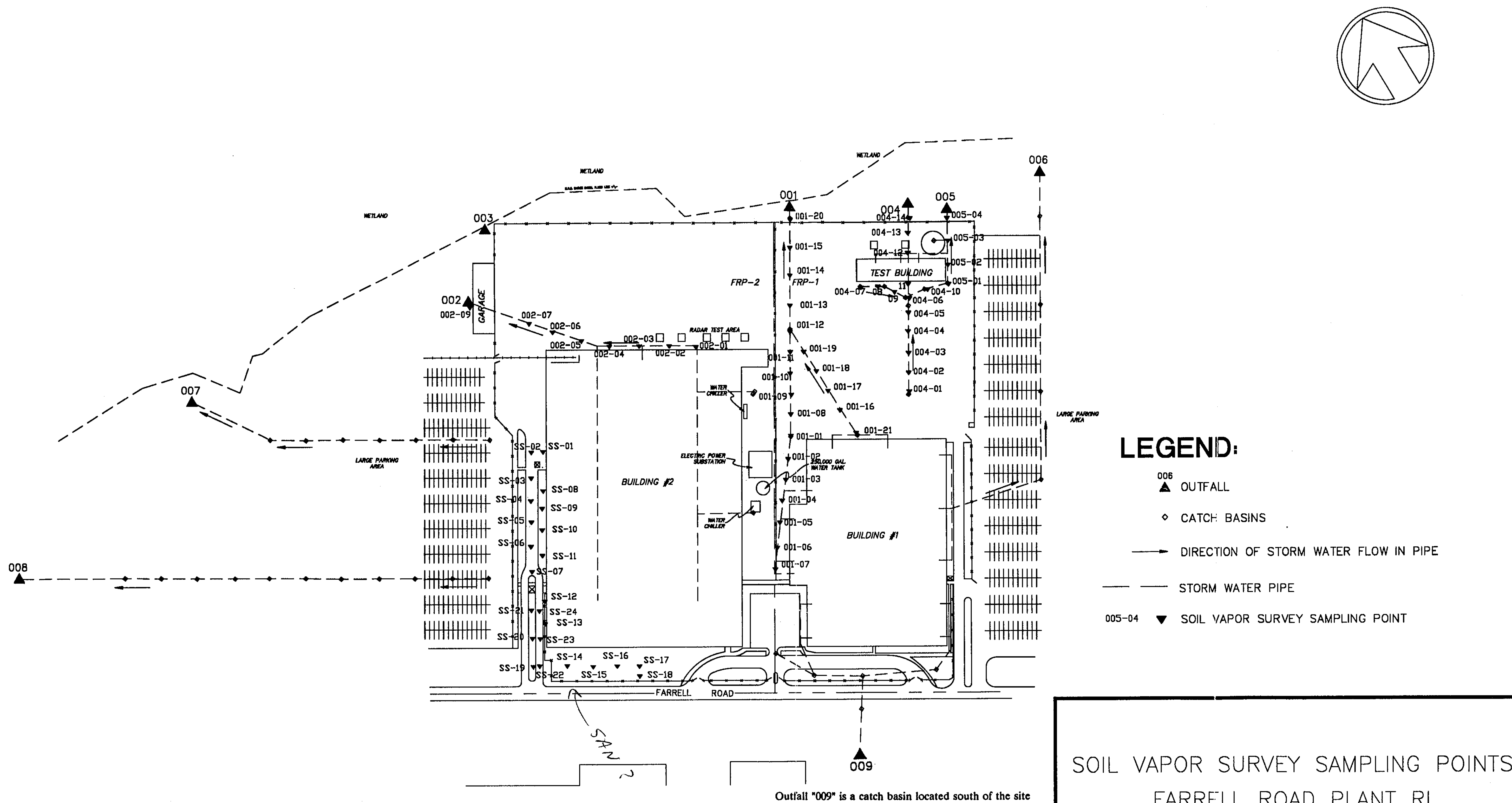
5.1 SOIL VAPOR SURVEY

A soil vapor survey was conducted along storm sewer lines associated with outfalls 001, 002, 004, and 005 and the sanitary sewer line from the west of Building No. 2 to Farrell Road to identify areas of soil potentially affected by VOCs. A total of 72 soil vapor sampling points were installed along sewer lines during this investigation (Figure 5-1). Soil vapor samples and Quality Assurance/Quality Control (QA/QC) samples were analyzed in the field with a Photovac 10S50 gas chromatograph that was calibrated to benzene, trichloroethene, toluene, and trans-1,2-dichloroethene standards. Results of the soil vapor survey are summarized in Table 5-1.

5.2 SEDIMENT INVESTIGATION

5.2.1 Outfalls

Between 29 April and 5 May 1994 sediment samples were collected from the eight outfalls and the catch basin south of the site designated outfall 009 located at the site (Figure 5-2). A total of 20 sediment samples were collected, including three QA/QC samples, one Matrix Spike/Matrix Spike Duplicate (MS/MSD), and two duplicate samples (Table 5-2). A second duplicate sample (FRP-DUPE-07) was collected on 5 May 1994 for VOCs due to breakage of the original VOC duplicate sample container (sample FRP-DUPE-04) during shipment to the laboratory. With the exception of sample FRP-OUT-07(0-0.5) which was analyzed for TCL VOCs only, all outfall sediment samples were analyzed under NYSDEC 1991 ASP protocol for the full TCL/TAL parameter suite. Detailed descriptions of sediment characteristics and other relevant sampling information are provided on sediment sampling records located in Appendix B.



SOIL VAPOR SURVEY SAMPLING POINTS
FARRELL ROAD PLANT RI

PREPARED FOR
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ERM-Northeast
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SCALE 1"=220'
DATE 9/94
FIGURE 5-1

TABLE 5-1
SUMMARY OF SOIL VAPOR SURVEY DATA
MMC-FARRELL ROAD PLANT RI

LOCATION	SAMPLE ID	RESULT (PPM)	COMMENT
Storm sewer to Outfall 001	SVS-001-01	ND	ND = None Detected.
	SVS-001-02	ND	
	SVS-001-03	0.189	Toluene; also possibly xylenes.
	SVS-001-04	ND	
	SVS-001-05	0.719	Toluene; also possibly xylenes.
	SVS-001-06	ND	
	SVS-001-07	ND	
	SVS-001-08	ND	
	SVS-001-09	ND	
	SVS-001-10	ND	
	SVS-001-11	ND	
	SVS-001-12	ND	
	SVS-001-13	ND	
	SVS-001-14	ND	
	SVS-001-15	ND	
	SVS-001-16	ND	
	SVS-001-17	ND	
	SVS-001-18	ND	
	SVS-001-18-DUP	ND	
	SVS-001-19	TRACE	Trace toluene; no quantification.
	SVS-001-19A	ND	
	SVS-001-20	ND	
	SVS-001-21	ND	
	SVS-001-22		
Storm sewer to Outfall 002	SVS-002-01	ND	
	SVS-002-02	ND	
	SVS-002-03	TRACE	Trace of an unknown compound.
	SVS-002-04	ND	
	SVS-002-05	ND	
	SVS-002-06	ND	
	SVS-002-07	0.004	Trichloroethene.
	SVS-002-08	ND	Vapor Point met refusal during drilling.
	SVS-002-09	ND	
Storm sewer to Outfall 004	SVS-004-01	ND	
	SVS-004-02	ND	
	SVS-004-03	ND	
	SVS-004-04	ND	
	SVS-004-05	0.122	Toluene.
	SVS-004-06	ND	

NOTES:

ND - Not Detected
NS - Not Sampled
NQ - No Qualification

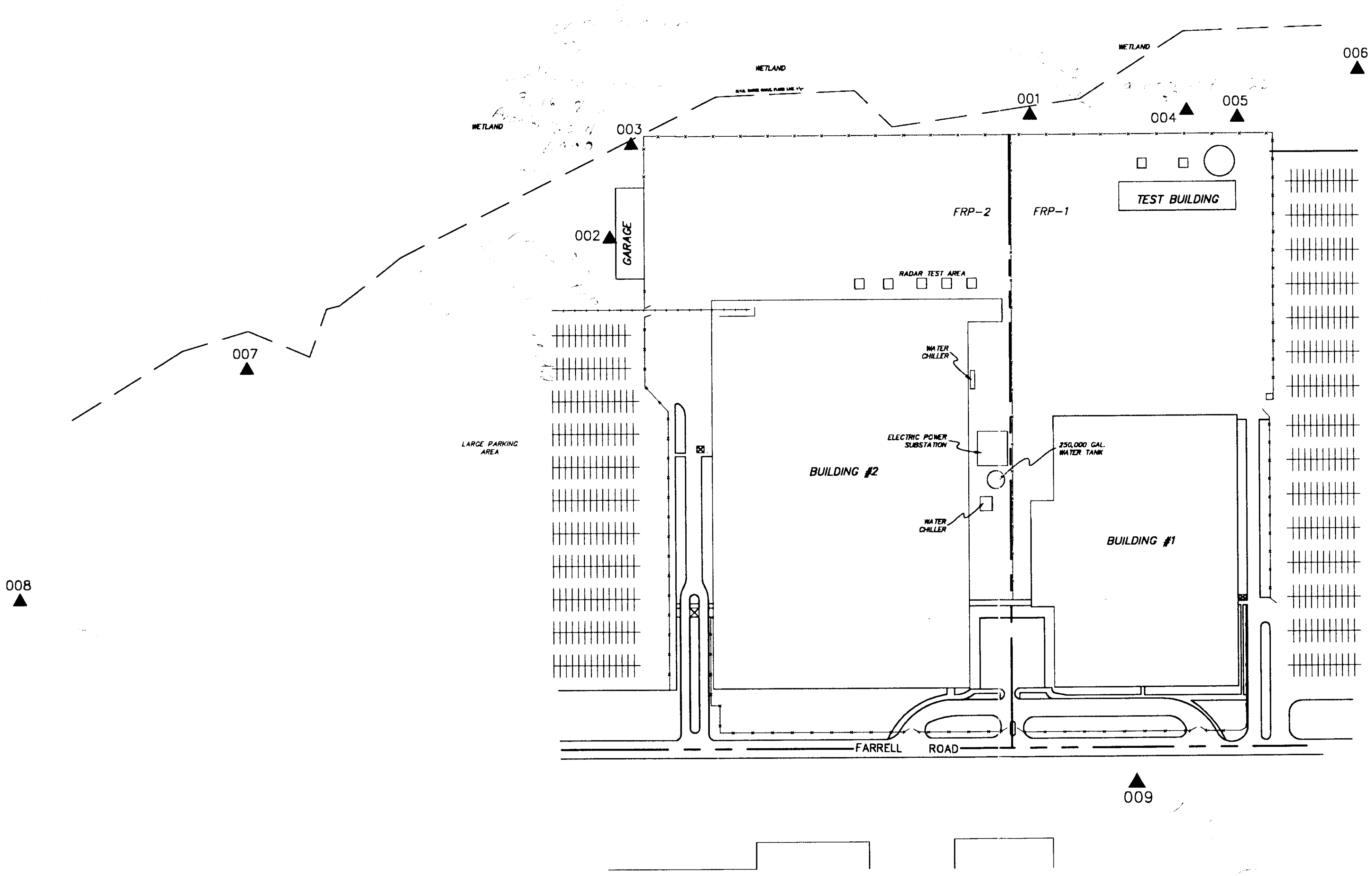
TABLE 5-1 (cont)
SUMMARY OF SOIL VAPOR SURVEY DATA
MMC-FARRELL ROAD PLANT RI

Storm sewer to Outfall 004	SVS-004-07	ND	
	SVS-004-08	ND	
	SVS-004-09	ND	
	SVS-004-10	ND	
	SVS-004-11	ND	
	SVS-004-12	ND	
	SVS-004-13	ND	
	SVS-004-14	ND	
Storm sewer to Outfall 005	SVS-005-01	ND	
	SVS-005-02	ND	
	SVS-005-03	ND	
	SVS-005-04	ND	
Sanitary Sewer	SAN-01	ND	
	SAN-02	ND	
	SAN-03	ND	
	SAN-04	TRACE	Trace unknowns, possibly methyl isobutyl ketone.
	SAN-05	TRACE	Trace unknowns, possibly methyl isobutyl ketone.
	SAN-06	13.77	1,1,1-Trichloroethane; also possibly methyl isobutyl ketone.
	SAN-06-DUP	NQ	Similar results as SAN-06.
	SAN-07	ND	
	SAN-08	ND	
	SAN-09	ND	
	SAN-10	ND	
	SAN-10-DUP	ND	
	SAN-11	ND	
	SAN-12	ND	
	SAN-13	ND	
	SAN-14	ND	
	SAN-15	ND	
	SAN-16	ND	
	SAN-17	ND	
	SAN-18	ND	
	SAN-19	ND	
	SAN-20	ND	
	SAN-21	ND	
	SAN-22	ND	
	SAN-23	ND	
	SAN-24	ND	
	SAN-DUP2	ND	
Quality Control	FB050494	ND	
	FB050594	0.019	Toluene.

NOTES:

ND - Not Detected

NQ - No Qualification



Outfall "009" is a catch basin located south of the site

LEGEND:

006 ▲ OUTFALL LOCATIONS

OUTFALL LOCATION MAP
FARRELL ROAD PLANT RI

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SCALE 1"=220'
DATE 8/94
FIGURE 5-2

TABLE 5-2
OUTFALL SEDIMENT SAMPLE SUMMARY
MMC-FARRELL ROAD PLANT RI

SAMPLE ID	SAMPLE DEPTH/ LOCATION*	DATE SAMPLED	COC NUMBER	COMMENTS
FRP-OUT-01A	0/0	5/2/94	940502-01	
FRP-OUT-01B	0/10	5/2/94	940502-01	
FRP-OUT-01C	1/0	5/2/94	940502-01	
FRP-OUT-02A	0/0	4/29/94	940429-01	
FRP-OUT-02B	1/0	4/29/94	940429-01	
FRP-OUT-02C	0/5	4/29/94	940429-01	
FRP-OUT-02D	0/10	4/29/94	940429-01	
FRP-OUT-03A	0/0	4/29/94	940429-02	
FRP-OUT-03B	1/0	4/29/94	940429-02	
FRP-OUT-03C	0/12	4/29/94	940429-02	
FRP-OUT-04	0/0	5/2/94	940502-01	
FRP-OUT-05	0/0	4/29/94	940429-02	
FRP-OUT-06	0/0	4/29/94	940429-01	
FRP-OUT-06 MS/MSD	0/0	4/29/94	940429-01	MS/MSD sample.
FRP-OUT-07	0/0	4/29/94	940429-01	
FRP-OUT-07 (0-0.5)	0-0.5/0	5/5/94	940505-01	VOC sample only.
FRP-OUT-08	0/0	4/29/94	940429-01	
FRP-OUT-09	0/0	4/29/94	940429-02	Catch Basin south of site.
FRP-DUPE-04	0/0	4/29/94	940429-01	FRP-OUT-07
FRP-DUPE-07	0-0.5/0	5/5/94	940505-01	FRP-OUT-07(0-0.5) VOC sample only.

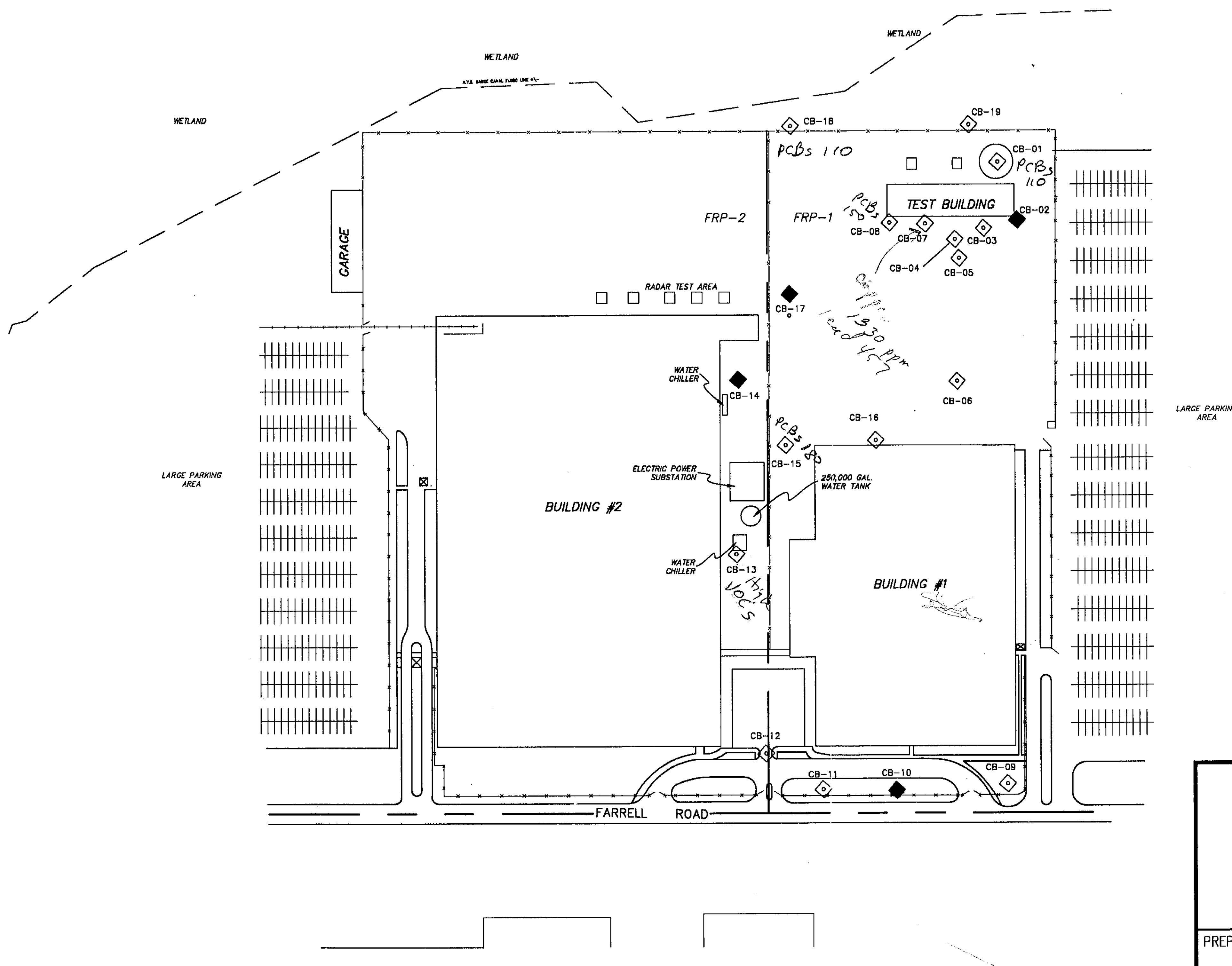
* Sample depth and location are given in feet relative to the point immediately below the end of the outfall pipe.
COC - Chain of Custody

5.2.2 *Catch Basins*

Site base maps show a total of 19 catch basins within or immediately adjacent to the fenced-in portion of the site, all of which were selected for sediment sampling under the conditions of the Consent Order. These catch basins were assigned designations by an ERM geologist prior to the initiation of field sampling (Figure 5-3). All sampling activities occurred between 25 and 27 April 1994. Of the 19 catch basins purported to exist, all except CB-12 were located. Four of these 18 catch basins (CB-02, CB-10, CB-14, and CB-17) did not contain enough sediment to collect any samples. A total of 16 sediment samples were collected from the remaining 14 catch basins including an MS/MSD sample (FRP-CB-13 MS/MSD) and a duplicate sample (FRP-DUPE-01). All catch basin sediment samples were sent to the laboratory for analysis under NYSDEC 1991 ASP protocol for the full TCL/TAL parameter suite with the exception of FRP-CB-19 which contained enough sediment for only two 40 ml VOC vials (Table 5-3). Detailed descriptions of sediment characteristics and other relevant sampling information are provided on sediment sampling records located in Appendix B.

5.2.3 *Wetlands*

Twelve soil cores (SS-1 through SS-12) were collected on 26 and 27 October 1993 from the wetlands north of the site as part of the accelerated RI/FS investigation (Figure 5-4). A total of 25 samples including one duplicate sample were collected from these cores (Table 5-4). All samples were sent to the laboratory for analysis under NYSDEC 1991 ASP protocol for TCL VOCs and total organic carbon. Detailed descriptions of soils and stratigraphy encountered in each borehole are indicated on boring logs located in Appendix B).



Show storm sewer system

LEGEND:

◇ CATCH BASIN LOCATIONS

◆ CATCH BASIN LOCATIONS NOT SAMPLED DUE TO INSUFFICIENT AMOUNT OF SEDIMENT

NOTE:

CATCH BASIN CB-12 WAS NOT LOCATED IN THE FIELD.

CATCH BASIN LOCATION MAP
FARRELL ROAD PLANT RI

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SCALE	1"=160'
DATE	8/94
FIGURE	5-3

TABLE 5-3
CATCH BASIN SEDIMENT SAMPLE SUMMARY
MMC-FARRELL ROAD PLANT RI

SAMPLE ID	DATE SAMPLED	COC NUMBER	AVE. SEDIMENT DEPTH1	CB RADIUS2	CB VOLUME3	COMMENTS
FRP-CB-01	4/25/94	940425-01	<0.054	2.05	<0.66	
FRP-CB-03	4/27/94	940427-01	<0.05	1.55	<0.38	
FRP-CB-04	4/27/94	940427-01	<0.05	1.55	<0.38	
FRP-CB-05	4/26/94	940426-01	<0.05	2.05	<0.66	
FRP-CB-06	4/26/94	940426-02	<0.05	2.05	<0.66	
FRP-CB-07	4/26/94	940426-01	<0.05	2.05	<0.66	
FRP-CB-08	4/26/94	940426-02	0.167	2.05	2.20	
FRP-CB-09	4/26/94	940426-01	1.00	NA	4.84	Square basin, length = 2.2'
FRP-CB-11	4/26/94	940426-01	0.33	NA	1.60	Square basin, length = 2.2'
FRP-CB-13	4/26/94	940426-01	0.80	1.05	2.77	
FRP-CB-13 MS/MSD	4/26/94	940426-02	NA	NA	NA	MS/MSD sample.
FRP-CB-15	4/27/94	940427-01	<0.05	1.05	<0.17	
FRP-CB-16	4/26/94	940426-02	0.167	NA	0.81	Square basin, length = 2.2'
FRP-CB-18	4/27/94	940427-01	0.167	1.55	1.26	
FRP-CB-19	4/27/94	940427-01	<0.05	1.55	<0.37	VOC sample only.
FRP-DUPE-01	4/26/94	940426-01	NA	NA	NA	FRP-CB-07

TOTAL ESTIMATED VOLUME OF SEDIMENT IN 14 CATCH BASINS IS APPROXIMATELY 18 CF

1 - Average depth of sediment given in feet.

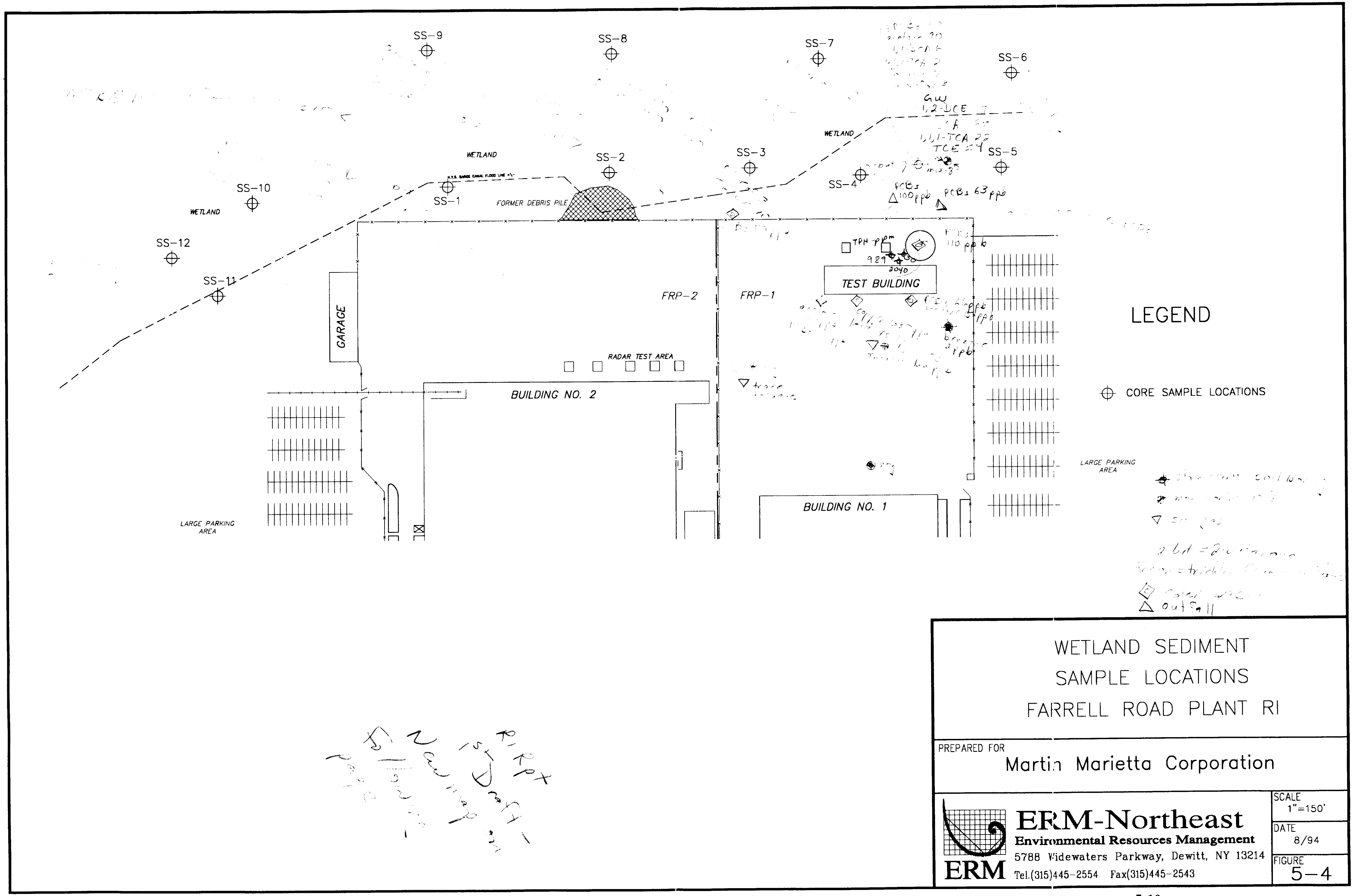
2 - Catch basin radius given in feet.

3 - Catch basin volume (V) estimate given in cubic feet calculated as a right circular cylinder by:

$$V = \Pi r2h$$

where Π = pi = 3.1415, r = radius of catch basin, and h = average depth of sediment.

4 - A value of <0.05 feet is used when average depth of sediment was less than one inch (1 inch = 0.083 feet).


SS-9
SS-8
SS-7
SS-6
SS-5
SS-4
SS-3
SS-2
SS-1
SS-10
SS-11
SS-12
WETLAND
WETLAND
WETLAND
WETLAND
FORMER DEBRIS PILE
GARAGE
FRP-2
FRP-1
RADAR TEST AREA
BUILDING NO. 2
BUILDING NO. 1
TEST BUILDING
LARGE PARKING AREA
LARGE PARKING AREA
GW
1,2-DCE
1,1,1-TCA
TCE
PCBs 100 ppb
PCBs 63 ppb
PCBs 110 ppb
TPH ppm
989
2040
LEGEND
CORE SAMPLE LOCATIONS
outfall
WETLAND SEDIMENT
SAMPLE LOCATIONS
FARRELL ROAD PLANT RI
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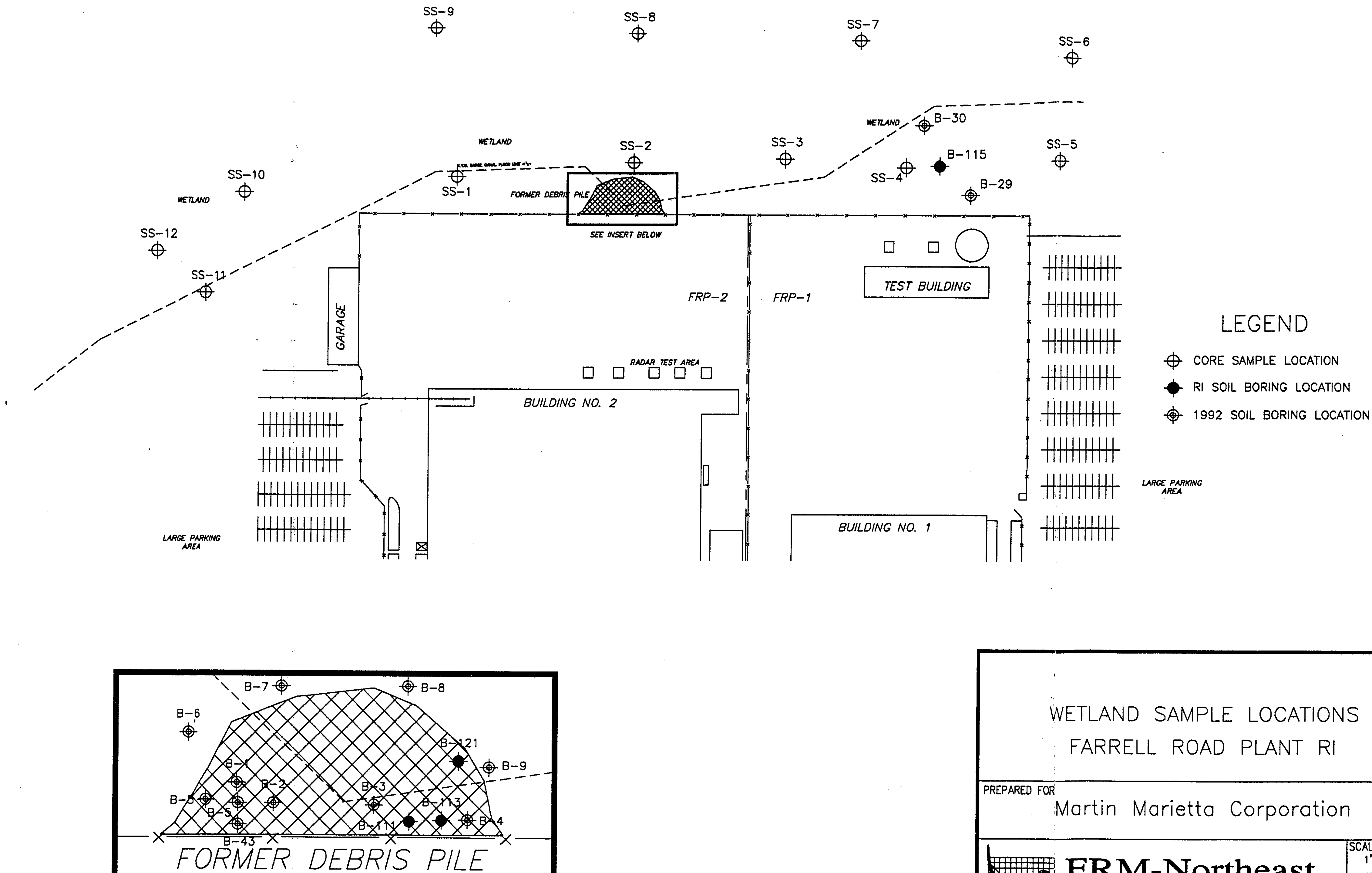
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE 1"=150'
DATE 8/94
FIGURE 5-4
RI Rpt
1st Draft
New map on following page



REV 4/95

WETLAND SAMPLE LOCATIONS
FARRELL ROAD PLANT RI

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SCALE 1"=150'
DATE 8/94
FIGURE 5-4

TABLE 5-4
WETLANDS SEDIMENT SAMPLE SUMMARY
MMC-FARRELL ROAD PLANT RI

SAMPLE ID	SAMPLE DEPTH (FT)	DATE SAMPLED	SAMPLING DEVICE	DOMINANT TEXTURE	COMMENTS
SS-1 (0-1)	0-1	10/26/93	Wildco Corer	Sand	
SS-1 (1-2)	1-2	10/26/93	Wildco Corer	Sandy Silt	
SS-2 (0-1)	0-1	10/27/93	ESP	Sand	
SS-2 (1-2)	1-2	10/27/93	ESP	Sand	
SS-3 (0-1)	0-1	10/27/93	ESP	Sand	
SS-3 (1-2)	1-2	10/27/93	ESP	Sand	
SS-4 (0-1)	0-1	10/27/93	ESP	Sand	
SS-4 (1-2)	1-2	10/27/93	ESP	Sand	Water saturated.
SS-5 (0-1)	0-1	10/27/93	ESP	Sand	
SS-5 (1-2)	1-2	10/27/93	ESP	Sand	
SS-6 (0-1)	0-1	10/27/93	Wildco Corer	Silt	Water saturated.
SS-6 (1-2)	1-2	10/27/93	Wildco Corer	Silt	Duplicated sample.
SS-7 (0-1)	0-1	10/27/93	Wildco Corer	Organic Silt	Water saturated.
SS-7 (1-2)	1-2	10/27/93	Wildco Corer	Organic Silt	Water saturated.
SS-8 (0-1)	0-1	10/26/93	Wildco Corer	Organic Silt	Water saturated.
SS-8 (1-2)	1-2	10/26/93	Wildco Corer	Silt	Water saturated.
SS-9 (0-1)	0-1	10/26/93	Wildco Corer	Organic Silt	Water saturated.
SS-9 (1-2)	1-2	10/26/93	Wildco Corer	Silt	Water saturated.
SS-10 (0-1)	0-1	10/26/93	Wildco Corer	Silt	Water saturated.
SS-10 (1-2)	1-2	10/26/93	Wildco Corer	Sand	
SS-11 (0-1)	0-1	10/26/93	Wildco Corer	Sand	
SS-11 (1-2)	1-2	10/26/93	Wildco Corer	Clayey Silt	
SS-12 (0-1)	0-1	10/26/93	Wildco Corer	Silt	Water saturated.
SS-12 (1-2)	1-2	10/26/93	Wildco Corer	Silt	
DUPLICATE- 1	1-2	10/27/93	Wildco Corer	Silt	From SS-6 (1-2)

5.3 *SOIL INVESTIGATION*

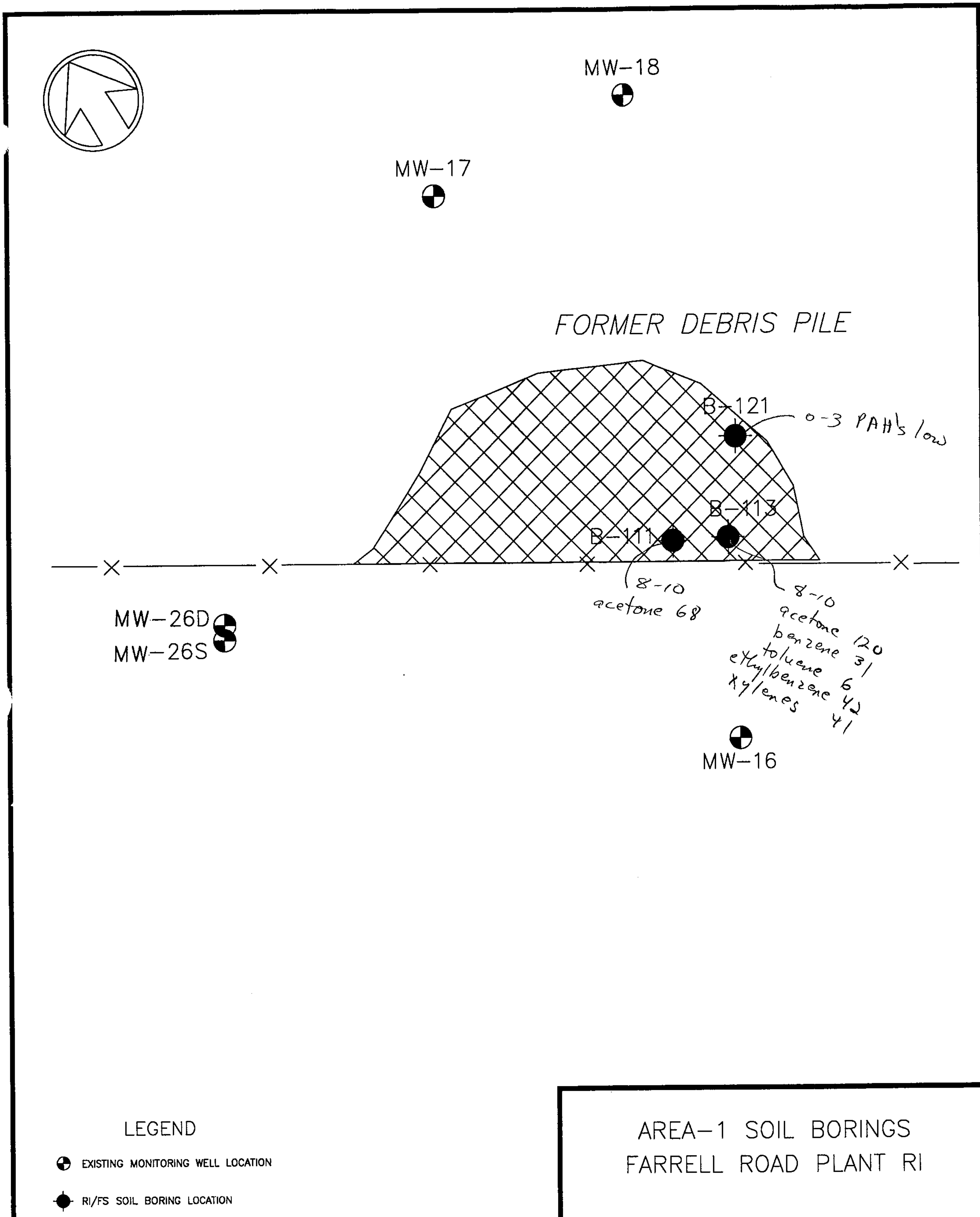
Soils at FRP have been extensively characterized during previous investigations. It was determined that additional data were required to characterize the nature and extent of constituents in all areas of concern. These data were necessary to support finalization of the RI/FS. During the 1994 RI, forty-one soil borings were drilled in the areas of concern and sixty-five soil samples were collected for laboratory analyses. Detailed descriptions of soil characteristics and other relevant sampling information are provided on soil boring logs in Appendix C. A summary of soil samples collected during the RI is presented in Table 5-5.

5.3.1 *Area 1 - Debris Pile North of FRP-2*

During the 1992 debris pile excavation, confirmation soil samples were collected from the natural soil area of the former debris pile. Analytical data from those soil samples indicated that residual VOCs were present at concentrations of less than 100 parts per billion (ppb). The potential that additional compounds may have been present in the former debris pile prompted the collection of soil samples from this area during the RI. Three soil borings (B-111, B-113, B-121) were advanced in this area (Figure 5-5) and one soil sample from each boring was submitted to Adirondack Environmental Services (AES) for analysis of TCL compounds.

Borings B-111 and B-113 were drilled using a truck mounted drill rig. Each of these borings were drilled through the fill materials and terminated upon encountering native soils. Split-spoon soil samples were collected continuously from the ground surface to the bottom of these borings. The split-spoon soil sample collected from the eight to ten foot interval in both of these borings was selected for laboratory analysis.

Boring B-121 was completed at the toe of the slope of the former debris pile using a hand auger. This boring was advanced to a depth of three feet below the ground surface. A composite soil sample from the entire boring length was collected and submitted to the laboratory for analysis.



AREA-1 SOIL BORINGS
FARRELL ROAD PLANT RI

PREPARED FOR
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SCALE	FIGURE
1"=40'	5-5
DATE 8/94	

TABLE 5-5
SUMMARY OF SOIL SAMPLES
MMC-FARRELL ROAD PLANT RI

SAMPLE AREA	SAMPLE LOCATION	SAMPLE ID	SAMPLE DEPTH (feet)	SAMPLE DATE	TCL VOCs	TCL SVOC	TCL PEST/PCBs	TAL	LEAD	TPH
AREA 1	B-111	FRP-B111(8-10)	8-10	4/25/94	X	X	X			
	B-113	FRP-B113(8-10)	8-10	4/25/94	X	X	X			
	B-121	FRP-B121(0-3)	0-3	4/25/94	X	X	X			
AREA 2	B-115	FRP-B115(2-3)	2-3	4/28/94	X	X	X	X		
	B-115	FRP-B115(5-6)	5-6	4/28/94	X	X	X	X		
	B-126	FRP-B126(3-5)	3-5	4/28/94						X
	B-127	FRP-B127(2-4)	2-4	4/28/94						X
	B-128	FRP-B128(1-3)	1-3	4/28/94						X
AREA 3	B-122	FRP-B122 (0-1)	0-1	10/28/93		X	X	X		
	B-123	FRP-B123(0-1)	0-1	10/28/93		X	X	X		
AREA 4	B-124	FRP-B124(3-5)	3-5	4/25/94	X	X	X			
	B-124	FRP-B124(7-9)	7-9	4/25/94	X	X	X			
	B-125	FRP-B125(3-5)	3-5	4/26/94	X	X	X			
	B-125	FRP-B125(7-9)	7-9	4/26/94	X	X	X			
AREA 5	B-120	FRP-B120(2-4)	2-4	4/26/94	X	X	X	X		
AREA 7	B-116	FRP-B116(4-6)	4-6	4/27/94	X					
	B-116	FRP-B116(8-10)	8-10	4/27/94	X					
	B-117	FRP-B117(2-4)	2-4	4/27/94	X					
	B-117	FRP-B117(6-8)	6-8	4/27/94	X					
	B-118	FRP-B118(3-5)	3-5	4/27/94	X					

SAMPLE AREA	SAMPLE LOCATION	SAMPLE ID	SAMPLE DEPTH (feet)	SAMPLE DATE	TCL VOCs	TCL SVOC	TCL PEST/PCBs	TAL	LEAD	TPH
	B-118	FRP-B118(7-9)	7-9	4/27/94	X					
	B-119	FRP-B119(3-5)	3-5	4/27/94	X					
	B-119	FRP-B119(7-9)	7-9	4/27/94	X					
AREA 9	B-101	FRP-B101(3-5)	3-5	4/26/94	X	X	X			
	B-101	FRP-B101(5-7)	5-7	4/26/94	X	X	X			
	B-102	FRP-B102(3-5)	3-5	4/26/94	X	X	X			
	B-102	FRP-B102(5-7)	5-7	4/26/94	X	X	X			
AREA 10	B-103	FRP-B103(3-5)	3-5	5/2/94	X	X	X	X		
	B-103	FRP-B103(7-9)	7-9	5/2/94	X	X	X	X		
	B-108	FRP-B108(3-5)	3-5	4/29/94	X	X	X	X		
	B-108	FRP-B108(7-9)	7-9	4/29/94	X	X	X	X		
	B-109	FRP-B109(3-5)	3-5	5/2/94	X	X	X	X		
	B-109	FRP-B109(9-11)	9-11	5/2/94	X	X	X	X		
	B-110	FRP-B110(3-5)	3-5	4/28/94	X	X	X	X		
	B-110	FRP-B110(7-9)	7-9	4/28/94	X	X	X	X		
	B-112	FRP-B112(3-5)	3-5	4/27/94	X	X	X	X		
	B-112	FRP-B112(9-11)	9-11	4/27/94	X	X	X	X		
	MW-26D	FRP-MW26D(3-5)	3-5	5/3/94	X	X	X	X		
	MW-26D	FRP-MW26D(11-13)	11-13	5/3/94	X	X	X	X		
AREA 11	B-114	FRP-B114(5-7)	5-7	5/4/94	X					
	B-114	FRP-B114(7-9)	7-9	5/4/94	X					
	B-129	FRP-B129(3-5)	3-5	5/5/94	X					
	B-129	FRP-B129(9-11)	9-11	5/5/94	X					

557.044.03\5-4.tbl

SAMPLE AREA	SAMPLE LOCATION	SAMPLE ID	SAMPLE DEPTH	SAMPLE DATE	TCL VOCs	TCL SVOC	TCL PEST/PCBs	TAL	LEAD	TPH
	B-130	FRP-B130(3-5)	3-5	5/4/94	X					
	B-130	FRP-B130(9-11)	9-11	5/4/94	X					
	B-131	FRP-B131(3-5)	3-5	5/4/94	X					
	B-131	FRP-B131(7-9)	7-9	5/4/94	X					
	B-132	FRP-B132(3-5)	3-5	5/5/94	X					
	B-132	FRP-B132(5-7)	5-7	5/5/94	X					
AREA 12	B-106	FRP-B106(2-3)	2-3	11/1/93				X		
	B-106	FRP-B106(5-6)	5-6	11/1/93				X		
	B-107	FRP-B107(2-3)	2-3	10/28/94				X		
	B-107	FRP-B107(5-6)	5-6	10/28/94				X		
AREA 16	B-104	FRP-B104(5-7)	5-7	5/6/94		X			X	
	B-104	FRP-B104(7-9)	7-9	5/6/94		X			X	
	B-105	FRP-B105(5-7)	5-7	5/6/94		X			X	
	B-105	FRP-B105(7-9)	7-9	5/6/94		X			X	
STORM SEWER	B-133	FRP-B133(1-3)	1-3	5/16/94	X	X	X			
	B-133	FRP-B133(5-7)	5-7	5/9/94	X	X	X			
	B-134	FRP-B134(1-3)	1-3	5/10/94	X	X	X			
	B-134	FRP-B134(7-9)	7-9	5/9/94	X	X	X			
	B-135	FRP-B135(1-3)	1-3	5/10/94	X	X	X			
	B-135	FRP-B135(7-9)	7-9	5/9/94	X	X	X			
	B-136	FRP-B136(1-3)	1-3	5/10/94	X	X	X			
	B-136	FRP-B136(7-9)	7-9	5/10/94	X	X	X			

557.044.03\5-4.tbl

5.3.2 *Area 2 - Septic Leach Field North of Test Building*

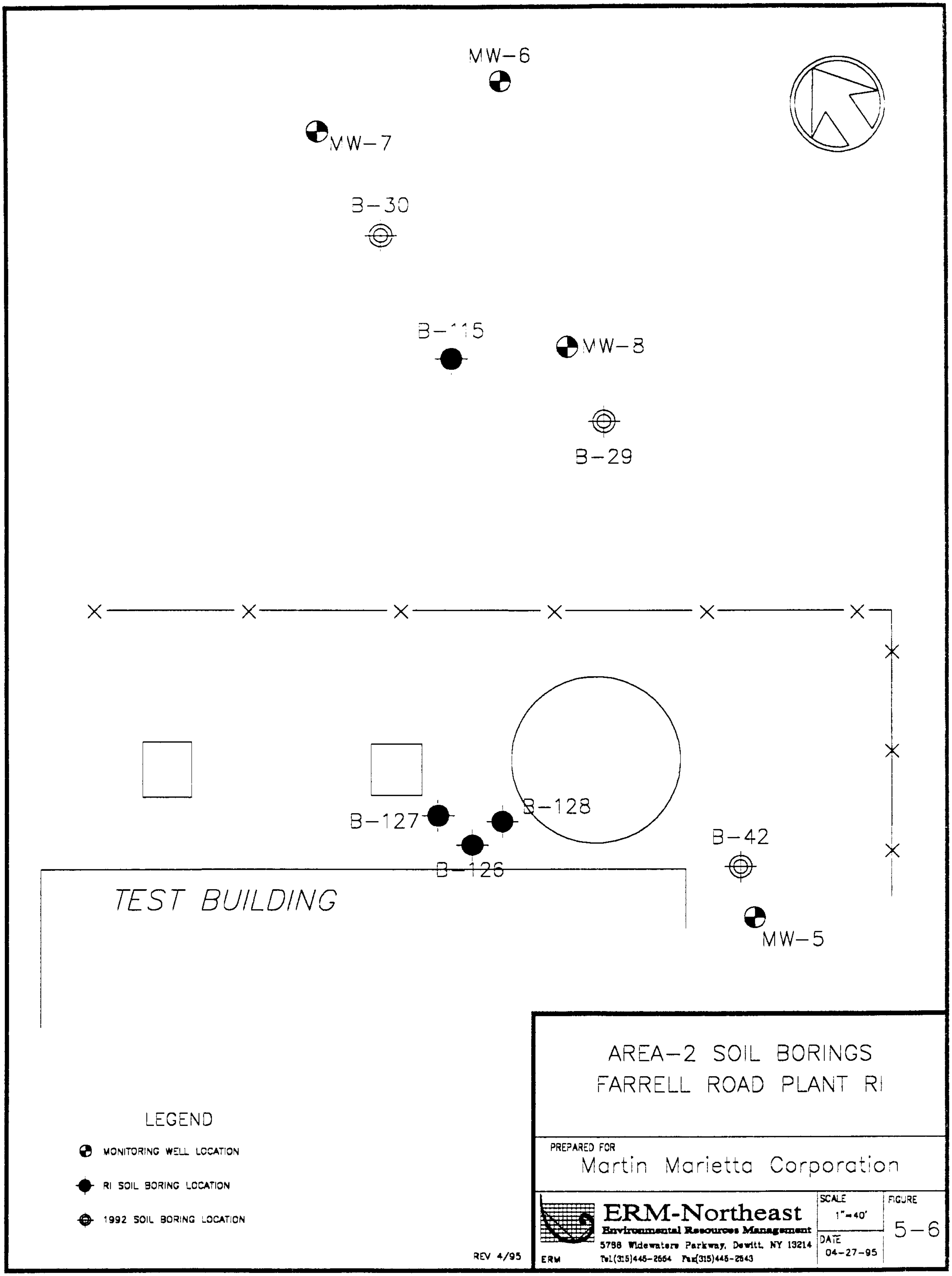
Previous investigations in this area indicated the presence of an anomalous (62 ppm) soil gas measurement. Subsequent soil and ground water investigations in this area did not indicate the presence of VOCs in subsurface soil or ground water. No soil samples had been collected from the location of the 62 ppm anomaly; therefore, additional soil samples were collected from this area as part of the 1994 RI. Four soil borings were completed in this area during the 1994 RI (Figure 5-6) and five soil samples were submitted to Adirondack Environmental Services for analyses.

Soil boring B-115 was completed to a depth of six feet below the ground surface at the location of the 62 ppm soil vapor anomaly using a hand auger. Soil samples were collected from the two to three foot interval and the five to six foot interval for laboratory analysis. These soil samples were analyzed for TCL and TAL compounds.

Three soil borings were completed in the area of the former septic tank north of the test building (B-126, B-127, and B-128). These borings were advanced using the ESP small diameter coring sampler to a total depth of six feet below the ground surface. One representative soil sample from each boring was selected for laboratory analysis based upon visual evidence. Visual evidence included dark gray staining, asphalt fragments and the observation that the material was "fill". The three to five foot interval in boring B-126, the two to four foot interval for boring B-127, and the one to three foot interval from boring B-128 were selected. These soil samples were submitted for analysis for Total Petroleum Hydrocarbons (TPH).

5.3.3 *Area 3 - Former Above Ground Solvent Tanks*

Two borings (B-122 and B-123) were installed through the concrete floor


MW-6
MW-7
B-30
B-115
MW-8
B-29
B-128
B-127
B-42
B-126
TEST BUILDING
MW-5
AREA-2 SOIL BORINGS
FARRELL ROAD PLANT RI
LEGEND
MONITORING WELL LOCATION
RI SOIL BORING LOCATION
1992 SOIL BORING LOCATION
PREPARED FOR
Martin Marietta Corporation
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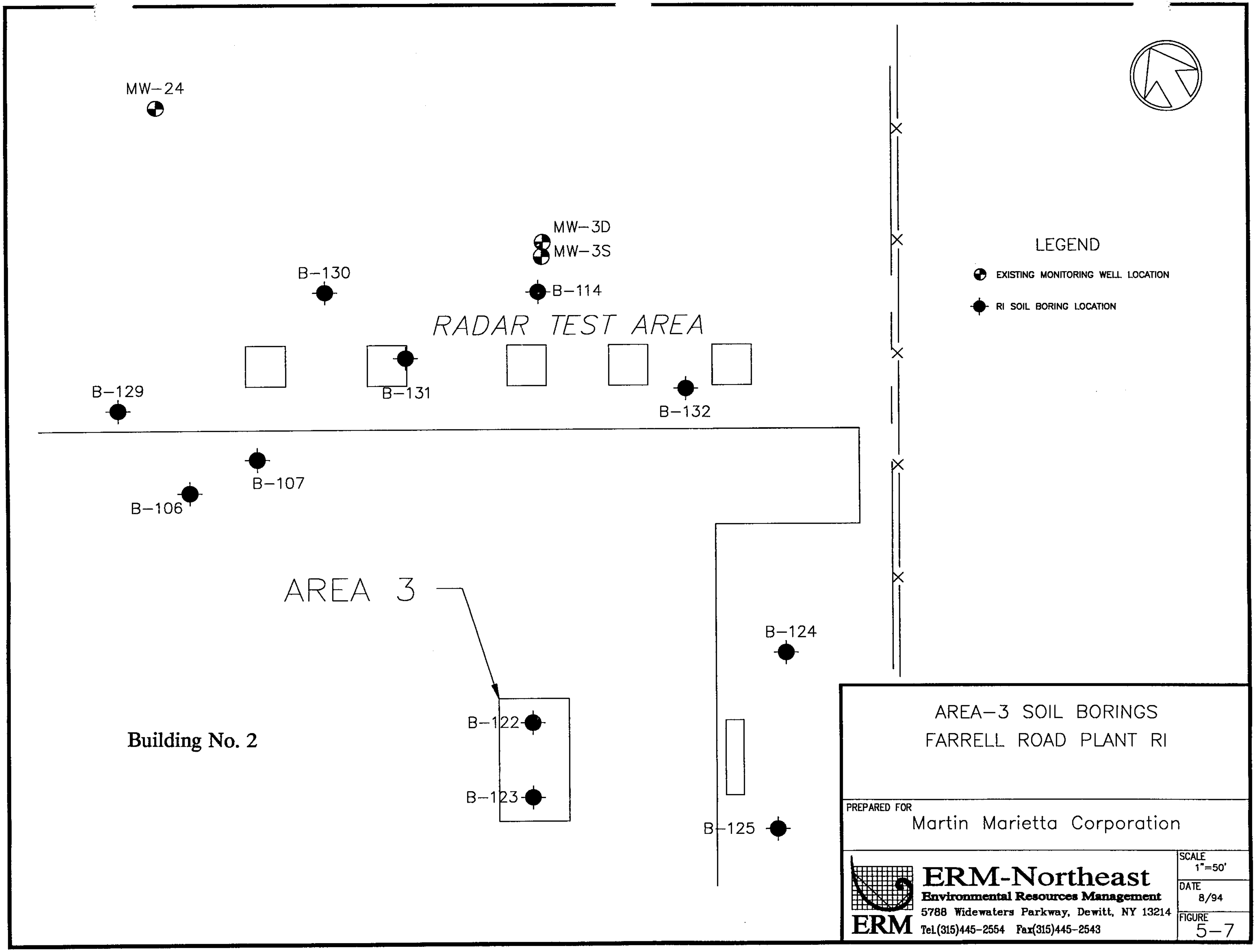
Environmental Resources Management
5788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE
1"=40'
DATE
04-27-95
FIGURE
5-6
REV 4/95

below the raised floor on the west side of the former power room of Building No. 2 (Figure 5-7). Boring B-122 was installed 5 feet north and B-123 was installed 4.3 feet south of the existing piezometer that was installed into boring B-48 during the 1992 environmental investigation. The concrete floor was penetrated using an electric hammer drill equipped with a carbide drill bit. Soil samples were retrieved using the ESP corer and samples were collected from zero to one foot below the bottom of the concrete floor (the total depth of each boring). The two soil samples were submitted to the laboratory for analysis for TCL SVOCs, TCL PCBs, and TAL metals. After completion of sampling activities, borings were backfilled with remaining soil cuttings and the concrete floor was repaired with Sacrete® concrete mix.

5.3.4 *Area 4 - Removed Above Ground Tanks East Side of Building No. 2*

This asphalt-paved area on the east side of FRP-2 was reportedly used to store tanks or trailers that may have contained solvents. Two previous soil borings were advanced to the ground water in this area and soil samples collected from these borings did not reveal any field evidence of VOCs; therefore, samples were not submitted to a laboratory for analysis. Two soil borings were drilled (Figure 5-8) during the 1994 RI to characterize the condition of the soil in this area that may have been affected by the unknown contents of the former tanks or trailers stored in this area. Borings B-124 and B-125 were drilled using hollow stem augers. Continuous split-spoon soil samples were collected from each boring from ground surface to the top of the red clay surface (27 feet in boring B-124 and 23 feet in boring B-125). Soil samples from the three to five foot interval and the seven to nine foot interval in each boring were collected for laboratory analysis for TCL compounds.


MW-24
MW-3D
MW-3S
B-130
B-114
RADAR TEST AREA
B-129
B-131
B-132
B-107
B-106
AREA 3
B-124
B-122
B-123
B-125
Building No. 2
LEGEND
EXISTING MONITORING WELL LOCATION
RI SOIL BORING LOCATION
AREA-3 SOIL BORINGS
FARRELL ROAD PLANT RI
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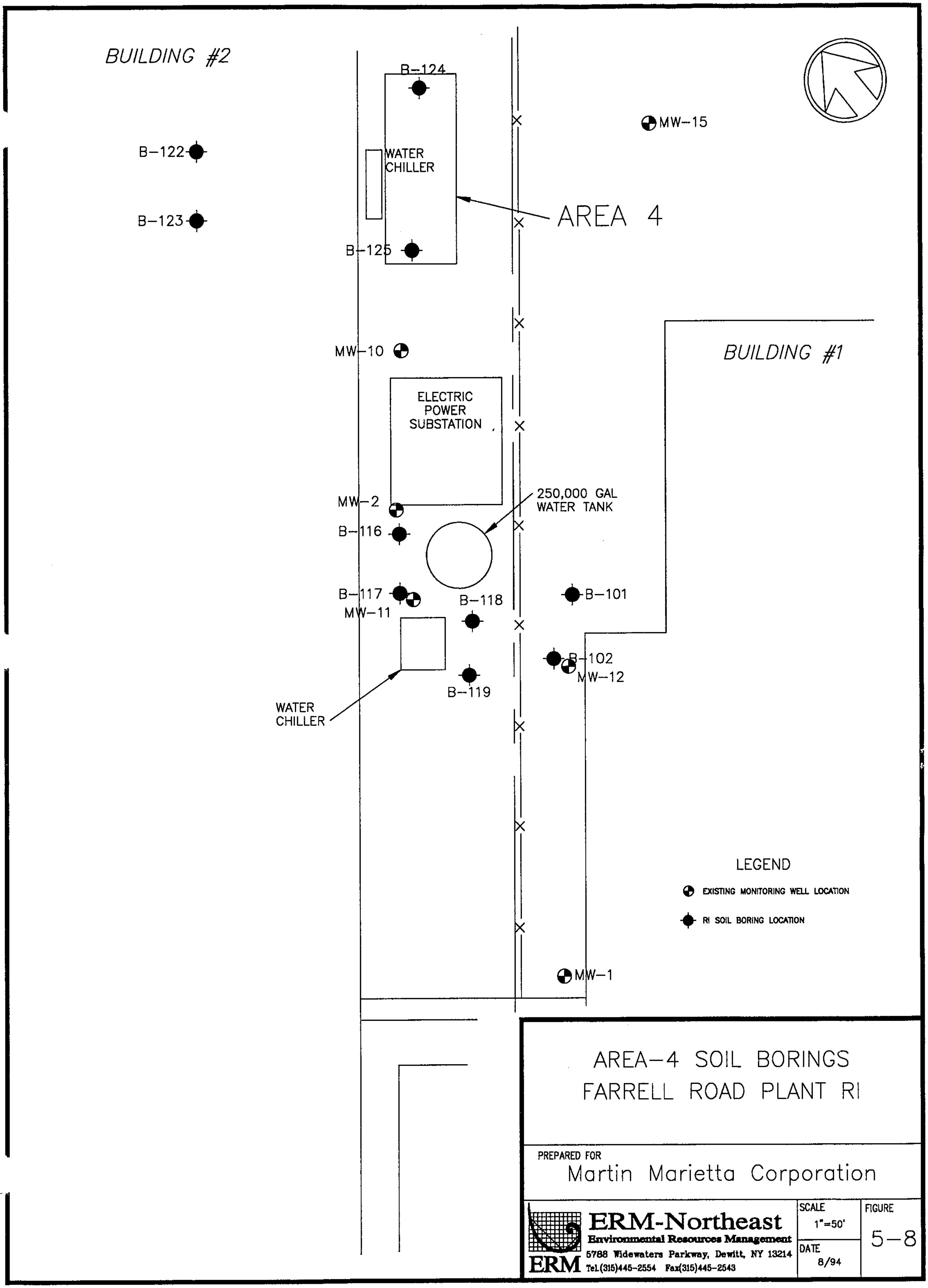
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE 1"=50'
DATE 8/94
FIGURE 5-7



BUILDING #2
B-124
B-122
B-123
WATER CHILLER
AREA 4
B-125
MW-15
MW-10
BUILDING #1
ELECTRIC POWER SUBSTATION
MW-2
250,000 GAL WATER TANK
B-116
B-117
MW-11
B-118
B-101
B-102
MW-12
B-119
WATER CHILLER
LEGEND
EXISTING MONITORING WELL LOCATION
RI SOIL BORING LOCATION
MW-1
AREA-4 SOIL BORINGS
FARRELL ROAD PLANT RI
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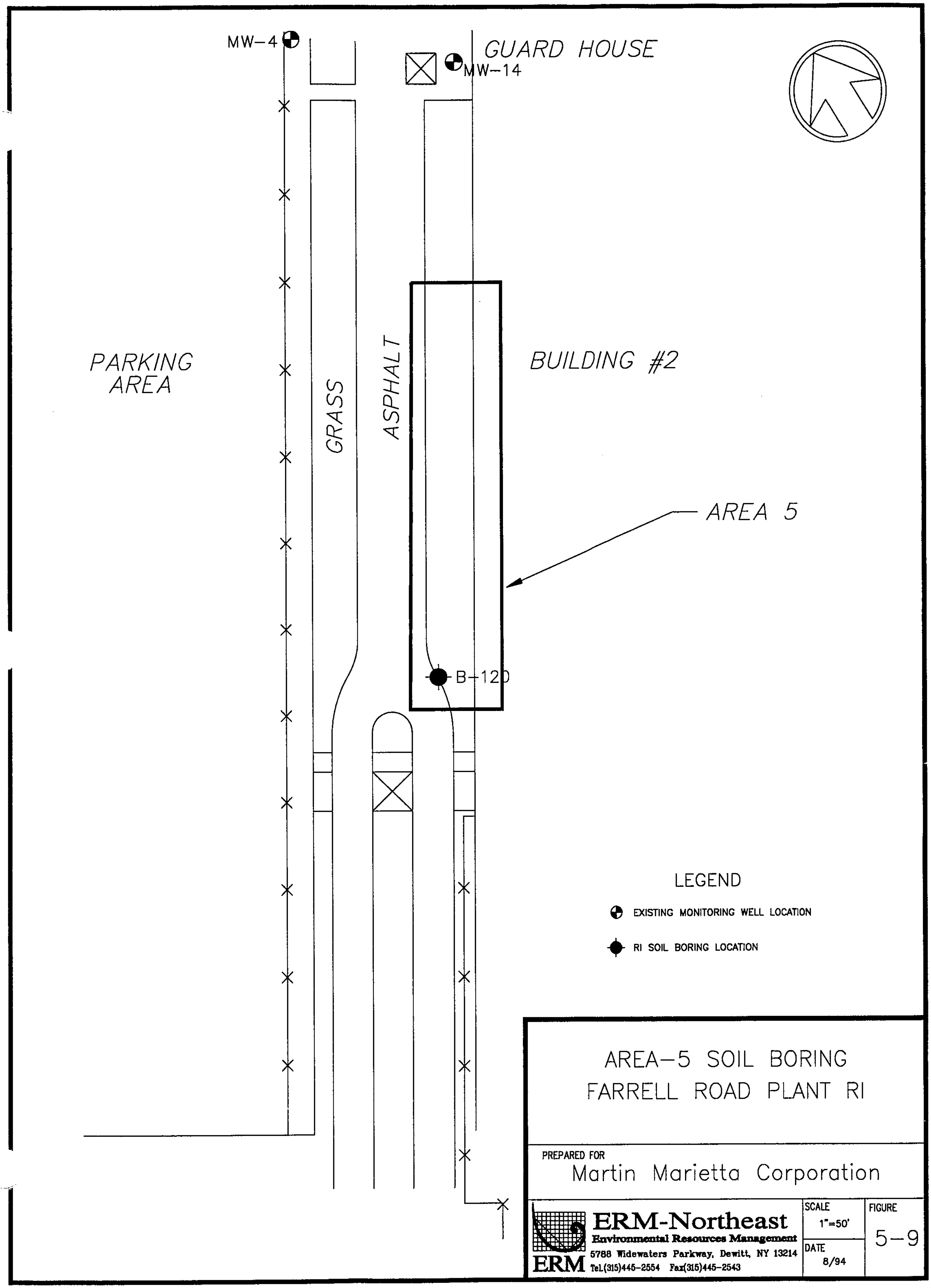
SCALE
1"=50'
DATE
8/94
FIGURE
5-8

5.3.5 *Area 5 - Removed USTs and Drywell West Side of Building No. 2*

The 1992 Environmental Investigation adequately characterized the VOC concentrations in and around this area. However, further investigation was conducted because of the potential presence of other constituents in the soils in this area as a result of possible releases in the past from the drywell. One boring (B-120) was drilled in this area as part of the RI (Figure 5-9). This boring was drilled to the top of the red clay unit using hollow stem augers. Continuous split-spoon soil samples were collected from this boring. One soil sample (two to four foot interval) was submitted to the laboratory for analysis for TCL and TAL compounds.

5.3.6 *Area 7 - Removed UST T-51*

Previous investigations in this area revealed the presence of petroleum hydrocarbons in the ground water in the vicinity of the former 10,000 gallon fuel oil tank. Soil samples obtained from beneath and adjacent to the tank and analyzed for TPH and fuel components had indicated that the soil was relatively unaffected. Existing background information indicated that freon residuals may have been released to the ground in this area. Although significant amounts of freon had not been detected in the soil, freon is present in ground water samples collected from this area at concentrations greater than NYSDEC standards. To address NYSDEC concerns regarding possible soil contamination in this area, four soil borings were drilled in the former tank area and around the chiller during the 1994 RI (Figure 5-10). Borings B-116, B-117, B-118, and B-119 were drilled to the top of the red clay unit using a truck mounted hollow stem auger drilling rig. The total depth of these borings ranged from 14 feet below the ground surface (B-117) to 17 feet below the ground surface (B-118 and B-119). Continuous split-spoon soil samples were collected from each of the borings and two soil samples from each were selected for


MW-4
GUARD HOUSE
MW-14
PARKING AREA
GRASS
ASPHALT
BUILDING #2
AREA 5
B-120
LEGEND
EXISTING MONITORING WELL LOCATION
RI SOIL BORING LOCATION
AREA-5 SOIL BORING
FARRELL ROAD PLANT RI
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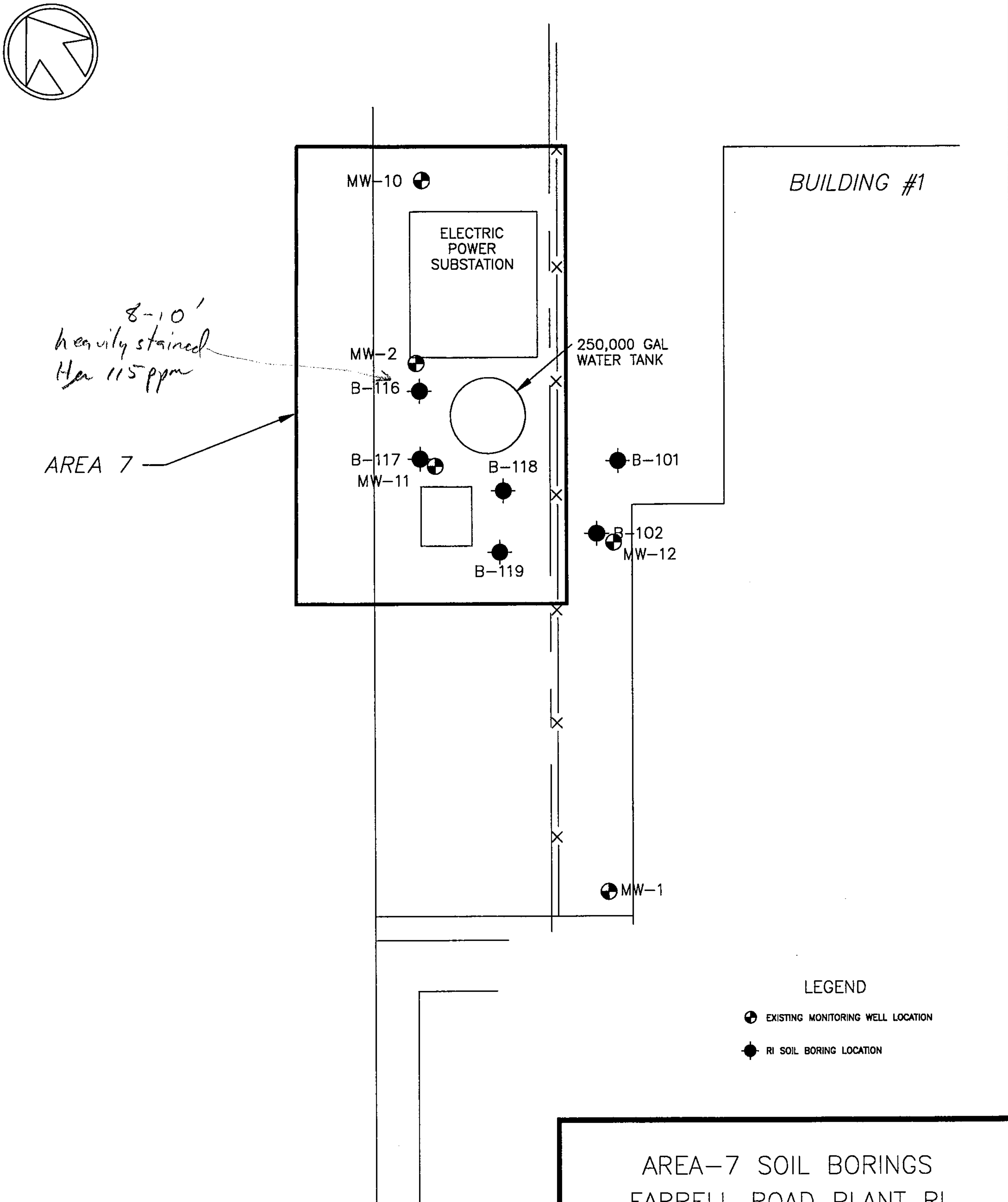
ERM
SCALE
1"=50'
DATE
8/94
FIGURE
5-9



AREA-7 SOIL BORINGS
FARRELL ROAD PLANT RI

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SCALE	FIGURE
1"=50'	5-10
DATE 8/94	

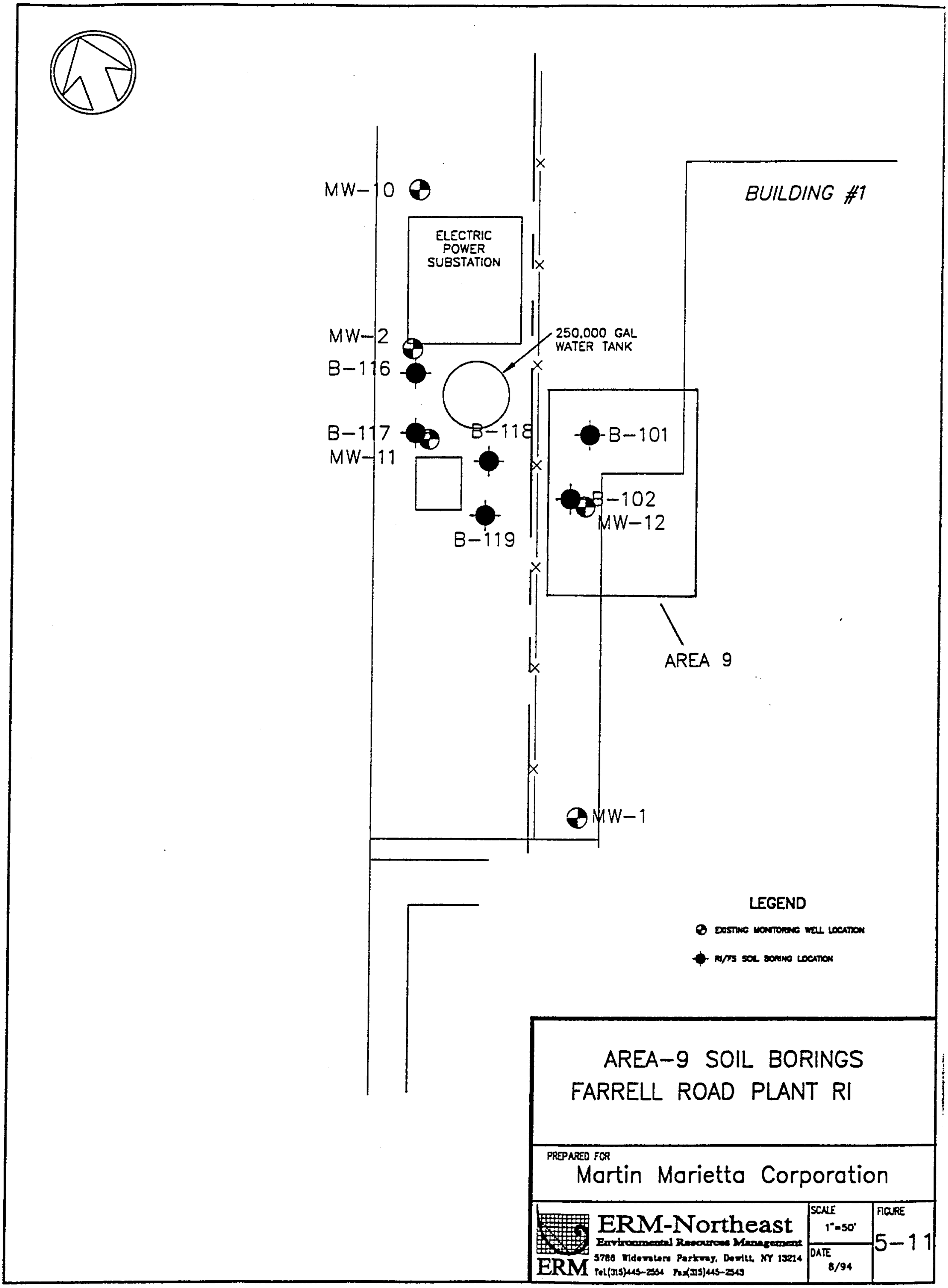
laboratory analysis. Soil samples submitted to the laboratory were analyzed for TCL VOCs.

5.3.7 *Area 9 - Removed UST T-50*

A 10,000-gallon fuel oil UST (T-50) was previously removed from this area. Three soil borings had been drilled in this area and indicated that the soils in the vicinity of the former tank had been affected from past releases. As part of the 1994 RI, two soil borings were drilled in this area (Figure 5-11) to further characterize the soils in Area 9. Soil borings B-101 and B-102 were drilled to the top of the red clay unit (19 feet and 18.6 feet, respectively) using a truck mounted hollow stem drill rig. Continuous split-spoon soil samples were collected from both borings from the ground surface to the red clay unit. Soil samples from the three to five foot and the five to seven foot interval from both borings were collected for laboratory analyses for TCL compounds.

5.3.8 *Area 10 - Temporary Hazardous Materials Storage Area*

A previously conducted soil gas survey in this portion of the parking lot revealed two areas of anomalous soil gas concentrations. These anomalies were investigated further with soil borings and temporary wells. Chlorinated solvents were detected at or near the water table in both borings; however, the extent of affected soils both vertically and laterally had not been established. To more fully characterize this area, six soil borings (B-103, B-108, B-109, B-110, B-112, and MW-26D) were drilled during the 1994 RI (Figure 5-12). Each of these borings were drilled to the top of the red clay unit with continuous split-spoon soil samples collected during the drilling. Two soil samples from each boring were selected for laboratory analyses for TCL and TAL compounds. Soil boring MW-26D was completed as a monitoring well. A seventh boring in this


BUILDING #1
MW-10
ELECTRIC POWER SUBSTATION
MW-2
B-116
250,000 GAL WATER TANK
B-117
MW-11
B-118
B-101
B-102
MW-12
B-119
AREA 9
MW-1
LEGEND
EXISTING MONITORING WELL LOCATION
RI/FS SOIL BORING LOCATION
AREA-9 SOIL BORINGS
FARRELL ROAD PLANT RI
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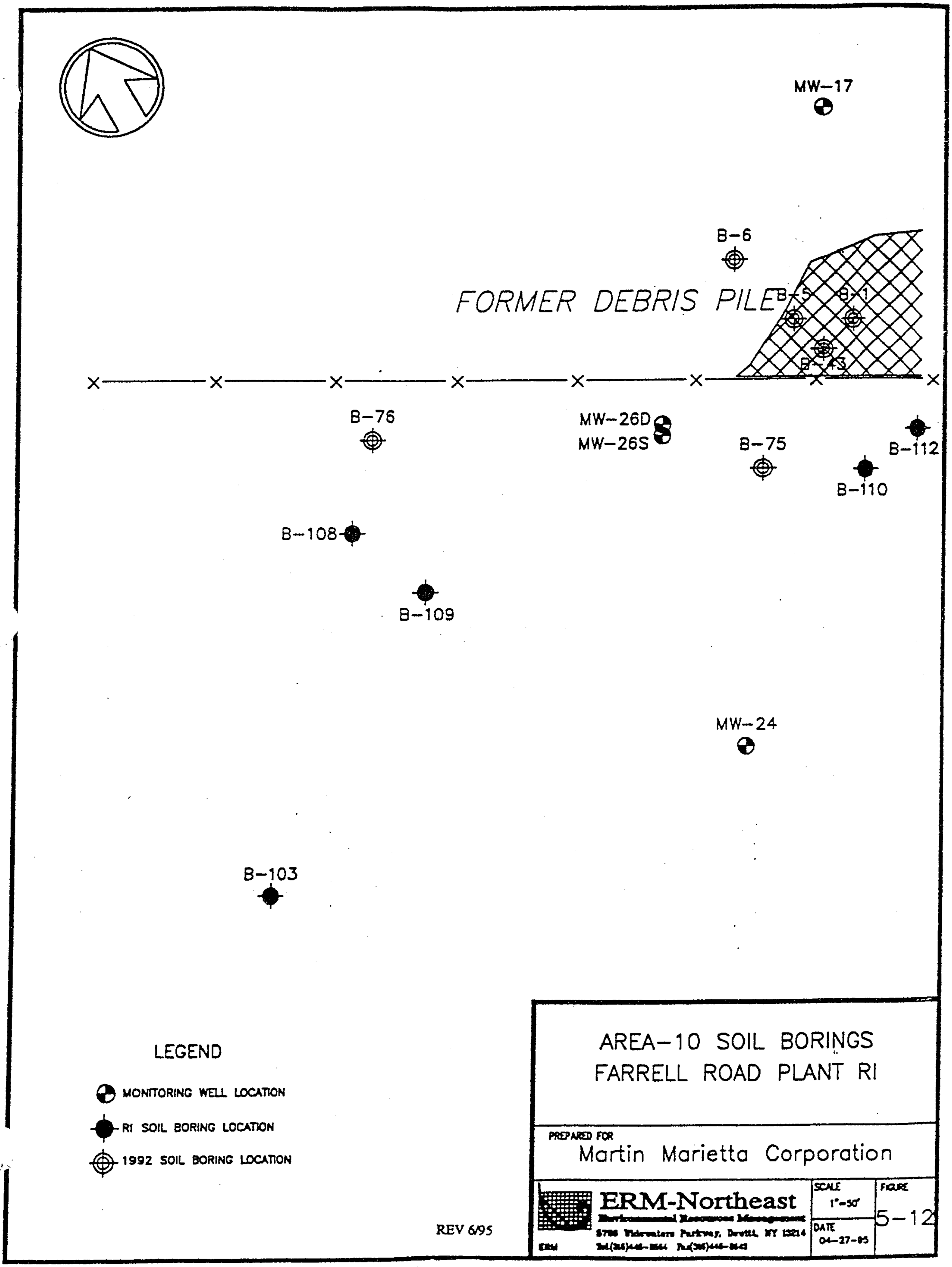
ERM
SCALE
1"=50'
DATE
8/94
FIGURE
5-11



MW-17
B-6
FORMER DEBRIS PILE
B-5
B-1
B-43
B-76
MW-26D
MW-26S
B-75
B-112
B-110
B-108
B-109
MW-24
B-103
LEGEND
MONITORING WELL LOCATION
RI SOIL BORING LOCATION
1992 SOIL BORING LOCATION
REV 6/95
AREA-10 SOIL BORINGS
FARRELL ROAD PLANT RI
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SCALE
1"=50'
FIGURE
5-12
DATE
04-27-95

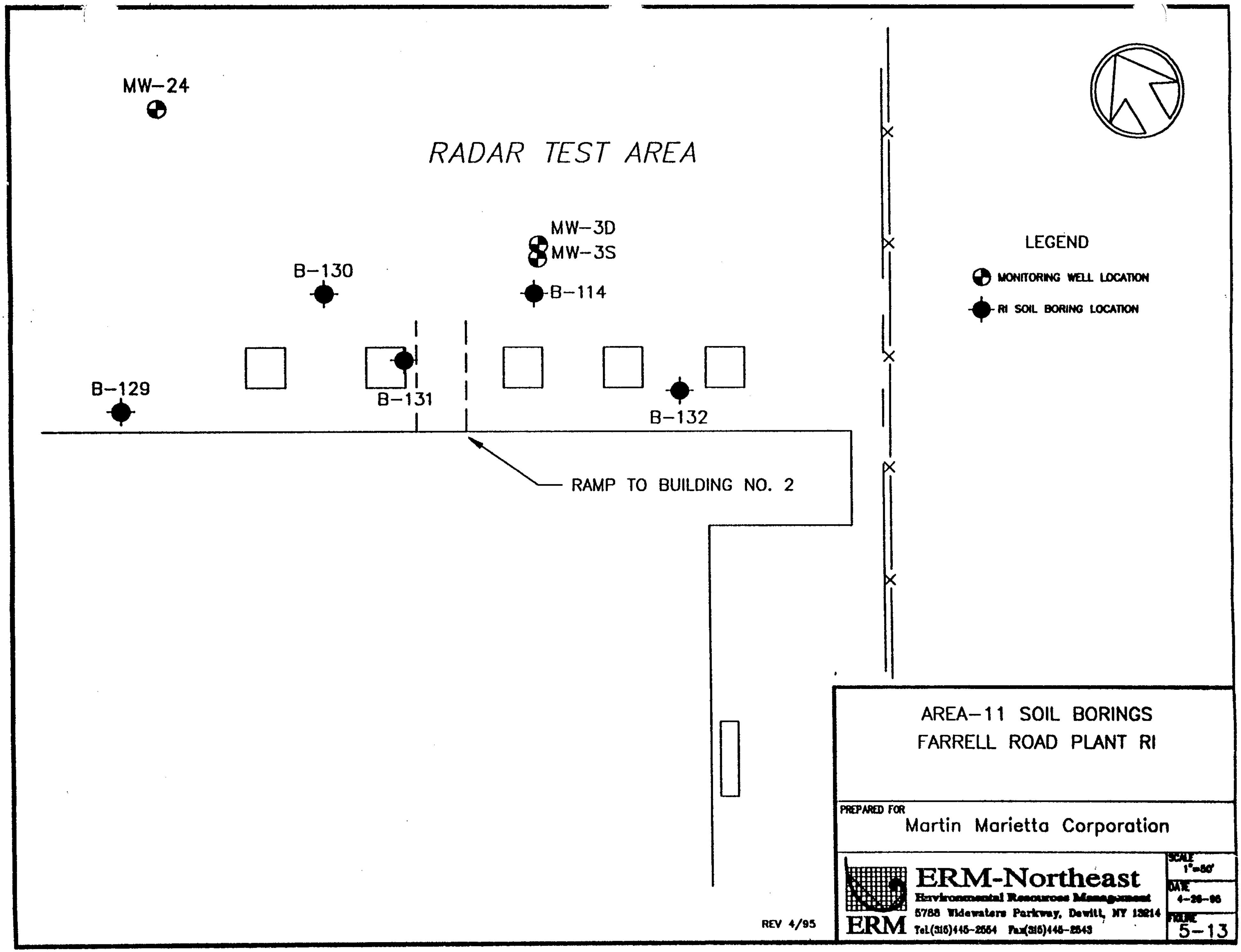
area (MW-26S) was drilled adjacent to MW-26D and completed as a shallow monitoring well. No soil samples were collected from boring MW-26S.

5.3.9 *Area 11 - Radar Test Area*

Previous investigations and an IRM in this area revealed the presence of VOC affected soils and ground water. VOC affected soil was removed during the IRM. The area around an 11 ppm soil gas survey anomaly and areas with background concentrations greater than 1 ppm were not evaluated. Five soil borings were drilled in Area 11 during the 1994 RI (Figure 5-13) to further evaluate the soils in this area. One soil boring (B-114) was drilled at the location of the 11 ppm anomaly and four borings (B-129, B-130, B-131, and B-132) were drilled where background concentrations were greater than 1 ppm. Each of these soil borings was drilled to the top of the red clay unit with total depths ranging from 27 feet to 33 feet below the ground surface. Two soil samples from each boring were collected for TCL VOCs analysis by the laboratory.

5.3.10 *Area 12 - Paint Booth Area*

Two borings (B-106 and B-107) were installed in the former paint booth area on the north side of Building No. 2. Boring B-106 was located 215 feet west of the building's northeast corner and 23 feet south of the north building wall and boring B-107 was located 215 feet west of the northeast corner and 3.5 feet south of the north building wall (Figure 5-14). The concrete floor was penetrated using an electric hammer drill equipped with a carbide drill bit. Soil samples were collected from below the floor with the ESP corer from depth intervals of two to three feet and five to six feet below the base of the concrete floor. Both borings were continued to a total depth of nine feet. Soil samples were submitted to the laboratory for


MW-24
RADAR TEST AREA
MW-3D
MW-3S
B-130
B-114
B-131
B-129
B-132
RAMP TO BUILDING NO. 2
LEGEND
MONITORING WELL LOCATION
RI SOIL BORING LOCATION
AREA-11 SOIL BORINGS
FARRELL ROAD PLANT RI
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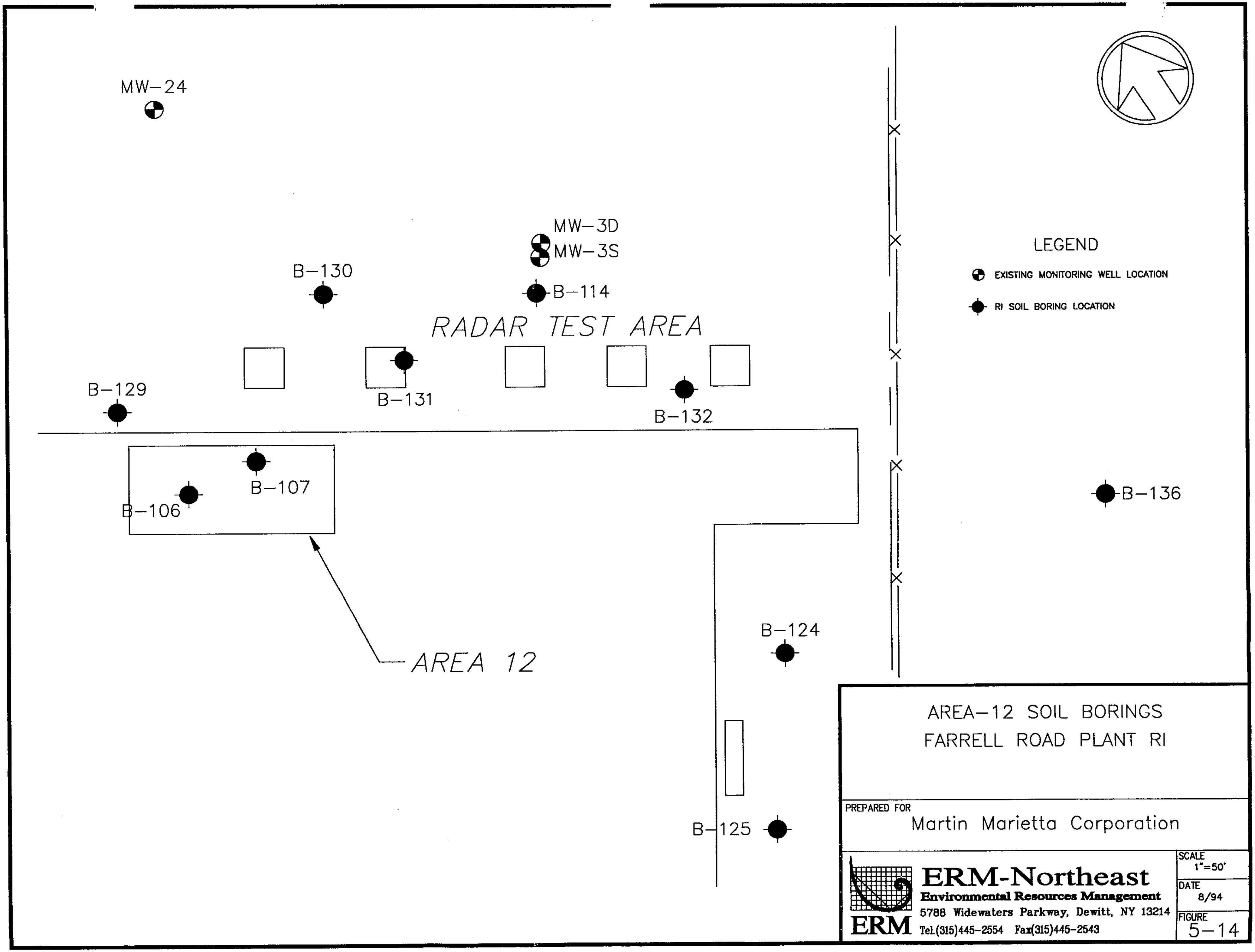
SCALE
DATE
FIGURE
5-13
REV 4/95


MW-24
MW-3D
MW-3S
B-130
B-114
RADAR TEST AREA
B-129
B-131
B-132
B-107
B-106
B-136
AREA 12
B-124
B-125
LEGEND
EXISTING MONITORING WELL LOCATION
RI SOIL BORING LOCATION
AREA-12 SOIL BORINGS
FARRELL ROAD PLANT RI
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ERM
SCALE 1"=50'
DATE 8/94
FIGURE 5-14

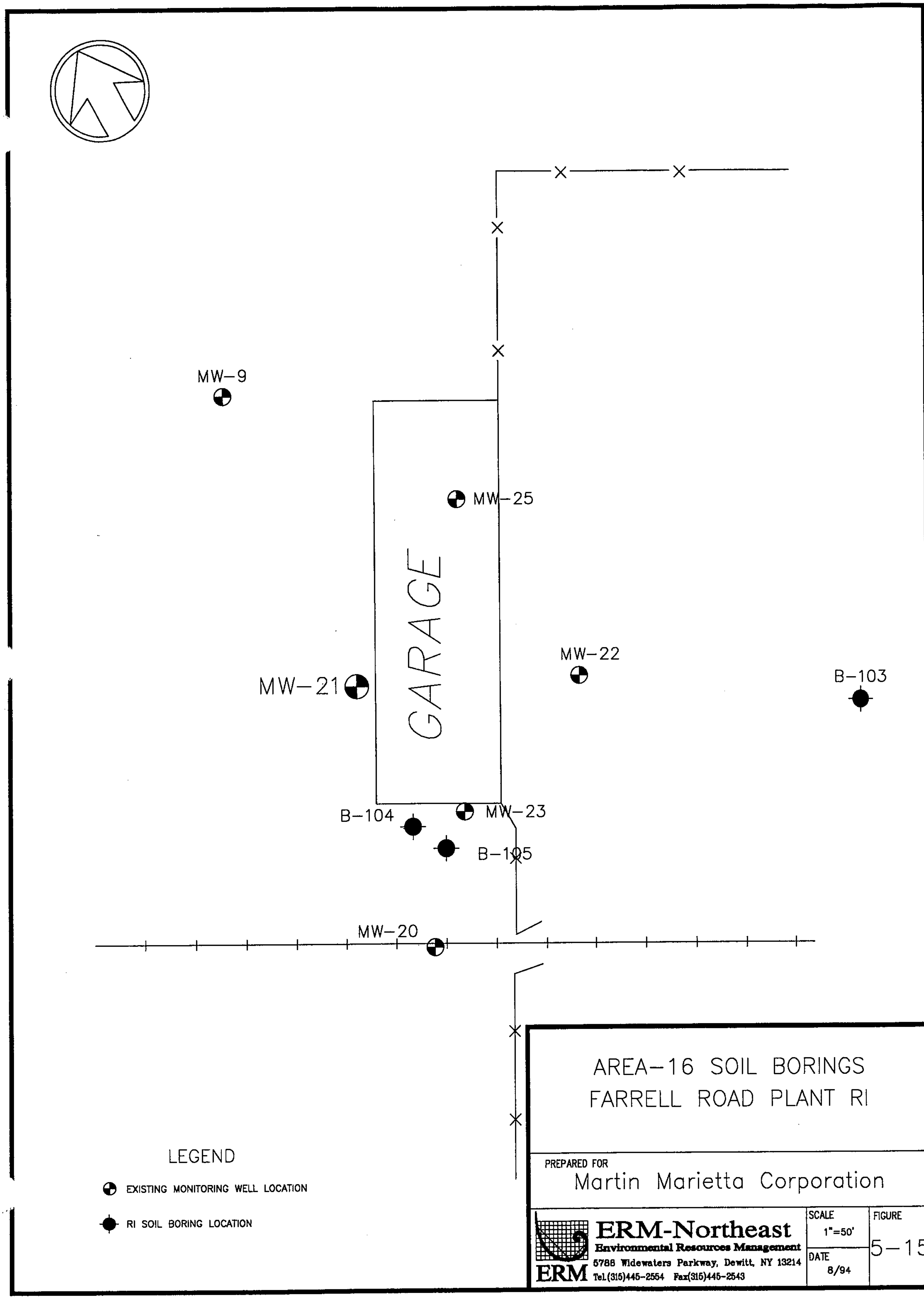
analyses under NYSDEC 1991 ASP protocol for TAL metals. Both boreholes were backfilled with remaining soil cuttings and the concrete floor was repaired with Sacrete® concrete mix.

5.3.11 *Area 16 - Removed Gasoline UST Near the Garage*

Soil borings and monitoring wells were drilled, installed and sampled as part of previous investigations in the area of the former gasoline UST (T-68) near the garage. Confirmation soil samples were also obtained during the removal of the UST. Analytical results for previously collected soil samples indicated that soil and ground water adjacent to the former tank had been affected by releases of petroleum hydrocarbons. The extent of VOC affected soils and ground water has been adequately defined in the past. The soil samples previously collected had not been analyzed for lead; therefore, two additional soil borings were drilled in this area during the 1994 RI (Figure 5-15). Soil borings B-104 and B-105 were advanced to the top of the red clay unit using a truck mounted hollow stem auger drill rig. Continuous split-spoon soil samples were collected from the borings. The total depth of both borings was 21 feet below the ground surface. Two soil samples were selected from each boring for laboratory analyses for lead and TCL SVOCs.

5.3.12 *Storm Sewer Soil Borings*

During the 1994 RI, four soil borings were drilled in the vicinity of the storm sewer at selected locations to investigate areas where the soil vapor survey conducted during the RI indicated potential VOC concentrations and to confirm results where no evidence of VOCs were found. Soil borings B-133, B-134, B-135, and B-136 (Figure 5-16) were drilled using a truck mounted drill rig and continuous split-spoon soil samples were collected. Borings B-133, B-135, and B-136 were drilled to approximately



AREA-16 SOIL BORINGS
FARRELL ROAD PLANT RI

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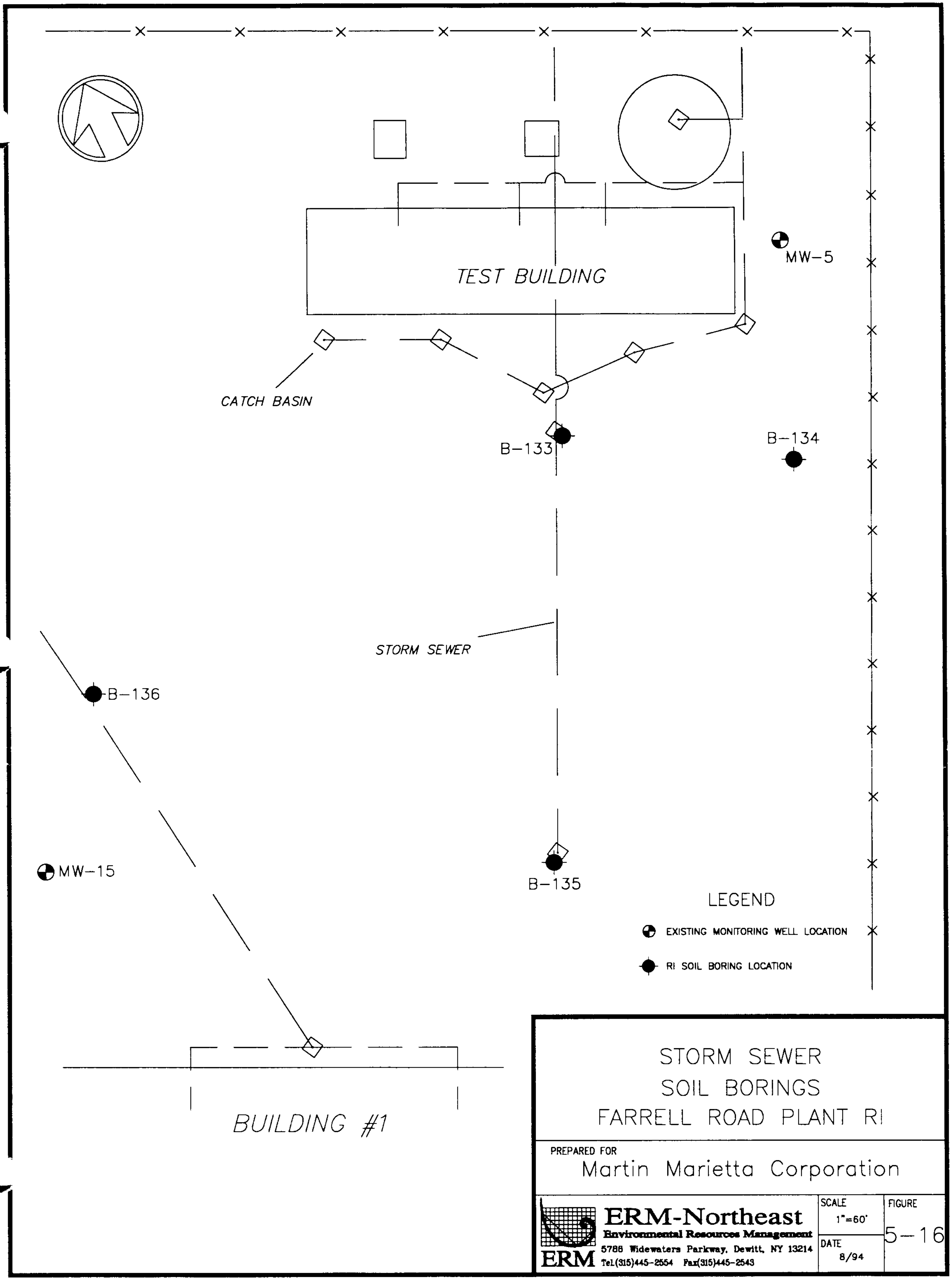
SCALE 1"=50'
DATE 8/94
FIGURE 5-15


TEST BUILDING
MW-5
CATCH BASIN
B-133
B-134
STORM SEWER
B-136
MW-15
B-135
LEGEND
EXISTING MONITORING WELL LOCATION
RI SOIL BORING LOCATION
BUILDING #1
STORM SEWER
SOIL BORINGS
FARRELL ROAD PLANT RI
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1"=60'
DATE
8/94
FIGURE
5-16

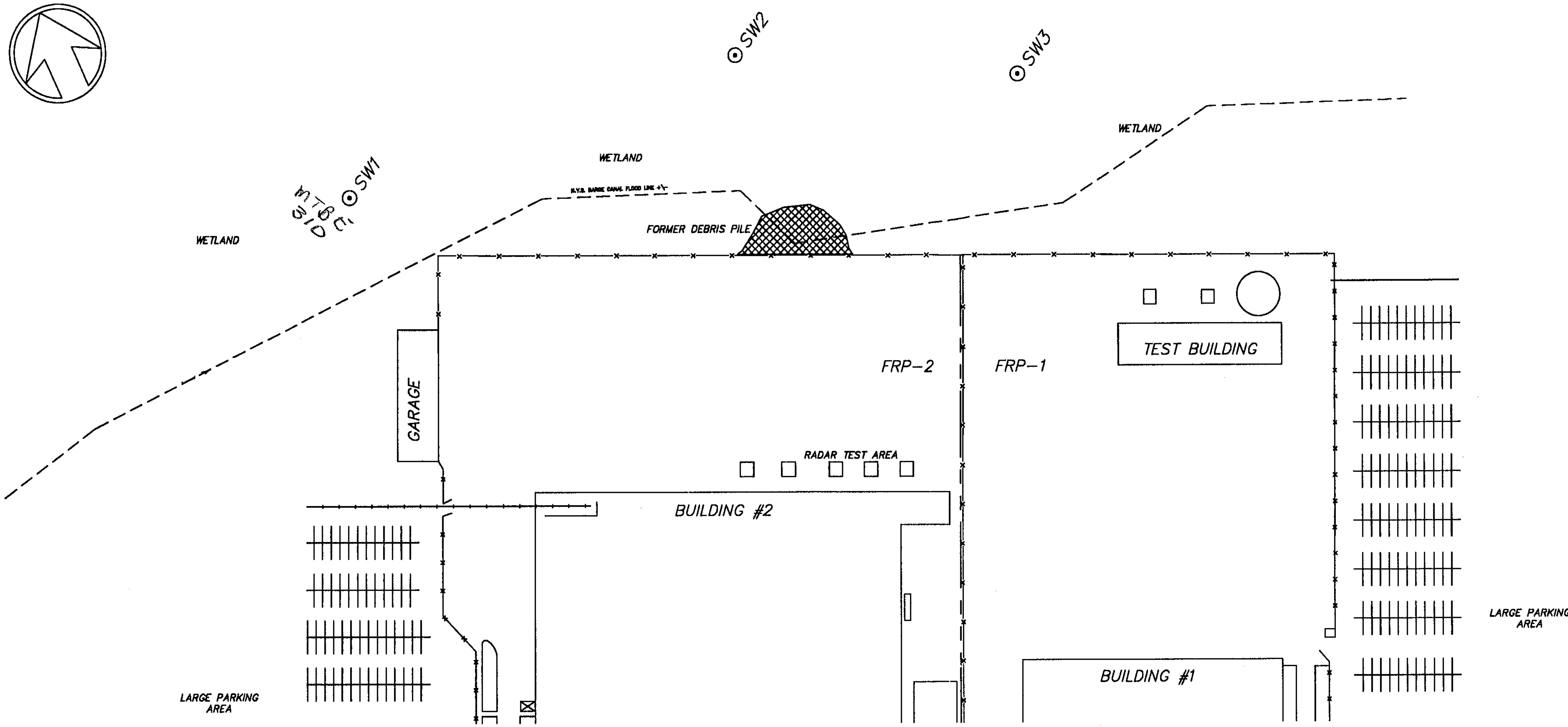
two feet below the water table (11 feet below the ground surface). Soil boring B-134 was drilled to 49 feet below the ground surface and was terminated upon reaching the red clay unit. Two soil samples from each boring were selected and submitted to the laboratory for analyses for TCL compounds.

5.4 SURFACE WATER INVESTIGATION

Three surface water samples (SW-1, SW-2, SW-3) were collected from areas of standing water in the wetlands north of the site (Figure 5-17). Field parameters and other relevant sampling data were recorded on field surface water sampling records given in Appendix D. All three water samples were stored in coolers with ice and were submitted to the laboratory for analyses under NYSDEC 1991 ASP protocol for TCL VOCs and hardness.

5.5 GROUND WATER INVESTIGATION

Ground water samples were collected from the twenty-eight overburden ground water monitoring wells (identified as "MW" throughout the report) and three glacial till (identified as "BR" throughout the report) wells at the site. Ground water samples were also collected from thirteen wetland piezometers during the accelerated RI/FS. Sampling locations are shown in Figure 5-18. Well purge details are summarized in Table 5-6. Field parameters and other relevant sampling records are included in Appendix E. Ground water samples from the piezometers were analyzed for TCL VOCs. All other ground water samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides/PCBs, and TAL analytes. In addition, six ground water samples from monitoring wells previously shown to contain high turbidity were also field filtered and analyzed for TAL analytes. The three glacial till wells were purged accordingly to a protocol discussed with



LEGEND

⊙ SURFACE WATER SAMPLE LOCATION

SURFACE WATER
SAMPLE LOCATIONS
FARRELL ROAD PLANT RI

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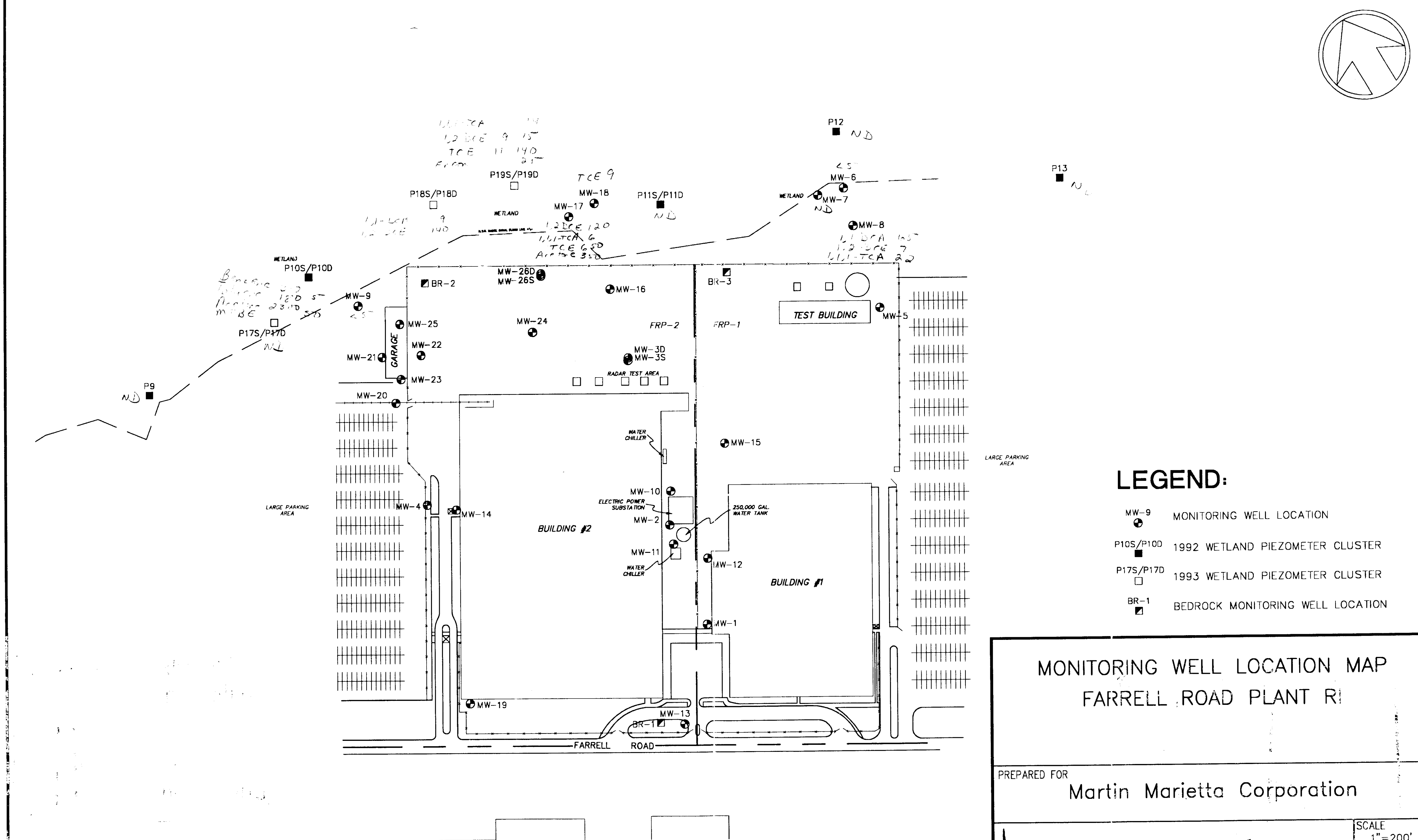
DATE	8/94
FIGURE	5-17



MONITORING WELL LOCATION MAP
FARRELL ROAD PLANT RI

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ERM

SCALE 1"=200'
DATE 8/94
FIGURE 5-18

TABLE 5-6
SUMMARY OF WELL PURGING
MMC-FARRELL ROAD PLANT RI

WELL ID	WELL DIAMETER (in)	DEPTH OF WELL (ft)	DEPTH TO WATER (ft)	WELL VOLUME (gallons)	VOLUME PURGED (gallons)	FINAL TUBIDITY MEASUREMENTS (NTUs)
MW-1	2	17.33	9.82	1.23	14.2	330
MW-2	4	22.00	13.79	5.36	43.2	28.0
MW-3S	2	18.93	9.34	1.56	12.5	26.3
MW-3D	4	33.50	8.93 ·	16.04	130	0.85
MW-4	2	11.74	8.39	0.55	5	1063
MW-5	2	19.39	10.77	1.41	13	>1000
MW-6	2	12.90	0.34	2.05	18	12.1
MW-7	2	12.30	1.52	1.76	15	>1000
MW-8	2	11.63	3.02	1.41	14.5	35
MW-9	2	14.52	4.00	1.72	16.5	147
MW-10	2	18.21	10.20	1.31	12.8	220
MW-11	4	18.90	9.89	5.88	45	16
MW-12	2	18.01	10.76	1.18	5.25*	206
MW-13	2	14.78	9.30	0.89	7.5	160
MW-14	2	23.47	7.36	2.63	5.3*	+1000
MW-15	2	21.32	11.10	1.67	16	+1000
MW-16	2	28.73	7.05	3.54	28.5	790
MW-17	2	15.15	1.66	2.20	18	>1000
MW-18	2	14.12	1.28	2.10	17	>1000
MW-19	2	16.86	9.05	1.27	9.75	355
MW-20	2	17.17	8.12	1.48	14.5	>1000
MW-21	2	16.71	9.26	1.22	10	48.8
MW-22	2	14.34	7.75	1.08	9	97
MW-23	4	19.90	11.24	5.65	62	28.7
MW-24	2	17.55	8.45	1.49	12.5	599
MW-25	2	17.50	7.87	1.57	12.6	652
MW-26S	2	14.45	6.65	1.27	10.2	185
MW-26D	2	32.57	6.21 ·	4.30	34	41.8
BR-01	2	140.00	8.07	22.4	85.5	253
BR-02	2	100.00	34.12	11.2	24.5	940
BR-03	2	100.00	11.37	15.1	50	891

*PURGED till dry.

and approved by NYSDEC.

5.6 *FIELD QUALITY CONTROL*

Field quality control checks were used during this investigation and consisted of the following:

- *Equipment Rinsate Blanks* - Equipment rinsate blanks were collected during soil, sediment, and water sampling to ensure that the sampling equipment was clean and that the potential for cross-contamination had been minimized by the equipment decontamination procedures. Equipment rinsate blanks were collected each day that sampling activities were performed at the site. These blanks were prepared by rinsing the sample collection devices for sampling events with water that was demonstrated to be analyte free. The rinsate water was collected into the appropriate sample containers and analyzed according to Contract Laboratory Program protocol for the same parameters as the associated sampling event. Results of the equipment rinsate blank analyses were used in the QA/QC and data validation process.

- *Field Duplicates* - One of every 20 samples collected during the 1994 RI was accompanied by a duplicate sample. Field duplicates for water samples were collected by filling the primary and duplicate sampling containers in an alternate fashion. Soil or sediment samples that were submitted for VOC analyses were not homogenized or split. All other duplicate soil and sediment samples were prepared by homogenizing the sample and preparing two identical sample aliquot for analysis. Duplicate samples were assigned "Dupe" sample numbers which were recorded in the field logbooks. Table 5-7 indicates the duplicate sample identifications and the corresponding samples. Analyses of duplicate samples were used to determine the precision of the field sampling techniques.

TABLE 5-7
SUMMARY OF DUPLICATE SAMPLES
MMC-FARRELL ROAD PLANT RI

DUPLICATE ID	CORRESPONDING SAMPLE	SAMPLE MATRIX	DATE COLLECTED
FRP-DUPE-01	FRP-CB-07	Sediment	4/26/94
FRP-DUPE-02	FRP-B110(7-9)	Soil	4/28/94
FRP-DUPE-03	FRP-B127(2-4)	Soil	4/28/94
FRP-DUPE-04	FRP-OUT-07	Sediment	4/29/94
FRP-DUPE-05	FRP-B130(3-5)	Soil	5/4/94
FRP-DUPE-06	FRP-B129(3-5)	Soil	5/5/94
FRP-DUPE-07	FRP-OUT-07(0-0.5)	Sediment	5/5/94
FRP-DUPE-08	FRP-B104(5-7)	Soil	5/6/94
FRP-DUPE-09	FRP-B133(5-7)	Soil	5/9/94
FRP-DUPE-10	FRP-MW26S(0594)	Ground Water	5/18/94
FRP-DUPE-11	FRP-MW25(0594)	Ground Water	5/19/94

- *Matrix Spike and Matrix Spike Duplicates* - One of every soil, sediment, and water samples collected in the field during the 1994 RI was obtained with extra volume so the laboratory could analyze for matrix spikes and matrix spike duplicates for organics, and sample spike and laboratory duplicates for inorganics. The samples contained sufficient volume so that the required analyses could be properly performed. Laboratory samples were labeled with the sample number and a notation was made on the chain-of-custody form that the extra sample volume was for laboratory quality control. The purpose of these samples was to evaluate the effect of possible matrix interferences on the sample results.

- *Travel Blanks* - Travel blanks consisted of laboratory supplied deionized water contained in appropriate sample containers. The blanks were prepared by Adirondack Environmental Services and shipped to the site in the sample coolers used for the collection of field samples. The travel blanks accompanied field sample containers during the sampling process and were returned to the laboratory with the sample shipment. These samples served as a QC check on container cleanliness, external contamination, and the analytical method. Travel blanks were submitted at a frequency of one per day during water sampling for VOCs.

6.0 ANALYTICAL PROCEDURES AND LABORATORY QUALITY CONTROL

6.1 ANALYTICAL PROCEDURES

Soil, sediment, surface water, and ground water samples were analyzed by NYSDEC 1991 ASP methods for all or some of the following: TCL VOCs (including trichlorofluoromethane); TCL SVOCs; TCL pesticides/PCBs; TAL metals and cyanide; TPH; and lead. TPH was analyzed by USEPA Method 418.1. Ground water and surface water samples for TCL VOC analysis were analyzed by Method 524.2 with deliverables according to NYSDEC 1991 ASP Deliverables Format B. This method was used to ensure that the detection limits were low enough to satisfy NYSDEC surface and ground water criteria listed in the Division of Water Technical and Operational Guidance Series 1.1.1 "Ambient Water Quality Standards and Guidance Values" dated 15 November 1991. Additionally, surface water samples collected as part of the wetland study were also analyzed for hardness. Sediment samples from the wetland were analyzed for total organic carbon. Table 6-1 presents a summary of the analytical procedures used and the number of samples analyzed by each procedure. Table 6-2 presents a list of the specific compounded metals that were analyzed for in samples collected during the 1994 RI.

6.2 LABORATORY QUALITY CONTROL

Adirondack Environmental Services (AES), Inc. of Albany, New York was contracted to perform all analytical work associated with the 1994 RI sampling at the site. Adirondack Environmental Services analytical laboratory is approved by the following institutions:

- NYSDEC

TABLE 6-1
SUMMARY OF ANALYSES PERFORMED
MMC-FARRELL ROAD PLANT RI

	TCL			TAL					
MATRIX	**VOCs**	**SVOCs**	**Pest/PCB**	**Metals**	**CYANIDE**	**TPH**	**LEAD**	**HARDNESS**	**TOC**
Soil	56	43	38	22	16	4	5	--	--
Sediment	57	31	31	31	31	--	--	--	25
Ground Water	47	33	33	39	39	--	--	--	--
Surface Water	3	--	--	--	--	--	--	3	--
Trip Blanks	13	--	--	--	--	--	--	--	--
Equipment Rinsates	16	12	11	9	8	1	1	--	2

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TABLE 6-2
SUMMARY OF TCL and TAL ANALYTES
MMC - FARRELL ROAD PLANT RI

TCL VOCs

chloromethane
bromomethane
vinyl chloride
chloroethane
methylene chloride
acetone
carbon disulfide
1,1-dichloroethene
1,1-dichloroethane
1,2-dichloroethene
chloroform
1,2-dichloroethane
2-butanone
1,1,1-trichloroethane
carbon tetrachloride
bromodichloromethane
1,2-dichloropropane
cis-1,3-dichloropropene
trichloroethene
dibromochloromethane
1,1,2-trichloroethane
benzene
trans-1,3-dichloropropene
bromoform
4-methyl-2-pentanone
2-hexanone
tetrachloroethene
1,1,2,2-tetrachloroethane
toluene
chlorobenzene
ethylbenzene
styrene
xylenes (total)
trichlorofluoromethane

TCL SVOCs

phenol
bis (-2-chloroethyl) ether
2-chlorophenol
1,3-dichlorobenzene
1,4-dichlorobenzene
1,2-dichlorobenzene
2-methylphenol
2,2-oxybis (1-chloropropane)

TCL SVOCs (cont)

4-methylphenol
N-nitroso-di-n-propylamine
hexachloroethane
nitrobenzene
isophrone
2-nitrophenol
2,4-dimethylphenol
bis (-2-chloroethoxy) methane
2,4-dichlorophenol
1,2,4-trichlorobenzene
naphthalene
4-chloroaniline
hexachlorobutadiene
4-chloro-3-methylphenol
2-methylnaphthalene
hexachlorocyclopentadiene
2,4,6-trichlorophenol
2,4,5-trichlorophenol
2-chloronaphthalene
2-nitroaniline
dimethyl phthalate
acenaphthylene
2,6-dinitrotoluene
3-nitroaniline
acenaphthene
2,4-dinitrophenol
4-nitrophenol
dibenzofuran
2,4-dinitrotoluene
diethylphthalate
4-chlorophenyl-phenylether
fluorene
4-nitroaniline
4,6-dinitro-2-methylphenol
n-nitrosodiphenylamine
4-bromophenyl-phenylether
hexachlorobenzene
pentachlorophenol
phenanthrene
anthracene
carbazole
di-n-butylphthalate
fluoranthene

TCL SVOCs (cont)

pyrene
butylbenzylphthalate
3,3-dichlorobenzidine
benzo (a) anthracene
chrysene
bis (2-ethylhexyl) phthalate
di-n-octyl phthalate
benzo (b) fluoranthene
benzo (k) fluoranthene
benzo (a) pyrene
indeno (1,2,3-cd) pyrene
dibenzo (a,h) anthracene
benzo (g,h,i) perylene

TCL Pest/PCBs

alpha-BHC
beta-BHC
delta-BHC
gamma-BHC (lindane)
heptachlor
aldrin
heptachlor epoxide
endosulfan I
dieldrin
4,4' - DDE
endrin
endosulfan II
4,4' - DDD
endosulfan sulfate
4,4' - DDT
methoxychlor
endrin ketone
endrin aldehyde
alpha - chlordane
gamma - chlordane
toxaphene
aroclor - 1016
aroclor - 1221
aroclor - 1232
aroclor - 1242
aroclor - 1248
aroclor - 1254
aroclor - 1260

TAL

aluminum
antimony
arsenic
barium
beryllium
cadmium
calcium
chromium
cobalt
copper
iron
lead
magnesium
manganese
mercury
nickel
potassium
selenium
silver
sodium
thallium
vanadium
zinc
cyanide

- New York State Department of Health (NYSDOH)

System and performance audits in conjunction with corrective actions are used to monitor internal laboratory quality control. Laboratory internal quality control procedures are based on guidelines established in USEPA SW-846 and NYSDEC Contract Laboratory Program protocols. Specific laboratory quality control checks utilized during the 1994 RI included:

- laboratory blanks;
- field blanks;
- trip blanks;
- reference standards;
- matrix checks;
- spiked samples;
- surrogate standards; and
- duplicate analyses.

Detailed information regarding internal laboratory quality control procedures is contained within the Adirondack Environmental Service's Quality Assurance Plan that was submitted and approved with the RI/FS Work Plan. In addition to internal quality controls, Adirondack Environmental Services participates in several inter-laboratory studies useful in assessing overall quality control including:

- NYSDOH Proficiency Sample Program;
- EPA Program for SPDES Monitoring;
- EPA Quality Control Check Samples Program; and
- Atlantic Regional Group Sample Exchange for Petroleum and Gas Testing.

6.3 DATA VALIDATION

Data generated during the 1994 RI had to be sufficiently accurate to determine whether the various media on the site met or exceeded applicable standards and criteria as set forth by NYSDEC. Therefore, data validation procedures were performed on all analytical data generated during the investigation to insure that data were gathered and recorded accurately, that samples were handled and shipped to the laboratory properly, and to qualify all laboratory analyses to assess the degree of confidence with which the resulting data can be used. The review of CLP data was performed in accordance with NYSDEC 1991 ASP Superfund CLP Methods and the EPA National Functional Guidelines for organic and inorganic data review.

Data Quality Objectives (DQO) are qualitative and quantitative statements regarding the quality of environmental data required to support decisions regarding characterization of the site. DQOs define total uncertainty in the data that is acceptable for each specific task of the investigation. The overall project DQO is to keep uncertainty in the data to a minimum so it will not hinder the intended use of the data. DQOs are achieved through the use of specific data quality requirements (parameters) such as detection limits, criteria for accuracy and precision, sample representativeness, and data comparability and completeness. Specific criteria objectives relating to DQOs for this investigation are summarized in Table 6-3.

Upon receipt of each data package, a preliminary review was conducted consisting of verification of chain of custody forms, traffic reports, analytical data reports, appropriate field and laboratory personnel signatures, and required deliverables. A quality assurance review consisting of evaluation and interpretation was performed by experienced ERM data validation chemists according to EPA data validation procedures using

TABLE 6-3
CRITERIA OBJECTIVES
MMC-FARRELL ROAD PLANT RI

CRITERIA	AQUEOUS	SOLID/OTHER
PRECISION OBJECTIVES		
Field Duplicates/Replicates (blind or labeled)	Within 20% RPD	Within 30% RPD
Lab Duplicates	*	*
ACCURACY OBJECTIVES		
Equipment Rinsate or Trip Blanks	Less than the CRDL or appropriate MDL	Less than the CRDL or appropriate MDL
Lab Blanks	*	*
Lab Spikes (matrix, etc.)	*	*

RPD = Relative Percent Difference.
CRDL = Contract Required Detection Limit.
MDL = Method Detection Limit.
* = As specified in NYSDEC 1991 ASP Superfund CLP Methods.

appropriate guidance documents, established (contractual) criteria, and professional judgement. Qualifier codes were placed next to specific sample results on summary tables. Subsequent to these reviews, a signed, dated Data Quality Assurance report was compiled and submitted by the ERM data validator describing the overall reliability of the data (Appendix F).

7.0 ANALYTICAL RESULTS

Analytical results are presented below according to media. Each area of concern is presented within the context of the appropriate media. All data are summarized in tables in Appendix G. These tables also present the appropriate SCG for comparative purposes.

All data points that exceed the values set forth in the three guidance documents referenced in Section 1.2 are highlighted. MMC will propose remedial objectives in the Feasibility Study (FS). In determining appropriate remedial objectives, MMC will give consideration to guidance, which is determined, after the exercise of engineering judgement to be applicable to this site (See 6 NYCRR § 375-1.10 (c) (1) (ii)). For this reason, the guidance values referenced in the summary tables cannot be considered remedial objectives at this time.

7.1 SEDIMENT

7.1.1 Outfalls

Sediment samples were collected from each of the eight outfalls that empty into the wetlands and the catch basins designed outfall 009 south of the site. These sediment samples were analyzed for TCL VOCs, TCL SVOCs, TCL pesticides and PCBs, and TAL analytes. Summaries of organic and inorganic analytes detected in the outfall sediment samples are presented in Tables 7-1 and 7-2, respectively. Volatile organics were detected in the sediment samples collected from outfalls 002, 003, 004, 007 and 008. Semivolatile organic compounds and pesticides were detected in each of the sediment samples collected. Surface sediment samples collected from outfalls 001, 002, 003, 004, 005, and 008 and samples from the one foot depth at outfall 003 had detectable quantities of the PCB Aroclor-1254.

7.1.2 Catch Basins

Eighteen catch basins were located at the site during the 1994 RI field investigation. Sediment samples were collected from 14 of the 18 catch basins; four were not sampled as a result of insufficient quantities of

TABLE 7-1
ANALYTICAL DATA
SUMMARY OF DETECTED ORGANIC ANALYTES
OUTFALLS
MMC - FARRELL ROAD PLANT RI

	LOCATION	OUT-01A	OUT-01B	OUT-01C	OUT-02A	OUT-02B	OUT-02C	OUT-02D	OUT-03A
	DEPTH	0	0	1	0	1	0	0	0
	DATE COLLECTED	5/2/94	5/2/94	5/2/94	4/29/94	4/29/94	4/29/94	4/29/94	4/29/94
VOCs	methylene chloride	—	—	—	—	—	—	—	9 J
	chloroform	—	—	—	—	—	—	—	—
	trichloroethene	—	—	—	—	3 J	—	—	—
	toluene	—	—	—	—	—	—	—	—
SVOCs	phenol	—	—	—	—	—	—	420 J	—
	2-methylnaphthalene	—	—	—	—	—	—	—	—
	phenanthrene	30 J	—	52 J	—	23 J	—	—	160 J
	anthracene	—	—	—	—	—	—	—	35 J
	carbazole	—	—	—	—	—	—	—	—
	di-n-butylphthalate	—	—	—	—	95 J	—	—	—
	fluoranthene	—	—	63 J	26 J	37 J	—	—	200 J
	pyrene	—	—	110 J	—	28 J	—	—	150 J
	benzo (a) anthracene	—	—	—	—	—	—	—	70 J
	chrysene	—	—	—	—	—	—	—	100 J
	bis (2-ethylhexyl) phthalate	—	120 J	83 J	49 J	39 J	96 J	98 J	81 J
	benzo (b) fluoranthene	—	—	—	—	—	—	—	220 J
	benzo (k) fluoranthene	—	—	110 J	—	—	—	—	230 J
	TICs	1	0	5	10	2	7	14	2
Pest /	alpha-BHC	—	0.51 J	0.22 J	0.19 J	—	—	—	—
PCBs	beta-BHC	—	—	—	0.39 J	—	0.16 J	—	—
	delta-BHC	0.33 J	0.64 J	—	0.26 J	—	0.08 J	—	0.28 J
	heptachlor	—	—	—	—	—	—	—	2.3 J
	aldrin	0.27 J	0.63 J	0.45 J	1.6 J	—	—	—	1.8 J
	heptachlor epoxide	—	—	—	—	—	—	—	0.54 J
	endosulfan I	0.42 J	—	0.50 J	—	—	—	—	—
	dieldrin	—	—	—	37	4.8 J	0.11 J	0.08 J	22 J
	4,4' - DDE	7.3 J	52	11 J	20	75	3.8 J	2.5 J	4.2 J
	endrin	—	—	0.59 J	—	—	—	—	1.4 J
	endosulfan II	1.1 J	—	—	—	—	0.10 J	—	2.0 J
	4,4' - DDD	3.9 J	31	6.8 J	2.7 J	7.9 J	0.88 J	0.55 J	2.1 J
	endosulfan sulfate	1.8 J	1.5 J	1.9 J	—	0.88 J	0.12 J	0.30 J	0.81 J
	4,4' - DDT	5.0 J	17 J	5.9 J	20 J	97 J	6.0 J	4.2 J	9.6 J
	methoxychlor	—	—	—	—	—	0.30 J	—	—
	endrin ketone	—	—	—	—	—	—	—	—
	endrin aldehyde	—	—	—	—	—	—	—	—
	alpha - chlordane	—	—	—	4.9	3.2 J	—	—	23 J
	gamma - chlordane	—	—	—	4.5	3.1 J	—	—	22
	aroclor - 1254	67 J	—	—	24 J	—	—	—	350 J

NOTES: - all concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
J - associated numerical value is an estimated quantity.

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TABLE 7-1 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED ORGANIC ANALYTES
OUTFALLS
MMC - FARRELL ROAD PLANT RI

								DUPE-07		
	LOCATION	OUT-03B	OUT-03C	OUT-04	OUT-05	OUT-06	OUT-07	OUT-07	OUT-08	OUT-09
	DEPTH	1	0	0	0	0	0	0	0	0
	DATE COLLECTED	4/29/94	4/29/94	5/2/94	4/29/94	4/29/94	5/5/94	5/5/94	4/29/94	4/29/94
VOCs	methylene chloride	16 J	8 J	—	—	—	—	—	23	—
	chloroform	—	—	5 J	—	—	2 J	1 J	—	—
	trichloroethene	—	—	—	—	—	—	—	—	—
	toluene	—	—	—	—	—	—	—	5 J	—
SVOCs	phenol	—	—	—	—	—	—	—	—	—
	2-methylnaphthalene	—	—	—	—	—	—	76 J	—	—
	phenanthrene	—	—	—	99 J	77 J	37 J	37 J	34 J	270 J
	anthracene	—	—	—	—	—	—	—	—	37 J
	carbazole	—	—	—	—	—	—	—	—	99 J
	di-n-butylphthalate	—	90 J	—	62 J	—	—	—	—	—
	fluoranthene	29 J	55 J	24 J	110 J	100 J	—	—	58 J	250 J
	pyrene	32 J	46 J	35 J	93 J	100 J	24 J	—	60 J	320 J
	benzo (a) anthracene	—	—	—	63 J	—	—	—	—	140 J
	chrysene	—	—	—	59 J	—	—	—	—	160 J
	bis (2-ethylhexyl) phthalate	37 J	150 J	110 J	200 J	170 J	36 J	27 J	43 J	170 J
	benzo (b) fluoranthene	—	—	—	—	78 J	—	—	55 J	440 J
	benzo (k) fluoranthene	—	—	—	—	45 J	—	—	26 J	—
	TICs	4	6	9	7	8	17	19	9	16
Pest /	alpha-BHC	—	—	—	—	—	—	—	—	—
PCBs	beta-BHC	—	—	—	1.5 J	—	—	—	—	—
	delta-BHC	1.6 J	—	—	0.18 J	—	0.43 J	—	—	—
	heptachlor	—	0.58 J	—	—	—	—	—	—	—
	aldrin	—	0.81 J	0.72 J	0.88 J	—	0.45 J	0.71 J	—	0.44 J
	heptachlor epoxide	—	—	—	—	—	—	—	—	—
	endosulfan I	—	1.7 J	—	—	0.78 J	0.65 J	0.80 J	—	—
	dieldrin	—	12 J	—	—	0.58 J	—	—	3.4 J	18
	4,4' - DDE	5.2 J	3.0 J	3.3 J	2.0 J	1.6 J	—	—	1.4 J	34
	endrin	—	—	—	—	—	—	—	0.53 J	—
	endosulfan II	—	2.6 J	1.6 J	1.8 J	—	1.5 J	1.1 J	1.2 J	—
	4,4' - DDD	5.5 J	—	—	—	1.4 J	—	—	0.49 J	3.3 J
	endosulfan sulfate	—	1.7 J	1.2 J	1.0 J	0.89 J	0.87 J	—	1.5 J	1.1 J
	4,4' - DDT	27 J	4.5 J	2.1 J	3.6 J	—	—	—	2.1 J	14 J
	methoxychlor	—	—	—	—	—	—	—	2.5 J	—
	endrin ketone	—	1.8 J	—	—	—	—	—	—	—
	endrin aldehyde	7.8 J	—	—	—	—	—	—	—	—
	alpha - chlordane	61 J	—	1.3 J	1.2 J	—	—	—	—	8.7 J
	gamma - chlordane	54	7.4	—	—	0.34 J	—	—	1.2 J	8.2 J
	aroclor - 1254	2900	170 J	100 J	63 J	—	—	—	65 J	—

NOTES: - all concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
J - associated numerical value is an estimated quantity.

TABLE 7-2
ANALYTICAL DATA
SUMMARY OF DETECTED INORGANIC ANALYTES
OUTFALL SEDIMENT
MMC - FARRELL ROAD PLANT RI

LOCATION	OUT-01A	OUT-01B	OUT-01C	OUT-02A	OUT-02B	OUT-02C
DEPTH	0	0	1	0	1	0
DATE COLLECTED	5/2/94	5/2/94	5/2/94	4/29/94	4/29/94	4/29/94
TAL						
aluminum	8490	13700	11000	7700	4090	6690
arsenic	21.1 J	7.4 J	6.5 J	4.0	2.3	3.4
barium	27.3	47.7	49.7	33.9	19.8	19.1
beryllium	0.63	0.8	0.86	0.4	---	---
cadmium	1.7 J	---	1.8 J	3.2 J	1.7 J	---
calcium	93700	22500	63000	2080	6070	1490
chromium	16.4	9.4	16.8	7.6	4.0	4.6
cobalt	6.6	6.2	6.7	---	---	5.4
copper	88.1	31.2	66.6	108	25.6	17.1
iron	19700	12400	17000	10200	7360	9670
lead	146 J	---	---	20.1 J	19.4 J	8.2 J
magnesium	12900	3110	7470	1660	2960	1360
manganese	630	185	674	133	244	111
nickel	17.9 J	13.5 J	19.1 J	9.5	5.7	7.6
potassium	---	875	1340	---	---	---
sodium	R	R	153 J	---	182	---
vanadium	13.0	15.5	21	8.2	6.0	8.2
zinc	395	58.8	364	162	77.2	45.1
cyanide	---	---	---	---	---	---

NOTES:
- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.

J - associated numerical value is an estimated quantity.
- all samples were analyzed for the complete TCL / TAL list.

TABLE 7-2 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED INORGANIC ANALYTES
OUTFALL SEDIMENT
MMC - FARRELL ROAD PLANT RI

	LOCATION	OUT-02D	OUT-03A	OUT-03B	OUT-03C	OUT-04	OUT-05
	DEPTH	0	0	1	0	0	0
	DATE COLLECTED	4/29/94	4/29/94	4/29/94	4/29/94	5/2/94	4/29/94
TAL							
	aluminum	7150	4250	8370	3390	5770	3420
	arsenic	3.2	4.8 J	5.5 J	2.3 J	R	2.2 J
	barium	24.5	64.4	36.3	12.4	3.3	—
	beryllium	0.37	0.38	0.48	0.49	0.56	0.38
	cadmium	0.73 J	1.7 J	2.5 J	1.8 J	—	2.1 J
	calcium	5610	118000	9020	84200	142000	136000
	chromium	6.9	9.4	27.4	20.6	10.4	10.7
	cobalt	5.5	4.5	6.5	—	—	—
	copper	42.5	67.7	111	73.1	22.6	25.0
	iron	11200	17700	13700	10700	11500	10600
	lead	14.1 J	54.0 J	60.9 J	72.8 J	—	35.3 J
	magnesium	2020	8360	3540	7460	12000	10000
	manganese	142	525	361	472	273	407
	nickel	9.9	14.6 J	16.4 J	14.6 J	8.6	10.4 J
	potassium	—	—	846	—	603	625
	sodium	—	R	R	R	R	R
	vanadium	9.2	6.6	15.0	10.7	13.5	10.9
	zinc	120	120	153	112	70.3	315
	cyanide	—	—	—	—	—	—

NOTES:

- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.

J - associated numerical value is an estimated quantity.

- all samples were analyzed for the complete TCL / TAL list.

TABLE 7-2 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED INORGANIC ANALYTES
OUTFALL SEDIMENT
MMC - FARRELL ROAD PLANT RI

				DUPE-04		
	LOCATION	OUT-06	OUT-07	OUT-07	OUT-08	OUT-09
	DEPTH	0	0	0	0	0
	DATE COLLECTED	4/29/94	5/5/94	5/5/94	4/29/94	4/29/94
TAL						
	aluminum	2840	1400	1570	4470	9220
	arsenic	1.1	---	---	6.0 J	11.9 J
	barium	3.8	---	---	31.1	52.6
	beryllium	0.3	---	---	0.46	0.72
	cadmium	---	---	---	0.79 J	1.5 J
	calcium	52400	171000	192000	110000	31400
	chromium	17.0	4.5	0.94	11.7	19.5
	cobalt	---	---	---	---	8.1
	copper	21.0	8.2	8.5	32.3	27.8
	iron	5870	5500	5880	18500	16400
	lead	88.8	26.9	7.9 J	102 J	85.8 J
	magnesium	6700	14700	16700	44200	6590
	manganese	117	211	247	916	625
	nickel	6.6	5.9	5.0	9.1 J	14.1
	potassium	---	---	---	---	1120
	sodium	363	191	162	R	R
	vanadium	12.5	4.0	4.6	10.3	18.3
	zinc	83.5	41.6	36.3	85.3	675
	cyanide	---	---	---	---	3.7

NOTES:
- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.

J - associated numerical value is an estimated quantity.
- all samples were analyzed for the complete TCL / TAL list.

TABLE 7-3
ANALYTICAL DATA
SUMMARY OF DETECTED ORGANIC ANALYTES
CATCH BASIN SEDIMENT
MMC - FARRELL ROAD PLANT RI

								DUPE-01								
	LOCATION	CB-01	CB-03	CB-04	CB-05	CB-06	CB-07	CB-07	CB-08	CB-09	CB-11	CB-13	CB-15	CB-16	CB-18	CB-19
	DEPTH	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.167	0-1	0-0.33	0-0.80	0-0.05	0-0.167	0-0.167	0-0.05
	DATE COLLECTED	4/25/94	4/27/94	4/27/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/27/94	4/26/94	4/27/94	4/27/94
VOCs	methylene chloride	---	4 J	4 J	---	---	---	---	---	---	---	---	---	4 J	5 J	6 J
	acetone	---	15	---	---	---	---	---	27	---	---	2000	---	18	---	---
	1,1-dichloroethane	---	---	---	---	---	---	---	---	---	---	1400 J	---	---	---	---
	1,1,1-trichloroethane	---	---	---	---	---	---	---	---	---	---	15000	---	---	---	---
SVOCs	acenaphthene	---	---	---	---	---	---	---	---	---	---	---	---	---	160 J	NA
	dibenzofuran	---	---	---	---	---	---	---	---	---	---	---	---	---	60 J	NA
	fluorene	---	---	98 J	---	---	---	---	---	---	---	---	---	---	130 J	NA
	phenanthrene	---	---	660	---	---	100 J	---	33 J	450	---	---	390 J	---	370 J	NA
	anthracene	---	---	210 J	---	---	---	---	---	---	---	---	---	---	250 J	NA
	di-n-butylphthalate	88 J	330 J	150 J	---	---	---	160 J	680	---	---	---	200 J	210 J	88 J	NA
	fluoranthene	---	200 J	600	80 J	79 J	96 J	39 J	110 J	660	---	45 J	380 J	210 J	600	NA
	pyrene	---	160 J	510	54 J	66 J	110 J	40 J	160 J	680	---	64 J	510 J	300 J	580	NA
	butylbenzylphthalate	---	230 J	240 J	300 J	---	410	550	4400	---	---	43 J	110 J	140 J	74 J	NA
	benzo (a) anthracene	---	---	290 J	---	---	---	---	---	500	---	---	280 J	390 J	350 J	NA
	chrysene	---	---	220 J	---	---	---	---	---	480	---	---	210 J	300 J	270 J	NA
	bis (2-ethylhexyl) phthalate	650 B	2200	1300	620 B	---	820 B	---	9500 J	---	---	---	1000	500	---	NA
	di-n-octyl phthalate	---	180 J	---	---	---	---	---	---	---	---	---	85 J	---	---	NA
	benzo (b) fluoranthene	40 J	230 J	740	970	110 J	---	---	140 J	410 J	25 J	34 J	540	650	1000	NA
	benzo (k) fluoranthene	49 J	---	300 J	---	89 J	---	---	---	330 J	---	50 J	---	430	---	NA

NOTES:

- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample was not analyzed for these analytes.

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TABLE 7-3
ANALTICAL DATA
SUMMARY OF DETECTED ORGANIC ANALYTES
CATCH BASIN SEDIMENT
MMC - FARRELL ROAD PLANT RI

								DUPE-01								
	LOCATION	CB-01	CB-03	CB-04	CB-05	CB-06	CB-07	CB-07	CB-08	CB-09	CB-11	CB-13	CB-15	CB-16	CB-18	CB-19
	DEPTH	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.167	0-1	0-0.33	0-0.80	0-0.05	0-0.167	0-0.167	0-0.05
	DATE COLLECTED	4/25/94	4/27/94	4/27/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/27/94	4/26/94	4/27/94	4/27/94
SVOCS	benzo (a) pyrene	---	---	210 J	---	---	---	---	100 J	430 J	---	---	---	400	340 J	NA
	indeno (1,2,3-cd) pyrene	---	---	---	---	---	---	---	---	230 J	---	---	---	---	---	NA
	dibenzo (a,h) anthracene	---	---	---	1400 J	---	---	---	---	140 J	---	---	---	---	---	NA
	benzo (g,h,i) perylene	---	---	---	970	---	---	---	---	300 J	---	---	---	490	---	NA
	TICs	8	9	9	13	10	14	5	11	5	9	13	12	10	3	NA
Pest / PCBs	aldrin	---	---	1.0 J	0.33 J	---	---	---	---	---	---	---	---	---	1.5 J	NA
	endosulfan I	---	---	---	0.46 J	---	---	---	---	---	---	---	---	---	---	NA
	dieldrin	---	---	---	0.71 J	---	---	---	---	27	33	---	---	---	1.6 J	NA
	4,4' - DDE	2.6 J	---	---	1.0 J	---	---	---	2.4 J	9.4 J	78	2.3 J	2.0 J	---	2.2 J	NA
	endrin	0.29 J	---	---	---	---	---	---	---	---	---	---	---	---	---	NA
	endosulfan II	0.69 J	---	2.0 J	0.86 J	---	---	---	---	---	---	2.2 J	1.4 J	---	2.5 J	NA
	4,4' - DDD	---	---	---	---	---	---	---	---	1.9 J	4.3 J	---	---	---	---	NA
	endosulfan sulfate	---	---	---	0.62 J	---	---	---	---	---	1.5 J	---	---	---	---	NA
	4,4' - DDT	3.3 J	---	---	1.8 J	---	---	---	---	10 J	27 J	5.9 J	7.3 J	---	---	NA
	endrin aldehyde	---	---	---	---	---	---	---	---	---	2.2 J	---	3.9 J	---	---	NA
	alpha - chlordane	2.5 J	1.5 J	---	---	---	---	---	---	23	20	---	---	---	---	NA
	gamma - chlordane	---	---	---	---	---	---	---	---	20	13	---	---	---	---	NA
	aroclor - 1254	110 J	66 J	---	---	---	---	---	150 J	---	---	---	180 J	---	110 J	NA

NOTES:

- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample was not analyzed for these analytes.

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TABLE 7-4
ANALYTICAL DATA
SUMMARY OF DETECTED INORGANIC ANALYTES
CATCH BASIN SEDIMENT
MMC - FARRELL ROAD PLANT RI

							DUPE-01		
LOCATION	CB-01	CB-03	CB-04	CB-05	CB-06	CB-07	CB-07	CB-08	CB-09
DEPTH	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.167	0-1
DATE COLLECTED	4/25/94	4/27/94	4/27/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94	4/26/94
TAL									
aluminum	3880 J	2140 J	2500 J	2110 J	2680 J	2050 J	3390 J	4680 J	12000 J
antimony	—	—	—	25.5 J	—	—	—	—	—
arsenic	2.1	2.6	3.8	2.6	2.1	1.8	2.4	14.4	3.4
barium	34.1	—	14.7	—	7.4	2.1	6.4	7.0	42.3
beryllium	0.39	—	0.34	0.26	0.33	0.34	0.35	0.4	0.58
cadmium	7.8	0.86	0.67	—	—	1.4	1.3	1.5	—
calcium	129000 J	222000 J	133000 J	187000 J	126000 J	212000 J	162000 J	152000 J	16400 J
chromium	15.1 J	5.3 J	28.1 J	22.8 J	16.1 J	24.5 J	11.5 J	24.0 J	10.5 J
cobalt	4.2	—	4.6	4.8	—	4.4	—	4.7	—
copper	43.1 R	220 J	38.1 R	145 R	23.7 R	1330 J	R	57.8 R	45. 3R
iron	10600 J	7830 J	8460 J	10800 J	7380 J	17000 J	13000 J	15000 J	6190 J
lead	79.0 J	40.1 J	182 J	58.2 J	47.8 J	457 J	80.8 J	85.9 J	97.2 J
magnesium	5910 J	19700 J	9740 J	17200 J	10800 J	18900 J	14100 J	12600 J	10400 J
manganese	333 J	313 J	398 J	768 J	479 J	284 J	724 J	571 J	309 J
nickel	16.5	13.1	10.7	12.3	11.1	115	15	18.9	14.2
silver	<1.8 R	<1.8 R	<1.4 R	<1.8 R	<1.9 R	<1.9 R	<1.9 R	<1.9 R	67.6 J
sodium	144	233	155	—	—	—	—	—	—
vanadium	8.6	6.1	12.7	10.1	10.6	13.2	14.2	22.7	9.1
zinc	2150 J	98.2 J	82.9 J	64.8 R	53 R	198 J	115 J	263 J	142 J

NOTES:

- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- samples were analyzed for the complete TAL list.

J - associated numerical value is an estimated quantity.
R - data was rejected during data validation.
NA - sample was not analyzed for these analytes.

TABLE 7-4 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED INORGANICS ANALYTES
CATCH BASIN SEDIMENT
MMC - FARRELL ROAD PLANT RI

	LOCATION	CB-11	CB-13	CB-15	CB-16	CB-18	CB-19
	DEPTH	0-0.33	0-0.80	0-0.05	0-0.167	0-0.167	0-0.05
	DATE COLLECTED	4/26/94	4/26/94	4/27/94	4/26/94	4/27/94	4/27/94
TAL							
	aluminum	5770 J	2040 J	1780 J	4520 J	1570 J	NA
	antimony	—	—	—	—	—	NA
	arsenic	3.0	1.8	2.3	2.1	2.9	NA
	barium	39.2	1.6	4.9	19.4	—	NA
	beryllium	0.38	0.38	0.33	0.39	0.29	NA
	cadmium	—	—	0.65	0.71	1.3	NA
	calcium	16800 J	150000 J	119000 J	108000 J	121000 J	NA
	chromium	12.7 J	2.7 J	19.4 J	13.8 J	16.1 J	NA
	cobalt	—	—	—	—	—	NA
	copper	30 R	21.5R	197 J	35.6 R	58.7R	NA
	iron	6500 J	6200 J	7430 J	10400 J	6300 J	NA
	lead	90.6 J	14.6 J	96.6 J	49.6 J	90.6 J	NA
	magnesium	4790 J	13200 J	10100 J	10600 J	11600 J	NA
	manganese	584 J	497 J	340 J	737 J	376 J	NA
	nickel	6.2	7.9	9.3	11.4	9.5	NA
	silver	<2.1 R	<1.8 R	<1.9 R	<1.8 R	<2 R	NA
	sodium	—	177	—	—	—	NA
	vanadium	8.9	7.5	10.1	15.0	10.6	NA
	zinc	83.0 J	92.9 J	483 J	127 J	246 J	NA

NOTES:

- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- samples were analyzed for the complete TAL list.

J - associated numerical value is an estimated quantity.

R - data was rejected during data validation.

NA - sample was not analyzed for these analytes.

sediment. Each sediment sample was analyzed for the full TCL/TAL parameter suite with the exception of the sample collected from catch basin CB-19 which was analyzed for TCL VOCs only. Analytical data for the catch basin sediment samples is summarized in Tables 7-3 and 7-4 (TCL and TAL data, respectively). Methylene chloride, acetone, 1,1-dichloroethane, and 1,1,1-trichloroethane were the volatile organic analytes that were detected in the sediment samples from the catch basins. There were no VOCs detected in the sediment samples obtained from catch basins CB-01, CB-05, CB-06, CB-07, CB-09, CB-11, and CB-15. Semivolatile organic analytes were detected in every sediment sample collected from the catch basins. There were nineteen different SVOCs identified within the catch basin sediment samples. Twelve pesticide compounds were detected at catch basins CB-01, CB-03, CB-04, CB-05, CB-08, CB-09, CB-11, CB-13, CB-15, and CB-18. The PCB, Aroclor-1254 was present in the sediment samples obtained from catch basins CB-01, CB-03, CB-08, CB-15, and CB-18. The concentration of Aroclor-1254 ranged from 66 ug/Kg (ppb) at catch basin CB-03 to 180 ug/Kg (ppb) at CB-15.

7.1.3 *Wetlands*

Twenty-four soil samples were collected from twelve locations in the wetlands to the north of the facility during October 1993 as a part of the Accelerated RI/FS tasks. Samples were obtained from zero to one foot and from one to two feet below ground at each of the twelve sample locations. These samples were analyzed for TCL VOCs (data is summarized in Table 7-5). Acetone, 1,1-dichloroethane, 2-butanone, trichloroethene, benzene, trichlorofluoromethane, methyl-tertiary-butyl ether, and hexane were detected in samples from the wetlands. Acetone was detected in eight samples and ranged from a concentration of 10 ug/Kg (SS-1 from 0 to 1 foot) to 530 ug/Kg (SS-8 from 1 to 2 feet). 1,1-dichloroethane was present in sample SS-1 collected from 0 to 1 foot (4 ug/Kg) and SS-9 collected from 1 to 2 feet (10 ug/Kg). Seven samples had detectable quantities of 2-butanone which ranged from 7 ug/Kg (SS-4, 1 to 2 feet) to 230 ug/Kg (SS-8, 1 to 2 feet). Trichloroethene concentrations ranged from 3 ug/Kg (SS-3, 0 to 1 foot) to 30 ug/Kg (SS-12, 0 to 1 foot) and was detected in four samples. The sample collected from one to two feet at location SS-10 was the only sample with a detectable concentration of benzene (66 ug/Kg).

TABLE 7-5
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
WETLAND SEDIMENT SAMPLES
MMC - FARRELL ROAD PLANT RI

LOCATION	SS-1	SS-1	SS-2	SS-2	SS-3	SS-3	SS-4	SS-4
DEPTH	0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2
DATE COLLECTED	10/26/93	10/26/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93
VOCs								
acetone	10J	---	---	---	---	---	---	---
1,1-dichloroethane	4J	---	---	---	---	---	---	---
2-butanone	---	---	---	---	---	10J	---	7J
trichloroethene	---	---	---	7J	3J	---	---	---
benzene	---	---	---	---	---	---	---	---
trichlorofluoromethane	---	---	---	---	---	---	---	---
methyl-t-butyl ether	---	---	---	---	---	---	---	---
hexane	---	---	---	---	---	---	---	---

NOTES:
- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.

TABLE 7-5 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
WETLAND SEDIMENT SAMPLES
MMC - FARRELL ROAD PLANT RI

					DUP-1			
LOCATION	SS-5	SS-5	SS-6	SS-6	SS-6	SS-7	SS-7	SS-8
DEPTH	0-1	1-2	0-1	1-2	1-2	0-1	1-2	0-1
DATE COLLECTED	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/26/93
VOCs								
acetone	—	—	—	—	—	—	—	490 J
1,1-dichloroethane	—	—	—	—	—	—	—	—
2-butanone	—	—	—	—	—	—	—	150 J
trichloroethene	—	—	27J	—	—	—	—	—
benzene	—	—	—	—	—	—	—	—
trichlorofluoromethane	—	—	—	—	15 J	—	18J	—
methyl-t-butyl ether	—	—	—	—	—	—	—	—
hexane	—	—	—	—	—	—	—	—

NOTES:
- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.

TABLE 7-5 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
WETLAND SEDIMENT SAMPLES
MMC - FARRELL ROAD PLANT RI

LOCATION	SS-8	SS-9	SS-9	SS-10	SS-10	SS-11	SS-11	SS-12	SS-12
DEPTH	1-2	0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2
DATE COLLECTED	10/26/93	10/26/93	10/26/93	10/26/93	10/26/93	10/26/93	10/26/93	10/26/93	10/26/93
VOCs									
acetone	530 J	150 J	84 J	24 J	—	—	—	62 J	150 J
1,1-dichloroethane	—	—	10 J	—	—	—	—	—	—
2-butanone	230 J	—	33 J	—	—	—	—	42 J	34 J
trichloroethene	—	—	—	—	—	—	—	30 J	—
benzene	—	—	—	—	66 J	—	—	—	—
trichlorofluoromethane	—	—	—	—	—	—	—	—	—
methyl-t-butyl ether	—	—	—	170 J	360 J	—	—	—	—
hexane	—	—	—	—	26 J	—	—	—	12 J

NOTES:
- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.

Trichlorofluoromethane was detected in sample SS-7 collected from 1 to 2 feet (18 ug/Kg) and in the duplicate sample (DUP-1) of SS-6 from 1 to 2 feet (15 ug/Kg).

Both the 0 to 1 foot and the 1 to 2 foot samples collected from sediment sample location SS-10 had detectable concentrations of methyl-tertiary-butyl-ether (170 ug/Kg and 360 ug/Kg, respectively). No other samples had methyl-tertiary-butyl-ether present. Hexane concentrations ranged from 12 ug/Kg (SS-12, 1 to 2 feet) to 26 ug/Kg (SS-10, 1 to 2 feet).

7.2 *SOIL*

7.2.1 *Area 1 - Debris Pile North of FRP-2*

Three soil borings were completed in Area 1 and one soil sample from each boring was submitted for analysis. Each of these soil samples were analyzed for TCL VOCs, TCL SVOCs, and TCL Pesticides and PCBs. Table 7-6 presents a summary of the detected analytes for these soil samples.

Acetone, benzene, toluene, ethylbenzene, and xylenes (total) were detected in at least one of the soil samples collected from this area. The soil sample collected from 0 to 3 feet at boring B-121 did not have any detectable concentrations of VOCs. Acetone, benzene, toluene, ethylbenzene, and xylenes (total) were each detected in the soil sample collected from 8 to 10 feet at boring B-113. Acetone (68 ug/Kg) was the only VOC detected in the soil sample collected from 8 to 10 feet from boring B-111.

Semivolatile organic compounds were detected in the soil sample obtained from 0 to 3 feet at boring B-121. Fluoranthene, pyrene, chysene, benzo (b)

TABLE 7-6
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-1, SOILS
MMC - FARRELL ROAD PLANT RI

	BORING	B-111	B-113	B-121	TAGM
	DEPTH (ft)	8-10	8-10	0-3	4046
	DATE COLLECTED	4/25/94	4/25/94	4/25/94	Objective
VOCs					
	acetone	68	120	—	200
	benzene	—	31	—	60
	toluene	—	6 J	—	1,500
	ethylbenzene	—	42	—	5,500
	xylenes (total)	—	41	—	1,200
SVOCs					
	fluoranthene	—	—	96 J	[illegible]
	pyrene	—	—	72 J	[illegible]
	chrysene	—	—	41 J	[illegible]
	benzo (b) fluoranthene	—	—	42 J	[illegible]
	benzo (k) fluoranthene	—	—	41 J	[illegible]
	benzo (g,h,i) perylene	—	—	65 J	[illegible]
	TICs	11	9	9	
Pest / PCBs					
	4,4' - DDE	81 J	200	11 J	[illegible]
	4,4' - DDD	130 J	290	12 J	[illegible]
	4,4' - DDT	24 J	94 J	3.0 J	[illegible]

NOTES:

- concentrations reported in ug/Kg.
- "—" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL list.

J - associated numerical value is an estimated quantity.

fluoranthene, benzo (k) fluoranthene, and benzo (g,h,i) perylene were identified at boring B-121. There were no identified SVOCs detected in the soil samples from 8 to 10 feet at both B-11 and B-113.

Pesticides were detected in each of the soil samples from borings B-111, B-113, and B-121. The concentration of 4,4'-DDE ranged from 11 ug/Kg at B-121 (0 to 3 feet) to 200 ug/Kg at B-113 (8 to 10 feet). The concentration of 4,4'-DDD ranged from 12 ug/Kg at B-121 (0 to 3 feet) to 290 ug/Kg at B-113 (8 to 10 feet). The concentration of 4,4'-DDT ranged from 3.0 ug/Kg at B-121 (0 to 3 feet) to 94 ug/Kg at B-113 (8 to 10 feet).

7.2.2 *Area 2*

Soil samples were collected from borings B-115, B-126, B-127 and B-128 that were completed within Area 2. Boring B-115 was analyzed for the full TCL/TAL parameter suite while the others were analyzed for TPH. A summary of the detected analytes from these soil samples is presented in Table 7-7.

Acetone and toluene were present in B-115 (2 to 3 feet) at a concentration of 90 ug/Kg and 7 ug/Kg respectively. The soil sample collected from 5 to 6 feet at boring B-115 contained 6 ug/Kg of 1,1-dichloroethane and 2 ug/Kg of 1,1,1-trichloroethane. Chloroform was identified in both samples obtained from boring B-115.

There were no identifiable SVOCs detected in either soil sample collected from boring B-115. There were twelve tentatively identified compounds in the soil sample from 2 to 3 feet and eight in the sample from 5 to 6 feet.

TABLE 7-7
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-2, SOILS
MMC - FARRELL ROAD PLANT RI

						DUPE-03	
	BORING	B-115	B-115	B-126	B-127	B-127	B-128
	DEPTH (ft)	2-3	5-6	3-5	2-4	2-4	1-3
	DATE COLLECTED	4/28/94	4/28/94	4/28/94	4/28/94	4/28/94	4/28/94
VOCs (ug/Kg)							
	acetone	90	—	NS	NS	NS	NS
	1,1-dichloroethane	—	6 J	NS	NS	NS	NS
	chloroform	3 J	2 J	NS	NS	NS	NS
	1,1,1-trichloroethane	—	2 J	NS	NS	NS	NS
	toluene	7 J	—	NS	NS	NS	NS
SVOCs (ug/Kg)							
	TICs	12	8	NS	NS	NS	NS
Pest / PCBs (ug/Kg)							
	dieldrin	0.12 J	—	NS	NS	NS	NS
	4,4' - DDE	2.1 J	—	NS	NS	NS	NS
	4,4' - DDD	0.38 J	—	NS	NS	NS	NS
	4,4' - DDT	1.1 J	—	NS	NS	NS	NS
	gamma - chlordane	0.10 J	—	NS	NS	NS	NS
	aroclor - 1254	10 J	—	NS	NS	NS	NS
TAL (mg/Kg)							
	aluminum	4530	3260	NS	NS	NS	NS
	arsenic	1.8	1.1	NS	NS	NS	NS
	barium	25.1	9.3	NS	NS	NS	NS
	beryllium	0.37	—	NS	NS	NS	NS
	calcium	2450	44200	NS	NS	NS	NS
	chromium	6.8	2.5	NS	NS	NS	NS
	cobalt	5.7	—	NS	NS	NS	NS
	copper	5.8	9.3	NS	NS	NS	NS
	iron	10100	7510	NS	NS	NS	NS
	lead	11.6	3.6 J	NS	NS	NS	NS
	magnesium	1340	13600	NS	NS	NS	NS
	manganese	177	301	NS	NS	NS	NS
	nickel	8.1	7.6	NS	NS	NS	NS
	sodium	216	180	NS	NS	NS	NS
	vanadium	9.7	3.8	NS	NS	NS	NS
	zinc	24.2	27.4	NS	NS	NS	NS
TPH (mg/Kg)	TPH	NS	NS	2040	220	989	30

NOTES:

- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.

J - associated numerical value is an estimated quantity.

NS - indicates that this sample was not analyzed for this analyte.

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Pesticides that were identified in the soil sample from 2 to 3 feet included dieldrin, 4,4'-DDE. 4,4'-DDD, 4,4'-DDT, and gamma-chlordane. The PCB, Aroclor-1254 was also identified in this sample at a concentration of 10 ug/Kg (ppb). TPH was detected in B-126, B-127 and B-128 at concentrations between 30 and 2040 mg/Kg.

7.2.3 *Area 3*

Soil samples were collected from 0 to 1 foot in two soil borings completed in Area 3. Each soil sample was analyzed for TCL SVOCs, TCL Pesticides and PCBs, and TAL Metals. Detected analytes from these samples are summarized in Table 7-8. The only SVOC that was detected was bis (2-ethylhexyl) phthalate in the soil sample from boring B-123 at a concentration of 110 ug/Kg. There were no pesticide or PCB compounds identified in either soil sample from this area. TAL metals were identified in each of the borings that were completed in this area.

7.2.4 *Area 4*

Two soil borings (B-124 and B-125) were drilled in Area 4 during the 1994 RI. Soil samples were collected from 3 to 5 feet and from 7 to 9 feet at each of the borings. Each soil sample was analyzed for the complete TCL suite of parameters. A summary table of detected analytes is presented in Table 7-9.

VOCs were not detected in any of the soil samples that were collected from the soil borings in this area.

TABLE 7-8
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA 3, SOILS
MMC - FARRELL ROAD PLANT RI

	BORING	B-122	B-123
	DEPTH (ft)	0-1	0-1
	DATE COLLECTED	10/28/93	10/28/93
SVOCs (ug/Kg)			
	bis (2-ethylhexyl) phthalate	---	110 J
	TICs	1	2
Pest/PCBs (ug/Kg)			
	None Detected		
TAL (mg/Kg)			
	aluminum	2840	3100
	barium	22.1	22.4
	beryllium	0.18	0.2
	calcium	50400	69100
	chromium	4.1	4.7
	cobalt	4.2	5.3
	copper	18.0	23.3
	iron	7080	8210
	lead	1.6 J	1.6 J
	magnesium	13200	15300
	manganese	287	349
	nickel	8.1	9.2
	potassium	489	395
	sodium	188	191
	vanadium	2.1	2.1
	zinc	17.7	17.5

NOTES:

- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for TCL SVOCs, TCL Pest / PCBs and TAL metals.

J - associated numerical value is an estimated quantity.

TABLE 7-9
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-4, SOILS
MMC - FARRELL ROAD PLANT RI

	BORING	B-124	B-124	B-125	B-125
	DEPTH (ft)	3-5	7-9	3-5	7-9
	DATE COLLECTED	4/25/94	4/25/94	4/26/94	4/26/94
VOCs					
	None Detected				
SVOCs					
	pyrene	24 J	---	---	---
	TICs	10	7	8	2
Pest / PCBs					
	alpha-BHC	0.045 J	0.042 J	0.13 J	---
	beta-BHC	0.34 J	---	---	---
	heptachlor	---	---	0.10 J	---
	aldrin	---	---	0.16 J	---
	4,4' - DDE	0.095 J	---	0.17 J	---
	endrin	0.074 J	0.072 J	0.074 J	---

NOTES:

- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL list.

J - associated numerical value is an estimated quantity.

Pyrene was the only SVOC that was detected in this area. The soil sample obtained from 3 to 5 feet at boring B-124 contained pyrene at a concentration of 24 ug/Kg. Pyrene was not detected in any of the other soil samples. Tentatively identified compounds (TIC) were detected in each of the soil samples.

There were no pesticides detected in the soil sample collected from 7 to 9 feet at boring B-125. Alpha-BHC was detected in each of the other soil samples at concentrations ranging from 0.042 ug/Kg to 0.13 ug/Kg. Beta-BHC was detected only in the soil sample collected from 3 to 5 feet from boring B-124 (0.34 ug/Kg). The soil sample from 3 to 5 feet at boring B-125 contained detectable quantities of Heptachlor (0.10 ug/Kg) and Aldrin (0.16 ug/Kg). These compounds were not detected in the other soil samples collected from this area. The soil samples from 3 to 5 feet at borings B-124 and B-125 were reported to contain 4,4'-DDE at concentrations of 0.095 ug/Kg and 0.17 ug/Kg, respectively. Endrin was detected in the 3 to 5 foot (0.074 ug/Kg) and 7 to 9 foot (0.072 ug/Kg) soil samples from boring B-124 and in the 3 to 5 foot (0.074 ug/Kg) sample from boring B-125. PCB compounds were not detected in any of the soil samples that were collected from this area.

7.2.5 Area 5

One soil boring was drilled in Area 5 and one soil sample from this boring was submitted for analysis. The soil sample collected from 2 to 4 feet at boring B-120 was analyzed for TCL organics and TAL metals. Table 7-10 presents a summary of the detected analytes in this sample.

VOCs were not detected in boring B-120; however, VOCs were detected in this area at high concentrations during previous investigations. See the 1992 Environmental Investigation Report for a summary.

TABLE 7-10
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-5, SOILS
MMC - FARRELL ROAD PLANT RI

	BORING	B-120
	DEPTH (ft)	2-4
	DATE COLLECTED	4/26/94
VOCs (ug/Kg)	None Detected	
SVOCs (ug/Kg)		
	acenaphthene	49 J
	fluorene	31 J
	phenanthrene	570
	carbazole	95 J
	fluoranthene	730
	pyrene	570
	benzo (a) anthracene	320 J
	chrysene	320 J
	benzo (b) fluoranthene	260 J
	benzo (k) fluoranthene	370 J
	benzo (a) pyrene	300 J
	indeno (1,2,3-cd) pyrene	170 J
	dibenzo (a,h) anthracene	78 J
	benzo (g,h,i) perylene	190 J
	TICs	3
Pest / PCBs (ug/Kg)		
	4,4' - DDE	0.41 J
	4,4' - DDT	0.36 J
TAL (mg/Kg)		
	aluminum	8120 J
	arsenic	1.8
	barium	25.5
	beryllium	0.41
	calcium	16000 J
	chromium	4.6 J
	cobalt	6.0
	iron	11200 J
	lead	5.4 J
	magnesium	3540 J
	manganese	324 J
	nickel	11.3
	selenium	0.57 J
	vanadium	7.7

NOTES:

- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL / TAL list.

J - associated numerical value is an estimated quantity.

Semivolatile organic compounds that were detected included acenaphthene (49 ug/Kg), fluorene (31 ug/Kg), phenanthrene (570 ug/Kg), carbazole (95 ug/Kg), fluoranthene (730 ug/Kg), pyrene (570 ug/Kg), benzo (a) anthracene (320 ug/Kg), chyrsene (320 ug/Kg), benzo (b) fluoranthene (260 ug/Kg), benzo (k) fluoranthene (370 ug/Kg), benzo (a) pyrene (300 ug/Kg), indeno (1,2,3-cd) pyrene (170 ug/Kg), dibenzo (a,h) anthracene (78 ug/Kg), and bezo (g,h,i) perylene (190 ug/Kg). There were three tentatively identified compounds in the soil sample. Pesticides that were identified in the soil sample from boring B-120 were 4,4'-DDE at a concentration of 0.41 ug/Kg and 4,4'-DDT at a concentration of 0.36 ug/Kg. PCBs were not detected in this soil sample.

Several metals were identified in the soil sample collected from boring B-120 as shown in Table 7-10. Cyanide was not analyzed in boring B-120; however, it was detected in a sample collected during the drywell closure at 2.5 ppm.

.6 *Area 7*

Eight soil samples were collected from four soil borings drilled in Area 7. Stained soil and elevated PID readings were observed in the soil at a depth roughly equivalent to the elevation of the water table during the RI and the 1992 investigation. Soil samples were collected from the 4 to 6 foot and 8 to 10 foot interval at boring B-116. Soil samples were collected from the 2 to 4 foot and 6 to 8 foot intervals at boring B-117. Soil from 3 to 5 feet and from 7 to 9 feet were obtained at borings B-118 and B-119. These eight soil samples were analyzed for TCL VOCs. VOCs detected in these soil samples are summarized in Table 7-11. Methylene chloride was detected in four soil samples from this area. Concentrations ranged from 4 ug/Kg (both samples from B-119) to 10 ug/Kg (3 to 5 foot sample from B-118). Acetone was identified in the 3 to 5 foot sample that was collected from boring B-119 (15 ug/Kg). One soil sample (B-116, 4 to 6 feet) was found to have a concentration of 2 ug/Kg of chloroform.

TABLE 7-11
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-7, SOILS
MMC - FARRELL ROAD PLANT RI

BORING	B-116	B-116	B-117	B-117	B-118	B-118	B-119	B-119
DEPTH (ft)	4-6	8-10	2-4	6-8	3-5	7-9	3-5	7-9
DATE COLLECTED	4/27/94	4/27/94	4/27/94	4/27/94	4/27/94	4/27/94	4/27/94	4/27/94
VOCs (ug/Kg)								
methylene chloride	---	---	---	---	10 J	5 J	4 J	4 J
acetone	---	---	---	---	---	---	15	---
chloroform	2 J	---	---	---	---	---	---	---
tetrachloroethene	---	---	---	---	3 J	---	3 J	---
trichlorofluoromethane	---	---	---	17	---	---	1 J	12 J

NOTES:

- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.

Detection limits

Tetrachloroethene was detected in the 3 to 5 foot samples from both boring B-118 and B-119 at a concentration of 3 ug/Kg. Trichlorofluoromethane was identified in three soil samples. The concentration ranged from 1 ug/Kg (B-119, 3 to 5 feet) to 17 ug/Kg (B117, 6 to 8 feet).

7.2.7 *Area 9 - Removed UST T-50*

Soil samples were collected from 3 to 5 feet and from 5 to 7 feet in soil borings B-101 and B-102 in Area 9. Samples were analyzed for the full suite of TCL parameters. A summary of the detected analytes is presented in Table 7-12.

VOCs were not detected in the soil samples from Area 9.

Identifiable SVOCs were not detected in any of the four samples that were collected from borings B-101 and B-102. However, there were six TICs detected in the soil sample obtained from 3 to 5 feet and two TICs in the sample from 5 to 7 feet in this boring. TICs that were detected in the samples from boring B-102 included five in the 3 to 5 foot sample and nine in the 5 to 7 foot sample.

Pesticide compounds were not detected in either soil sample from boring B-101. Alpha-BHC, aldrin, 4,4'-DDE, 4,4'-DDD, endosulfan sulfate, and 4,4'-DDT were identified in one or both of the soil samples from boring B-102. PCB compounds were not detected in any of the four soil samples that were collected in this area.

TABLE 7-12
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-9, SOIL
MMC - FARRELL ROAD PLANT RI

	BORING	B-101	B-101	B-102	B-102
	DEPTH (ft)	3-5	5-7	3-5	5-7
	DATE COLLECTED	4/26/94	4/26/94	4/26/94	4/26/94
VOCs (ug/Kg)					
	None Detected				
SVOCs (ug/Kg)					
	TICs	6	2	5	9
Pest / PCBs (ug/Kg)					
	alpha-BHC	—	—	0.24 J	0.11 J
	aldrin	—	—	0.14 J	—
	4,4' - DDE	—	—	0.76 J	1.5 J
	4,4' - DDD	—	—	—	0.25 J
	endosulfan sulfate	—	—	0.31 J	0.43 J
	4,4' - DDT	—	—	0.62 J	—

NOTES:
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL.

J - associated numerical value is an estimated quantity.

7.2.8 Area 10 - Temporary Hazardous Materials Storage Area

Two soil samples were collected from each of six soil borings (B-103, B-108, B-109, B-110, B-112, and MW-26D) that were drilled in Area 10. One sample was obtained from 3 to 5 feet in each boring. The second soil sample in each boring was collected from the split spoon sample immediately above the water table. In borings B-103, B-108, and B-110 the 7 to 9 foot soil sample was identified as the two foot interval directly above the water table. The 9 to 11 foot sample interval was selected in borings B-109 and B-112. In soil boring MW-26D, the two foot interval above the water table was the 11 to 13 foot sample. Each of these soil samples was submitted for analysis of the full suite of TCL/TAL parameters. A summary table of detected analytes is presented in Table 7-13.

Methylene chloride was identified in both samples collected from boring B-112; however, it was not detected in any other soil sample from this area. Acetone was detected in the 3 to 5 foot sample from boring B-108 (42 ug/Kg) and in the 3 to 5 foot and 11 to 13 foot soil samples from boring MW-26D (53 ug/Kg and 41 ug/Kg, respectively). Soil from the 3 to 5 foot interval in boring B-103 and from the 7 to 9 foot interval in both boring B-103 and B-108 had concentrations of 1,1-dichloroethene. 1,1-dichloroethene was identified in five soil samples and ranged from a concentration of 2 ug/Kg in the 3 to 5 foot interval at boring B-108 to 660 ug/Kg in the 7 to 9 foot interval at boring B-108. Chloroform was detected at a concentration of 1 ug/Kg in the 7 to 9 foot soil sample from boring B-110 and the 3 to 5 foot interval from boring MW-26D. Chloroform was also detected at boring B-108 in the 3 to 5 foot sample (0.8 ug/Kg) and in the 11 to 13 foot interval of boring MW-26D (3 ug/Kg). Three soil samples had detectable quantities of 1,1,1-trichloroethane at concentrations ranging from 9 ug/Kg (MW-26D, 3 to 5 feet) to 530 ug/Kg (B-103, 7 to 9 feet). Ethylene benzene and xylenes (total) were detected

TABLE 7-13
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-10, SOILS
MMC - FARRELL ROAD PLANT RI

									DUPE-02				
BORING	B-103	B-103	B-108	B-108	B-109	B-109	B-110	B-110	B-110	B-112	B-112	MW-26D	MW-26D
DEPTH (ft)	3-5	7-9	3-5	7-9	3-5	9-11	3-5	7-9	7-9	3-5	9-11	3-5	11-13
DATE COLLECTED	5/2/94	5/2/94	4/29/94	4/29/94	5/2/94	5/2/94	4/28/94	4/28/94	4/28/94	4/27/94	4/27/94	5/3/94	5/3/94
VOCs													
methylene chloride	---	---	---	---	---	---	---	---	---	6 J	7 J	---	---
acetone	---	---	42	---	---	---	---	---	---	---	---	53	41
1,1-dichloroethene	7 J	36	---	40 J	---	---	---	---	---	---	---	---	---
1,1-dichloroethane	190	340 J	2 J	660	---	---	---	---	4 J	---	---	---	---
chloroform	---	---	0.8 J	---	---	---	---	1 J	---	---	---	1 J	3 J
1,1,1-trichloroethane	48	530 J	---	---	---	---	---	---	---	---	---	9 J	---
ethylbenzene	---	---	---	---	---	---	---	---	---	---	---	---	93
xylenes (total)	---	---	---	---	---	---	---	---	---	---	---	---	390
SVOCs													
phenol	---	---	---	840 J	---	---	---	---	---	---	---	---	---
fluoranthene	---	---	---	---	---	---	20 J	---	---	---	---	---	---
pyrene	---	---	---	---	---	---	20 J	---	---	---	---	---	---
bis (2-ethylhexyl) phthalate	---	---	47 J	37 J	---	---	---	---	---	---	---	160 J	48 J
TICs	2	3	9	18	6	3	12	11	8	6	6	13	13

NOTES:
- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL / TAL list.

J - associated numerical value is an estimated quantity.
R - data for sample was rejected during data validation.

TABLE 7-13 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-10, SOILS
MMC - FARRELL ROAD PLANT RI

									DUPE-02				
BORING	B-103	B-103	B-108	B-108	B-109	B-109	B-110	B-110	B-110	B-112	B-112	MW-26D	MW-26D
DEPTH (ft)	3-5	7-9	3-5	7-9	3-5	9-11	3-5	7-9	7-9	3-5	9-11	3-5	11-13
DATE COLLECTED	5/2/94	5/2/94	4/29/94	4/29/94	5/2/94	5/2/94	4/28/94	4/28/94	4/28/94	4/27/94	4/27/94	5/3/94	5/3/94
Pest / PCBs													
delta-BHC	---	---	0.23 J	0.13 J	---	---	---	0.57 J	0.18 J	---	---	---	---
dieldrin	---	---	---	---	0.053 J	---	---	---	0.094 J	---	---	---	---
4,4' - DDE	---	12 J	170	---	8.0 J	---	7.8 J	140 J	21 J	18	---	4.1 J	---
4,4' - DDD	---	16	210	---	4.5 J	---	7.9 J	120 J	---	---	---	4.9 J	0.096 J
4,4' - DDT	---	---	11 J	0.066 J	0.57 J	---	---	30 J	2.8 J	---	---	---	---
alpha - chlordane	---	---	0.31 J	---	---	---	---	---	0.083 J	---	---	---	---
TAL													
aluminum	9690	7170	9980	3110	7270	7910	3610	9610	10600	7110 J	3740 J	6990	3040
arsenic	3.7 J	5.3 J	2.5	1.6	4.0 J	4.9 J	---	2.7	2.4	2.3	2.8	4.1 J	25.0 J
barium	24.5	32.3	39.7	11.6	29.0	29.8	3.4	52.0	77.4	21.6	15.2	21.5	7.9
beryllium	0.57	0.57	0.51	0.27	0.54	0.74	---	0.53	0.69	0.45	0.33	0.54	0.57
cadmium	---	---	---	---	---	---	0.64 J	---	---	---	---	---	---
calcium	1590	27500	9020	25900	24900	43500	114000	14200	2420	37800 J	83300 J	20800	45700
chromium	7.3	5.5	6.6	2.4	6.9	9.4	3.1	9.2	8.1	8.0 J	4.2 J	5.3	3.0

NOTES:
- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL / TAL list.

J - associated numerical value is an estimated quantity.
R - data for sample was rejected during data validation.

TABLE 7-13 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-10, SOILS
MMC - FARRELL ROAD PLANT RI

										DUPE-02				
	BORING	B-103	B-103	B-108	B-108	B-109	B-109	B-110	B-110	B-110	B-112	B-112	MW-26D	MW-26D
	DEPTH (ft)	3-5	7-9	3-5	7-9	3-5	9-11	3-5	7-9	7-9	3-5	9-11	3-5	11-13
	DATE COLLECTED	5/2/94	5/2/94	4/29/94	4/29/94	5/2/94	5/2/94	4/28/94	4/28/94	4/28/94	4/27/94	4/27/94	5/3/94	5/3/94
TAL	cobalt	6.3	5.9	7.9	---	6.2	6.4	5.4	9.3	10.4	7.0	4.5	6.1	---
	copper	21.3	28.1	17.2	9.4	20.7	17.0	10.1	36.5	5.8	R	R	15.0	6.9
	iron	11600	10800	14500	7770	12900	16000	7970	14200	21600	12900 J	7660 J	12200	9180
	lead	---	---	8.0	6.0 J	---	---	4.2	11.2 J	13.5 J	24.3 J	5.0 J	---	---
	magnesium	2110	6440	4740	7960	9870	14500	6510	3290	2290	8710 J	20300 J	8660	14000
	manganese	197	513	459	445	407	468	262	618	447	365 J	446 J	395	298
	nickel	9.2 J	11.2 J	13.8	8.4	13.0 J	14.2 J	9.4	12.3	13.9	13.8	8.9	14.1 J	8.6 J
	potassium	---	---	---	---	754	1570	540	---	---	---	572	1050	---
	selenium	---	---	---	---	---	---	---	0.63 J	---	---	---	---	---
	sodium	R	R	251	165	R	R	249	287	---	---	---	R	R
	thallium	1.5 J	---	---	---	---	---	---	---	---	---	---	---	---
	vanadium	10.9	8.2	9.7	4.4	7.8	14.0	8.4	11.9	18.4	16.5	6.1	8.9	6.0
	zinc	25.4	24.6	36.1	22.3	26.7	30.2	23.1	34.9	27.9	R	R	26.1	20.8

NOTES:

- concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL / TAL list.

J - associated numerical value is an estimated quantity.

R - data for sample was rejected during data validation.

in the 11 to 13 foot soil sample that was collected at boring MW-26D (93 ug/Kg and 390 ug/Kg, respectively).

Phenol, fluoranthene, pyrene, and bis (2-ethylhexyl) phthalate were the only SVOCs that were identified in samples from Area 10. The sample collected from the 7 to 9 foot interval of boring B-108 was the only sample in which phenol was detected (840 ug/Kg). Fluoranthene and pyrene were both identified at a concentration of 20 ug/Kg in the 3 to 5 foot soil sample from boring B-110 and were not detected in any other sample. Four samples had detectable quantities of bis (2-ethylhexyl) phthalate (3 to 5 feet and 7 to 9 feet in boring B-108 and 3 to 5 feet and 11 to 13 feet in boring MW-26D).

Pesticide compounds that were detected in the soil samples collected from Area 10 included delta-BHC, dieldrin, 4,4'-DDE, 4,4'-DDD, 4,4'-DDT and alpha-chlordane. Delta-BHC was detected in both the 3 to 5 foot sample and the 7 to 9 foot sample from boring B-108 (0.23 ug/Kg and 0.13 ug/Kg, respectively) and in the 7 to 9 foot sample from boring B-110 (0.57 ug/Kg). Dieldrin was identified at a concentration of 0.053 ug/Kg in the 3 to 5 foot sample from B-109 and in a duplicate sample (DUPE-02) at a concentration of 0.094 ug/Kg, although dieldrin was not identified in the duplicates corresponding sample (B-110, 7 to 9 feet). Seven soil samples had detectable quantities of 4,4'-DDE which ranged from 4.1 ug/Kg in the sample from the 3 to 5 foot interval of boring MW-26D to 170 ug/Kg in the sample from the 3 to 5 foot interval of boring B-108. Seven soil samples also had detectable quantities of 4,4'-DDD which ranged from 0.096 ug/Kg in the sample from the 11 to 13 foot interval of boring MW-26D to 210 ug/Kg in the sample from the 3 to 5 foot interval of boring B-108. The concentration of 4,4'-DDT ranged from 0.066 ug/Kg in the 7 to 9 foot sample from boring B-108 to 30 ug/Kg in the 7 to 9 foot sample from boring B-110 and was identified in four soil samples. Alpha-chlordane was identified at a concentration of 0.31 ug/Kg in the 3 to 5 foot sample from B-108 and in a duplicate sample (DUPE-02) at a concentration of 0.083 ug/Kg, although alpha-chlordane was not identified in the duplicates' corresponding sample (B-110, 7 to 9 feet).

Several TAL metal analytes were identified in each of the soil samples that were collected from Area 10. Cyanide was not detected in any of these samples.

7.2.9 *Area 11 - Radar Test Area*

Five soil borings were drilled in Area 11 as part of the 1994 RI and two soil samples were collected from each boring. A soil sample was collected from 3 to 5 feet and 7 to 9 feet at boring B-114. The 3 to 5 foot and 9 to 11 foot intervals from both B-129 and B-130 were collected for analysis. Samples at boring B-131 were obtained from 3 to 5 feet and 7 to 9 feet. Samples from the 3 to 5 foot and 5 to 7 foot intervals in boring B-132 were collected for analysis. Each of these ten soil samples was submitted for TCL VOCs analysis. A summary of the detected compounds is presented in Table 7-14.

VOCs were detected in only two of the ten soil samples from Area 11. The soil sample obtained from the 7 to 9 foot interval at boring B-114 contained acetone at a concentration of 65 ug/Kg and 1,2-dichloroethene at a concentration of 8 ug/Kg. Soil boring B-129 contained methylene chloride at 14 ug/Kg and acetone at 15 ug/Kg in the 9 to 11 foot interval. No additional VOCs were identified in this area.

TABLE 7-14
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-11, SOILS
MMC - FARRELL ROAD PLANT RI

				DUPE-06			DUPE-05					
	BORING	B-114	B-114	B-129	B-129	B-129	B-130	B-130	B-130	B-131	B-131	B-132	B-132
	DEPTH (ft)	5-7	7-9	3-5	3-5	9-11	3-5	3-5	9-11	3-5	7-9	3-5	5-7
	DATE COLLECTED	5/4/94	5/4/94	5/5/94	5/5/94	5/5/94	5/4/94	5/4/94	5/4/94	5/4/94	5/4/94	5/5/94	5/5/94
VOCs													
	methylene chloride	---	---	---	---	14	---	---	---	---	---	---	---
	acetone	---	65	---	---	15	---	---	---	---	---	---	---
	1,2-dichloroethene	---	8 J	---	---	---	---	---	---	---	---	---	---

NOTES: - concentrations reported in ug/Kg.
- "---" in a column indicates that the analyte was not detected in the sample.
- all samples shown were analyzed for complete TCL VOC list.
- only compounds that were detected in one or more sample are shown above.
J - associated numerical value is an estimated quantity.

7.2.10 *Area 12 - Paint Booth Area*

Four soil samples were collected from two soil borings completed in Area 12 during the accelerated RI tasks. Samples were collected from the 2 to 3 foot interval and the 5 to 6 foot interval in soil borings B-106 and B-107. These soil samples were analyzed for TAL metals. The analytical results are summarized in Table 7-15

7.2.11 *Area 16 - Removed Gasoline UST Near the Garage*

Two soil borings were drilled in Area 16 during the 1994 RI. Soil samples were collected from 5 to 7 feet and 7 to 9 feet in borings B-104 and B-105. These four soil samples were analyzed for TCL SVOCs and lead. A summary table of analytical results is presented in Table 7-16.

Bis (2-ethylhexyl) phthalate was the only SVOC that was detected in the samples from this area (B104 5 to 7 feet; 3 ug/Kg).

Lead was detected in each of the samples from this area. Lead concentrations ranged from 3.0 mg/Kg (B-104, 7 to 9 feet) to 7.0 mg/Kg (B-105, 5 to 7 feet).

7.2.12 *Storm Sewer Soil Borings*

Four soil borings (B-133, B-134, B-135, and B-136) were drilled adjacent to storm sewer lines at the site. Two soil samples were collected from each of these soil borings. The 1 to 3 foot interval from each boring was collected for laboratory analysis. The 5 to 7 foot interval at boring B-133 and the 7 to 9 foot interval at borings B-134, B-135, and B-136 were also collected for laboratory analysis. Each sample was analyzed for the full

TABLE 7-15
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-12, SOILS
MMC - FARRELL ROAD PLANT RI

	BORING	B-106	B-106	B-107	B-107
	DEPTH (ft)	2-3	5-6	2-3	5-6
	DATE COLLECTED	11/1/93	11/1/93	10/28/93	10/28/93
TAL (mg/Kg)					
	aluminum	8140	6900	4940	6490
	arsenic	4.3 J	1.2 J	2.3 J	3.5 J
	barium	32.8	23.5	40.3	24.9
	beryllium	0.45	0.27	0.28	0.43
	calcium	1180	1170	21500	1590
	chromium	9.2	R	7.4	7.5
	cobalt	7.3	6.9	6.0	6.5
	copper	11.5	6.8	16.8	13
	iron	12600	10400	12100	11700
	lead	2.3 J	1.3 J	1.9 J	1.9 J
	magnesium	2140	1970	4580	1940
	manganese	373	293	550	567
	nickel	R	R	15.5	10.9
	potassium	703	554	442	600
	selenium	0.26	---	---	---
	sodium	140	130	217	167
	vanadium	7.9	6.5	4.2	6.7
	zinc	24.3	17.2	20.3	26

NOTES:

- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TAL list.

R - data for sample was rejected during data validation.
J - associated numerical value is an estimated quantity.

TABLE 7-16
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
AREA-16, SOILS
MMC - FARRELL ROAD PLANT RI

			DUPE-08			
	BORING	B-104	B-104	B-104	B-105	B-105
	DEPTH (ft)	5-7	5-7	7-9	5-7	7-9
	DATE COLLECTED	5/6/94	5/6/94	5/6/94	5/6/94	5/6/94
SVOCs (ug/Kg)						
	bis (2-ethylhexyl) phthalate	30 J	—	—	—	—
	TICs	19	10	3	6	2
METALS (mg/Kg)						
	lead	3.6	3.1	3.0	7.0	4.7

NOTES:

- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL SVOC list and lead.

J - associated numerical value is an estimated quantity.

TCL suite of parameters. A summary of the analytes that were detected in these samples is presented in Table 7-17.

Benzene was the only VOC detected among the samples that were collected from the storm sewer soil borings. The sample collected from the 1 to 3 foot interval at boring B-134 had a benzene concentration of 2 ug/Kg. Benzene was not detected in any of the other samples that were collected.

Identifiable SVOCs were not detected in soil samples collected from the storm sewer soil borings. Several TICs were detected in each soil sample with the exception of the sample collected from 5 to 7 feet in boring B-133 which contained no TICs.

Beta-BHC and 4,4'-DDE were the only pesticide compounds detected in samples collected from this area. Beta-BHC was detected in the 7 to 9 foot sample (0.28 ug/Kg) collected from boring B-135. The samples from the 1 to 3 foot interval in borings B-134 and B-135 contained 4,4'-DDE at concentrations of 0.26 ug/Kg and 0.64 ug/Kg, respectively.

7.3 *SURFACE WATER*

A total of six surface water samples were collected at the site; three from the Seneca River in June 1992 and three from the wetland in November 1993. VOCs were not detected in any of the Seneca River samples (Attachment to Letter of Response from MMC to NYSDEC dated 22 December 1994). Results from wetland samples are presented below.

7.3.1 *Wetlands*

Three surface water samples were collected from the wetland in November 1993 as part of the accelerated RI/FS tasks. Surface water samples SW-1, SW-2, and SW-3 were collected and analyzed for TCL VOCs, calcium, magnesium, and hardness. Detected analytes are summarized in Table 7-18. Detected VOCs include: carbon disulfide, 2-butanone, and methyl tert-butyl ether. Carbon disulfide was detected in surface water samples SW-2 (6 ug/L) and SW-3 (2 ug/L).

TABLE 7-17
ANALYTICAL DATA
SUMMARY OF DETECTED ANALYTES
STORM SEWER SOIL BORINGS
MMC - FARRELL ROAD PLANT RI

				DUPE-09						
	BORING	B-133	B-133	B-133	B-134	B-134	B-135	B-135	B-136	B-136
	DEPTH (ft)	1-3	5-7	5-7	1-3	7-9	1-3	7-9	1-3	7-9
	DATE COLLECTED	5/10/94	5/9/94	5/9/94	5/10/94	5/9/94	5/10/94	5/9/94	5/10/94	5/10/94
VOCs (ug/Kg)										
	benzene	—	—	—	2 J	—	—	—	—	—
SVOCs (ug/Kg)										
	TICs	8	0	4	10	7	5	3	2	3
Pest / PCBs (ug/Kg)										
	beta-BHC	—	—	—	—	—	—	0.28 J	—	—
	4,4' - DDE	—	—	—	0.26 J	—	0.64 J	—	—	—

NOTES:
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL list.

J - associated numerical value is an estimated quantity.

TABLE 7-18
ANALYTICAL DATA
SUMMARY OF DETECTED ORGANIC ANALYTES
SURFACE WATER
MMC - FARRELL ROAD PLANT RI

		SW-01	SW-02	SW-03
	LOCATION	SW-01	SW-02	SW-03
	DATE COLLECTED	11/4/93	11/4/93	11/4/93
VOCs (ug/L)				
	carbon disulfide	---	6 J	2 J
	2-butanone	---	7 J	---
	methyl tert-butyl ether	310 J	---	---
METALS (ug/L)				
	calcium	74100 J	182000 J	146000 J
	magnesium	10700	68000	38300
	hardness	229000 J	734000 J	522000 J

NOTES:
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC and selected inorganics.

J - associated numerical value is an estimated quantity.

Surface water sample SW-2 was the only sample with detectable concentrations of 2-butanone (7 ug/L). Methyl tert-butyl ether was detected at a concentration of 310 ug/L in sample SW-1.

Calcium concentrations in the surface water samples ranged from 74,100 ug/L in sample SW-1 to 182,000 ug/L in surface water sample SW-2. The concentration of magnesium ranged from 10,700 ug/L in surface water sample SW-1 to 68,000 ug/L in surface water sample SW-2. Hardness concentrations ranged from 229,000 ug/L in surface water sample SW-1 to 734,000 ug/L in surface water sample SW-2.

7.4 GROUNDWATER

Ground water samples were obtained from the 28 overburden ground water monitoring wells and the three glacial till wells during the 1994 RI. All ground water samples were analyzed for the full suite of TCL/TAL parameters. Six of the ground water samples were also field filtered and analyzed for TAL metals. In addition, ground water samples were collected from the thirteen wetland piezometers located and installed during the Accelerated RI/FS tasks. Ground water samples collected from the wetland piezometers were analyzed solely for TCL VOCs.

Table 7-19 presents a summary of the VOCs detected in the ground water samples collected at the site. Thirty-five VOCs were detected in the ground water samples collected from site monitoring wells. Benzene was detected in eight ground water samples in concentrations that ranged from 0.12 ug/L (MW-03D) to 16,000 ug/L (MW-25). Bromodichloromethane was identified in monitoring well BR-01 at a concentration of 0.65 ug/L. The ground water sample collected from monitoring well MW-22 was the only sample to contain n-butylbenzene (20 ug/L). Four ground water samples had detectable concentrations of sec-butylbenzene which range from 0.15 ug/L at MW-26S to 4.2 ug/L at MW-22. Tert-butylbenzene was detected in the ground water sample collected from MW-11 (0.54 ug/L). Chloroform was identified in samples from each of the till wells (BR-01, BR-02, and BR-03), MW-11 and MW-21. Chloroform concentrations ranged from 0.14 ug/L (MW-11) to 40 ug/L (MW-21). The ground water sample obtained from BR-02 was the only sample to contain 2-chlorotoluene (0.05 ug/L) and 1,4-dichlorobenzene (0.06 ug/L). Dibromochloromethane was detected only in the sample from BR-01 at a concentration of 0.29 ug/L.

Nineteen ground water samples collected at the site had detectable quantities of 1,1-dichloroethane which ranged from 0.12 ug/L in the sample from MW-06 to 65 ug/L in the sample from MW-08. The ground water sample from MW-26D was the only sample with detectable concentrations of 1,2-dichloroethane (2 ug/L). Eleven samples had detectable quantities of 1,1-dichloroethene which ranged from 0.22 ug/L at MW-18 to 50 ug/L at MW-26D. Cis-1,2-dichloroethene was identified in eight ground water samples ranging in concentration from 0.08 ug/L at MW-09 to 130 ug/L at MW-26D. The detected concentrations of trans-1,2-dichloroethene ranged from 0.14 ug/L in the sample from MW-18 to 13 ug/L in the sample collected from MW-03S. Wetland piezometers P-18D, P-19S, and P-19D had detectable concentrations of 1,2-dichloroethene (140 ug/L, 9 ug/L, and 15 ug/L, respectively). Ethylbenzene concentrations ranged from 7.2 ug/L (MW-10) to 660 ug/L (MW-25) in the five ground water samples in which this compound was detected. Isopropylbenzene was identified in eight ground water samples and ranged from 0.02 ug/L (MW-03D) to 42 ug/L (MW-22). Eight samples had detectable concentrations of 4-ispropyltoluene at concentrations ranging from 1.7 ug/L in the sample collected from MW-26S to 12 ug/L in the sample from MW-22. MW-02

TABLE 7-19
ANALYTICAL DATA
SUMMARY OF DETECTED TCL VOLATILE ORGANIC DATA
GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-01	MW-02	MW-03S	MW-03D	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09
COMPOUND (ug/L)										
benzene	—	—	—	0.12 J	—	—	—	—	—	—
bromodichloromethane	—	—	—	—	—	—	—	—	—	—
n-butlybenzene	—	—	—	—	—	—	—	—	—	—
sec-butlybenzene	—	2.9 B	—	—	—	—	—	—	—	—
tert-butlybenzene	—	—	—	—	—	—	—	—	—	—
chloroform	—	—	—	—	—	—	—	—	—	—
2-chlorotoluene	—	—	—	—	—	—	—	—	—	—
dibromochloromethane	—	—	—	—	—	—	—	—	—	—
1,4-dichlorobenzene	—	—	—	—	—	—	—	—	—	—
1,1-dichloroethane	—	0.25 J	0.2 J	0.18 J	—	—	0.12 J	—	65	1
1,2-dichloroethane	—	—	—	—	—	—	—	—	—	—
1,1-dichloroethene	—	1.3	—	1.1	0.83	—	—	—	—	—
cis-1,2-dichloroethene	—	—	—	87	—	—	—	—	7	0.08 J
trans-1,2-dichloroethene	—	—	13	3.2	—	—	—	—	0.25 J	—
1,2-dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylbenzene	—	—	—	—	—	—	—	—	—	—
isopropylbenzene	—	4.0 B	—	0.02 J	—	—	—	—	—	—
4-isopropyltoluene	—	10	—	—	—	—	—	—	—	—
methylene chloride	—	2.2 BJ	—	—	—	—	—	—	—	—
naphthalene	—	140 B	—	—	—	—	—	—	—	—
n-propylbenzene	—	6.0 B	—	—	—	—	—	—	—	—
toluene	—	—	—	—	—	—	—	—	—	—
1,1,1-trichloroethane	—	13	—	0.99	—	—	1	—	22	1.2
trichloroethene	—	4.9	39	160	—	—	—	—	5.4	0.65
trichlorofluoromethane	—	130 J	—	10 J	—	—	—	—	—	—
1,2,4-trimethylbenzene	—	82 B	—	—	—	—	—	—	—	—
1,3,5-trimethylbenzene	—	33	—	—	—	—	—	—	—	—
vinyl chloride	—	—	4.7 J	—	—	—	—	—	—	—
o-xylenes	—	43 B	—	—	—	—	—	—	—	—
m & p-xylenes	—	—	—	—	—	—	—	—	—	—
acetone	—	—	—	—	—	—	—	—	—	—
carbon disulfide	—	—	—	—	—	—	—	—	—	—
4-methyl-2-pentanone	—	—	—	—	—	—	—	—	—	—
butane, 2-methyl	—	—	—	—	—	—	—	—	—	—
methyl tert butyl ether	—	—	—	—	—	—	—	—	—	—

NOTE:

- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.

B - compound was also detected in associated laboratory blank.

TABLE 7-19 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED TCL VOLATILE ORGANIC DATA
GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION COMPOUND (ug/L)	MW-10	MW-11	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19
benzene	3.2 B	—	56 B	—	—	—	—	—	—	—
bromodichloromethane	—	—	—	—	—	—	—	—	—	—
n-butlybenzene	—	—	—	—	—	—	—	—	—	—
sec-butlybenzene	2.5 B	—	—	—	—	—	—	—	—	—
tert-butlybenzene	—	0.54 B	—	—	—	—	—	—	—	—
chloroform	—	0.14 BJ	—	—	—	—	—	—	—	—
2-chlorotoluene	—	—	—	—	—	—	—	—	—	—
dibromochloromethane	—	—	—	—	—	—	—	—	—	—
1,4-dichlorobenzene	—	—	—	—	—	—	—	—	—	—
1,1-dichloroethane	0.50	1.2	—	—	—	0.22 J	—	1.0 J	0.28 J	3.2
1,2-dichloroethane	—	—	—	—	—	—	—	—	—	—
1,1-dichloroethene	—	8.6	—	—	—	—	—	3.7 J	0.22 J	0.68
cis-1,2-dichloroethene	—	—	—	—	—	—	5.6	120	2.4	—
trans-1,2-dichloroethene	—	—	—	—	—	—	0.28 J	4.9 J	0.14 J	—
1,2-dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylbenzene	7.2	—	—	—	—	—	—	—	—	—
isopropylbenzene	3.7 B	—	—	—	—	—	—	—	—	—
4-isopropyltoluene	1.8	6.8	10	—	—	—	—	—	—	—
methylene chloride	—	—	—	—	—	—	—	—	—	—
naphthalene	73 B	31 B	160 B	—	—	—	—	—	—	—
n-propylbenzene	2.1	—	—	—	—	—	—	—	—	—
toluene	—	—	—	—	—	—	—	—	—	—
1,1,1-trichloroethane	6.4	62	—	—	—	—	—	6.4 J	0.81	—
trichloroethene	3.6	0.79	—	—	—	1.5	4.2	650	9.6	33
trichlorofluoromethane	130	59 J	—	—	—	—	—	—	—	—
1,2,4-trimethylbenzene	25	25 B	190 B	—	—	—	—	—	—	—
1,3,5-trimethylbenzene	4.6	20	69	—	—	—	—	0.61 J	—	—
vinyl chloride	—	—	—	—	—	—	—	—	—	—
o-xylenes	22 B	6.1 B	110 B	—	—	—	—	—	—	—
m & p-xylenes	2.6 B	—	140 B	—	—	—	—	—	—	—
acetone	—	—	—	—	—	—	—	350 J	—	—
carbon disulfide	—	—	—	6 J	—	—	2 J	—	—	—
4-methyl-2-pentanone	—	—	—	—	—	—	—	—	—	—
butane, 2-methyl	—	—	—	—	—	—	—	—	—	—
methyl tert butyl ether	—	—	—	—	—	—	—	—	—	—

NOTE:

- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample not analyzed for this compound.

TABLE 7-19 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED TCL VOLATILE ORGANIC DATA
GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25	DUPE-11 MW-25	MW-26S	DUPE-10 MW-26S	MW-26D
COMPOUND (ug/L)										
benzene	—	2200 B	35 B	1800 B	—	16000 B	14000 B	—	—	— 0.7
bromodichloromethane	—	—	—	—	—	—	—	—	—	—
n-butlybenzene	—	—	20 B	—	—	—	—	—	—	—
sec-butlybenzene	—	—	4.2 BJ	—	—	—	—	0.15 J	—	—
tert-butlybenzene	—	—	—	—	—	—	—	—	—	—
chloroform	—	40	—	—	—	—	—	—	—	—
2-chlorotoluene	—	—	—	—	—	—	—	—	—	—
dibromochloromethane	—	—	—	—	—	—	—	—	—	—
1,4-dichlorobenzene	—	—	—	—	—	—	—	—	—	—
1,1-dichloroethane	—	—	—	—	5	—	—	58	57	23
1,2-dichloroethane	—	—	—	—	—	—	—	—	—	2
1,1-dichloroethene	—	—	—	—	0.63	—	—	24	24	50 J
cis-1,2-dichloroethene	—	—	—	—	—	—	—	—	0.72 J	130
trans-1,2-dichloroethene	—	—	—	—	—	—	—	—	—	0.66 J
1,2-dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethylbenzene	—	510	420	—	—	660	500	68	68	—
isopropylbenzene	—	—	42 B	—	—	32 BJ	21 BJ	2.1 J	2.2 J	—
4-isopropyltoluene	—	—	12	8.8 J	—	7.4 J	—	1.7 J	1.7 J	—
methylene chloride	—	—	—	—	—	—	—	—	—	—
naphthalene	—	—	—	—	—	—	—	—	—	—
n-propylbenzene	—	—	85	—	—	37 J	—	0.76 J	0.80 J	—
toluene	—	6500 B	1200 B	1400 B	—	12000	11000 B	—	—	—
1,1,1-trichloroethane	0.54	—	—	—	—	—	—	18	19	10
trichloroethene	—	—	—	—	—	—	—	—	—	96 BJ
trichlorofluoromethane	—	—	—	—	—	—	—	—	—	1.5 J
1,2,4-trimethylbenzene	—	—	980 B	450 B	—	—	—	24	24	—
1,3,5-trimethylbenzene	—	—	270 B	160	—	—	130 B	9	9.6	—
vinyl chloride	—	—	—	—	—	—	—	—	—	—
o-xylenes	—	—	1200 B	360 B	—	—	1200 B	4.6 B	4.6 B	—
m & p-xylenes	—	—	1500 B	530 B	—	—	1100 B	180 B	180 B	—
acetone	—	—	—	—	—	—	4000 J	125 J	110 J	—
carbon disulfide	—	—	—	—	—	—	—	—	—	—
4-methyl-2-pentanone	—	—	—	—	—	—	—	—	—	—
butane, 2-methyl	—	—	—	—	—	—	—	—	—	—
methyl tert butyl ether	—	—	—	—	—	—	—	—	—	—

NOTE:

- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample not analyzed for this compound.

TABLE 7-19 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED TCL VOLATILE ORGANIC DATA
GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	BR-01	BR-02	BR-03	P-9	P-10S	P-10D	P-11S	P-11D	P-12	P-13
COMPOUND (ug/L)										
benzene	---	---	---	---	310 J	---	---	---	---	---
bromodichloromethane	0.65	---	---	---	---	---	---	---	---	---
n-butlybenzene	---	---	---	NA	NA	NA	NA	NA	NA	NA
sec-butlybenzene	---	---	---	NA	NA	NA	NA	NA	NA	NA
tert-butlybenzene	---	---	---	NA	NA	NA	NA	NA	NA	NA
chloroform	1.5 BJ	7.3 BJ	1.8 BJ	---	---	---	---	---	---	---
2-chlorotoluene	---	0.05 J	---	NA	NA	NA	NA	NA	NA	NA
dibromochloromethane	0.29 J	---	---	---	---	---	---	---	---	---
1,4-dichlorobenzene	---	0.06 J	---	NA	NA	NA	NA	NA	NA	NA
1,1-dichloroethane	---	---	---	---	---	3 J	---	---	---	---
1,2-dichloroethane	---	---	---	---	---	---	---	---	---	---
1,1-dichloroethene	---	---	---	---	---	---	---	---	---	---
cis-1,2-dichloroethene	---	---	---	NA	NA	NA	NA	NA	NA	NA
trans-1,2-dichloroethene	---	---	---	NA	NA	NA	NA	NA	NA	NA
1,2-dichloroethene	NA	NA	NA	---	---	---	---	---	---	---
ethylbenzene	---	---	---	---	---	---	---	---	---	---
isopropylbenzene	---	0.05 J	0.18 J	NA	NA	NA	NA	NA	NA	NA
4-isopropyltoluene	---	---	---	NA	NA	NA	NA	NA	NA	NA
methylene chloride	---	---	---	---	---	---	---	---	---	---
naphthalene	---	---	---	NA	NA	NA	NA	NA	NA	NA
n-propylbenzene	---	---	---	NA	NA	NA	NA	NA	NA	NA
toluene	---	---	---	---	21 J	---	---	---	---	---
1,1,1-trichloroethane	---	---	---	---	180 J	5 J	---	---	---	---
trichloroethene	---	---	---	---	---	---	---	---	---	---
trichlorofluoromethane	---	---	---	---	---	---	---	---	---	---
1,2,4-trimethylbenzene	---	---	0.88 BJ	NA	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	---	---	0.57 BJ	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	---	---	---	---	---	---	---	---	---	---
o-xylenes	---	---	---	NA	NA	NA	NA	NA	NA	NA
m & p-xylenes	---	---	---	NA	NA	NA	NA	NA	NA	NA
acetone	---	---	---	---	2300 JE	---	---	---	---	---
carbon disulfide	---	---	---	9 J	---	---	---	---	---	2 J
4-methyl-2-pentanone	---	5 J	---	---	---	---	---	---	---	---
butane, 2-methyl	---	---	---	---	330 JN	---	---	---	---	---
methyl tert butyl ether	---	---	---	---	---	50 JN	---	---	---	---

NOTE:

- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample not analyzed for this compound.

TABLE 7-19 (cont)
ANALYTICAL DATA
SUMMARY OF DETECTED TCL VOLATILE ORGANIC
GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION COMPOUND (ug/L)	P-17S	P-17D	P-18S	DUP-2 P-18S	P-18D	P-19S	P-19D
benzene	—	—	—	—	—	—	—
bromodichloromethane	—	—	—	—	—	—	—
n-butlybenzene	NA	NA	NA	NA	NA	NA	NA
sec-butlybenzene	NA	NA	NA	NA	NA	NA	NA
tert-butlybenzene	NA	NA	NA	NA	NA	NA	NA
chloroform	—	—	—	—	—	—	—
2-chlorotoluene	NA	NA	NA	NA	NA	NA	NA
dibromochloromethane	—	—	—	—	—	—	—
1,4-dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,1-dichloroethane	—	—	—	—	9 J	3 J	3 J
1,2-dichloroethane	—	—	—	—	—	—	—
1,1-dichloroethene	—	—	—	—	—	—	9 J
cis-1,2-dichloroethene	NA	NA	NA	NA	NA	NA	NA
trans-1,2-dichloroethene	NA	NA	NA	NA	NA	NA	NA
1,2-dichloroethene	—	—	—	—	140	9 J	15
ethylbenzene	—	—	—	—	—	—	—
isopropylbenzene	NA	NA	NA	NA	NA	NA	NA
4-isopropyltoluene	NA	NA	NA	NA	NA	NA	NA
methylene chloride	—	—	—	—	—	—	—
naphthalene	NA	NA	NA	NA	NA	NA	NA
n-propylbenzene	NA	NA	NA	NA	NA	NA	NA
toluene	—	—	—	—	—	—	—
1,1,1-trichloroethane	—	—	—	—	—	—	14
trichloroethene	—	—	—	—	—	11	140
trichlorofluoromethane	—	—	—	—	—	—	25 JN
1,2,4-trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	—	—	—	—	—	—	—
o-xylenes	NA	NA	NA	NA	NA	NA	NA
m & p-xylenes	NA	NA	NA	NA	NA	NA	NA
acetone	—	—	34 J	21 J	—	—	30
carbon disulfide	—	—	—	—	—	—	—
4-methyl-2-pentanone	—	—	—	—	—	—	—
butane, 2-methyl	—	—	—	—	—	—	—
methyl tert butyl ether	—	—	—	—	—	—	—

NOTE:
- "—" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more samples are shown above.
- all samples were analyzed for the complete TCL VOC list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.
NA - sample not analyzed for this compound.

was the only ground water sample that had a detectable concentration of methylene chloride (2.2 ug/L). Naphthalene was identified in four samples with concentrations ranging from 31 ug/L at MW-11 to 160 ug/L in the sample from MW-12. The concentration of n-propylbenzene ranged from 0.76 ug/L in the ground water sample from MW-26S to 85 ug/L in the sample from MW-22 and was identified in five samples. Toluene was also identified in five samples and the concentration ranged from 21 ug/L at piezometer P-10S to 12,000 ug/L in the sample from MW-25. Fifteen ground water samples had detectable concentrations of 1,1,1-trichloroethane which ranged from 0.54 ug/L at MW-20 to 180 ug/L in the sample from P-10S. Trichloroethene was also detected in fifteen samples and concentrations ranged from 0.79 ug/L at MW-11 to 650 ug/L at MW-17. Trichlorofluoromethane concentrations ranged from 1.5 ug/L (MW-26D) to 130 ug/L (MW-02 and MW-10) and was detected in six samples. Eight ground water samples had detectable concentrations of 1,2,4-trimethylbenzene and ten samples had 1,3,5-trimethylbenzene detected. Vinyl chloride was only detected in the ground water sample collected from MW-03S (4.7 ug/L). Concentrations of o-xylenes were detected in eight samples and ranged from 4.6 ug/L at MW-26S to 1,200 ug/L at MW-22. Six ground water samples had detectable concentrations of m- and p-xylenes which ranged from 2.6 ug/L at MW-10 to 1200 ug/L at MW-22. Acetone was detected in four ground water samples and the concentrations ranged from 110 ug/L in MW-26S to 4,000 ug/L in the duplicate sample from MW-25, although the corresponding sample from MW-25 was reported to have no acetone. Four samples had detectable quantities of carbon disulfide which ranged from 2 ug/L at MW-16 to 9 ug/L at P-9. Glacial till BR-02 was the only well with detectable concentrations of 4-methyl-2-pentanone (5 ug/L). Butane, 2-methyl was reported in the sample collected from piezometer P-10S (330 ug/L). Methyl-tert-butyl-ether was reported at a concentration of 50 ug/L in the ground water sample from P-10S and was not detected in any other sample.

Semivolatile organic compounds were reported in fifteen ground water samples collected from the site. Table 7-20 presents a summary of the SVOCs that were detected at the site. Ten specific SVOCs were identified in these ground water samples.

Pesticide and PCB compounds were detected in ground water samples. All pesticides and PCB analytical data summarized in Table 7-21. Sixteen pesticide compounds were detected in at least one of the ground water samples collected from the monitoring wells at the site. Twelve wells were identified as containing detectable concentrations of pesticide compounds. Aroclor-1254 was detected in only one ground water sample from the site. The ground water sample from MW-26S was reported to have an aroclor-1254 concentration of 1.0 ug/L.

A summary of detected TAL analytes in the ground water samples from the monitoring wells at the site is presented in Table 7-22. Calcium, magnesium, potassium, and sodium concentrations collected from the glacial till wells (BR-01, BR-02, and BR-03) were generally an order of magnitude higher than those of the ground water samples collected from the wells constructed in the overburden deposits. Cyanide was not detected in any of the ground water samples that were collected.

TABLE 7-20
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION COMPOUND	MW-01	MW-02	MW-03S	MW-03D	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	MW-12
2-methylphenol	---	---	---	---	---	---	---	---	---	---	---	---	---
4-methylphenol	---	---	---	---	---	---	---	---	---	---	---	---	---
naphthalene	---	240 J	---	---	---	---	---	---	---	---	62	26	270
2-methylnaphthalene	---	870	---	---	---	---	---	---	---	---	66	87	420
acenaphthene	---	---	---	---	---	---	---	---	---	---	3 J	---	16 J
dibenzofuran	---	---	---	---	---	---	---	---	---	---	3 J	3 J	10 J
fluorene	---	56 J	---	---	---	---	---	---	---	---	1 J	4 J	12 J
phenanthrene	---	150 J	---	---	---	---	---	---	---	---	3 J	2 J	34 J
di-n-butylphthalate	---	---	---	---	---	---	---	---	---	---	---	---	---
bis (2-ethylhexyl) phthalate	---	---	---	---	3 J	---	---	---	0.9 J	1 J	---	---	---
Tenatively Identified Compounds	7	20	4	7	1	2	1	0	1	1	16	20	19

NOTE:

- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL SVOC list.

J - associated numerical value is an estimated quantity.

TABLE 7-20 (cont)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-13	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	MW-21	MW-22
COMPOUND										
2-methylphenol	---	---	---	---	---	---	---	---	---	---
4-methylphenol	---	---	---	---	---	---	---	---	---	---
naphthalene	---	---	---	---	---	---	---	---	41	62
2-methylnaphthalene	---	---	---	---	---	---	---	---	7 J	24 J
acenaphthene	---	---	---	---	---	---	---	---	---	---
dibenzofuran	---	---	---	---	---	---	---	---	---	---
fluorene	---	---	---	---	---	---	---	---	---	---
phenanthrene	---	---	---	---	---	---	---	---	---	---
di-n-butylphthalate	---	---	---	---	---	---	---	---	---	---
bis (2-ethylhexyl) phthalate	---	---	---	---	---	---	---	---	---	---
Tenatively Identified Compounds	4	4	3	2	0	1	4	1	10	18

NOTE:
- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL SVOC list.

J - associated numerical value is an estimated quantity.

TABLE 7-20 (cont)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-23	MW-24	MW-25	DUPE-11 MW-25	MW-26S	DUPE-10 MW-26S	MW-26D	BR-01	BR-02	BR-03
COMPOUND										
2-methylphenol	9 J	---	---	---	---	---	---	---	---	---
4-methylphenol	8 J	---	---	---	130	140	---	---	---	--- 5
naphthalene	33	---	36	30	---	---	---	---	---	---
2-methylnaphthalene	18 J	---	6 J	7 J	---	---	---	---	---	---
acenaphthene	---	---	---	---	---	---	---	---	---	---
dibenzofuran	---	---	---	---	---	---	---	---	---	---
fluorene	---	---	---	---	---	---	---	---	---	---
phenanthrene	---	---	---	---	---	---	---	---	---	---
di-n-butylphthalate	---	---	---	---	---	---	---	---	---	0.7 J
bis (2-ethylhexyl) phthalate	10 J	---	---	---	---	---	---	---	---	---
Tenatively Identified Compounds	14	5	13	15	19	19	1	0	4	11

NOTE:
- concentrations reported in ug/L.
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- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL SVOC list.

J - associated numerical value is an estimated quantity.

TABLE 7-21
SUMMARY OF TCL PESTICIDE and PCB DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-01	MW-02	MW-03S	MW-03D	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11	
COMPOUND													
alpha-BHC	---	0.026 B	---	---	---	---	---	---	---	---	---	---	
beta-BHC	---	0.047 J	---	---	---	---	---	---	---	---	---	0.004 J	
delta-BHC	---	0.031 J	---	---	---	---	---	---	---	---	0.009 J	0.008 J	
heptachlor	---	0.031 J	---	---	---	---	---	---	---	---	0.002 J	---	ND
aldrin	---	0.24 J	---	---	---	---	---	---	---	---	---	0.017 J	
heptachlor epoxide	---	---	---	---	---	---	---	---	---	---	---	---	ND
dieldrin	---	0.012 J	---	---	---	---	---	---	---	---	---	---	ND
4,4' - DDE	---	---	---	---	---	---	---	---	---	---	---	---	ND
endrin	---	0.055 J	---	---	---	---	---	---	---	---	---	---	ND
endosulfan II	---	0.053 J	---	---	---	---	---	---	---	---	---	---	
4,4' - DDD	---	0.022 J	---	---	---	---	---	---	---	---	---	---	ND
4,4' - DDT	---	---	---	---	---	---	---	---	---	---	---	---	ND
methoxychlor	---	---	---	---	---	---	---	---	---	---	---	---	35
endrin ketone	---	---	---	---	---	---	---	---	---	---	---	---	
alpha - chlordane	---	0.036 J	---	---	---	---	---	---	---	---	---	---	
gamma - chlordane	---	0.035 J	---	---	---	---	---	---	---	---	---	---	
aroclor - 1254	---	---	---	---	---	---	---	---	---	---	---	---	

NOTE:
- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL Pesticide / PCB list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.

TABLE 7-21 (cont)
SUMMARY OF TCL PESTICIDE and PCB DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-12	MW-13	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	MW-21	MW-22	MW-23
COMPOUND												
alpha-BHC	---	---	---	---	---	---	---	---	---	---	---	---
beta-BHC	0.016 J	---	0.007 J	---	---	---	---	---	---	---	---	---
delta-BHC	0.014 J	---	0.003 J	---	---	---	---	---	---	---	---	0.006 J
heptachlor	---	---	---	---	---	---	---	---	---	---	---	---
aldrin	---	---	---	---	---	---	---	---	---	---	---	---
heptachlor epoxide	0.002 J	---	---	---	---	---	---	---	---	---	---	---
dieldrin	0.002 J	---	---	---	---	0.003 J	---	0.065 J	---	---	---	---
4,4' - DDE	0.052 J	---	0.012 J	---	---	---	---	---	---	---	---	---
endrin	0.009 J	---	0.01 J	---	---	---	---	---	---	---	---	---
endosulfan II	---	---	---	---	---	---	---	---	---	---	---	---
4,4' - DDD	---	---	---	---	---	---	---	---	---	---	---	---
4,4' - DDT	---	---	---	---	---	---	---	---	---	---	---	---
methoxychlor	---	---	---	---	---	---	---	---	---	---	---	---
endrin ketone	---	---	0.012 J	---	---	---	---	---	---	---	---	---
alpha - chlordane	---	---	---	---	---	---	---	---	---	---	---	---
gamma - chlordane	0.002 J	---	---	---	---	---	---	---	---	---	---	---
aroclor - 1254	---	---	---	---	---	---	---	---	---	---	---	---

NOTE:
- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL Pesticide / PCB list.

J - associated numerical value is an estimated quantity.
B - compound was also detected in associated laboratory blank.

TABLE 7-21 (cont)

SUMMARY OF TCL PESTICIDE and PCB DATA - GROUND WATER

MMC - FARRELL ROAD PLANT RI

LOCATION	MW-24	MW-25	DUPE-11	MW-26S	DUPE-10	MW-26D	BR-01	BR-02	BR-03
COMPOUND			MW-25		MW-26S				
alpha-BHC	---	---	---	---	---	---	---	---	---
beta-BHC	---	---	---	0.028 J	0.23 J	---	---	---	---
delta-BHC	---	---	---	0.008 J	0.01 J	0.005 J	---	---	---
heptachlor	---	0.006 J	---	---	---	0.004 J	---	---	---
aldrin	---	---	---	---	---	---	---	---	---
heptachlor epoxide	---	---	---	---	---	---	---	---	---
dieldrin	---	0.001 J	---	0.028 J	0.036 J	0.004 J	---	---	---
4,4' - DDE	---	---	---	0.015 J	0.05 J	---	---	---	0.003 J
endrin	---	---	---	0.023 J	---	---	---	---	---
endosulfan II	---	---	---	0.031 J	0.04 J	---	---	---	---
4,4' - DDD	---	---	---	---	0.04 J	---	---	---	---
4,4' - DDT	---	---	---	0.07 J	0.093 J	---	---	---	---
methoxychlor	---	---	---	---	---	---	---	---	0.013 J
endrin ketone	---	---	---	0.026 J	0.032 J	---	---	---	---
alpha - chlordane	---	---	---	---	---	---	---	---	---
gamma - chlordane	---	---	---	---	0.003 J	---	---	---	---
aroclor - 1254	---	---	---	1.0	1.6	---	---	---	---

NOTE:

- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only compounds that were detected in one or more sample are shown above.
- all samples were analyzed for the complete TCL Pesticide / PCB list.

J - associated numerical value is an estimated quantity.

B - compound was also detected in associated laboratory blank.

TABLE 7-22
SUMMARY OF TAL INORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

LOCATION	MW-01	MW-02	MW-03S	MW-03D	MW-04	MW-05	MW-06	MW-07	MW-08	MW-09	MW-10	MW-11
ANALYTE												
aluminum	---	100	---	---	---	177	---	341	173	251	342	---
antimony	---	489 J	---	---	---	---	---	---	---	---	---	---
arsenic	---	---	19.6	---	---	---	---	---	---	---	---	---
barium	28.3	87.3	72.9	116	94.7	178	188	299	112	42.8	37.7	44.1
beryllium	---	1.0	---	---	---	---	---	---	---	---	---	---
cadmium	117 J	---	---	---	81.3 J	---	---	---	---	---	---	---
calcium	45300	76000	88000	140000	341000	134000	167000	208000	208000	78000	130000	151000
chromium	---	---	---	---	---	---	---	---	---	---	---	---
cobalt	---	---	---	---	---	---	---	---	---	---	---	---
copper	145	474	70.4 R	91.5 R	9.5 R	126 R	97.9 R	71.1 R	73.7 R	57.6R	144	78.8 R
iron	318	250	51100	26.9	238	504	27.1	1300	416	631	745	210
lead	---	---	---	---	---	---	---	---	---	---	---	1.9 J
magnesium	8840	9520	9440	29600	37600	43400	51000	66100	24400	13300	14600	23700
manganese	9.0	327	15700	12.8	---	38.5	---	118	1890	384	1410	937
mercury	0.1 J	---	---	---	---	0.06 J	0.05 J	---	---	---	---	---
nickel	---	25.8	---	---	---	---	---	---	---	---	20.1	20.5
potassium	11100	3110	---	---	6340	---	---	---	---	---	---	2580
selenium	---	---	3.7 J	---	---	---	---	---	---	---	---	---
silver	96.2 J	10.2	---	---	68.8 J	12.4 J	---	---	---	---	---	---
sodium	78800	34000	6710	34700	325000	56500	113000	306000	32900	30500	70800	59900
thallium	---	---	---	---	38.0 J	---	---	---	---	---	---	---
vanadium	---	---	---	---	---	---	---	---	---	---	---	---
zinc	86.8	231	17.1	29.8	85.1	322	29.5	52.2	16.1	24.9	48.7	24.2

NOTE:
- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more sample are shown in table.
- all samples were analyzed for the complete TAL.

J - associated numerical value is an estimated quantity.

R- value rejected by validation due to analytes in blank.

557.044.03\7-22.tbl
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TABLE 7-22 (cont)

SUMMARY OF TAL INORGANIC DATA - GROUND WATER

MMC - FARRELL ROAD PLANT RI

ANALYTE	LOCATION	MW-12	MW-12F (filtered)	MW-13	MW-14	MW-15	MW-16	MW-17	MW-17F (filtered)	MW-18	MW-18F (filtered)
aluminum		758	---	244	426	435	---	30900	---	17900	---
antimony		---	449 J	---	---	---	---	---	---	---	---
arsenic		---	15.2 J	---	---	---	4.8 J	---	---	8.0 J	---
barium		34.3	93.8	36.7	27.1	86.9	135	540	104	332	167
beryllium		---	1.0	---	---	---	---	3.5	---	1.2	---
cadmium		---	3.1 J	---	---	---	---	---	56.6 J	---	---
calcium		119000	110000 J	53200	142000	259000	76600	1860000	170000 J	762000	206000 J
chromium		---	---	---	---	---	---	19.4	---	12.9	---
cobalt		---	18.5	---	---	---	---	47.7	---	---	---
copper		44.3 R	122 J	46.9 R	95.1 R	58.4 R	85.4 R	305	166	132	48.2
iron		24000	5850	584	1400	1460	5850	102000	36	50700	---
lead		---	---	---	---	---	---	21.2	---	20.4	---
magnesium		16400	15200 J	7970	40900	44200	27100	462000	53600 J	175000	64600 J
manganese		5640	5580	21.2	114	121	10900	9650	59	3170	10.9
mercury		---	---	0.10 J	0.04 J	0.10 J	---	0.51 J	---	---	---
nickel		67.8	33.2	---	---	---	---	101	---	57.6	---
potassium		---	2700 J	---	---	---	9810	3700 J	10200 J	3340	---
selenium		---	---	---	---	---	---	---	---	---	---
silver		---	31.6 J	---	---	---	---	---	135 J	---	R
sodium		95000	87400 J	3630	28700	77300	15800	74300 J	90500 J	81100	88000 J
thallium		---	---	---	---	---	---	---	---	---	---
vanadium		---	11.6	---	---	---	---	57.6	---	21.1	---
zinc		28.3 J	41.6 J	68.8	115	71.6	30.6	448	99.8	189	37.5

NOTE:

- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more sample are shown in table.
- all samples were analyzed for the complete TAL.

J - associated numerical value is an estimated quantity.

R - value rejected by validator due to analytes in blank.

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TABLE 7-22 (cont)
SUMMARY OF TAL INORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

ANALYTE / LOCATION	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25	DUPE-11 MW-25	MW-26S
aluminum	---	147	134	391	---	275	406	431	119
antimony	---	---	---	---	173	---	---	---	---
arsenic	---	---	---	---	4.8 J	---	---	---	5.7 J
barium	74.0	67.4	21.8	81.3	42	55.8	86.6	129	57.5
beryllium	---	---	---	---	---	---	---	---	---
cadmium	---	---	---	---	---	---	---	---	---
calcium	94000	87500	119000	231000	124000	196000	238000	253000	144000
chromium ST - 50	271	12.9	---	---	---	---	5.1	---	---
cobalt	---	---	---	---	---	---	---	---	---
copper	132 R	34.4R	30 R	17.38 R	69.3 R	33.2 R	47.3 R	25.8 R	34.6 R
iron	44.6	476	770	1030	2960	4490	1150	1230	10200
lead	---	---	---	---	1.4 J	---	---	1.5 J	---
magnesium	14700	11900	15500	22200	13300	36100	26100	27400	21900
manganese	---	31.5	15000	4270	2880	4020	17500	18600	6990
mercury	---	0.04 J	---	---	---	0.12 J	---	0.08 J	0.07 J
nickel	---	---	---	18.6	---	---	---	---	---
potassium	---	---	---	---	2630	---	---	---	3190
selenium	---	---	---	---	---	---	---	---	---
silver	---	---	---	---	---	---	---	---	---
sodium	2380	244000	9400	144000	214000	42400	39000	37200	89000
thallium	---	---	---	---	---	---	---	---	---
vanadium	---	---	---	---	---	---	---	---	---
zinc	89.8	70.7	11.7	30.3	28.6	104	24.5	12.7	18.8

NOTE:

- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more sample are shown in table.
- all samples were analyzed for the complete TAL.

J - associated numerical value is an estimated quantity.

R - value rejected by validator due to analytes in blank.

TABLE 7-22 (cont)
SUMMARY OF TAL INORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI

ANALYTE / LOCATION	DUPE-10 MW-26S	MW-26D	BR-01	BR-01F (filtered)	BR-02	BR-02F (filtered)	BR-03	BR-03F (filtered)
aluminum	152	125	2440	---	41900	---	13200	1020
antimony	---	---	---	83.5 J	---	---	---	---
arsenic	5.7 J	---	---	---	8.6 J	---	---	---
barium	95.2	36.9	86.4	211	360	115	157	320
beryllium	---	---	---	---	1.7	---	---	---
cadmium	---	---	---	---	---	---	---	---
calcium	145000	175000	1160000	1190000 J	593000 J	689000 J	2510000	2740000 J
chromium	---	---	---	---	31.6	---	28.4	---
cobalt	---	---	---	---	---	---	---	---
copper	37.5 R	27.5 R	3.8 R	237 J	20.4 R	146 J	21.5 R	90.5 J
iron	7520	420	1810	245	28600	31.6	11200	1110
lead	---	---	---	---	4.5 J	---	4.1 J	2.1 J
magnesium	22100	36200	159000 J	177000 J	63900	51200 J	287000 J	340000 J
manganese	6570	1090	2910 J	3380 J	947	648	2280 J	3030 J
mercury	---	---	---	---	---	---	0.09 J	0.23 J
nickel	---	---	19.6	---	37.3	---	31.9	---
potassium	2440	---	298000	327000 J	163000	160000 J	218000 J	255000 J
selenium	---	---	---	---	---	---	---	---
silver	---	---	---	R	---	R	---	R
sodium	83700	20500	987000	1050000 J	1540000 J	1720000 J	3650000 J	4050000 J
thallium	---	---	---	---	---	---	---	---
vanadium	---	---	---	---	41.6	---	---	---
zinc	17.6	20.3	890	712	57.3	25.4	275	63.6

NOTE:

- concentrations reported in ug/L.
- "---" in a column indicates that the analyte was not detected in the sample.
- only analytes that were detected in one or more sample are shown in table.
- all samples were analyzed for the complete TAL.

J - associated numerical value is an estimated quantity.

R- value rejected by validator due to analytes in blank.

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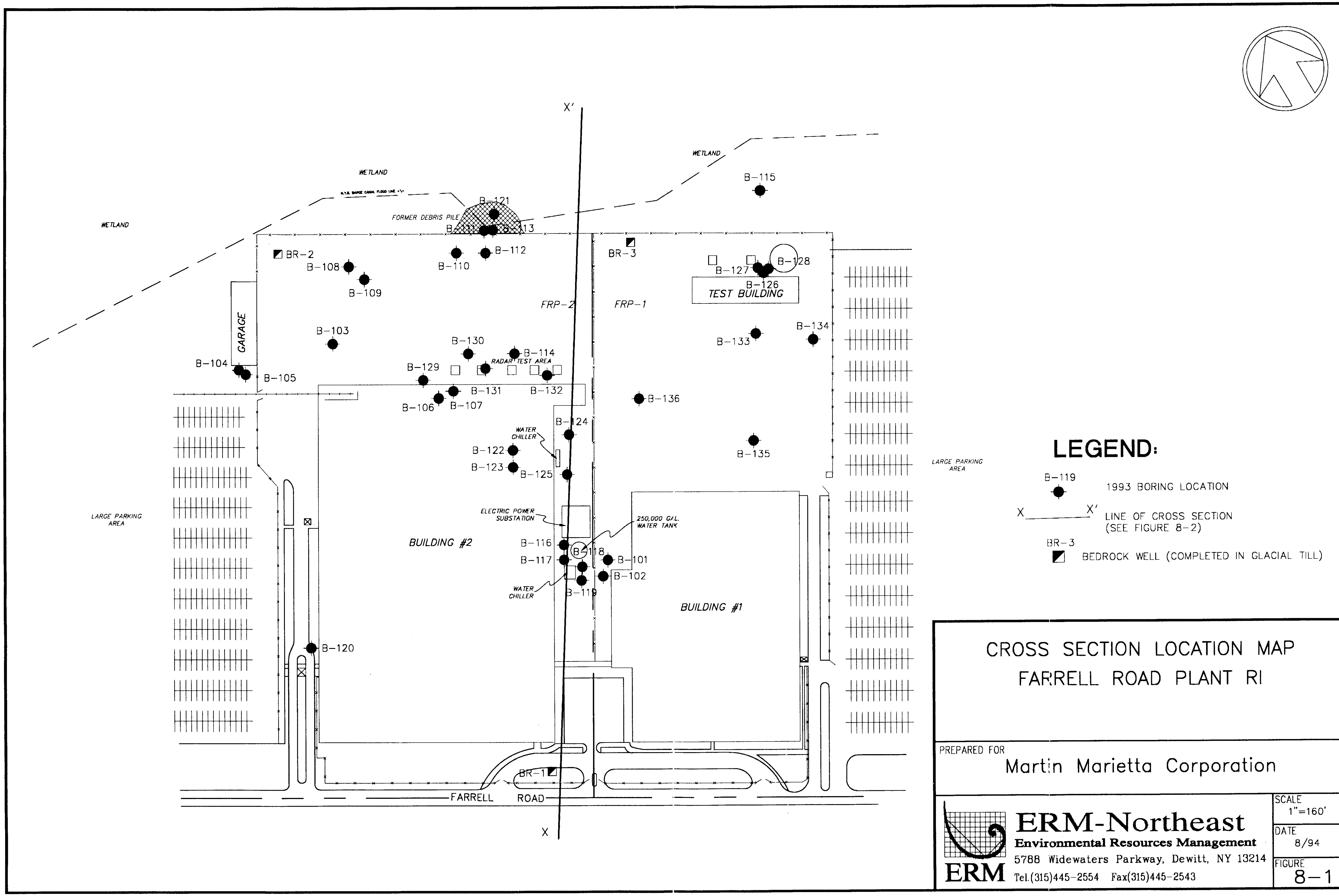
8.0 SUMMARY OF FINDINGS

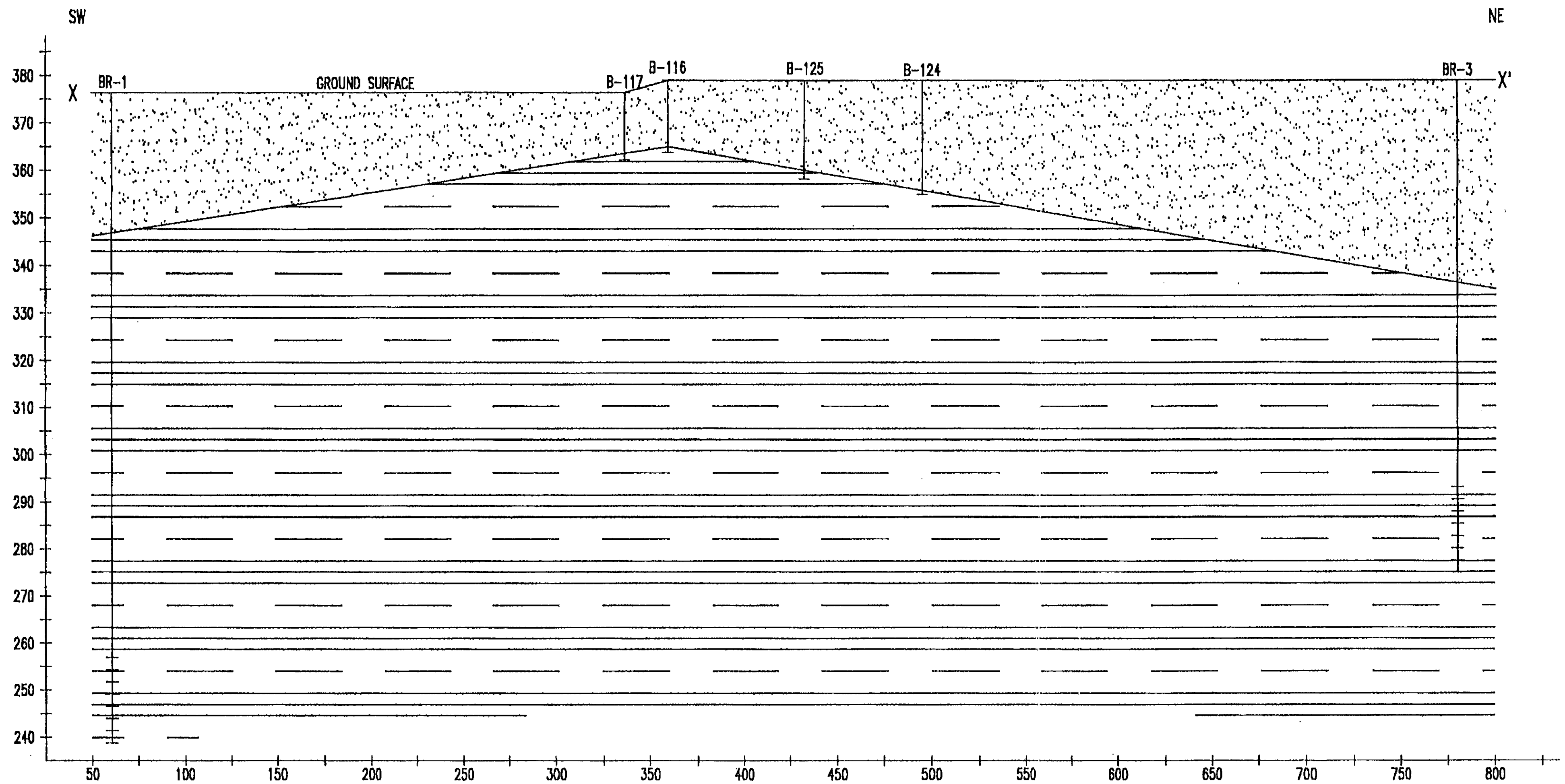
8.1 GEOLOGY AND ENVIRONMENTAL SETTING

The site stratigraphy observed during the 1994 RI field investigation was consistent with previous findings. The site geology and hydrogeology at FRP fairly typical for sandy sediments overlying glacial till in the Central New York area. Near surface soils at the site consist of medium to fine, well sorted brown sand with some silt and a trace to little clay. Within the fine sand and silt there are thin silt partings and other stratigraphic horizons such as sand lenses, old soil zones and thin clay layers. A red clay (glacial till) unit underlies the fine sand and silt although a discontinuous coarse sand and/or gravel layer separates the top of the red clay from the fine sand and silt in some areas of the site. A cross section from the southwest portion of the site to the northeast (see Figure 8-1 and Figure 8-2) shows a localized high which forms a northwest to southeast trending buried ridge.

The red clay till unit underlying the fine sand and silt at the site is a poorly sorted massive unit. This unit has no apparent structure and contains of gravel and cobble clasts ranging in size from 0.5 cm to 15 cm in diameter. A triaxial permeability test was performed on a core sample obtained from the till unit. The triaxial permeability results indicated that the permeability of the till unit is 8.21×10^{-8} cm/sec. Results of the permeability tests are included in Appendix G. The depth to the till unit ranges from 9 feet below grade along the west side of Building #2 (MW-4) to 48 feet below grade near the northeastern end of the site. The top of the till unit is variable with elevations of the till unit ranging from 332.65 feet above MSL to 370.5 feet above MSL. Figure 8-3 illustrates that the surface relief of the red clay forms a buried hill or ridge trending northwest to southeast across the site. See Figures 8-2 and 8-3 for subsurface expression of the glacial till surface.

Ground water contour maps were generated based on measurements made from site monitoring wells on two separate occasions (Table 8-1); 3 May


X'
X
WETLAND
WETLAND
WETLAND
N.Y.S. BARGE CANAL FLOOD LINE
FORMER DEBRIS PILE
B-121
B-111
B-113
B-112
B-110
BR-2
B-108
B-109
BR-3
B-115
B-127
B-128
B-126
TEST BUILDING
FRP-2
FRP-1
GARAGE
B-103
B-104
B-105
B-130
B-114
RADAR TEST AREA
B-129
B-131
B-132
B-106
B-107
B-133
B-134
B-136
B-124
WATER CHILLER
B-122
B-123
B-125
B-135
LARGE PARKING AREA
LARGE PARKING AREA
ELECTRIC POWER SUBSTATION
250,000 GAL. WATER TANK
BUILDING #2
B-116
B-118
B-117
B-101
B-102
WATER CHILLER
B-119
BUILDING #1
B-120
BR-1
FARRELL
ROAD
LEGEND:
B-119
1993 BORING LOCATION
X X'
LINE OF CROSS SECTION
(SEE FIGURE 8-2)
BR-3
BEDROCK WELL (COMPLETED IN GLACIAL TILL)
CROSS SECTION LOCATION MAP
FARRELL ROAD PLANT RI
PREPARED FOR
Martin Marietta Corporation
ERM-Northeast
Environmental Resources Management
5788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE
1"=160'
DATE
8/94
FIGURE
8-1



SCALE: HORZ. 1"=100'
VERT. 1"=20'

LEGEND

REFER TO FIGURE 8-1 FOR LOCATION

B-117 – BORING LOCATION

BR-3 – WELL LOCATION WITH SCREENED INTERVAL INDICATED

BROWN MEDIUM TO FINE SAND WITH SILT AND TRACE CLAY

RED CLAY AND SILT

GEOLOGIC CROSS SECTION
FARRELL ROAD PLANT RI

PREPARED FOR
Martin Marietta Corporation

ERM-Northeast
Environmental Resources Management
6788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543

SCALE AS SHOWN
DATE 8/94
FIGURE 8-2

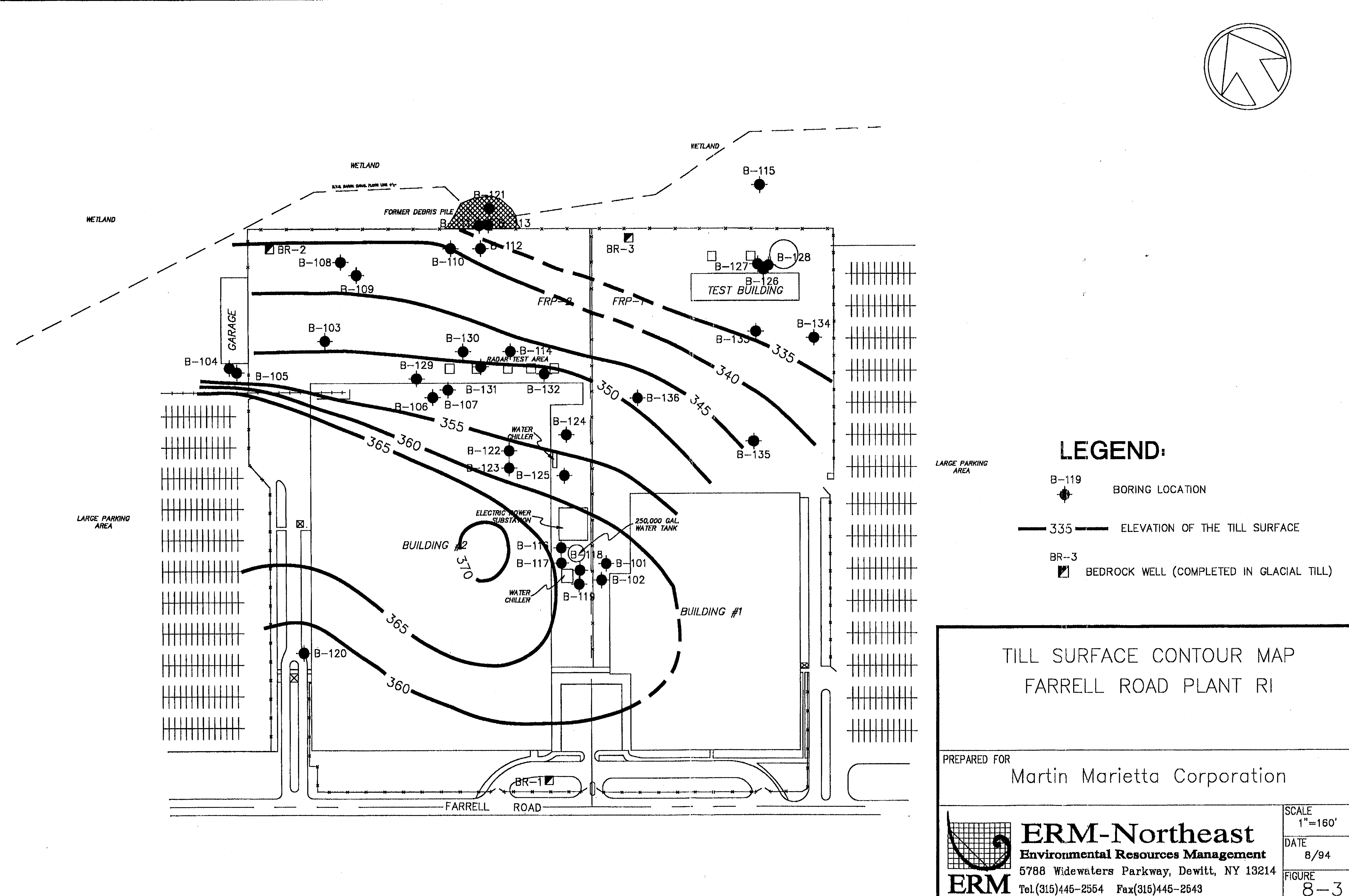

WETLAND
WETLAND
WETLAND
FORMER DEBRIS PILE
B-121
B-112
B-115
BR-2
B-108
B-109
B-110
BR-3
B-127
B-126
B-128
TEST BUILDING
FRP-2
FRP-1
B-103
B-130
B-114
RADAR TEST AREA
B-133
B-134
GARAGE
B-104
B-105
B-129
B-131
B-132
B-106
B-107
B-136
B-124
WATER CHILLER
B-122
B-123
B-125
B-135
LARGE PARKING AREA
LARGE PARKING AREA
ELECTRIC POWER SUBSTATION
250,000 GAL. WATER TANK
BUILDING #2
B-116
B-117
B-118
B-101
B-102
B-119
WATER CHILLER
BUILDING #1
B-120
BR-1
FARRELL ROAD
335
340
345
350
355
360
365
370
LEGEND:
B-119 BORING LOCATION
335 ELEVATION OF THE TILL SURFACE
BR-3 BEDROCK WELL (COMPLETED IN GLACIAL TILL)
TILL SURFACE CONTOUR MAP
FARRELL ROAD PLANT RI
PREPARED FOR
Martin Marietta Corporation
ERM-Northeast
Environmental Resources Management
5788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE 1"=160'
DATE 8/94
FIGURE 8-3

TABLE 8-1
SUMMARY OF WELL MEASUREMENTS
MMC - FARRELL ROAD PLANT RI

WELL ID	DEPTH OF WELL[1] (ft)	WELL LENGTH[2] (ft)	SCREEN LENGTH[1] (ft)	SCREENED INTERVAL[1] (ft)	WELL ELEVATION (ft MSL)	DTW (ft) 03 MAY 94	GROUND WATER ELEVATION (ft msl) 03 MAY 94	DTW (ft) 23 JUNE 94	GROUND WATER ELEVATION (ft msl) 23 JUNE 94
MW-1	18.0	17.46	10	8.0-18.0	381.66	9.39	372.27	11.52	370.14
MW-2	19.0	22.00	10	9.0-19.0	383.09	13.81	369.28	14.40	368.69
MW-3S	19.8	18.35	10	9.8-19.8	378.38	8.62	369.76	10.06	368.32
MW-3D	24.0	32.80	5	19.0-24.0	377.91	9.02	368.89	9.70	368.21
MW-4	10.0	11.79	5	5.0-10.0	380.03	8.15	371.88	9.28	370.75
MW-5	19.5	18.60	10	9.5-19.5	380.07	10.56	369.51	11.65	368.42
MW-6	9.8	12.30	4	5.8-9.8	367.98	0.00	367.98	0.75	367.23
MW-7	11.0	12.20	6	5.0-11.0	368.30	1.24	367.06	1.37	366.93
MW-8	11.5	11.64	10	1.5-11.5	371.20	2.79	368.41	3.79	367.41
MW-9	11.5	14.24	10	1.5-11.5	370.24	3.75	366.49	5.93	364.31
MW-10	18.0	18.21	10	8.0-18.0	379.71	10.19	369.52	10.98	368.73
MW-11	NR	18.90	NR	NR	379.57	8.68	370.89	10.65	368.92
MW-12	19.6	18.01	10	9.6-19.6	380.72	9.65	371.07	11.52	369.20
MW-13	11.6	14.60	10	1.6-11.6	382.07	8.89	373.18	12.33	369.74
MW-14	24.0	23.45	10	19.0-24.0	378.95	8.27	370.68	8.21	370.74
MW-15	22.0	21.10	10	12.0-22.0	380.50	10.89	369.61	11.93	368.57
MW-16	29.0	28.25	20	9.0-29.0	375.49	6.69	368.80	7.98	367.51
MW-17	15.0	14.20	10	5.0-15.0	367.59	1.21	366.38	2.81	364.78
MW-18	17.5	13.90	10	7.5-17.5	367.07	0.57	366.50	2.42	364.65
MW-19	15.0	16.84	10	5.0-15.0	381.01	8.22	372.79	10.77	370.24
MW-20	19.0	17.04	10	9.0-19.0	376.89	7.89	369.00	9.17	367.72
MW-21	19.0	16.43	10	9.0-19.0	376.98	8.80	368.18	10.80	366.18
MW-22	15.0	14.25	10	5.0-15.0	375.60	7.27	368.33	8.98	366.62

NOTES:

1 - Distance from grade as reported on construction log.
2 - Measured from top of casing at time of development.
NR - No record.
DTW - Depth to water measured from top of casing.
NM - Not measured.

TABLE 8-1 (cont)
SUMMARY OF WELL MEASUREMENTS
MMC - FARRELL ROAD PLANT RI

WELL ID	DEPTH OF WELL[1] (ft)	WELL LENGTH[2] (ft)	SCREEN LENGTH[1] (ft)	SCREENED INTERVAL[1] (ft)	WELL ELEVATION (ft MSL)	DTW (ft) 03 MAY94	GW ELEV (ft MSL) 03 MAY94	DTW (ft) 23 JUNE 94	GW ELEV (ft MSL) 23 JUNE 94
MW-23	18.0	19.90	10	8.0-18.0	379.55	10.79	368.76	12.44	367.11
MW-24	17.8	16.90	10	7.8-17.8	376.58	7.96	368.62	9.01	367.57
MW-25	17.8	16.90	10	7.8-17.8	374.85	7.39	367.46	9.36	365.49
MW-26S	14.5	14.23	10	4.5-14.5	374.27	NM	NM	7.78	366.49
MW-26D	33.0	29.34	10	23.0-33.0	374.23	NM	NM	7.30	366.93
BR-01	140.0	NM	10	130-140	378.52	NM	NM	8.23	370.29
BR-02	103.0	101.20	10	90-100	372.06	NM	NM	7.81	364.25
BR-03	103.0	101.60	10	90-100	377.85	NM	NM	13.44	364.41
P-02	11.5	NM	5	6.5-11.5	380.75	NM	NM	10.18	370.57
P-04	11.5	NM	5	6.5-11.5	380.72	NM	NM	10.91	369.81
P-09	3.3	NM	3	0.3-3	366.72	1.84	364.88	NM	NM
P-10S	4.0	NM	3	1-3	366.35	1.36	364.99	NM	NM
P-10D	12.1	NM	3	9.1-12.1	367.04	1.65	365.39	NM	NM
P-11S	3.1	NM	3	0.1-3.1	367.06	0.23	366.83	NM	NM
P-11D	10.4	NM	3	7.4-10.4	365.90	2.19	363.71	NM	NM
P-17S	3.2	NM	2.53	0.67-3.2	366.76	0.66	366.10	NM	NM
P-17D	7.5	NM	2.0	5.5-7.5	367.66	1.80	365.86	NM	NM
P-18S	3.0	NM	2.0	1.0-3.0	365.96	1.06	364.90	NM	NM
P-18D	7.75	NM	2.0	5.75-7.75	366.19	1.06	365.13	NM	NM
P-19S	3.1	NM	2.0	1.1-3.1	365.74	0.84	364.90	NM	NM
P-19D	7.25	NM	2.0	5.25-7.25	366.71	0.60	366.11	NM	NM

NOTES:

1 - Distance from grade as reported on construction log.

2 - Measured from top of casing at time of development.

NR - No record.

DTW - Depth to water measured from top of casing.

NM - Not measured.

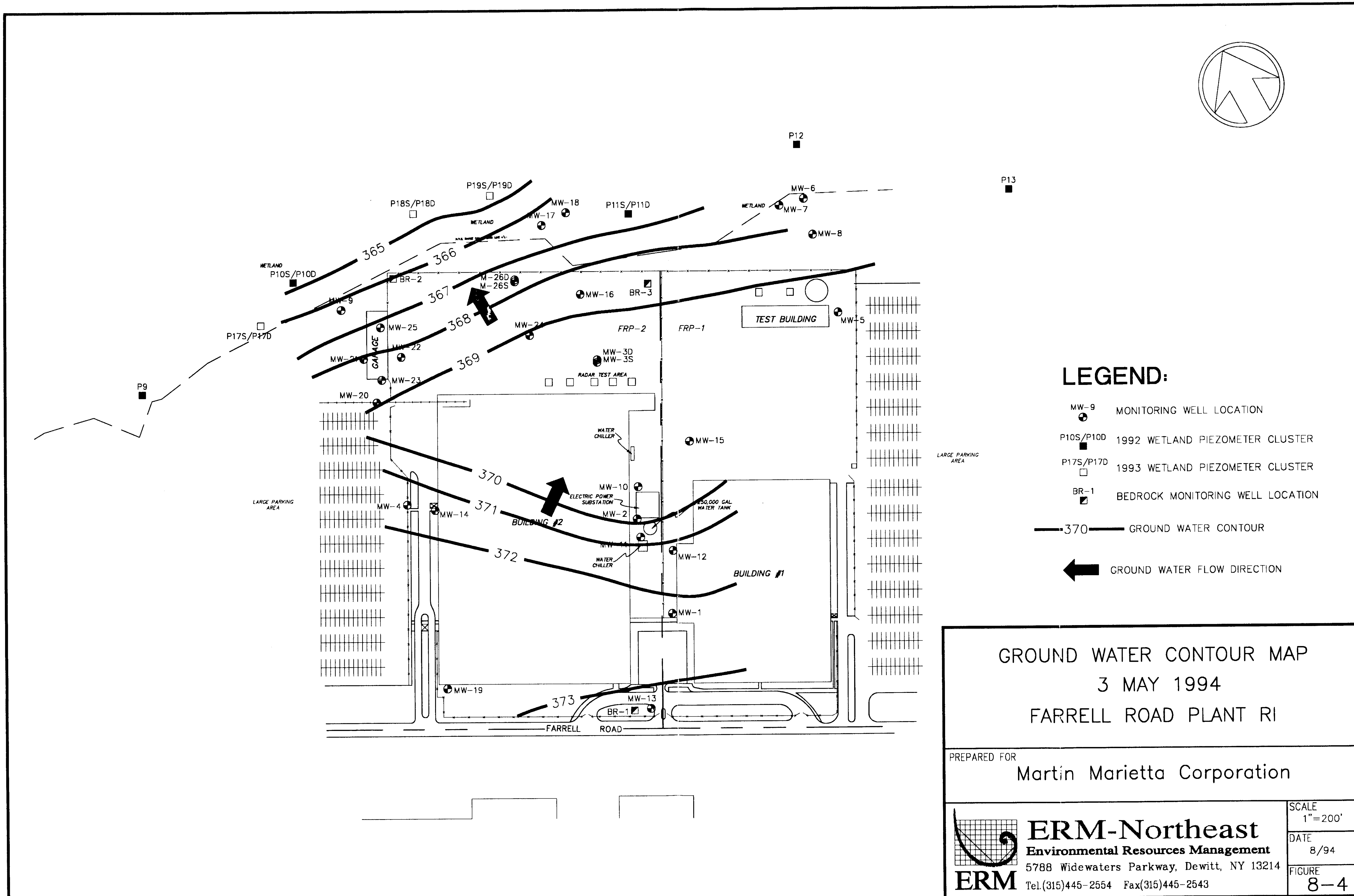
1994 (Figure 8-4); and 23 June 1994 (Figure 8-5). Ground water flow on both dates was predominately northward. As can be seen in Figures 8-4 and 8-5 the gradient of the water table surface is less steep in the vicinity of the northeast corner of Building No. 2. This is most likely a result of site features (buildings and pavement) and the underlying till surface. Depth to water measurements ranged from 0.00 feet below top of casing (BTOC) at MW-06 to 13.81 feet (BTOC) at MW-02 on 3 May 1994. On 23 June 1994 depth to water measurements ranged from 0.75 feet (BTOC) at MW-06 to 14.40 feet (BTOC) at MW-02. Ground water elevations ranged from 363.71 feet above MSL (P-11D) to 373.18 feet above MSL (MW-13) on 3 May 1994. Water table elevations generally decreased by approximately 1 to 2 feet between 3 May 1994 to 23 June 1994. The ground water pressure gradient between wells MW-26S and MW-26D on 23 June 1994 was upward suggesting that the north end of the site is an area of ground water discharge.

The red clay till unit underlying the fine sand and silt at the site is a poorly sorted massive unit probably derived from glacial ice action. It is at least 104 feet thick at the south end of the site and 70 feet thick at the north. A laboratory permeability test indicates that the hydraulic conductivity is approximately 10^{-8} cm/s; however, field observations suggest that permeabilities may be greater than those derived from laboratory analysis. The apparent discrepancy may have resulted from compaction of the laboratory sample during the coring process, or anisotropic conditions in the glacial till.

8.2 ANALYTICAL RESULTS

8.2.1 Sediment

Sediment samples were collected from the storm sewer outfalls, storm sewer catch basins and the wetlands north of the site. The samples were analyzed for one or all of the following suites: TCL VOC; TCL SVOC; TCL pesticides/PCBs; and/or TAL analytes.

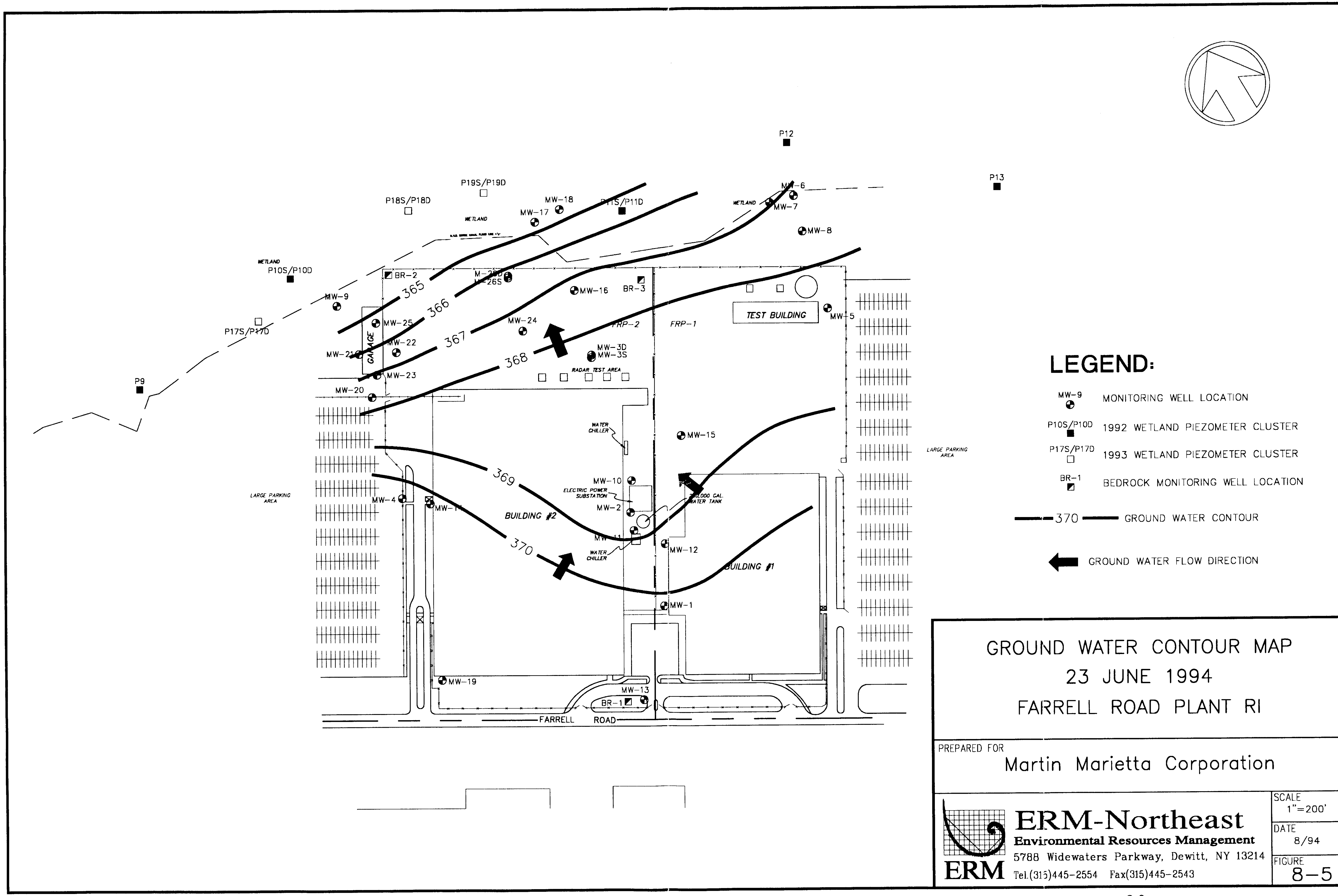


GROUND WATER CONTOUR MAP
3 MAY 1994
FARRELL ROAD PLANT RI

PREPARED FOR
Martin Marietta Corporation

ERM-Northeast
Environmental Resources Management
5788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543

SCALE 1"=200'
DATE 8/94
FIGURE 8-4


P12
P13
P19S/P19D
P18S/P18D
MW-18
MW-17
P11S/P11D
MW-6
MW-7
MW-8
WETLAND
P10S/P10D
BR-2
BR-3
MW-16
MW-26D
MW-26S
MW-9
P17S/P17D
MW-25
MW-22
MW-21
GARAGE
MW-23
MW-20
P9
MW-24
MW-3D
MW-3S
RADAR TEST AREA
FRP-2
FRP-1
TEST BUILDING
MW-5
365
366
367
368
369
370
WATER CHILLER
MW-15
MW-10
ELECTRIC POWER SUBSTATION
MW-2
MW-11
MW-4
MW-14
BUILDING #2
BUILDING #1
MW-12
MW-1
MW-19
MW-13
BR-1
FARRELL ROAD
LARGE PARKING AREA
LEGEND:
MW-9 MONITORING WELL LOCATION
P10S/P10D 1992 WETLAND PIEZOMETER CLUSTER
P17S/P17D 1993 WETLAND PIEZOMETER CLUSTER
BR-1 BEDROCK MONITORING WELL LOCATION
370 GROUND WATER CONTOUR
GROUND WATER FLOW DIRECTION
GROUND WATER CONTOUR MAP
23 JUNE 1994
FARRELL ROAD PLANT RI
PREPARED FOR
Martin Marietta Corporation
ERM-Northeast
Environmental Resources Management
5788 Widewaters Parkway, Dewitt, NY 13214
Tel.(315)445-2554 Fax(315)445-2543
ERM
SCALE 1"=200'
DATE 8/94
FIGURE 8-5

TAL analysis of sediment and soil samples throughout the site suggests that site background concentrations for beryllium, copper, chromium, iron, and zinc are slightly elevated.

Storm Sewer Outfalls

- Low concentrations of VOCs were present in the sediment at outfall 002, 003, 004, 007, and 008.
- Concentrations of SVOCs were present in all sediment samples from all outfalls sampled; outfall 002 exceeded SCGs for phenols.
- Low concentrations of pesticides were present in the sediment at all outfalls sampled; outfall 002, 004, 005 and 009 exceeded SCGs for chlordane.
- Low concentration of PCBs were detected in the sediment in all outfalls sampled except 007 and 009; outfall 003 exceeded SCG for Arochlor 1254.

All concentrations (including TAL analytes) are below SCGs with the exception of phenols, the pesticide chlordane, PCBs and TPH as noted above.

Storm Sewer Catch Basins

- VOCs were present in catch basins CB-03, CB-04, CB-08, CB-13, CB-16, CB-18 and CB-19. The highest concentration occurred in CB-13 (15,000 μg/Kg, 1,1,1-trichloroethane).
- Low concentrations of SVOCs (identifiable or TICs) were present in all catch basins.
- Low concentrations of pesticides were present in all catch basins except CB-06, CB-07, and CB-16.
- Low concentrations of PCBs were present in CB-01, CB-03, CB-08, CB-15 and CB-18.

- Metal concentrations were within the expected range except cadmium, chromium, copper, and zinc which were elevated in some catch basins.

There are no standards applicable to affected sediment in catch basins; therefore, analyte concentrations were compared to relevant guidance documents.

Catch basin samples exceeded recommended cleanup objectives as stated in NYSDEC DHWR TAGM #4046 for 1,1,1-trichloroethane and metals.

<u>Wetland Sediment</u>

- Low concentrations of VOCs were detected in all wetland borings except SS-05, SS-07 and SS-11. The highest concentration was 530 μg/Kg of acetone in SS-08 (1-2).

There are no standards applicable to affected sediment; therefore, the results of the Fish and Wildlife Impact Analysis and Qualitative Public Health Risk Assessment will be used to evaluate remedial requirements.

8.2.2 *Soil*

Soil samples were collected from 11 areas of concern and along the storm sewer pipes and catch basins during the RI. All areas of concern were investigated during previous investigations. The samples were analyzed for one or all of the following suites: TCL VOCs; TCL SVOCs; TCL pesticides/PCBs; TAL analytes; TPH; and lead.

<u>Area 1</u>

Three soil borings were completed in Area 1. Boring B-111 and B-112 contained low concentrations of VOCs, while boring B-121 contained low concentrations of SVOCs. All three borings contained low concentrations of pesticides. PCBs were not detected in any samples from Area 1.

All organic concentrations are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046. Concentrations of beryllium, iron, and nickel exceed criteria but are within the expected range of northeastern US soils.

Area 2

Four soil boring were completed in Area 2. Samples contained low concentrations of VOCs, pesticides, TPH and PCBs. All metal concentrations were within the expected range for soils.

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 3

Two soil samples were collected from two soil borings in Area 3. The samples were analyzed for TCL SVOCs, TCL Pesticides and PCBs, and TAL metals. All analyses were non-detect or within the range of metals expected for soils. Boring B-123 (0-1) contained 110 μg/Kg of bis (2ethylexyl) phthalate.

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 4

Four soil samples were collected from two soil borings. The samples were analyzed for TCL VOCs, TCL SVOCs and TCL pesticides/PCBs. VOCs were not detected in any sample. SVOCs were not detected in any sample, except pyrene (24μg/Kg) in B-124 (3-5). Low concentrations of pesticides were present in both borings. PCBs were not detected in any sample.

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 5

One boring was completed in Area 5 and one soil sample was collected for laboratory analysis. It was analyzed for the full suite of TCL/TAL parameters. VOCs were not detected; however low concentrations of SVOCs and pesticides were detected. PCBs were not detected, and all metals were within the range expected for soil.

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 7

Eight soil samples were collected from four soil borings in Area 7. Samples were analyzed for TCL VOCs. Low concentrations of VOCs were detected in all samples except B-116 (8-10) and B-117 (2-4).

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 9

Two borings were completed in Area 9 and four soil samples were collected for analysis. All samples were analyzed for the full suite of TCL parameters. VOCs were not detected in any sample. No identifiable SVOCs were detected; however, trace concentrations of SVOC TICs were present. Low concentrations of pesticides were present in B-102. PCBs were not detected in any sample.

All concentrations are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 10

Twelve samples were collected from 6 borings in Area 10. Each sample was analyzed for the full suite of TCL/TAL parameters.

- Low concentrations of VOCs were detected in all samples except B-109 (3-5), B-109 (9-11) and B-110 (3-5).
- VOCs were detected in sample B-103 (7-9) and B-108 (7-9) at elevated concentrations. These samples were collected directly above the water table and the VOCs present may be derived from volatilization from ground water.
- Low concentrations of SVOCs were present in B-108 (3-5), B-108 (7-9), B-110 (3-5), MW-26S (3-5) and MW-26S (11-13).
- Low concentrations of pesticides were present in all samples except B-103 (3-5), B-109 (9-11) and B-112 (9-11).
- PCBs were not detected in any sample.

All concentrations (including TAL analytes) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046 except B-103 (7-9) and B108 (7-9).

Area 11

Ten samples were collected from 5 borings in Area 11. The samples were analyzed for TCL VOCs. Low concentrations of VOCs were present in B-114 (7-9) and B-129 (9-11).

All concentrations are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 12

Four soil samples were collected from two soil borings in Area 12. All samples were analyzed for TAL analytes.

All concentrations are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Area 16

Four soil samples were collected from two borings in Area 16. All four samples were analyzed for TCL SVOCs and lead.

- One SVOC compound, bis (2-ethylexyl) phthalate was detected at 30 μg/Kg.
- All lead concentrations were within expected range for soils.

All concentrations (including lead) are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

Storm Sewer Borings

Eight soil samples were collected from four soil borings drilled at the locations of soil vapor anomalies along the storm sewer lines. All samples were analyzed for the full suite of TCL parameters.

- VOCs were not detected in any sample except B-134 (1-3) which contained 2 μg/Kg of benzene.
- No identifiable SVOCs were detected; however, low concentrations of SVOC TICs were present in all samples except B-133 (5-7).
- Low concentrations of pesticides were present in B-134 (1-3), B-135 (1-3) and B-135 (7-9). The greatest concentration was 0.64 μg/Kg of 4-4'-DDE in B-135 (1-3).

All concentrations are below the recommended clean-up objectives of NYSDEC DHWR TAGM #4046.

8.2.3 *Surface Water*

A total of six surface water samples were collected at the site; three from the wetland area and three from the Seneca River. The samples were analyzed for one or more of the following analytes; TCL VOCs, calcium, magnesium and hardness.

- VOCs were not detected in Seneca River samples.
- Low concentrations of VOCs were detected in all wetland samples. The highest concentration was 310 μg/Kg of methyl-tert-butyl-ether (MTBE) in SW-02.
- All inorganic results were within accepted ranges for surface water.

Currently there is no standard criteria or guidance, (SCG) values for the three detected VOCs. However, concentrations of the detected VOCs appear to be acceptable based on the Fish and Wildlife and the Qualitative Public Health Risk Assessment (See Section 9.3.2.1).

8.2.4 *Ground Water*

ERM collected a complete round of ground water samples from all on-site monitoring wells: 28 overburden wells and 3 glacial till wells. All samples were analyzed for the full suite of TCL/TAL parameters. Six samples were field filtered and analyzed for TAL analytes. Thirteen samples were collected from the piezometers located in the wetland; the wetland piezometers were analyzed for TCL VOCs only.

- VOCs were present in MW-02, MW-03S, MW-03D, MW-08, MW-10, MW-11, MW-12, MW-16, MW-17, MW-18, MW-19, MW-21, MW-22, MW-23, MW-25, MW-26S, MW-26D, BR-02, P-10S, P-18S, P-18D, P-19S and P-19D at concentrations above ground water standards.

- SVOCs were present in MW-02, MW-10, MW-11, MW-12, MW-22 and MW-26S in concentrations that exceed ground water standards.

- Pesticides were present in MW-02, MW-10, MW-11, MW-12, MW-14, MW-17, MW-19, MW-23, MW-25, MW-26S, MW-26D and BR-03 at concentrations that exceeded SCGs.

- PCBs were detected in MW-26S at 1.0 ug/1 which exceeds the TOG.1.1 NYSDEC TOGS 1.1.1 standard of 0.1 ug/1.

- Several exceedances were detected in ground water samples analyzed for metals. The exceedances are related primarily to naturally high iron and manganese concentrations in the unfiltered water samples. However, the exceedance for chromium that occurred in MW-19 may be related to previous site activity.

PARSONS ENGINEERING SCIENCE, INC.

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February 25, 1997

Robert W. Schick, P.E.
Section Chief, Remedial Section A
Bureau of Western Remedial Action
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

RE: Revision Sheet for the 1994 Remedial Investigation -
Fish and Wildlife Impact Analysis
GE Farrell Road Site, Town of Geddes, Onondaga County, New York
NYSDEC Site #734055

Dear Mr. Schick:

Please find enclosed a copy of the revision sheet for Section 9 - Fish and Wildlife Impact Analysis (FWIA) of the 1994 Remedial Investigation (RI) Report for the Farrell Road Site. The revision sheet is consistent with Lockheed Martin Corporation's (LMC's) February 19, 1997 response to the January 28, 1997 comments received from the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH).

If you have any questions, please contact me at (315) 456-3199.

Sincerely,

Patrick D. Salvador

Patrick D. Salvador, P.E.
Principal Engineer

Enclosure

cc: Director, Bureau of Environmental Exposure Investigation - NYSDOH
Sandra Lee Fenske, Esq. - Lockheed Martin
Henriette Hamel - NYSDOH
Michael J. Lesser, Esq. - NYSDEC
Ken Lynch, Acting Director - NYSDEC - Region 7
Virginia C. Robbins, Esq. - Bond, Schoeneck & King, LLP

CERTIFICATION STATEMENT

ERM-NORTHEAST, INC. certifies that the revisions to Section 9 - Fish and Wildlife Impact Analysis (FWIA) specified in the February 1997 Revision Sheet for the 1994 Remedial Investigation at the Farrell Road Plant Final Report (ERM-Northeast, Inc., May 1995) are accurate and in full accordance with the New York State Department of Environmental Conservation-approved Remedial Investigation/Feasibility Study (RI/FS) Work Plan (ERM-Northeast, Inc., January 1994).

EDWARD HINCHEY

Name

Edward Hinchey

Signature

2/25/97

Date

FEBRUARY 1997

REVISION SHEET FOR THE 1994 REMEDIAL INVESTIGATION AT THE FARRELL ROAD PLANT FINAL REPORT (ERM - NORTHEAST, INC., MAY 1995)

Section 9 - Fish and Wildlife Impact Analysis (FWIA)

The following are revisions to Section 9 of the Remedial Investigation (RI) report based on comments of the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH).

Page 9-5: Delete the last sentence of the second paragraph and replace it with:

> "The Seneca River in the vicinity of the site is a Class B surface water body, which has a best use designation of primary contact recreation and any other uses except as a source of water supply for drinking, culinary or food processing purposes (Title 6 of NYCRR, Article 14, Chapter 10, Part 897)."

Page 9-18: Delete the last sentence of the first full paragraph and replace with:

> "The detected concentrations of carbon disulfide and 2-butanone are orders of magnitude lower than the acute toxicity levels, therefore no adverse chronic impacts to aquatic life are expected to occur due to the presence of these chemicals in surface water at the site. No information was presented in the USEPA guidance document entitled "Ecological Risk Assessment in the Office of Toxic Substances - Problems and Progress 1984-1987" (USEPA, 1987) to evaluate chronic toxicity of MTBE, and therefore potential chronic impacts due to MTBE were not evaluated."

Page 9-19 and 9-20, Table 9-4: Delete Table 9-4 and replace it with revised Table 9-4. The revised Table 9-4 is attached, which includes the following changes:

The entry under the column "NYS Surface Water Quality Standards" for dieldrin has been revised to "0.001(d)/0.0019(e)".

The entry under the column "NYS Surface Water Quality Standards" for mercury has been revised to "0.2(d)/0.012(e)."

Footnote "a" has been revised to read "NYS Surface Water Quality Standard for the protection of Aquatic Life for Class B Waters, except as noted."

Footnote "d" has been deleted from bis(2-ethylhexyl) phthalate, beryllium, and selenium under the column "NYS Surface Water Quality Standards."

Footnote "d" has been revised to read "NYS Surface Water Quality Guideline for Class B waters based on human consumption of fish."

Footnote "f" has been added to zinc under the column "NYS Surface Water Quality Standard".

Footnote "f" has been revised to read "The hardness values for surface water samples SW-1, SW-2, and SW-3 were 229 mg/L, 734 mg/L, and 522 mg/L, respectively (Table 7-18).

The average hardness value of 495 mg/L for these three surface water samples was used to determine hardness-dependent surface water criteria."

Footnote "g" has been deleted from cobalt under the column "NYS Surface Water Quality Standard."

The entries for NYS Surface Water Quality Standards have been revised for vanadium, nickel, arsenic, cadmium, zinc, chromium, cobalt, lead, silver, and thallium based on the use of a hardness value of 495 mg/L (discussed above under footnote "f") and/or on using NYS Surface Water Quality Standards for Class B rather than Class D surface waters.

The entries for vanadium have been moved from page 9-19 to page 9-20.

Page 9-21: Delete the last two sentences of the first full paragraph and replace with:

> "Thirteen chemicals had maximum detected concentrations in excess of the applicable standard or criterion. Due to the relative infrequency of the detections for most of these chemicals, the fact that nine of these chemicals (metals) are not believed to be due to site contamination, and the fact that the concentrations are measured in ground water (not surface water), the presence of these chemicals are not expected to pose a significant risk to aquatic life. Considered individually, based on best professional judgement, the presence of these contaminants does not appear to represent a significant environmental risk. However, when considering these contaminants along with the other detected organic compounds for which standards or guidance values do not exist, it is possible that additive and synergistic effects pose potential risk to fish and wildlife resources in the wetland. Although possible risks are presented due to additive and synergistic effects, no visual evidence of stressed biota or effects of additive or synergistic effects was observed in the wetland by biologists during site inspections completed as part of the FWIA."

Page 9-22, Table 9-5: Delete Table 9-5 and replace it with revised Table 9-5. The maximum detected concentrations for acetone, 2-butanone, TCE and benzene have been revised. NYS Sediment Screening Criteria have been added for TCE and benzene. The NYS Sediment Screening Criteria and Derived EP Method Sediment Criteria have been revised based on the use of the site-specific average measured value of 12% for the fraction of organic carbon (FOC) rather than the default FOC value of 3%.

Page 9-24, Table 9-6: Delete Table 9-6 and replace it with revised Table 9-6. NYS Sediment Screening Criteria have been added for TCE and benzene. The NYS Sediment Screening Criteria and Derived EP Method Sediment Criteria have been revised based on the use of the site-specific average measured value of 12% for the fraction of organic carbon (FOC) rather than the default FOC value of 3%.

Page 9-26: Add the following to the end of the first paragraph on Page 9-26:

"Further investigation would be necessary to determine if actual impacts to ecological receptors exist as a result of additive and synergistic effects of the contaminants detected."

Page 9-28 and 9-29. Delete the last paragraph page 9-28 and continuation on page 9-29 and replace it with:

"Ground water from the site probably discharges to a NYSDEC regulated wetland (CAM-6) and ultimately to the Seneca River located to the north. Concentrations of certain contaminants have been detected in surface water, shallow groundwater, and sediment in the wetland. There are no guidance values for the three contaminants detected in surface water. An evaluation determined that there appear to be no adverse chronic impacts to aquatic life due to the presence of these three contaminants in surface water. Thirty-seven contaminants were detected in shallow groundwater. Guidance values have been established for twenty-seven of these contaminants. Thirteen of the detected contaminants exceeded the guidance values. Nine of these contaminants (metals) are not related to the site. Nine organic compounds were detected in sediment. There are no guidance values established for four of these compounds. Of the five remaining compounds, the guidance value for one was exceeded.

Considered individually, based on best professional judgement, the presence of these contaminants does not appear to represent a significant environmental risk. However, when considering these contaminants along with the other detected organic compounds for which standards or guidance values do not exist, it is possible that additive and synergistic effects pose potential risk to fish and wildlife resources in the wetland. Although possible risks are presented due to additive and synergistic effects, no visual evidence of stressed biota or effects of additive or synergistic effects was observed in the wetland by biologists during site inspections completed as part of the FWIA. Provided the remaining source of contaminants to the wetland, that is, the migration of contaminated groundwater, is controlled at the northern edge of FRP-2, contaminant concentrations in the wetland are expected to attenuate, thereby reducing potential risks to ecological receptors.

Further investigation would be necessary to determine if actual impacts to ecological receptors exist as a result of additive and synergistic effects of the contaminants detected. However, because the migration of contaminated groundwater will be controlled at the northern edge of FRP-2, and because remediation of residual contamination in the wetland could itself impact this resource, there is no need for further investigation or remediation of surface water, groundwater or sediment in the wetland."

TABLE 9-4 (REVISED 2/97)
EVALUATION OF CHEMICALS DETECTED IN WETLAND GROUNDWATER
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/l)	NYS Surface Water Quality Standard (a) (ug/l)
Acetone	5/23	2,400	N/A
1,1-DCA	13/23	79	N/A
TCE	17/23	660	11(d)
Benzene	2/23	90	6(d)
TCFM	4/23	12	11000(c)
1,1,1-TCA	15/23	150	18000(c)
Toluene	2/23	11	17500(c)
MTBE	1/18	50	N/A
Carbon Disulfide	2/18	9	N/A
cis,1-2-DCE	3/18	120	11600(c)
trans-1,2-DCE	3/18	4.9	11600(c)
1,2-DCE (Total)	8/18	40	11600(c)
1,1-DCE	3/23	9	11600(c)
1,3,5-TMB	1/5	0.61	N/A
bis(2-ethylhexyl)phthalate	1/5	0.9	0.6
Methylene Chloride	4/23	8	11000(c)
Chloroform	1/23	1	1240(b)
Dieldrin	1/5	0.003	0.001(d)/0.0019(e)

N/A: No applicable standard or criteria
(a) NYS Surface Water Quality Standard for the Protection of Aquatic Life for Class B Waters, except as noted.
(b) LOEL for chronic effects as cited in the USEPA Ambient Water Quality Criteria for the protection of Aquatic Freshwater Life (USEPA, undated).
(c) LOEL for acute effects as cited in the USEPA Ambient Water Quality Criteria for the Protection of Aquatic Freshwater Life (USEPA, undated).
(d) NYS Surface Water Quality Guideline for Class B waters based on human consumption of fish.
(e) USEPA Ambient Water Quality for the Protection of Freshwater Aquatic Life.
(f) The hardness values for surface water samples SW-1, SW-2, and SW-3 were 229 mg/L, 734 mg/L, and 522 mg/L, respectively (Table 7-18). The average hardness value of 495 mg/L for these three surface water samples was used to determine hardness-dependent surface water criteria.

TABLE 9-4 (CONT'D) (REVISED 2/97)
EVALUATION OF CHEMICALS DETECTED IN WETLAND GROUNDWATER
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/l)	NYS Surface Water Quality Standard (a) (ug/l)
Vanadium	2/9	448	14
Nickel	3/9	101	322(f)
Arsenic	5/9	10	190
Barium	7/9	540	N/A
Cadmium	2/9	5	3.98(f)
Calcium	5/9	1860000	N/A
Iron	3/9	1300	300
Zinc	7/9	448	322(f)
Magnesium	9/9	462000	N/A
Manganese	9/9	9650	N/A
Beryllium	3/9	3.5	1100
Chromium	3/9	19.4	767(f)
Cobalt	1/9	47.7	5
Lead	4/9	21.2	24.4(f)
Mercury	1/9	0.51	0.2(d)/0.012(e)
Selenium	2/9	5	1
Silver	2/9	10	0.1
Sodium	4/9	80900	N/A
Thallium	2/9	50	8

N/A: No applicable standard or criteria

(a) NYS Surface Water Quality Standard for the Protection of Aquatic Life for Class B Waters, except as noted.

(b) LOEL for chronic effects as cited in the USEPA Ambient Water Quality Criteria for the protection of Aquatic Freshwater Life (USEPA, undated).

(c) LOEL for acute effects as cited in the USEPA Ambient Water Quality Criteria for the Protection of Aquatic Freshwater Life (USEPA, undated).

(d) NYS Surface Water Quality Guideline for Class B waters based on human consumption of fish.

(e) USEPA Ambient Water Quality for the Protection of Freshwater Aquatic Life.

(f) The hardness values for surface water samples SW-1, SW-2, and SW-3 were 229 mg/L, 734 mg/L, and 522 mg/L, respectively (Table 7-18). The average hardness value of 495 mg/L for these three surface water samples was used to determine hardness-dependent surface water criteria.

TABLE 9-5 (REVISED 2/97)
EVALUATION OF CHEMICALS DETECTED IN WETLAND SEDIMENT
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/kg)	NYS Sediment Screening Criteria (ug/kg) (a)	Derived EP Method Sediment Criteria (ug/kg) (a)
Acetone	9/40	530	N/A	N/A (b)
1,1-DCA	2/40	20	N/A	1980
2-Butanone	7/40	230	N/A	N/A (b)
TCE	8/40	30	230 (c)	331,128
Benzene	1/40	66	72 (c)	528
TCFM	1/40	18	N/A	2100
PCB	8/40	2900	168 (d)	168
Methylene Chloride	7/40	23	N/A	N/A
MTBE	1/40	360	N/A	N/A

N/A: Applicable standard or criteria not available.

(a) "Technical Guidance for Screening Contaminated Sediments", NYSDEC 1993.

(b) EP method not applicable to polar compounds, which are not expected to remain in sediments, and thus are not expected to pose significant risks to benthic or aquatic life via sediment.

(c) Based on human health bioaccumulation.

(d) Based on wildlife bioaccumulation.

TABLE 9-6 (REVISED 2/97)
DERIVATION OF AQUATIC LIFE-BASED SEDIMENT CRITERIA
MMC-FARRELL ROAD PLANT RI

Chemical	LC-50 (a) (mg/l)	Acceptable Acute Criteria (mg/l)	Water Quality Criteria (ug/l)	Koc (l/kg)	foc (kg OC/ kg soil) (g)	Derived EP Method Sediment Criteria (ug/kg) (h)	NYS Sediment Screening Criteria (ug/kg) (h)
1,1-DCA	550 (b)	55 (c)	550 (e)	30	0.12	1980	N/A
TCE	---	---	21,900 (f)	126	0.12	331,128	240 (i)
Benzene	---	5.3 (d)	53 (e)	83	0.12	528	72 (i)
TCFM	---	11 (d)	110 (e)	159	0.12	2100	N/A
PCB	---	---	---	---	0.12	---	168 (j)

(a) Source: Verschueren, 1983.

(b) LC-50 for bluegill sunfish.

(c) Based on one-tenth LC-50.

(d) LOEL for acute effects as cited in the USEPA Water Quality Criteria Summary (USEPA, undated).

(e) Chronic criteria based on one-one hundredth of the acceptable acute criteria.

(f) LOEL for chronic effects as cited in the USEPA Water Quality Criteria Summary (USEPA, undated).

(g) Based on an average measure for foc value of 12% for all sediment samples.

(h) From "Technical Guidance for Screening Contaminated Sediments", NYSDEC 1993, and USEPA 1993.

(i) Based on human health bioaccumulation.

(j) Based on wildlife bioaccumulation.

N/A: Applicable standard or criteria not available.

Sediment Criteria derived from the following formula:

Sc = (WQC)(Koc)(foc)

Where:

Sc = Sediment Criteria

WQC = Water Quality Criteria (or Chronic Criteria)

Koc = Organic Carbon Partition Coefficient

foc = Fraction of Organic Carbon

9.0 FISH AND WILDLIFE IMPACT ANALYSIS

This section provides a fish and wildlife impact analysis of the FRP site. This assessment conforms to the guidelines contained in Step I and Step II A and B of the NYSDEC guidance document entitled, "Fish and Wildlife Impact Analysis for Inactive Hazardous Waste Sites" (NYSDEC, 1991). The purpose of the fish and wildlife impact analysis is to: 1) identify fish and wildlife resources potentially affected by site-related contaminants; and 2) determine the impacts of site-related contaminants on those resources.

This assessment is based on site background information, sampling data collected as part of this investigation and previous efforts, observations by site investigative personnel, and the results of a site survey conducted on 14 July 1994. In addition, various divisions of NYSDEC and the Onondaga County Department of Health were consulted during this assessment.

The fish and wildlife impact analysis is divided into four sections as follows:

Description of Fish and Wildlife Resources: This section provides a description of fish and wildlife resources at the site and in the site vicinity, including any observations of stressed vegetation. A topographical map showing special resources within two miles of the site and a covertype map are also presented.

Description of Value of Fish and Wildlife Resources: A description of the value of the habitat to associated fauna and the value of resources to humans is provided in this section.

Applicable Fish and Wildlife Regulatory Criteria: Fish and wildlife criteria applicable to the site are identified in this section, including both site-specific criteria and contaminant-specific criteria.

Risk Characterization: On the basis of the preceding information, this section characterizes potential impacts to ecological resources due to chemicals from the site.

9.1 DESCRIPTION OF FISH AND WILDLIFE RESOURCES

This section provides the following: 1) a general description of the site; 2) a topographical map and description of special resources within two miles of the site perimeter; 3) a description and map of the vegetative covertypes found on and adjacent to the site; and 4) a description of any observations of stress potentially related to site contaminants.

9.1.1 General Description

FRP is located in a small, historically industrial area of Geddes, New York. The site comprises approximately 156 acres, of which approximately 81 acres is a NYSDEC classified freshwater wetland. With the exception of the wetland area, which is located in the northern portion of the site, almost the entire site is occupied by the plant buildings and associated paved parking areas. The site is bordered on the north and west by the Seneca River, to the east by John Glenn Boulevard, and to the south by Farrell Road. An asphalt plant a cold storage warehouse, and a beverage bottling facility are located on Farrell Road south of the site. Surface water and ground water flow north from the site to the wetland and the Seneca River.

9.1.2 Topographical Map/Description of Special Resources

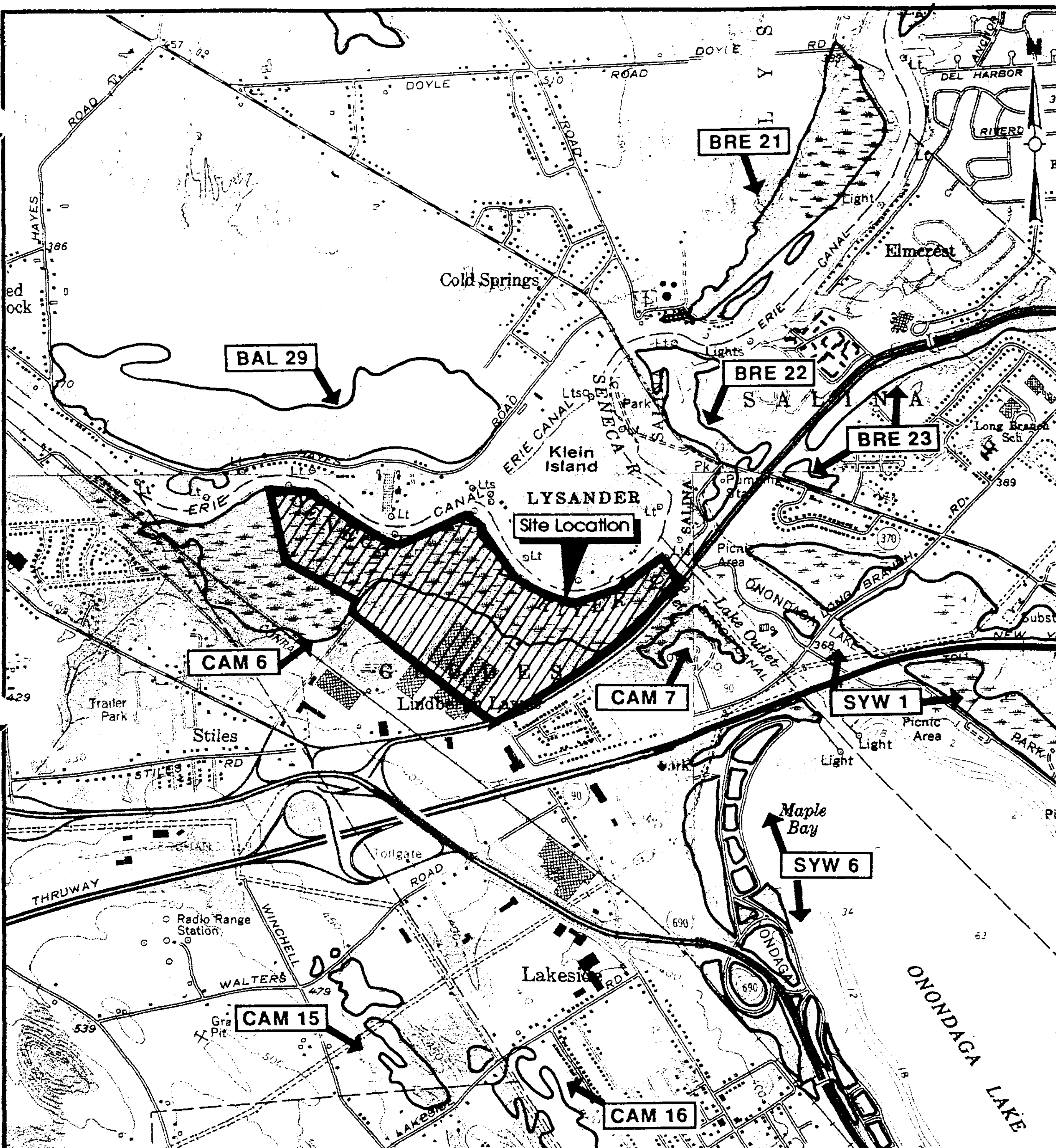
Figure 9-1 provides a topographical map of the site and surrounding area within a two-mile radius of the perimeter of the site. Special ecological resources within this area are shown on the topographic map. Major resources located beyond this area are mapped only if these resources are likely to be affected by site-related contaminants. Resources that were evaluated include: NYSDEC Significant Habitats, as defined by the New York State Natural Heritage Program; habitats supporting endangered, threatened or rare species, or species of special concern; regulated wetlands; wild and scenic rivers; and streams, lakes and other major resources. These resources are discussed below.

Significant Habitats, Endangered or Threatened Species, or Species of Special Concern

The NYSDEC Wildlife Resources Center was contacted for information on significant habitats and endangered and threatened species within two miles of the site. Based on a review of Natural Heritage Program files, there are no significant habitats, endangered or threatened species, or species of special concern located within two miles of the site (NYSDEC, 1994a). The closest mapped occurrences are over three miles from the Site, with a listed precision of 1.5 miles.

Regulated Wetlands

The New York State Freshwater Wetlands Act (Article 24 of the Environmental Conservation Law) regulates activities in wetlands that are 12.4 acres and larger. According to NYSDEC freshwater wetland maps, there are several regulated wetlands within two miles downgradient of the site (see Figure 9-1). The closest regulated freshwater wetland (designated CAM-6 on the wetlands maps) is located in the northern portion of the site. This wetland, approximately 50 acres in size, is also designated as a flood control area of the New York State Barge Canal System and reportedly floods when the Seneca River rises.



LEGEND

SYW 6 NYSDEC Regulated Freshwater Wetlands

SOURCE: U.S.G.S. Quadrangle Maps, Camillus, Baldwinsville Brewerton and Syracuse West, NY

SCALE: 1" =2000'

TITLE

SPECIAL RESOURCES

FARRELL ROAD PLANT RI

PREPARED FOR

MARTIN MARIETTA CORPORATION

ERM–Northeast
Environmental Resources Management

ERM

SCALE	FIGURE
NOTED	9 – 1
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Wild and Scenic Rivers

The Wild and Scenic Rivers Act defines wild and scenic rivers as "selected rivers in the nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values". According to NYSDEC, no wild and scenic rivers are located within two miles of the site (NYSDEC, 1994a).

Streams and Lakes

There are no streams or lakes within the site boundary. However, the Seneca River is located north of the site immediately adjacent to the previously cited freshwater wetland. The river is one-eighth to one-quarter mile north of the developed portion of the site. The Seneca River flows to the north, and eventually joins the Oswego River, a tributary of Lake Ontario. ~~The NYSDEC Division of Water in Albany indicated that the Seneca River in the vicinity of the site is a Class C water body, whose best use designation is for fishing, fish propagation and survival, and primary and secondary recreation, although other factors may limit contact recreational uses (NYSDEC, 1994b).~~

See p. 2, revisions

The Region 7 Bureau of Fisheries was contacted regarding the fish resources of the Seneca River. There is currently no fish stocking program in the vicinity of the site (NYSDEC, 1994c). Fisheries data was collected in the portion of the river near the Onondaga Lake Outlet, approximately 0.75 miles downstream of the site, as part of a 1994 report prepared by the Upstate Freshwater Institute entitled, "The State of Onondaga Lake". This report references a 1991 investigation of the Seneca River on the west side of Klein Island (Erie Barge Canal), which is almost due north of the site.

The river is reportedly 55 to 65 meters wide and 4.5 to 6.5 meters deep at this location.

A highly diverse fish community was encountered during this sampling event (21 species), with White Perch and Gizzard Shad the most abundant species. Other species included Channel Catfish, Golden Shiner, Walleye, Shorthead Redhorse, Carp, Smallmouth Bass, and Largemouth Bass. The planktivorous species were the most abundant, with benthic piscivore-insectivore and littoral planktivore-insectivore the next most abundant trophic types.

NYSDEC Division of Fish and Wildlife reports of toxic substances in fish and wildlife (1979-1987) were reviewed. According to these reports, and correspondence with the Region 7 Bureau of Fisheries (NYSDEC, 1994c), no contaminant data for fish in the Seneca River in this region has been compiled. However, mercury levels in fish from Onondaga Lake, located approximately 0.75 miles downstream of the site, have been monitored by NYSDEC. A 1987 NYSDEC Division of Fish and Wildlife document entitled, "Toxic Substances in Fish and Wildlife Analyses Since 1 May 1982", reports 1985 and 1986 mercury levels in ten species as averaging less than 1.0 ppm, but concentrations in legal sized walleye and smallmouth bass averaging greater than 1.0 ppm. These data revealed an increase in concentrations over previous years, and was assumed to be the result of increased mercury concentrations in Onondaga Lake water. It should be noted that mercury was not detected at the site.

Summary

The special resources that required evaluation include the wetland in the northern portion of the site (CAM-6) and the Seneca River. A comparison of surface water concentrations and sediment criteria guidance (presented in detail in Sections 9.3.2.1 and 9.3.2.2) reveal no acute or chronic adverse effect from identified organic and inorgainc compounds. Potential impacts in these areas are evaluated in Section 9.3.

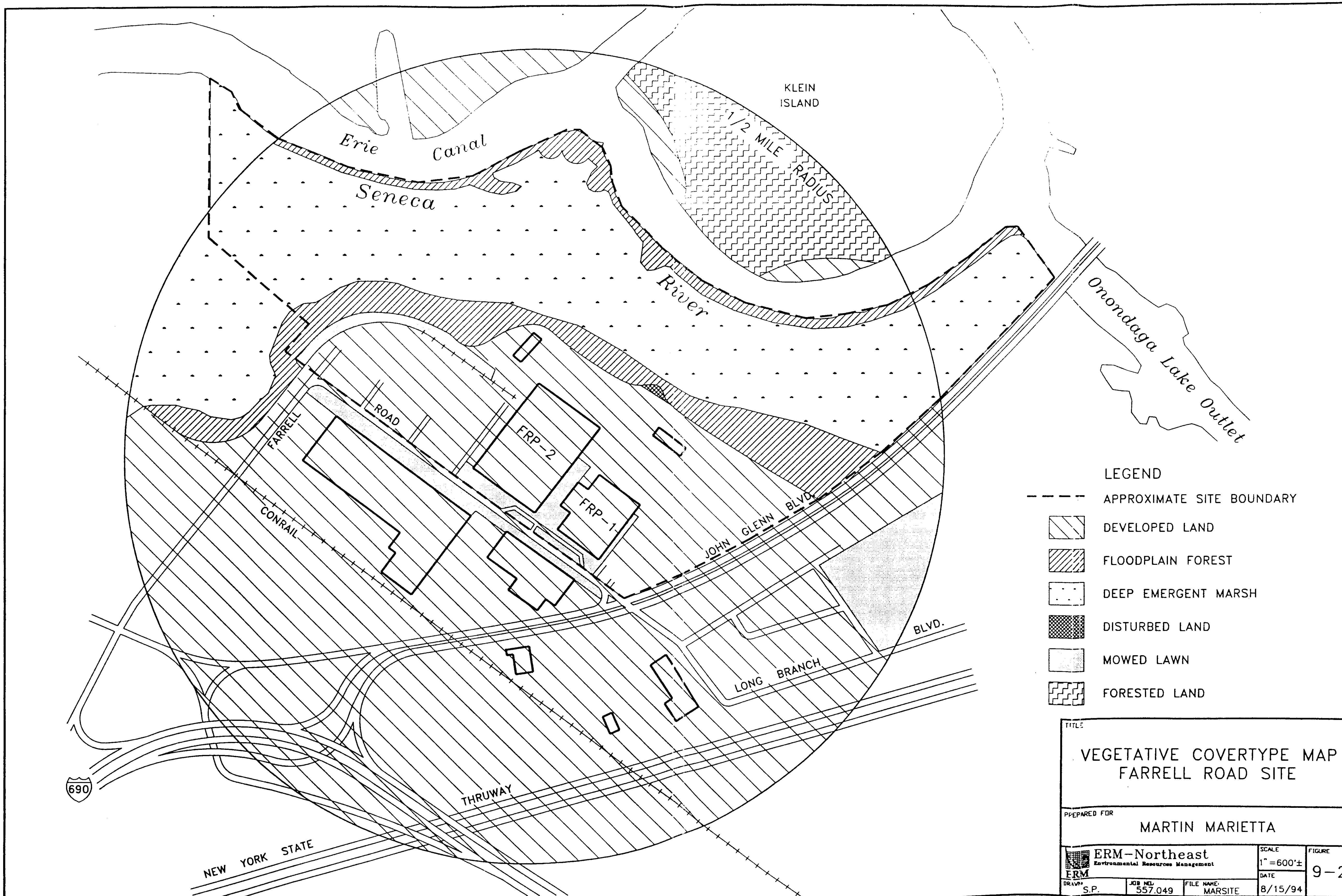
9.1.3 *Covertype Map/Description of Covertypes*

Figure 9-2 provides a covertype map of the site and adjacent areas. The covertype map was prepared based on the site survey and information collected during the field investigation. Covertypes were identified based on terminology provided in the NYSDEC document entitled, "Ecological Communities of New York State" (Reschke, 1990).

A total of five dominant covertypes were identified within one-half mile of the site. The dominant covertypes include: 1) developed land; 2) floodplain forest; 3) deep emergent marsh; 4) disturbed land; and 5) mowed lawns. A small area of forested land is encountered on Klein Island north of the site, but was not considered a dominant covertype due to its distance from the site. Table 9-1 presents a list of plant species identified within each covertype. Table 9-2 presents a list of birds which may occur in the site vicinity based on the New York State Bird Atlas listing for the Town of Geddes (NYSDEC, 1994a). A description of each of the covertypes is presented below.

Developed Land

With the exception of the large wetland which dominates the northern portion of the site, almost the entire site and surrounding area is comprised of developed land typical of urbanized industrial areas. The covertype within a one-half mile radius of the site consists of developed residential and commercial/industrial areas, except for the Seneca River corridor located north and west of the site. Developed land generally consists of



Erie Canal
Seneca River
KLEIN ISLAND
1/2 MILE RADIUS
Onondaga Lake Outlet
FARRELL ROAD
FRP-2
FRP-1
CONRAIL
JOHN GLENN BLVD.
LONG BRANCH BLVD.
NEW YORK STATE THRUWAY
690
LEGEND
APPROXIMATE SITE BOUNDARY
DEVELOPED LAND
FLOODPLAIN FOREST
DEEP EMERGENT MARSH
DISTURBED LAND
MOWED LAWN
FORESTED LAND
TITLE
VEGETATIVE COVERTYPE MAP
FARRELL ROAD SITE
PREPARED FOR
MARTIN MARIETTA
ERM–Northeast
Environmental Resources Management
SCALE
1" =600'±
FIGURE
9–2
DATE
8/15/94
DRAWN
S.P.
JOB NO.
557.049
FILE NAME:
MARSITE

TABLE 9-1
PLANT SPECIES LIST BY COVERTYPE
MMC-FARRELL ROAD PLANT RI

SPECIES		**COVERTYPE**				
Common Name	**Scientific Name**	**Floodplain Forest**	**Deep Emergent Marsh**	**Disturbed Land**	**Mowed Lawn**	**Developed Land**
Black Cherry	*Prunus serotina*	X				
Silver Maple	*Acer saccharinum*	X				
Box-Elder	*Acer negundo*	X				
Tuliptree	*Liriodendron tulipifera*	X				
Smooth Alder	*Alnus serrulata*	X				
Eastern Cottonwood	*Populus deltoides*	X				
American Elm	*Ulmus americana*	X				
Bitternut Hickory	*Carya cordiformus*	X				
Staghorn Sumac	*Rhus typhina*	X				
Willow	*Salix spp.*	X				
Sugar Maple	*Acer saccharum*	X				
Smooth Sumac	*Rhus glabra*	X				
Sensitive Fern	*Onoclea sensibilis*	X				
Virginia Creeper	*Parthenocissus quinquefolia*	X				
Poison Ivy	*Toxicodendron radicans*	X				
Jewelweed	*Impatiens capensis*	X				
Bullthistle	*Cirsium vulgare*	X		X		
Common Mullein	*Verbascum thapsus*	X		X		
Rice Cut-Grass	*Leersia oryzaides*			X		
Cattails	*Typha spp.*		X			
Arrow Arum	*Peltandra virginica*		X			
Purple Loosestrife	*Lythrum salicaria*		X			
Blueflag	*Iris versicolor*		X			

TABLE 9-2
NEW YORK STATE BREEDING BIRD ATLAS TOWN OF GEDDES AND VICINITY
MMC-FARRELL ROAD PLANT RI

COMMON NAME	SCIENTIFIC NAME
American Redstart	*Setophaga ruticilla*
Common Yellowthroat	*Geothlypis trichas*
Scarlet Tanager	*Piranga olivacea*
Northern Cardinal	*Cardinalis cardinalis*
Rose-breasted Grosbeak	*Phelutricus ludovicianus*
Indigo Bunting	*Passerina cyanea*
Rufous-sided Towhee	*Pipilo erythrophthalmus*
Chipping Sparrow	*Spizella passerina*
Field Sparrow	*Spizella pusilla*
Savannah Sparrow	*Passerculus sandwichensis*
Song Sparrow	*Melospiza melodia*
Swamp Sparrow	*Melospiza georgiana*
Bobolink	*Dolichonyx oryzivorus*
Red-winged Blackbird	*Agelaius phoeniceus*
Eastern Meadowlark	*Sturnella magna*
Common Grackle	*Quiscalus quiscula*
Brown-headed Cowbird	*Molothrus ater*
Northern Oriole	*Icterus galbula*
Purple Finch	*Carpodacus purpureaus*
House Finch	*Carpodacus mexicanus*
American Goldfinch	*Carduelis tristis*
House Sparrow	*Passer domesticus*
Alder Flycatcher	*Empidonax alnorum*
Willow Flycatcher	*Empidonax traillii*
Least Flycatcher	*Empidonax minimus*
Eastern Phoebe	*Sayornis phoebe*
Great Crested Flycatcher	*Myiarchus crinitus*
Eastern Kingbird	*Tyrannus tyrannus*
Horned Lark	*Eremophila alpestris*
Purple Martin	*Progne subis*
Tree Swallow	*Tachycineta bicolor*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Blue Jay	*Cyanocitta cristata*
Black-capped Chickadee	*Parus atricapillus*
White-breasted Nuthatch	*Sitta carolinensis*
Brown Creeper	*Certhia americana*
House Wren	*Troglodytes aedon*
Marsh Wren	*Cistothorus palustris*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Veery	*Catharus fuscescens*
Wood Thrush	*Hylocichla mustelina*
American Robin	*Turdus migratorius*
Gray Catbird	*Dumetella carolinensis*
Northern Mockingbird	*Mimus polyglottos*
Brown Thrasher	*Toxostoma rufum*
Cedar Waxwing	*Bombycilla cedrorum*
European Starling	*Sturnus vulgaris*
Solitary Vireo	*Vireo solitarius*

TABLE 9-2 (Cont'd)
NEW YORK STATE BREEDING BIRD ATLAS TOWN OF GEDDES AND VICINTY
MMC-FARRELL ROAD PLANT RI

COMMON NAME	SCIENTIFIC NAME
Yellow-throated Vireo	*Vireo flavifrons*
Warbling Vireo	*Vireo gilvus*
Red-eyed Vireo	*Vireo olivaceus*
Yellow Warbler	*Dendroica petechia*
Yellow-rumped Warbler	*Dendroica coronata*
Great Blue Heron	*Ardea herodias*
Green-backed Heron	*Butorides striatus*
Wood Duck	*Aix sponsa*
American Black Duck	*Anas rubripes*
Mallard	*Anas platyrhynchos*
Turkey Vulture	*Cathartes aura*
Northern Harrier	*Circus cyaneus*
Sharp-shinned Hawk	*Accipiter striatus*
Red-tailed Hawk	*Buteo jamaicensis*
American Kestrel	*Falco sparverius*
Ring-necked Pheasant	*Phasianus colchicus*
Ruffed Grouse	*Bonasa umbellus*
American Crow	*Corvus brachyrhynchos*
Virginia Rail	*Rallus limicola*
Sora	*Porzana carolina*
Killdeer	*Charadrius vociferus*
Spotted Sandpiper	*Actitis macularia*
American Woodcock	*Scolopax minor*
Rock Dove	*Columba livia*
Mourning Dove	*Zenaida macroura*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Great Horned Owl	*Bubo virginianus*
Common Nighthawk	*Chordeiles minor*
Chimney Swift	*Chaetura pelagica*
Ruby-throated Hummingbird	*Archilochus colubris*
Belted Kingfisher	*Ceryle alcyon*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-bellied Woodpecker	*Melanerpes carolinus*
Downy Woodpecker	*Picoides pubescens*
Hairy Woodpecker	*Picoides villosus*
Northern Flicker	*Colaptes auratus*
Pileated Woodpecker	*Dryocopus pileatus*
Eastern Wood-Pewee	*Contopus virens*

Source: NYSDEC Wildlife Information Services impervious paved surfaces and buildings barren of significant wildlife or vegetation.

Floodplain Forest

The northern boundary of the developed area of the site is formed by a steep embankment that drops from between 10 and 15 feet to a floodplain forest. During periods when the Seneca River rises, this area is reportedly flooded up to the embankment. The overstory is dominated by Silver Maple (*Acer saccharinum*), Box-Elder (*Acer negundo*), and Tuliptree (*Liriodendron tulipifera*), as well as Smooth Alder (*Alnus serrulata*), Eastern Cottonwood (*Populus deltoides*), and Staghorn Sumac (*Rhus typhina*). The understory is dominated by Sensitive Fern (*Onoclea sensibilis*), Virginia Creeper (*Parthenocissus quinquefolia)*, Poison Ivy (*Toxicodendron radicans*) and Jewelweed (*Impatiens capensis*).

An area of floodplain forest is also present along the southern bank of the Seneca River. This area was inaccessible from the site during the site survey, but was viewed from the northern bank of the Seneca River. This forest is of varying width and the boundary is approximated on the covertype map.

Birds characteristic of floodplain forests include Yellow-Throated Vireo (*Vireo flavifrons*), Red-Bellied Woodpecker (*Melanerpes carolinus*), and Pileated Woodpecker (*Dryocopus pileatus*) (Reschke, 1990). A number of reptiles and amphibians are also expected to occur in this covertype; a Northern Leopard Frog (*Rana pipiens*) was observed during the site survey.

Deep Emergent Marsh

The overstory and understory of the floodplain forest immediately adjacent to the developed portion of the site gradually gives way to a large deep emergent marsh. The emergent marsh extends north to the floodplain forest on the southern bank of the Seneca River. As discussed above, the southern river bank was not accessible from the site during the site survey; therefore, the location of the northern boundary of the emergent wetland is approximated on the covertype map based on observations from the northern bank of the Seneca River. Emergent wetland vegetation is dominated by Cattails (*Typha spp.*), Arrow Arum (*Peltandra virginica*), Blue Flag (*Iris versicolor*), and Purple Loosestrife (*Lythrum salicaria*). Arrow Arum is particularly evident in the transition area between the floodplain forest and the emergent wetland areas. Characteristic animals for this covertype include the Red-Winged Blackbird (*Agelaius phoeniceus*), Marsh Wren (*Cistothorus palustris*), Virginia Rail (*Rallus limicola*), Bullfrog (*Rana catesbeiana*), and Painted Turtle (*Chrysemys picta*) (Reschke, 1990).

Disturbed Land

Disturbed lands are considered to be those areas which exhibit outward signs of past use, including roadways, pathways, or areas of disruption due to other activities. A small, rounded area in the floodplain forest behind Building No. 2 (former debris pile) is classified as disturbed land. This area extends approximately 50 feet from the embankment into the floodplain forest, and was associated with the excavation of soils as part of an interim remedial measure. This area was planted with Rice Cut-Grass (*Leersia oryzoides*), and has been subsequently colonized by Bullthistle (*Cirsium vulgare*), Common Mullein (*Verbascum thapsus*), and Sensitive Fern (*Onoclea sensibilis*).

Mowed Lawn

Limited areas of cultivated lawn are present along Farrell Road in the southern portion of the site, along narrow corridors between FRP-1 and FRP-2, and between the parking areas and the floodplain forest. These areas are landscaped and well maintained, and provide little habitat value.

9.1.4 *Observation of Stress Potentially Related To Site Activity*

During field activities at the site on 14 July 1994, which included extensive investigation of the wetland area in the northern portion of the site, there were no signs of stressed vegetation, wildlife, or stained soils on or adjacent to the site.

9.2 *DESCRIPTION OF VALUE OF FISH AND WILDLIFE RESOURCES*

A description of the value of the habitat to associated fauna and the value of resources to humans is provided in this section.

9.2.1 *Value To Wildlife*

The southern portion of the site, where the buildings and parking lots are located, consists of developed land, and presents little value to wildlife. The floodplain forest and deep emergent marsh in the northern portion of the site, however, provide excellent habitat value in the form of food and cover to birds, reptiles, amphibians, and small to medium mammals, and supports a variety of vegetative species. The deep emergent marsh is a NYSDEC-regulated freshwater wetland (CAM-6).

Information obtained from NYSDEC Region 7 indicates that the Seneca River is not stocked with fish in the region of the site (NYSDEC, 1994c).

However, a study of the local fish population indicates that the Seneca River-Onondaga Lake area supports a diverse fish community with at least 21 species identified (Upstate Freshwater Institute, 1994).

9.2.2 *Value To Humans*

In addition to its ecological value, the floodplain forest and deep emergent marsh areas provide an aesthetically pleasing buffer between the Seneca River and the industrialized Farrell Road area. This area is also designated as a flood control area of the New York State Barge Canal System.

Recreational fishing is popular in the Seneca River-Onondaga Lake area, especially at the Onondaga Lake outlet approximately 0.75 miles downstream of the site. As stated above, the Seneca River supports a diverse fish community. Recreational boaters likely travel this section of the river between their moorings on the river and Onondaga Lake, which is popular among recreational boaters. The Seneca River in the vicinity of the site is therefore considered valuable for recreational purposes.

9.3 *APPLICABLE FISH AND WILDLIFE REGULATORY CRITERIA*

Based on a review of the Fish and Wildlife Impact Analysis guidance document (NYSDEC, 1991) and the list of New York State Standards, Criteria, and Guidelines (NYSDEC, 1992), fish and wildlife regulatory criteria potentially applicable to the site include four site-specific criteria and two contaminant-specific criteria, as discussed below.

9.3.1 *Site-Specific Criteria*

The site-specific criteria potentially applicable to the site include: (1) NYSDEC regulated wetlands; (2) endangered and threatened species/significant habitats; (3) regulated streams; and (4) navigable waterbodies. As discussed in Section 9.1.2, there is a NYSDEC regulated wetland in the northern portion of the property (CAM-6), and the Seneca River is both a regulated stream and a navigable waterbody. Any remedial action plans developed in the Feasibility Study which would impact these areas must meet the requirements of the regulations governing these areas.

9.3.2 *Analyte-Specific Criteria*

The analyte-specific criteria applicable to the site include: (1) NYSDEC surface water quality standards/guidance values for the protection of aquatic life (NYCRR 700-705); and (2) NYSDEC sediment criteria developed by the Division of Fish and Wildlife (NYSDEC, 1993). An investigation of the wetland area north of the developed portion of the site was conducted in 1993. As part of that investigation, surface water, ground water, and sediment samples were collected. In addition, as part of the current investigation, additional ground water samples from the wetland area were collected. The following sections compare the detected concentrations in each of these media to applicable standards.

9.3.2.1 *NYSDEC Surface Water Quality Standards*

Three surface water samples were collected from standing water within the wetland area of the site and analyzed for VOCs. The results are summarized in Table 9-3. As shown in this table, only three VOCs were detected. MTBE was detected at SW-1 at 310 ug/l; carbon disulfide was detected at SW-2 and SW-3 at 6 ug/l and 2 ug/l, respectively; and 2-

TABLE 9-3
EVALUATION OF CHEMICALS DETECTED IN WETLAND SURFACE WATER
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/l)	NYS Surface Water Quality Standard	One-Tenth of LC-50 (a) (ug/l)
MTBE	1/3	310	N/A	N/A
Carbon Disulfide	2/3	6	N/A	13,500 (b)
2-Butanone	1/3	7	N/A	169,000 (c)

N/A: Applicable standard or criteria not available.

(a) Source: Verschueren, 1983.
(b) LC-50 for Mosquito Fish.
(c) LC-50 for Bluegill..

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Part 5 of 5

butanone was detected at 7 ug/l at SW-2.

There are currently no New York State or USEPA surface water quality standards for these parameters. Therefore, in order to evaluate this data, the concentrations are compared to 1/10 of an applicable LC_{50} value. This approach is discussed in USEPA's guidance document entitled, "Ecological Risk Assessment in the Office of Toxic Substances - Problems and Progress 1984-1987" (USEPA, 1987). In this approach, a presumption of no risk to aquatic organisms for acute toxicity can be made if the detected concentrations are less than 1/10 of an applicable LC_{50}. As shown in Table 9-3, the detected concentrations of carbon disulfide and 2-butanone are three to four orders of magnitude below the acceptable level for acute toxicity. (No LC_{50} was available for MTBE). The above reference does not present a formula based on LC_{50} data for evaluating chronic toxicity impacts. However, given that the detected concentrations are orders of magnitude lower than the acute toxicity levels, no adverse chronic impacts to aquatic life are expected to occur due to the presence of these chemicals in surface water at the site.

As part of the accelerated RI in the Fall 1993, a total of 13 piezometers were installed to sample ground water in the wetland. Water samples collected from these piezometers were analyzed for VOCs. Shallow piezometers were installed to a depth of approximately three feet, and deep piezometers to approximately seven feet. In addition to the piezometers, five monitoring wells were sampled (MW-6, MW-7, MW-8, MW-17, MW-18) in the wetland area. Samples from these five wells were analyzed for VOCs, semi-VOCs, pesticides and PCBs, and TAL inorganics. The analytical results are presented in Table 9-4. Because of the shallow depth of the ground water and its probable discharge to surface water either within the wetland area or the Seneca River, the ground water data is also compared to New York State Surface Water Quality Standards for

TABLE 9-4
EVALUATION OF CHEMICALS DETECTED IN WETLAND GROUND WATER
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/l)	NYS Surface Water Quality Standard (a) (ug/l)	GUIDANCE VALUE TOGS 1.1.1 (A)	GW STD
Acetone	5/23	2,400	N/A	50	5
1,1-DCA	13/23	79	N/A	5	5
TCE	17/23	660	11 (d)/3	3	5
Benzene	2/23	90	6 (d)	6	
TCFM	4/23	12	11000 (c)	5	
1,1,1-TCA	15/23	150	18000 (c)	5	
Toluene	2/23	11	17500 (c)	5	
MTBE	1/18	50	N/A		
Carbon Disulfide	2/18	9	N/A		
cis-1,2-DCE	3/18	120	11600 (c)	5	
trans-1,2-DCE	3/18	4.9	11600 (c)		
1,2-DCE (Total)	8/18	40	11600 (c)		
1,1-DCE	3/23	9	11600 (c)	5	
1,3,5-TMB	1/5	0.61	N/A	5	
bis(2-ethylhexyl)phthalate	1/5	0.9	0.6 (d)		
Methylene Chloride	4/23	8	11000 (c)	5	
Chloroform	1/23	1	1240 (b)		
Dieldrin	1/5	0.003	0.0019 (e)		
Vanadium	2/9	448	190		

N/A: No applicable standard or criteria

(a) NYS Surface Water Quality Standard for the Protection of Aquatic Life for Class D Waters, except as noted.

(b) LOEL for chronic effects as cited in the USEPA Ambient Water Quality Criteria for the protection of Aquatic Freshwater Life (USEPA, undated).

(c) LOEL for acute effects as cited in the USEPA Ambient Water Quality Criteria for the Protection of Aquatic Freshwater Life (USEPA, undated).

(d) NYS Surface Water Quality Standard.

(e) USEPA Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life.

(f) Calculated from site-specific hardness value of 6543 mg/l.

(g) Guidance value.

Guidance Values
TOGS 1.1.1

Acetone - 50 ppb
1,1 DCA 5 ppb
GA 5 (std)

TMB 5 ppb
GA 5 ppb (STD)

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TABLE 9-4 (cont.)
EVALUATION OF CHEMICALS DETECTED IN WETLAND GROUND WATER
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/l)	NYS Surface Water Quality Standard (a) (ug/l)
Nickel	3/9	101	44243 (f)
Arsenic	5/9	10	360
Barium	7/9	540	N/A
Cadmium	2/9	5	438 (f)
Calcium	5/9	1860000	N/A
Iron	3/9	1300	300
Zinc	7/9	448	4139
Magnesium	9/9	462000	N/A
Manganese	9/9	9650	N/A
Beryllium	3/9	3.5	1100 (d)
Chromium	3/9	19.4	51922 (f)
Cobalt	1/9	47.7	110 (g)
Lead	4/9	21.2	16437 (f)
Mercury	1/9	0.51	0.012 (e)
Selenium	2/9	5	1 (d)
Silver	2/9	10	5389
Sodium	4/9	80900	N/A
Thallium	2/9	50	20

N/A: No applicable standard or criteria

(a) NYS Surface Water Quality Standard for the Protection of Aquatic Life for Class D Waters, except as noted.

(b) LOEL for chronic effects as cited in the USEPA Ambient Water Quality Criteria for the protection of Aquatic Freshwater Life (USEPA, undated).

(c) LOEL for acute effects as cited in the USEPA Ambient Water Quality Criteria for the Protection of Aquatic Freshwater Life (USEPA, undated).

(d) NYS Surface Water Quality Standard for Class C Waters.

(e) USEPA Ambient Water Quality Criteria for the Protection of Freshwater Aquatic Life.

(f) Calculated from site-specific hardness value of 6543 mg/l.

(g) Guidance value.

the protection of aquatic life. If no applicable New York State standard or guidance value is available, the results are compared to the USEPA Ambient Water Quality Criteria for the protection of freshwater aquatic life. It should be noted that this comparison may overstate risk because VOCs present in ground water are likely to volatilize once they discharge to surface water; thus, detected concentrations in ground water are higher than what would be expected in the surface water.

As shown in Table 9-4, a total of 37 chemicals have been detected in wetland ground water samples. Standards or criteria were available for 27 of these chemicals. Nine chemicals had maximum detected concentrations in excess of the applicable standard or criterion. Due to the relative infrequency of their detections (3 out of 9 samples or less), the fact that their presence is not believed to be due to site contamination, and the fact that the concentrations are measured in ground water (not surface water), these chemicals are not expected to pose a significant risk to aquatic life.

9.3.2.2 NYSDEC Sediment Criteria

As part of the Accelerated RI, sediment samples were collected from the wetland area to evaluate whether sediments have been impacted by materials discharged from the site. The sediment analyses previously described in Section 7.1.1 were also incorporated into this evaluation. A total of 12 locations were sampled in the wetland. Samples were collected at depth intervals of 0-1 feet and 1-2 feet. A total of 17 samples were collected from the outfalls. All samples were analyzed for one or more of the following compounds; TCL organic and TAL inorganics. A total of eight organic compounds were detected in the wetland sediment, compounds included: acetone, benzene, 2-butanone, 1,1-dichloroethane, TCE, PCB, methylene chloride, and trichlorofluoromethane. Table 9-5 presents an evaluation of the sampling results from the wetland. See Table 7-2 for a summary of sampling results from the outfalls.

TABLE 9-5
EVALUATION OF CHEMICALS DETECTED IN WETLAND SEDIMENT
MMC-FARRELL ROAD PLANT RI

Chemical	Frequency of Detection	Maximum Detected Concentration (ug/kg)	NYS Sediment Criteria for Aquatic Organisms	Derived EP Method Sediment Criteria (ug/kg) (a)
Acetone	9/40	460	N/A	N/A (b)
1,1-DCA	2/40	20	N/A	495
2-Butanone	7/40	150	N/A	N/A (b)
TCE	8/40	31	N/A	82,782
Benzene	1/40	22	N/A	132
TCFM	1/40	18	N/A	525
PCB	8/40	2900	N/A	42
Methylene Chloride	7/40	23	N/A	N/A
MTBE	1/40	360	N/A	N/A

N/A: Applicable standard or criteria not available.

(a) "Technical Guidance for Screening Contaminated Sediments", NYSDEC 1993.

(b) EP method not applicable to polar compounds, which are not expected to remain in sediments, and thus are not expected to pose significant risks to benthic or aquatic life via sediment.

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NYSDEC has not established sediment standards or criteria for the protection of benthic aquatic life or wildlife for any of the chemicals detected (NYSDEC, 1993). In general, these chemicals are not likely to accumulate to any significant degree in sediments. All of the chemicals are highly soluble, volatile compounds with relatively low K_{ow}, and, therefore, will not tend to sorb to sediments and/or bioaccumulate with the exception of PCB in outfall sediment.

However, in order to evaluate this data on a more quantitative basis, the equilibrium partitioning approach to developing sediment quality criteria, as discussed in NYSDEC's "Technical Guidance for Screening Contaminated Sediment", was used (NYSDEC, 1993). The equilibrium partitioning approach is applicable to non-polar organic compounds (as opposed to polar organic compounds). The guidance document indicates that polar compounds, which tend have high water solubilities, will dissolve and not accumulate in sediments (NYSDEC, 1993). Four of the compounds detected in sediments at the site are polar compounds (acetone, methylene chloride, MIBK and 2-butanone). Based on the above information, these compounds are not expected to accumulate significantly in sediment, and therefore are not evaluated further.

Sediment criteria for the remaining non-polar chemicals (benzene, 1,1-dichloroethane, TCE, PCB, and trichlorofluoromethane) were derived using the equilibrium partitioning approach. The calculations are presented in Table 9-6. The equation for calculating an acceptable sediment concentration is as follows (USEPA, 1993):

Sediment Criterion (SC) (ug/kg) = WQC x Koc x foc

where:

WQC = Water Quality Criterion (ug/L). The WQC is an acceptable

TABLE 9-6
DERIVATION OF AQUATIC LIFE-BASED SEDIMENT CRITERIA
MMC-FARRELL ROAD PLANT RI

Chemical	LC-50 (a) (mg/l)	Acceptable Acute Criteria (mg/l)	Water Quality Criteria (ug/l)	Koc (l/kg)	foc (kg OC/ kg soil) (g)	EP Method Sediment Criteria (h) (ug/kg)
1,1-DCA	550 (b)	55 (c)	550 (e)	30	0.03	495
TCE	---	---	21,900 (f)	126	0.03	82,782
Benzene	---	5.3 (d)	53 (e)	83	0.03	132
TCFM	---	11(d)	110(e)	159	0.03	525
PCB	---	---	---	2.26	---	42

(a) Source: Verschueren, 1983.
(b) LC-50 for bluegill sunfish.
(c) Based on one-tenth LC-50.
(d) LOEL for acute effects as cited in the USEPA Water Quality Criteria Summary (USEPA, undated).
(e) Chronic criteria based on one-one hundredth of the acceptable acute criteria.
(f) LOEL for chronic effects as cited in the USEPA Water Quality Criteria Summary (USEPA, undated).
(g) Assumed to be 3%.
(h) From "Technical Guidance for Screening Contaminated Sediments", NYSDEC 1993, and USEPA 1993.

Sediment Criteria derived from the following formula:

Sc= (WQC)(Koc)(foc)

Where:

Sc= Sediment Criteria
WQC= Water Quality Criteria (or Chronic Criteria)
Koc= Organic Carbon Partition Coefficient
foc= Fraction of Organic Carbon

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concentration of the chemical of concern for the protection of aquatic life for chronic effects. There are no New York State surface water quality standards for the chemicals of concern for the protection of aquatic life. Similarly, no federal ambient water quality criteria (AWQC) for chronic exposure for freshwater aquatic life have been established for these chemicals. However, USEPA cites a lowest observed effect level (LOEL) of 21,900 ug/L for trichloroethene (USEPA, undated), which is used as the WQC for this calculation. For benzene and trichlorofluoromethane, EPA cites acute criteria of 5,300 ug/L and 11,000 ug/L, respectively (USEPA, undated). In order to derive chronic criteria for these chemicals, a safety factor of 100 was applied to the acute criteria, resulting in chronic WQC of 53 ug/L and 110 ug/L for benzene and trichlorofluoromethane, respectively. For 1,1-dichloroethane, and no acute or chronic AWQC exist. Therefore, as described in Section 9.3.2.1, an acute criterion was derived using 1/10 of an applicable LC_{50}. A chronic criterion was then derived using a safety factor of 100 applied to the acute criteria, as described for benzene.

Koc = Organic Carbon Partition Coefficient (l/kg).

foc = Fraction of Organic Carbon (kg OC/kg soil).

The resulting derived sediment quality criteria for the protection of aquatic and/or benthic life are presented in Table 9-6.

Table 9-5 presented above compares the maximum concentrations of all chemicals detected in sediment to the above derived sediment criteria. As shown in this table, the maximum concentrations are in all cases well below the derived criteria with the exception of PCBs which exceeded criteria at Outfall 003. Therefore, adverse impacts to aquatic and/or benthic life are expected to be minimal as a result of chemicals present in sediment.

Based on the results of the field program conducted at the site, ecological resources in the vicinity of the site have not been significantly impacted by chemicals from the site. Minimal impacts to NYSDEC identified significant habitats, endangered or threatened species, species of special concern, or wild and scenic rivers are expected to result from chemicals from the site at the present time. No areas of stressed vegetation were observed during the site survey.

Wetlands are composed of both soils and sediment. Samples collected near the wetland outfalls were analyzed for TCL volatile organic compounds, TCL semi-volatile organic compounds, PCBs and pesticides, and inorganics.

Pesticides were detected in low concentrations in sediments at each of the seven storm water outfalls that discharge to the wetland. Given the concentrations of the contaminants, the location of the outfalls and the persistence of pesticides in the environment, the detected concentrations are likely the result of localized use of pesticides at the site. There is no history of pesticide use at the site beyond incidental use to control pests.

The NYSDEC DFW sediment screening criteria are useful in estimating risk. Based on an assumed organic concentration of three percent in the wetland sediments, the following comparison can be made between pesticides detected at the outfalls and NYSDEC guidance for the protection of human health or aquatic life.

Heptachlor and Dieldrin are present above the human health bioaccumulation sediment criteria of 0.024 μg/KG and 3.0 μg/KG respectively. Heptachlor was detected at outfall 003 at a maximum concentration of 2.3 μg/KG and Dieldrin was present at outfalls 002 and 003 at a maximum concentration of 37 μg/KG and 12 μg/KG respectively. Only Endosulfan was present in concentrations above the benthic aquatic life criteria of 0.9 μg/KG, having been detected at outfall 003 at 1.7 μg/KG.

Sediment screening criteria are available for phenol (benthic aquatic chronic toxicity), phenanthrene (benthic aquatic chronic toxicity), fluoranthene (benthic aquatic chronic toxicity), phthalate (benthic aquatic chronic toxicity), and trichloroethene (human health accumulation). Only phenol was detected above the benthic aquatic chronic toxicity sediment criteria of 18 μg/KG at outfall 002 at a maximum concentration of 420 μg/KG.

In addition, 2-methylnapthalene (76 μg/KG), anthracene (35 μg/KG), di-n-butylpthalate (95 μg/KG), pyrene (150 μg/KG), benzo(a)anthracene (70 μg/KG), chrysene (100 μg/KG). benzo(b)flouranthene (220 μg/KG), benzo(k)fluroranthene (230 μg/KG), methylene chloride (16 μg/KG), chloroform (5 μg/KG), and toluene (5 μg/KG) were detected in outfall sediments, and no sediment criteria protective of human health or benthic aquatic life are included in NYSDEC's DFW sediment screening criteria document.

Screening criteria for metals are also provided in the NYSDEC DFW sediment screening criteria. Two levels of risk are established, a lowest effect and a severe effect level. A sediment is considered contaminated if either criteria is exceeded. All concentrations of metals detected in the wetland outfall sediments were below the lowest effect level criteria.

PCBs were detected in five of the outfall sediment samples. The human health bioaccumlation sediment criteria of 0.0024 μg/KG was exceeded at outfalls 001, 002, 003, 004, and 005. The benthic aquatic life chronic toxicity criteria of 579 μg/KG was exceeded at outfall 003, where the highest concentration of PCBs were detected at 2,900 μg/KG. There were no exceedances of the benthic aquatic life acute toxicity criteria of 82,800 μg/KG.

In conclusion, contaminants in the wetland outfall sediments in excess of NYSDEC DFW sediment screening criteria are presented above. These concentrations are considered to be localized at each outfall, and are not considered indicative of the overall contamination in the wetland. Endosulfan (outfall 003), phenol (outfall 002), and PCBs (outfall 003) were detected above benthic aquatic life chronic toxicity sediment criterion. Heptachlor (outfall 003), PCBs (outfalls 001, 002, 003, 004, and 005) and Dieldrin (outfalls 002, 003, and 006) exceeded sediment criteria based on human health bioaccumulation.

The potential exists for adverse long-term exposure impacts to fish that may utilize the wetland. However, the risk is somewhat limited based upon the brief exposure caused by occasional spring flooding and the localized nature of the affected sediment.

Ground water from the site probably discharges to a NYSDEC regulated wetland (CAM-6) and ultimately to the Seneca River located to the north. No NYSDEC or USEPA standards for the protection of aquatic organisms or wildlife have been developed for the chemicals of concern in either surface water or sediment. However, the maximum detected concentrations of these chemicals are all significantly below derived acceptable levels in surface water and sediment based on methods and approaches presented in USEPA and NYSDEC guidance documents. In general, shallow ground water also meets applicable criteria for the protection of aquatic life. The maximum detected concentrations of seven chemicals, primarily metals, exceeded applicable SCG. However, these chemicals were relatively infrequently detected. Provided that the source of the analytes in the developed area of the site is controlled, no adverse impacts to ecological receptors are expected in the future.

The NYSDEC regulated wetland located in the northern portion of the site as well as the Seneca River are site-specific criteria, as defined by NYSDEC guidance (NYSDEC, 1991), which must be considered in the Feasibility Study. Thus, any remedial action plans developed in the Feasibility Study which would impact these areas must meet the requirements of the regulations governing these areas.

10.0 QUALITATIVE PUBLIC HEALTH RISK ASSESSMENT

10.1 INTRODUCTION

ERM performed a Qualitative Public Health Risk Assessment at FRP. The purpose of the risk assessment was to characterize the potential risks to human health resulting from identified areas of affected soil and ground water at the site. The risk assessment is used as a benchmark against which the effectiveness of proposed remedial alternatives can be evaluated. All findings are based on a qualitative evaluation of current site conditions and anticipated future site conditions.

The risk assessment did not identify any significant exposure pathways at the site under current conditions. However, several potential exposure pathways were identified associated with: 1) future construction activities at the building portion of the site; and 2) future movement of affected ground water towards the Seneca River.

The potential exposure pathways during future construction activities include: inhalation of volatile organics and direct contact with affected site soils. These activities can potentially impact construction workers, site employees and nearby residents. Nine VOCs and one inorganic analyte were identified in the soils of the site above the cleanup objectives of NYSDEC DHWR TAGM #4046. Future construction activities could potentially expose these affected soils.

The potential exposure pathways following future movement towards the Seneca River include: inhalation of volatile organics, and direct contact and ingestion of affected fish tissue from the surface water. These exposures can potentially impact nearby residents and recreational river uses. Seven VOCs and two inorganic analytes were identified in the ground water of the wetland above the New York State Department of Health drinking water levels. Sampling done in 1992 indicated that the surface water of the Seneca River has not been affected by site activity.

The general methods used in the risk assessment are based on those methods presented in the USEPA's Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (USEPA, 1989). The risk assessment utilizes information presented in past and present environmental investigations performed by ERM at the property. All applicable ERM site documents were incorporated into the risk assessment.

10.2 PUBLIC HEALTH RISK ASSESSMENT

On the basis of the information presented in past environmental investigations at the Farrell Road site, a qualitative public health risk assessment was completed. The risk assessment is divided into four sections as described below:

- Section 10.2.1 - Potential Routes of Exposure. This section describes the potential routes of exposure by which individuals may be exposed to site affected site media. This includes both current and projected future conditions.

- Section 10.2.2 - Chemicals of Concern. This section describes the chemicals of concern in those media associated with the identified potential routes of exposure. Specific indicator chemicals or classes of chemicals have been used where multiple chemicals are found on site. This allows the evaluation to selectively identify the chemicals posing the greatest risk and to focus the evaluation on these chemicals.

- Section 10.2.3 - Toxicity Assessment. This section evaluates the particular toxicity and characteristics of those identified chemicals of concern.

- Section 10.2.4 - Risk Characterization. This section uses the presented information to evaluate and characterize the risk to human health associated with affected media on the site.

10.2.1 Potential Routes of Exposure

Exposure to affected media at the site can occur through a number of different exposure pathways. Two exposure scenarios have been evaluated: 1) potential exposures under current site conditions; and, 2) potential exposures under future site conditions. The current conditions are represented by current activities at the site according to the most recent investigation. The site has been industrially zoned since the 1960s and is anticipated to be maintained in this fashion through the future. It is assumed that the site will not undergo major zoning modifications in the future, such as development as a residential/recreational area. It is anticipated that industrial construction activities will be conducted in the future.

Previous site investigations have delineated the extent and boundaries of affected media at the site. In general, the affected media is located on the west side of Building No.1, east and west sides Building No. 2 and the area north of Building No. 2 (ERM, 1992a and 1992b). This is consistent with the known point sources and the flow of ground water to the north. Sampling has been conducted to the south of Building No. 2 where analysis of soils and ground water has shown that there is no impact with the exception of low concentrations of VOCs in MW-19. Some of these areas to the distant south, east and west of the site have residential and recreational facilities, but will not be addressed due to the lack of an identified exposure pathway.

Exposure at the site may occur through a number of different exposure pathways, as outlined below:

- Section 10.2.1.1-Inhalation of Volatilized Organics from Site Soils;
- Section 10.2.1.2-Inhalation of Fugitive Dust Emissions from Site Soils;
- Section 10.2.1.3-Direct Contact with Site Soils;
- Section 10.2.1.4-Exposure to Ground Water; and
- Section 10.2.1.5-Exposure to Surface Water.

A discussion of these exposure pathways and identification of those potential exposure pathways of concern will follow. Section 10.2.1.6 presents a summary of the potential exposure pathways.

10.2.1.1 Inhalation of Volatile Organics from Site Soils

Volatile organic compounds have been identified in site soils and present a potential inhalation exposure pathway. The potential exposure pathway for VOCs is generated through the volatilization of the contaminants from the soils into the atmosphere. Volatilization rates for VOCs will vary among each contaminant, but they generally will volatilize when exposed to the atmosphere.

Most of the facility portion of the property is paved, which eliminates the potential exposure route for inhalation of volatile organics in these areas. In addition, neither of the buildings have basements that would tend to accumulate volatile vapors. However, there are two areas of the site where the potential for exposure through volatilization under current conditions still exists: the stretch of land on the west wall of Building No. 2 and the wetlands north of the buildings. These areas are unpaved and contain affected soils.

The stretch of land along the west wall of Building No. 2 is the previous location of the solvent tanks and drywell. The soils in this area have been impacted by these previous operations. This area is within the fenced-in portion of the site and is approximately 10 feet wide by 200 feet long. It is currently covered with grass and is accessible to site employees. Although this area is adjacent to the west guard shack and entrance, it does not appear to be an area of high employee occupancy. Therefore, this area would not be considered a potential exposure pathway for inhalation of VOCs.

Most of the wetland area is located north of the buildings and outside the facility fence line. The soils in this area have been impacted in low concentrations by site related activity. The small stretch of wetland south of the fence (building side) is accessible to site employees. However, there are no operations in this portion of the site and it does not appear to be an area of high employee occupancy. The large portion of the wetlands located north of the fence (river side) is accessible to trespassers. However, this portion of the wetland is difficult to access due to its location and heavy vegetative growth. Access to this area is restricted to the north and northwest by the Seneca River, to the south by the property fence, to the east by John Glenn Boulevard and to the west by additional wetlands. Trespassers in the wetland would appear to be rare. Based on the anticipated low occupancy in the wetland area, this would not be considered a potential exposure pathway for inhalation of VOCs.

It is possible that some degree of building construction may be conducted at the facility in the future. In this case, pavement will be removed and affected soils within the building portion of the property may be exposed. Construction in the wetland is not anticipated. The extent and duration of any construction can not be determined, but operations could leave an area of affected soils exposed for several months. In addition, intrusive soil operations will allow for additional volatilization of compounds. During construction operations, construction workers, site workers and potentially nearby residents may have access to exposed affected media. Future construction activities could present a potential exposure pathway for inhalation of volatile organics in the building portion of the site.

10.2.1.2 Inhalation of Fugitive Dust from Site Soils

Inorganic, semi-volatile organics and pesticide/PCB analytes in the soil present an exposure potential when affected soil particulates become airborne. These particulates typically become airborne from wind erosion and vehicular traffic over exposed soils. As indicated above, areas of unpaved soils are located along the west wall of Building No. 2 and within the wetland. The area west of Building No. 2 is grassed over and would not appear to be used for vehicle traffic under current conditions. The wetland is seasonally flooded and highly vegetated, which would eliminate the potential for wind erosion as an exposure pathway. In addition, the location of the wetland will not allow vehicle traffic and would eliminate the potential for vehicle traffic as an exposure pathway. Inhalation of fugitive dust emissions from the soils would not be considered a potential exposure pathway under current conditions.

As previously stated, future construction activities could potentially expose affected soils in the construction area and allow for airborne suspension of contaminants through vehicle traffic and wind erosion. During these activities, construction workers, site workers and potentially nearby residents could be exposed. Future construction activities could present a potential exposure pathway for inhalation of fugitive dust emissions and should be managed accordingly.

10.2.1.3 *Direct Contact with Site Soils*

Direct contact with soils can cause both incidental ingestion and dermal absorption of affected soils. Incidental ingestion occurs when affected soil particles in contact with the hands are incidentally ingested by transfer from the hands directly or indirectly to the mouth. Dermal absorption of contaminants occurs when contaminated soils in contact with the skin are physically absorbed through the skin.

As previously noted, most of the facility portion of the property is paved. This eliminates the potential exposure route for incidental ingestion and dermal absorption in these areas. However, the stretch of land on the west wall of Building No. 2 and the wetlands north of the buildings present a potential for exposure. The stretch of land on the west side of Building No. 2 is accessible to site employees and the wetland is accessible to site employees and trespassers. Based on the low potential for occupancy in each area, neither appear to present a potential incidental ingestion or dermal absorption exposure pathway under current conditions.

If construction activity is performed in the future, construction workers may be susceptible to incidental ingestion and dermal absorption of contaminated soils. With adequate dust control procedures and construction site security, the risk to exposure can be minimized. Future construction activities present a potential exposure pathway for incidental ingestion and dermal absorption of contaminated soils.

10.2.1.4 *Exposure to Ground Water*

No exposure pathways were identified for ground water at the site under current conditions. Potable water is supplied to the site and surrounding area by the Onondaga County Water Authority in Syracuse, New York. No private wells are known to be located within a one-mile radius of the site. Downgradient monitoring wells located within the wetland have indicated that affected ground water is located beneath the wetland. Therefore, exposure to affected ground water would not currently be considered a potential exposure pathway.

In the future, the potential exposure pathway for ground water is based on the movement of existing contaminants at the site. With the ground water flow to the north, ground water contaminants will move towards the wetland. Typically, wetlands act as filters to any analyte movement which reduces analyte movement towards potential down gradient receptors. Based on the anticipated water flow (Seneca River), distant proximity of private wells and the established drinking water source outside the area, ground water migration does not appear to be a significant exposure pathway. In addition, it is not anticipated that ground water supply wells will be constructed within the facility portion of the property or the wetland. Future exposure to contaminated ground water would not be considered a potential exposure pathway.

10.2.1.5 *Exposure to Surface Water*

No potential exposure pathways were identified for surface water at the site under current conditions. Surface water is located adjacent to the site at the Seneca River. The surface water of the Seneca River was sampled during a follow-up investigation in June of 1992 and no contaminants were detected at any sampled location along the river.

Downgradient wells located within the wetland have indicated that contaminated ground water has not migrated off-site (i.e. to the river). Surface water in the wetland from seasonal flooding is not considered a potential exposure pathway based on the anticipated occupancy in the wetland discussed previously. Therefore, current exposure to contaminated surface water would not be considered a complete exposure pathway.

In the future, the potential exposure pathway for surface water is based on the movement of existing contaminants at the site. Site ground water, which flows to the north, migrates towards the wetlands and Seneca River. This presents a limited potential exposure pathway for exposure to the surface waters of the Seneca River; however, as previously stated, the presence of the wetland and the large volume of water in the Seneca River greatly reduces the likelihood of exposure due to dilution. Potential exposure pathways include: 1) inhalation of VOCs from the surface water; 2) direct contact through dermal absorption; 3) incidental ingestion of surface water; and, 4) ingestion of fish tissue. Participants in recreational activities could potentially be impacted by these exposure pathways. However, exposure to contaminated surface water will be limited in the future as site remediation continues.

10.2.1.6 Summary of Potential Exposure Pathways

Several potential exposure pathways were identified at the site. These pathways include:

- Inhalation of VOCs from site soils - future construction activities.
- Inhalation of fugitive dust emissions from site soils - future construction activities.
- Direct contact with site soils - future construction activities.
- Exposure to surface water - Seneca River - future contaminant migration to the Seneca River.

10.2.2 CHEMICALS OF CONCERN

The identification of the chemicals of concern is conducted to enhance the risk assessment process by centering the evaluation only on the significant chemicals at the site. In order to identify the chemicals of concern at the site, the results of sample analysis from previous investigations were evaluated. During these investigations, several different media were sampled, which included soil, surface water and ground water.

In an evaluation of the potential route of exposure (Section 10.2.1), two separate areas and media at the site need to be evaluated. This includes: 1) the soils at the building portion of the site to evaluate exposure during future construction activities; and 2) ground water in the wetland portion of the site to evaluate potential movement towards the Seneca River. Although the ground water concentrations in the building portion of the site are greater than those found at the wetland, the wetland ground water concentrations were used for risk evaluation because it is anticipated that ground water remediation will be conducted in the building portion of the site. The building portion of the site is defined as the fenced-in areas of FRP-1 and FRP-2 and the paved areas (parking lots) of the site. The wetland is defined as the portion of the site from the north fence to the Seneca River. Each area will be evaluated for significant chemicals of concern. Based on the lack of potential exposure pathways, contaminants in the ground water at the building portion of the site and in the soil of the wetland portion of the site will not be evaluated further.

At sites where a number of chemicals have been detected, an indicator chemical selection process is used to reduce the number of chemicals that warrant a complete and thorough evaluation. This process uses site data for each chemical to determine those chemicals that are integral to the evaluation. This risk assessment uses a selection process based on certain criteria to evaluate and reduce the number of chemicals of concern. This criteria incorporates the frequency of detection, site concentration data and chemical toxicity data. The site concentration data will be screened against the Contract Required Quantitation Limit (CRQL), Eastern USA Background Levels (NYSDEC Memorandum, Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels) and New York State Ground Water Standards (NYSGWS) for Class GA waters. Chemicals falling below these levels or within the background range will be eliminated from the evaluation. However, chemicals will not be eliminated if they are detected in high concentrations or will eliminate an area of concern due to a large number of samples outside that area.

The following sections identify the chemicals of concern in each media at the site.

10.2.2.1 Chemicals of Concern in Building Soils

Table 10-1 summarizes the chemicals detected in the soils at the building portion of the site. The table presents a list of the identified compounds, range of reported concentration, frequency of detection, and CRQL/Eastern USA background levels. Volatile organics, semi-volatile organics, inorganics and pesticides/PCBs were detected in building soils.

Volatile organics in the soils present the biggest concern at the building portion of the site. Those chemicals that were identified at the greatest frequency and concentration included: 1,1-dichloroethane, 1,1,1-trichloroethane, toluene, ethylbenzene, 4-methyl-2-pentanone, xylene and acetone. In addition, trichloroethene and benzene will be included as chemicals of concern due to their elevated concentrations in a specific area. Based on frequency and concentration, no semi-volatile organics were identified as chemicals of concern.

All samples analyzed for inorganics approximate the average background soil concentrations in the Eastern USA, except for magnesium (average 8,510 ppm-background 5,000 ppm). Sitewide magnesium concentrations appear to be elevated relative to soils in the Eastern USA; however, there are no known contaminant sources for this metal onsite.

Several pesticides and PCBs were detected on the site, but only three pesticides were identified as chemicals of concern. These pesticides, based on their frequency and concentration, included: 4,4´-DDE, 4,4´-DDD and 4,4´-DDT.

10.2.2.2 *Chemicals of Concern in Wetland Ground Water*

Table 10-2 summarizes the chemicals detected in the ground water of the wetland portion of the site. The table presents a list of the identified chemicals, range of reported concentration, frequency of detection, and CRQL/New York State Ground Water Standard (NYSGWS). Volatile organics, semi-volatile organics, inorganics and pesticides/PCBs were detected in this media.

Volatile organics in the ground water present a concern at the wetland portion of the site. Those chemicals that were identified at the greatest frequency and concentration included: 1,1,1-trichloroethane, trichloroethene, benzene, toluene, ethylbenzene, xylene and acetone. Based on frequency and concentration, no semi-volatile organics were identified as chemicals of concern.

Table 10 - 1
Compounds Detected in Soil
Building Portion of the Site
MMC-Farrell Road Plant RI

Chemical	Range of Concentration	Frequency of Detection	Comparison Value
Volatile Organics:	(ppb)		(ppb)1
Chloroform	0.8-3	4/108	10
Acrylonitrile	25-125	8/64	10
Methylene Chloride	4-16	11/108	10
Trichlorofluoromethane	1-17	4/108	10
1,1-Dichloroethene	6-500	13/108	10
1,1-Dichloroethane	2-1,400	14/108	10
1,2-Dichloroethene (total)	8	1/108	10
1,2-Dichloroethane	6	2/108	10
1,1,1-Trichloroethane	7-650,000	21/108	10
Trichloroethene	5-1,600	3/108	10
Benzene	2-5,400	3/108	10
2-Chloroethylvinylether	10	1/65	10
Tetrachloroethene	3-14	3/108	10
Toluene	5-2,100,000	18/109	10
Ethylbenzene	15-630,000	14/109	10
4-Methyl-2-Pentanone	21,000-2,000,000	2/13	10
Xylenes (Total)	58-4,200,000	14/59	10
Acetone	15-4,000	18/55	10
Carbon Disulfide	22	1/43	10
2-Butanone	200	1/43	10
Semi-Volatile Organics:	(ppb)		(ppb)1
Fluoranthene	20-730	2/38	330
Phenol	840	1/32	330
Pyrene	20-570	3/38	330
Benzo (a) Anthracene	320	1/38	330
Acenaphthene	49-400	2/38	330
Anthracene	730	1/38	330
Fluorene	31-430	2/38	330
Naphthalene	1,100	1/32	330
Phenanthrene	570-930	3/38	330
2-Methylnaphthalene	820-3,300	3/38	330
Carbazole	95	1/31	330
Chrysene	320	1/38	330
Bis (2-Ethylhexyl) Phthalate	30-160	5/32	330
Benzo (b) Fluoranthene	280	1/38	330
Benzo (k) Fluoranthene	370	1/38	330
Benzo (a) Pyrene	300	1/38	330
Ideno (1,2,3-cd) Pyrene	170	1/38	330
Dibenzo (a,h) Anthracene	78	1/38	330
Benzo (g,h,i,) Perylene	190	1/38	330
Inorganics:	(ppm)		(ppm)2
Arsenic	1.4-25	16/17	3-12
Cadmium	0.4-0.64	2/17	0.1-1
Chromium	2.4-52	17/17	1.5-40
Copper	6.9-96	13/17	1-50
Lead	1.1-24.3	15/21	200-500
Mercury	0.02-0.125	3/17	0.001-0.2
Nickel	8.6-14.2	15/17	0.5-25
Zinc	1.4-36.1	14/17	9-50
Aluminum	3,110-9,980	13/13	33,000
Barium	3.4-52	13/17	15-600
Beryllium	0.27-0.74	13/17	0-1.75
Calcium	1,590-114,000	13/13	130-35,000
Cobalt	4.5-9.3	11/13	2.5-60
Iron	7,660-16,000	13/13	2,000-550,000
Magnesium	2,110-20,300	13/13	100-5,000
Manganese	197-618	13/13	50-5,000
Potassium	540-1,570	5/13	8,500-43,000
Selenium	0.57-0.63	2/17	0.1-3.9
Sodium	165-287	4/13	6,000-8,000
Thallium	1.5	1/13	N/A
Vanadium	4.4-16.5	13/13	1-300
Cyanide	30-2040	3/17	N/A
Pesticides/PCBs:	(ppb)		(ppb)1
Alpha-BHC	0.042-0.24	5/31	1.7
Beta-BHC	0.13-0.57	4/31	1.7
Delta-BHC	0.23	1/31	1.7
Heptachlor	0.1	1/31	1.7
Aldrin	0.14-0.16	2/31	1.7
Dieldrin	0.053	1/31	3.3
4,4'-DDE	0.095-170	15/31	3.3
Endrin	0.072-0.074	3/31	3.3
4,4'-DDD	0.096-210	10/31	3.3
Endosulfan Sulfate	0.31-0.43	2/31	3.3
4,4'-DDT	0.066-30	7/31	3.3
Alpha-Chlordane	0.31	1/31	1.7

1 Contract Required Quantitation Limit (CRQL)
2 Eastern USA Background Levels
N/A - Not Available

Table 10 - 2
Compounds Detected in Ground Water,
Wetland Portion of the Site
MMC-Farrell Road Plant RI

Chemical	Range of Concentration	Frequency of Detection	Comparison Value
Volatile Organics:	(ppb)		(ppb)1
Trichlorofluoromethane	2-36	6/51	10
Chloroethane	13-25	3/67	10
Methylene Chloride	6-8	4/67	10
1,1-Dichloroethene	0.22-9	3/67	10
1,2-Dichloroethene (Total)	0.08-104	19/67	10
Chloroform	1	1/67	10
1,1,1-Trichloroethane	0.81-190	22/67	10
Trichloroethene	0.65-660	26/67	10
Benzene	1-8,300	9/67	10
Toluene	1-17,000	7/67	10
Ethylbenzene	69-1,300	4/67	10
Xylenes (Total)	62-7,000	4/43	10
Acetone	9-2,400	4/29	10
1,1-Dichloroethane	0.12-130	18/67	10
1,3,5-Trimethylbenzene	0.61	1/7	10
Semi-Volatile Organics:	(ppb)		(ppb)1
Naphthalene	41	1/14	330
2-Methylnaphthalene	7	1/7	330
Bis(2-Ethylhexyl) Phthalate	0.9-1	2/7	330
Inorganics:	(ppb)		(ppb)2
Arsenic	8-20	5/13	25
Barium	21.8-1,770	13/13	1000
Cadmium	5	2/13	10
Calcium	119,000-1,860,000	11/11	N/S
Copper	30-8,990	4/8	200
Lead	5-21.2	5/13	25
Magnesium	13,300-462,000	11/11	35,000
Manganese	15-9,650	10/11	300
Nickel	57.6-101	3/13	N/S
Selenium	5	2/13	10
Silver	10	2/13	50
Sodium	9,400-306,000	11/11	20,000
Thallium	50	2/13	4
Zinc	10.9-448	11/13	300
Aluminum	134-30,900	6/11	N/S
Beryllium	1.2-3.5	2/13	3
Chromium	12.9-19.4	2/13	50
Cobalt	47.7	1/11	N/S
Iron	27.1-102,000	7/11	300
Mercury	0.05-0.051	2/13	2
Potassium	3,340-3,700	2/11	N/S
Vanadium	21.1-57.6	2/11	N/S
Pesticides/PCBs:	(ppb)		(ppb)1
Dieldrin	0.003	1/7	0.1

[1] Contract Required Quantitation Limit (CRQL)
[2] New York State Ground Water Standards (Class GA)
N/S - No Standard

All of the inorganics fell below the New York State Ground Water Standard (NYSGWS), except for copper (average 1,187 ppb - NYSGWS 200 ppb), magnesium (average 88,873 ppb - NYSGWS 35,000 ppb), manganese (average 2,969 ppb - NYSGWS 300 ppb), sodium (average 77,209 ppb -NYSGWS 20,000 ppb) and iron (average 14,168 ppb - NYSGWS 300 ppb).

With regards to the copper and manganese, high concentrations were detected below the former debris pile. Magnesium, sodium and iron do not appear to be a contaminant source to the wetland portion of the site. Both copper and manganese were identified as chemicals of concern.

Several pesticides and PCBs were detected in the wetland. Based on their low frequency and concentration, no pesticides or PCBs have been included as chemicals of concern.

0.2.2.3 *Summary of Chemicals of Concern*

The chemicals of concern in the various site media have been identified on Table 10-3.

0.2.3 *Toxicity Assessment*

The potential exposure routes of concern at the site are inhalation of volatile organics/fugitive dust emissions from site soils and direct contact with site soils during future construction activities, along with future exposure to surface water resulting from migration of contaminants. With this in mind, the toxicity assessment will focus on the means of contaminant release into the atmosphere, fate of contaminants released to the environment and associated health effects. Three (3) separate classes

Table 10 - 3
Chemicals of Concern
MMC-Farrell Road Plant RI

Chemical	Building Soils	Wetland Ground Water
Volatile Organics:		
1,1-Dichloroethane	X	
1,1,1-Trichloroethane	X	X
Toluene	X	X
Ethylbenzene	X	X
4-Methyl-2-Pentanone	X	
Xylene	X	X
Acetone	X	X
Trichloroethene	X	X
Benzene	X	X
Inorganics:		
Copper		X
Manganese		X
Cyanide	X	
Pesticides:		
4,4´-DDE	X	
4,4´-DDD	X	
4,4´-DDT	X	

of chemicals have been identified as chemicals of concern at the site: volatile organics, inorganics and pesticides. Each chemical class will be discussed as a group with additional information on chemical specific concerns. Information in this section is gathered from the Handbook of Environmental Fate and Exposure Data (Howard, 1990) and the Handbook of Toxicology (Haley and Berndt, 1987).

10.2.3.1 Volatile Organics

The group of volatile organics identified at the site consist mostly of chemicals used as solvents or degreasers and constituents of petroleum products. In general, this class of chemicals exhibit a similar environmental fate, with chemical-specific toxicological effects. Typically, the release of these chemicals into the atmosphere is through volatilization. The degree of volatilization is based on the vapor pressure (plus water solubility in liquid media) of the chemical. The vapor pressure of those volatile organics at the site ranged well over 1 mm Hg (chloroform-246 mm Hg; 1,2-dichloroethene-200 mm Hg; water-1 mm Hg). These chemicals, when released to the environment, will volatilize rapidly to the atmosphere. These chemicals in the soils are highly mobile and typically have low adherence to the soils. This enables these chemicals to leach through the soils to the ground water. Each chemical will have varying degrees of biodegradation in each media and will not significantly bioaccumulate in the environment.

The major route of exposure for volatile organics is through volatilization from the soils, and to a lesser extent by direct contact through dermal absorption and incidental ingestion. Since significant exposures may be encountered during future construction activities, chemicals will be evaluated with respect to exposure to construction workers. Worker exposure levels are regulated by the Occupational Safety and Health

Administration (OSHA) through established Permissible Exposure Limits (PELs). These PELs represent allowable exposures over an 8-hour work day in a 40-hour work week. Of the chemicals of concern, most PELs ranged from 25 ppm to 1,000 ppm. However, the PELs for benzene (1 ppm) and acrylonitrile (2 ppm) are significantly lower and essentially "more toxic" at lower concentrations. The International Agency for Research on Cancer (IARC) has identified benzene as a Group 1 compound (carcinogenic to humans) and acrylonitrile as a Group 2A compound (probable carcinogenic to humans). In addition, chloroform (Group 2B - probable carcinogenic to humans), methylene chloride (Group 2B) and trichloroethene (Group 3 - not classified as to its carcinogenicity to humans) have been identified as probable carcinogens. OSHA also has a skin designation for those chemicals which present an exposure route by absorption through the skin. Acrylonitrile has this skin designation.

10.2.3.2 Inorganics

Three (3) inorganics were identified as chemicals of concern at the site. Two of the inorganics are heavy metals, copper and manganese, found in the ground water and the other inorganic is cyanide, found in the soils.

Since the heavy metals of concern are in the ground water, exposure through inhalation of airborne contaminants is not of concern. Therefore, the main routes of human exposure are through ingestion of contaminated food, such as fish, and by direct contact (incidental ingestion and dermal absorption). Dermal absorption is not of concern with regards to these heavy metals. In general, heavy metals released to the soils will adhere to soil particles. In this case, these metals will tend to bioaccumulate in certain media. The leaching of heavy metals into the ground water, however, is based on those characteristics of the soil, such as pH or organic matter content.

Copper is an essential element in the human diet and small amounts are ingested by humans every day. In general, copper is relatively non-toxic at low levels. Manganese appears most commonly in the +2 or +4 oxidation state. According to epidemiological studies, there is no evidence that manganese is carcinogenic or exhibits teratogenic or reproductive effects in humans. The IARC has not identified either copper or manganese as a potential carcinogen.

Cyanides can be extremely toxic in any of its many forms. The main routes of exposure for cyanide are through inhalation of contaminated airborne soils and direct contact by dermal absorption or incidental ingestion. These exposures may be encountered during future construction activities and will be evaluated with respect to exposure to construction workers. The PEL for cyanide is 5 mg/m^3 and is also given an OSHA skin designation. The IARC has not identified cyanide as a potential carcinogen.

10.2.3.3 Pesticides

Three (3) pesticides were identified as chemicals of concern at the site. All of the pesticides are organochlorine insecticides and will be evaluated according to this classification. These insecticides were used as a control measure from the 1940s through the 1980s, most of which were banned by the end of the 1980s. The most popular insecticide was 4,4´-DDT (DDT), which will be used to represent the toxicity of this class of chemicals. Other pesticides of concern at the site include: 4,4´-DDD and 4,4´-DDE, which are insecticides as well as breakdown products of DDT.

Pesticides are extremely persistent in the environment. These chemicals do not readily volatilize, except when applied during spraying or coated on the soils. Since site pesticides are within the soils, volatilization will not be significant. Pesticides adhere to soil particulates and are relatively immobile in soils. For this reason, they do not typically leach into the ground water. As a group, pesticides have a low solubility in water and a high solubility in fat, which enables them to bioaccumulate in the environment. In addition, these chemicals biodegrade very slowly. Pesticides can make their way to surface water through surface soil run-off and will accumulate in surface water sediments.

The main route of human exposure is through ingestion of food contaminated with bioaccumulated pesticides, such as fish. However, since no pesticides were detected as chemicals of concern in the wetland ground water, this is not a concern at the site. Other significant routes of exposure are through inhalation of contaminated airborne soils and direct contact by dermal absorption or incidental ingestion. These exposures may be encountered during future construction activities and will be evaluated with respect to exposure to construction workers. The PEL for DDT is 1.0 mg/m3. The IARC has identified this pesticide as a Group 2B potential carcinogen and is also given an OSHA skin designation.

10.2.4 Risk Characterization

The final phase of the risk assessment combines the information on the chemicals of concern, exposure pathways and toxicity assessment to evaluate the human risk presented by the contamination at the site. No exposure pathways were identified for the site in its current condition. However, several exposure pathways were identified as potentially associated with future construction in the building portion of the site and analyte movement towards the Seneca River in ground water. Each of these potential exposure pathways will be evaluated.

10.2.4.1 *Future Construction Activities*

For the future, the building portion of the site has both identified chemicals of concern and potential exposure pathways. The potential exposure pathway for the building portion of the site is associated with future construction activities. The potential exposure pathways for future construction include: inhalation of volatile organics and fugitive dust emissions and direct contact with contaminated site soils. These activities can potentially impact construction workers, site employees and nearby residents. The chemicals of concern in the soils of the building portion of the site included nine volatile organics, one inorganic and three pesticides.

To evaluate the human health risk for future construction activities, the degree of chemical contamination in the soils must be identified. To do this, average soil concentrations are compared to the recommended clean up objective in NYSDEC DHWR TAGM #4046. These data are presented in Table 10-4.

In comparing soil concentrations in the building soils to the recommended soil cleanup objectives, six exceed the cleanup objective. These included: 1,1,1-trichloroethane, toluene, ethylbenzene, 4-methyl-2-pentanone, xylene and benzene. Three of the VOCs were below the cleanup objective. These included: 1,1-dichloroethane, acetone and trichloroethene. These chemicals, however, have area specific concentrations (i.e. maximum values) that would exceed the cleanup objectives. For the purpose of the qualitative risk assessment, each of the nine volatile organics present a potential exposure pathway for future construction activities. A quantitative assessment of these chemicals could further classify the risk associated with their exposure.

Table 10 - 4
Future Construction Activities
MMC-Farrell Road Plant RI

Chemical	Average Concentration of Affected Building Soils	NYS Recommended Soil Cleanup Objective
Volatile Organics:	(ppb)	(ppb)
1,1-Dichloroethane	26.6	200
1,1,1-Trichloroethane	7,963	800
Toluene	29,558	1,500
Ethylbenzene	9,734	5,500
4-Methyl-2-Pentanone	155,462	1,000
Xylene	111,183	1,200
Acetone	91.7	200
Trichloroethene	15.4	700
Benzene	66.7	60
Inorganics:	(ppm)	(ppm)
Cyanide	137	N/A
Pesticides:	(ppb)	(ppb)
4,4′-DDE	12.1	2,100
4,4′-DDD	9.3	2,900
4,4′-DDT	1.5	2,100

N/A - Not Available

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There are no recommended soil cleanup objectives for cyanide in the soil. Therefore, cyanide exposure has been included as a potential exposure pathway for future construction activities. A quantitative assessment of cyanide could further classify the risk associated with its exposure.

The concentrations of pesticides in the building portion of the site were well below the recommended soil cleanup objectives. On the average, the cleanup objectives were an order of magnitude greater than the maximum pesticide concentrations detected in the soils. Therefore, pesticide exposure during construction activities is not considered a significant exposure pathway.

10.2.4.2 Analyte Migration Towards the Seneca River

Ground water in the wetland has several identified chemicals of concern. Seven VOCs and two inorganics were identified as chemicals of potential concern in the ground water of the wetland portion of the site. Data indicates that the Seneca River has not been affected by site related activity (ERM, 1992d); however, future contaminant movement is a potential exposure pathway. If this were to occur, potential exposure pathways for exposure to surface water would include: inhalation of VOCs, and direct contact and ingestion of contaminated fish tissue from the surface water. These activities can potentially impact river users.

Ground water concentration in the wetland exceed the NYSDOH drinking water levels. A comparison to drinking water standards is conservative because it makes two distinct assumptions: 1) the affected ground water of the wetland will move to the Seneca River and the resultant concentrations in the river will constitute a potential exposure pathway; and, 2) the quality of the river will be measured against drinking water standards. Both of these assumptions are very conservative. With regards to the migration of contaminants, several factors that would reduce contaminant migration have been identified. This includes: 1) dilution of contaminants in the ground water; 2) dilution of contaminants upon entering into the river; 3) volatilization/biodegradation of compounds before they reach the river; and, 4) contaminant concentration versus travel distance to the river (i.e. highest concentration located farthest from the river). Each of these factors would reduce the expected concentration in the river. In addition, NYSDOH levels are established for drinking water. Even with the future projected use for the river, it is not anticipated to be used as a drinking water source. Surface water ingestion from the Seneca River is projected to be incidental intake only. Additionally, the waters of the Seneca River were sampled for chemicals associated with site activity; analyses of these samples did not detect any VOCs.

11.0 CONCLUSIONS AND RECOMMENDATIONS

ERM conducted an RI at FRP in the Fall of 1993 and Spring of 1994. The results of both field efforts are reported here as the 1994 RI Report. The RI investigated the following areas at the site; 1) the soil in 11 of 16 Areas of Concern previously identified throughout the site and along the storm sewer piping system; 2) the sediment in the storm sewer catch basins and outfalls and in the wetland north of the developed portion of the site; 3) surface water in the wetland, and 4) site-wide ground water. This investigation was designed to supplement existing data gathered at the site during previous investigations and IRMs. As such, five Areas of Concern were not evaluated during the 1994 RI, as they had been sufficiently characterized by earlier studies. The conclusions stated below incorporate the results of all previous investigations.

11.1 CONCLUSIONS

Based on the results of the 1994 RI and data from previous investigations, ERM has developed the following conclusions regarding the environmental setting at the site, the geochemistry of site sediment, soils, surface water, and ground water, and the potential for human exposure to contaminants and their migration at the site.

It should be noted that MMC is under Consent Order to conduct IRMs to address affected media at three of the previously discussed Areas of Concern. IRM Work Plans have been approved by NYSDEC, and construction is complete at AOC #5, AOC #7 and AOC #16. Remediation is underway in AOC #7. Remedial system start-up at AOC #5 and AOC #16 is awaiting final approval from NYSDEC.

11.1.1 *Environmental Setting*

The site is located in the Erie-Ontario Lowland Province of Central New York State, an area characterized by low relief and drumlins. Natural soils at the site are a medium to fine grained sand with some silt and a trace to little of clay. The fine sand varies in thickness across the site thickening from south to north. A dense red glacial clay underlies the fine sand and silt. A coarse sand and gravel lens is interposed between the medium to fine sand and the underlying red clay intermittently across the site. The underlying clay has considerable relief on its upper surface. The thickness of the clay is unknown; however, it is greater than approximately 65 feet along the north end of the site.

Surface water drainage is diverted by a series of catch basins to the wetlands north of the site. There are no other surface water drainage features at the site with the exception of the Seneca River which borders the north end of the site.

Ground water flows to the north, towards the wetland and the Seneca River. Saturated thickness varies across the site, thickening from south to north. Hydraulic permeabilities of the medium to fine sand varied across the site from approximately 10^{-3} to 10^{-4} cm/sec. The relief on the top of the underlying red clay probably plays a significant role in ground water flow direction and analyte migration. The hydraulic permeability of the red clay was estimated by laboratory testing to be approximately 10^{-8} cm/sec.

11.1.2 *Sediment Geochemistry*

Sediment investigations were conducted in three areas throughout the site. Conclusions regarding sediment geochemistry at the site are presented below.

Storm Sewer Outfalls - Low concentrations of VOCs and SVOCs were present in storm sewer outfalls 002, 003, 004, 007 and 008. PCBs were detected in Outfalls 002, 003, 004, 005 and 008. Concentrations exceeded NYSDEC DFW sediment screening criteria. Future action in these areas may include: 1) remediation of the storm sewer system as an IRM; 2) additional sampling to estimate the extent of PCBs near Outfall 003; and, 3) remedial evaluation as part of the Feasibility Investigation.

Storm Sewer Catch Basins - VOCs, SVOCs, PCBs and pesticides were present in some of the catch basins; however, the only exceedance of SCG occurred in CB-13, which contained 1,1,1-trichloroethane at 15 ppm. Cadmium, chromium, copper, and zinc are present in some catch basins at elevated levels. The sediment in these catch basins may require remediation and may be addressed as part of an IRM.

Wetland - Concentrations of VOCs were present in the wetland sediment samples analyzed. Due to the lack of a potential pathway, the public health risk assessment did not identify the sediment in the wetland as a source of risk; however, concentrations of VOCs in some samples exceed NYSDEC DFW sediment screening criteria, especially the sediment around SS-08. The sediment around SS-08 and affected sediment in the wetland may require remediation and will be evaluated as part of the Feasibility Study.

11.1.3 Soil Geochemistry

The soils in 16 separate Areas of Concern were evaluated during the RI and previous environmental investigations. VOCs, SVOCs, PCBs, and pesticides were identified in some areas in varying concentrations. Based on the results of the 1994 RI and previous investigations, the soil in the following Areas of Concern contain analytes of concern below action levels and require no further action.

Area 1	- Debris Pile north of FRP-2
Area 3	- Former Above Ground Solvent Tanks in FRP-2
Area 4	- Removed Above Ground Tanks east of FRP-2
Area 8	- Area of Freon Residuals
Area 9	- Removed UST T-50
Area 11	- Radar Test Area
Area 12	- Paint Booth Area
Area 13	- Chemical Laboratory
Area 14	- Septic and Storm Drainage Headwall west of the Garage
Area 15	- USTs near Old Metal Finishing Room

The public health risk assessment did not identify any excessive risks associated with site soils in their current condition. However, it did recognize that site disturbance (including construction) may create a risk to workers and site personnel.

The soil in the following areas exceed soil NYSDEC DHWSR TAGM #4046 clean-up objectives and will require remedial evaluation in the Feasibility Study:

Area 2	- Septic Leach Field north of the Test Building
Area 5	- Removed USTs and Drywell on the west side of FRP-2
Area 6	- Printed Wireboard Assembly Area
Area 7	- Removed UST T-51
* Area 10	- Temporary Hazardous Material Storage Area
Area 16	- Removed Gasoline UST near the Garage.

* Area 10 is currently being further evaluated to assess the potential of

ground water to be the source of soil contamination in accordance with MMC's Letter of Response to NYSDEC dated 22 March 1995. The results of the evaluation will be presented as an addendum to the Final RI Report.

11.1.4 *Surface Water Geochemistry*

Surface water samples collected from the Seneca River did not contain any VOCs. Surface water samples collected from standing water in the wetland contained low concentrations of VOCs. The compounds and the concentrations at which they were detected in surface water are not cited in any standards or guidance for surface water. The fish and wildlife impact analysis did not identify any significant ecological risk from these compounds. No further action is required on surface water in the wetland.

11.1.5 *Ground Water Geochemistry*

Ground water at the site contains varying concentrations of analytes of concern. Elevated concentrations of chlorinated and non-chlorinated VOCs are probably derived from soil point sources previously described. The greatest concentrations of affected ground water are located at AOC #5, AOC #7, and AOC #16; however, ground water exceedances of water quality standards is a site wide issue. Additionally, elevated concentrations of SVOCs and oil are present in the ground water at AOC #7 and AOC #9. A full-scale fate and migration analysis of affected ground water is beyond the scope of this investigation. Based on the RI and previous site investigations, it can be concluded that affected ground water is migrating to the north, towards the wetlands and Seneca River north of the site. No analytes have been detected in the Seneca River; however, concentrations are present in the ground water beneath the wetland. The qualitative public health risk assessment did not identify any potential receptors of affected ground water; however, site wide concentrations exceed ground water standards and will require remedial evaluation in the Feasibility Study.

11.2 *RECOMMENDATIONS*

The results of the 1994 RI and previous investigations are sufficient to provide a characterization of environmental conditions at the site and to support a Feasibility Study. The potential effect on public health and fish and wildlife has been evaluated. The Fish and Wildlife Impact Analysis did not identify any impacts to special resources in the area of FRP. The Qualitative Public Health Risk Assessment identified two potential exposure pathways: 1) future construction or disturbance of site soils; and, 2) potential of affected ground water to move towards the Seneca River.

ERM recommends that the following additional tasks be conducted at the site:

- IRMs should continue at AOC #5, AOC #7, and AOC #16 as a source control action to remove known concentrations of analytes in the soil that may be acting as a source to ground water. The IRMs at AOC #5 and AOC #16 have been constructed and are awaiting startup. Remediation is underway at AOC #7.

- A Feasibility Study should be conducted to determine the most efficient and cost-effective remedial program for affected sediment, soil and ground water at the site.

- The Feasibility Study should evaluate the potential for proposed IRMs to be acceptable as final remedial measures for AOC #5, AOC #7, and AOC #16.

- Additional field investigation is recommended for Outfall 003 to estimate the extent of PCBs in sediment. Further evaluation of soil and ground water data is recommended in AOC #10 to estimate whether site wide ground water could be the source of soil contamination.

- A non-aqueous phase liquid (NAPL) was encountered in monitoring wells at AOC #5 which may require further evaluation. MMC will prepare a separate scope of work in accordance with the MMC Letter of Response to NYSDEC dated 22 March 1995 to address the NAPL issues. The results of the NAPL investigation will be presented as an addendum to the Final RI Report.

- An IRM will be conducted to remove the affected sediment in the catch basins and site storm sewer lines.

- Additionally, pre-design field work may be required to support preliminary design of the selected remedial alternatives identified by the Feasibility Study.

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APPENDIX A

MONITORING WELL CONSTRUCTION LOGS

ERM-Northeast

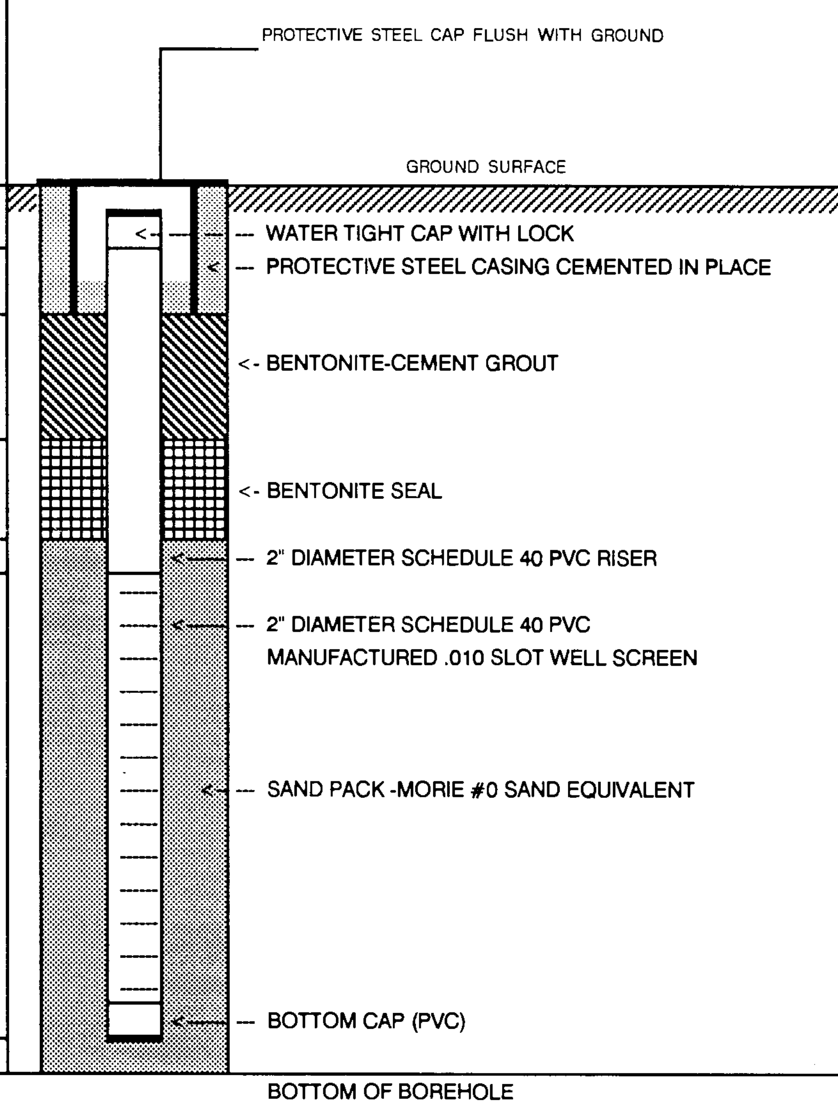
5788 Widewaters Parkway, Dewitt, NY 13214 (315) 445-2554

MONITORING WELL CONSTRUCTION: MW - 26S

Project Name & Location	Project No.	Water Level(s) (ft below PVC casing)			Site Elevation Datum (feet)
MMC - Farrel Road Plant	**557.044.01**	Date	Time	Level (feet)	
Drilling Company: Aquifer Drilling and Testing	Foreman: M. Mede				Ground Elevation (feet):
Surveyor: Lehr Associates					Top of Protective Steel Cap Elevation (feet):
Date and Time of Completion: 5/3/94	Inspector: S. Pepling				Top of Riser Pipe Elevation (feet): 374.27

Generalized Soil Description	*Elevation	**Depth
	0.00	0.0
	374.27	0.0
	373.27	1.0
	372.27	2.0
	370.77	3.5
	369.77	4.5
	359.77	14.5
	359.27	15.0

CONSTRUCTION DETAILS



REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground

ERM-Northeast

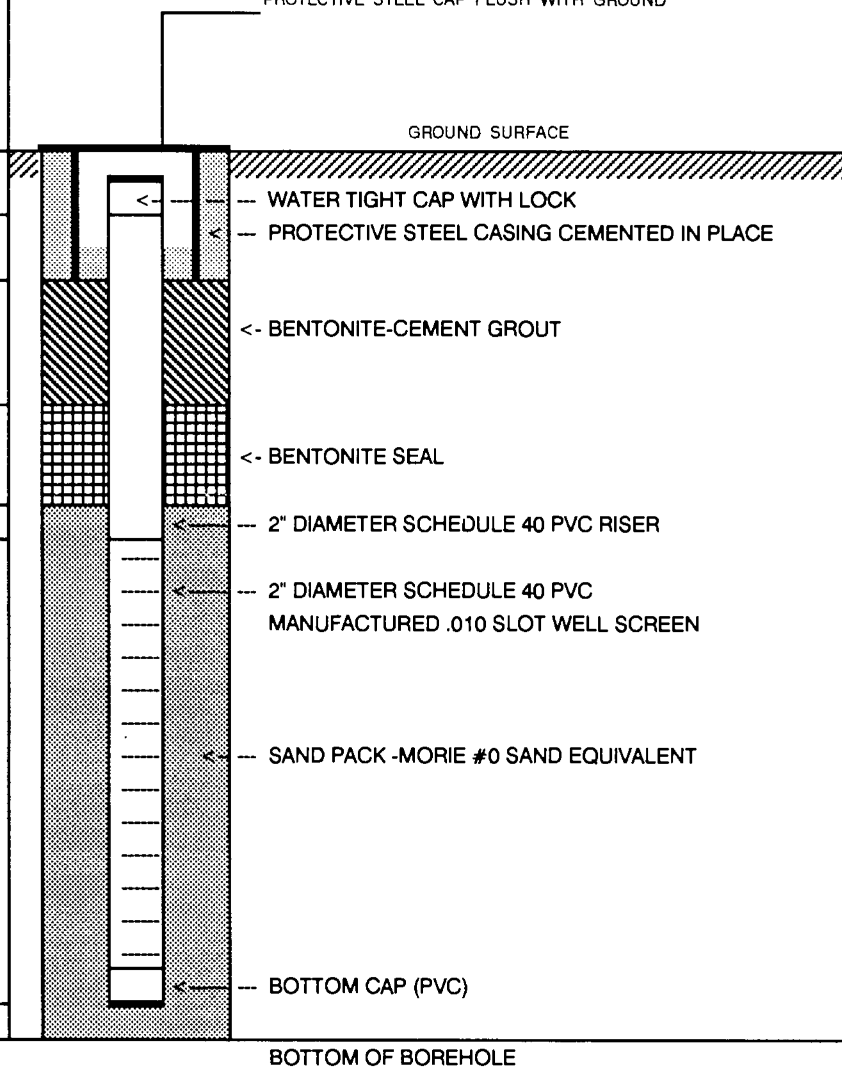
5788 Widewaters Parkway, Dewitt, NY 13214 (315) 445-2554

MONITORING WELL CONSTRUCTION: MW - 26D

Project Name & Location	Project No.	Water Level(s) (ft below PVC casing)			Site Elevation Datum (feet)
MMC - Farrel Road Plant	**557.044.01**	Date	Time	Level (feet)	
Drilling Company: Aquifer Drilling and Testing	Foreman: M. Mede				Ground Elevation (feet):
Surveyor: Lehr Associates					Top of Protective Steel Cap Elevation (feet):
Date and Time of Completion: 5/3/94	Inspector: S. Pepling				Top of Riser Pipe Elevation (feet): 374.23

CONSTRUCTION DETAILS

Generalized Soil Description	*Elevation	**Depth
	0.00	0.0
	374.23	0.0
	373.23	1.0
	355.23	19.0
	353.23	21.0
	351.23	23.0
	341.23	33.0
	340.23	34.0



REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground

ERM-Northeast

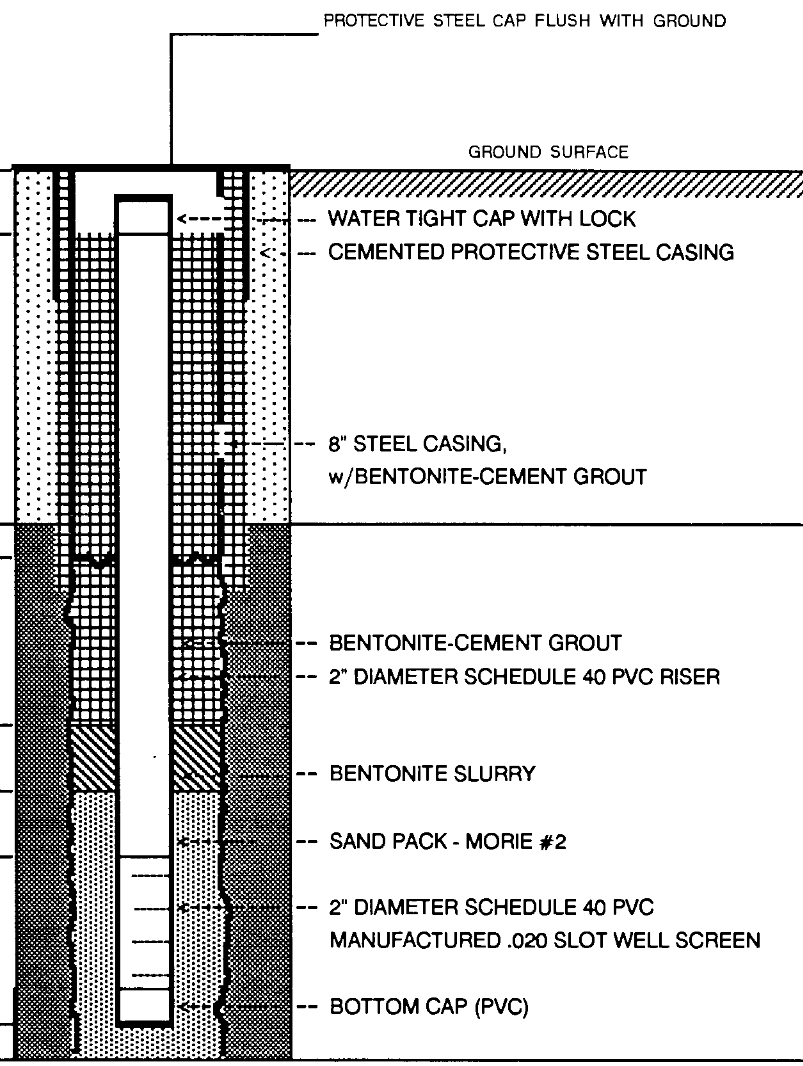
5788 Widewaters Parkway, Dewitt, NY 13214 (315) 445-2554

MONITORING WELL CONSTRUCTION: BR - 1

Project Name & Location	Project No.	Water Level(s) (ft below PVC casing)			Site Elevation Datum (feet)
MMC - Farrell Road Plant	**557.044.01**				
Drilling Company	Foreman	Date	Time	Level (feet)	Ground Elevation (feet)
Aquifer Drilling & Testing	M. Adams				378.79
Surveyor					Top of Protective Steel Cap Elevation (feet)
Lehr Associates					
Date and Time of Completion	Inspector				Top of Riser Pipe Elevation (feet)
5/10/94	B. Mahoney				378.52

CONSTRUCTION DETAILS

Generalized Soil Description	*Elevation	**Depth
	378.79	0.0
Brown, f/SAND, trace-some silt	378.52	0.3
Red, CLAY and SILT, trace-little gravel	345.79	33.0
	342.29	36.5
	269.79	109.0
	259.79	119.0
	248.79	130.0
	238.79	140.0
	237.79	141.0



BOTTOM OF BOREHOLE

REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground

ERM-Northeast

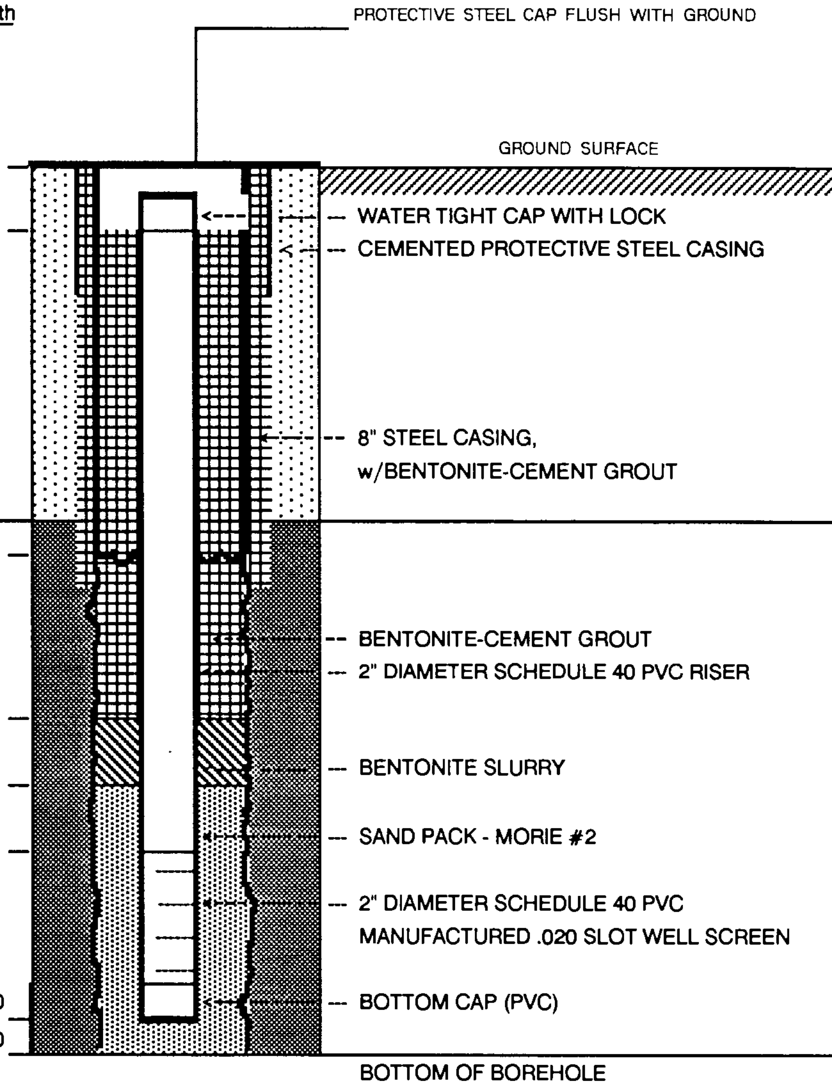
5788 Widewaters Parkway, Dewitt, NY 13214 (315) 445-2554

MONITORING WELL CONSTRUCTION: BR - 2

Project Name & Location	Project No.	Water Level(s) (ft below PVC casing)			Site Elevation Datum (feet)
MMC - Farrell Road Plant	**557.044.01**	Date	Time	Level (feet)	
Drilling Company: Aquifer Drilling & Testing	Foreman: M. Adams				Ground Elevation (feet): 372.40
Surveyor: Lehr Associates					Top of Protective Steel Cap Elevation (feet):
Date and Time of Completion:	Inspector: B. Mahoney				Top of Riser Pipe Elevation (feet): 372.06

CONSTRUCTION DETAILS

Generalized Soil Description	*Elevation	**Depth
	372.40	0.0
Brown, f/SAND, trace-some silt	372.06	0.3
Red, CLAY and SILT, trace-little gravel	340.50	31.9
	336.40	36.0
	300.40	72.0
	290.40	82.0
	282.40	90.0
	272.40	100.0
	269.40	103.0



REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground

ERM-Northeast

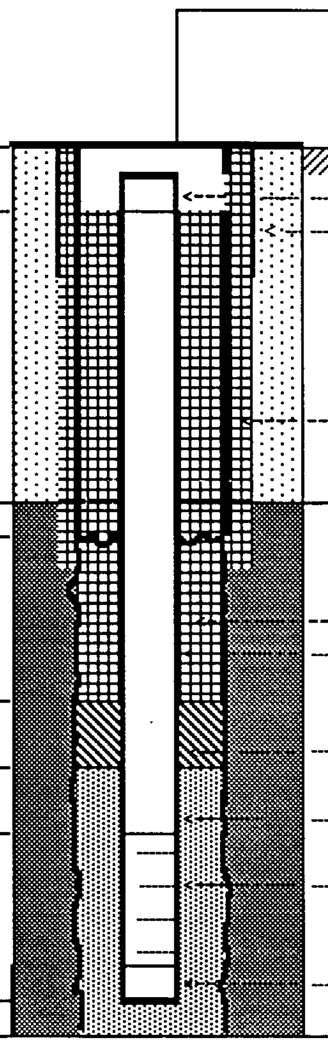
5788 Widewaters Parkway, Dewitt, NY 13214 (315) 445-2554

MONITORING WELL CONSTRUCTION: BR-3

Project Name & Location	Project No.	Water Level(s) (ft below PVC casing)			Site Elevation Datum (feet)
MMC - Farrell Road Plant	**557.044.01**				
Drilling Company: Aquifer Drilling & Testing	Foreman: M. Adams	Date	Time	Level (feet)	Ground Elevation (feet): 378.18
Surveyor: Lehr Associates					Top of Protective Steel Cap Elevation (feet)
Date and Time of Completion: 5/16/94	Inspector: B. Mahoney				Top of Riser Pipe Elevation (feet): 377.85

CONSTRUCTION DETAILS

Generalized Soil Description	*Elevation	**Depth
	378.18	0.0
	377.68	0.5
Brown, f/SAND, trace-some silt		
Red, CLAY and SILT, trace-little gravel	334.18	44.0
	329.18	49.0
	307.18	71.0
	297.18	81.0
	288.18	90.0
	278.18	100.0
	275.18	103.0



REMARKS

* Elevation (feet) above mean sea level unless noted

** Depth in feet below ground

APPENDIX B

SEDIMENT SAMPLE RECORDS

ERM

SOIL SAMPLE RECORD

JSF

Job Number: 557.~~04~~4.01

Sample ID: FRP - CB - 01

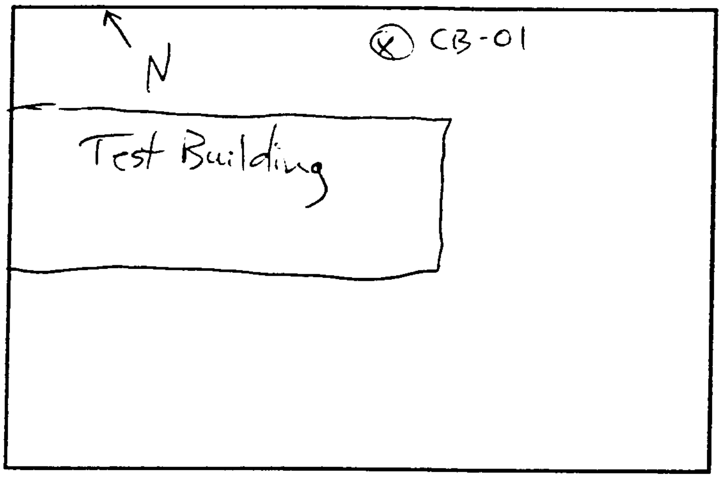
Laboratory No.: AES

Date: 4/25/94

Time: 1610

Sampler: JSF

Sample Location



Description: FRP - CB - 01

< 1 inch sediment depth (ave)

CB = 4.1' diameter

Sample Method

stainless steel scoop

Sample Description

Color: Brown

Structure: NA

Moisture: Wet

Grain Size: Med - crs. sand, some brown - gray gravel, trace brown silt
Also gravel-size concrete and asphalt debris, nuts and bolts

Weather

Precipitation: none

Wind: light and variable

Temperature: ≈ 70°F, humid

Comments:

- PID (HNU) 0 ppm above background (≈ 0.5 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

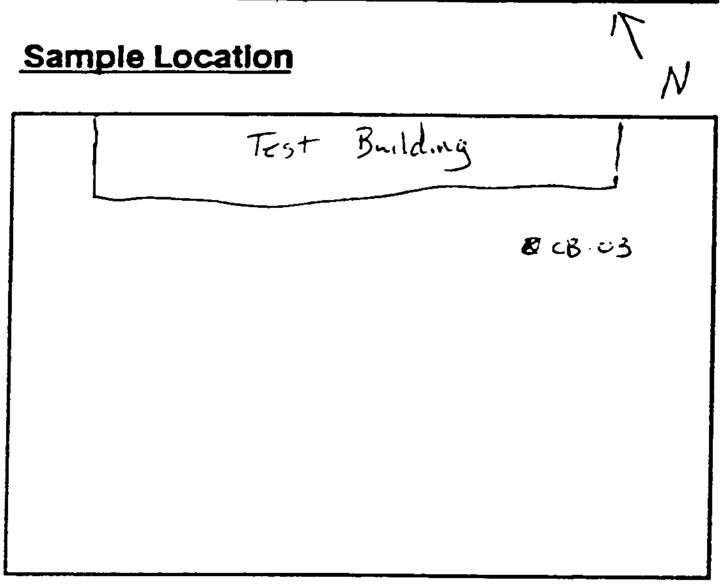
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-03
Laboratory No.: AES

Date: 4/27/94
Time: 0915
Sampler: JSF

Sample Location



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Brown fine to coarse subrn SAND, little brownish-gray fine suban. gravel,
~~Structure~~: trace brown silt, trace plant (?) debris (organics)
Moisture: wet / saturated
Grain Size:

Weather

Precipitation: none
Wind: SW + var, est 10-15 mph.
Temperature: ± 70°F

Comments:

- catch basin diameter = 3.1'
- sediment depth = < 1 inch
- PID reading = 0 ppm above background (= 0.3 ppm)

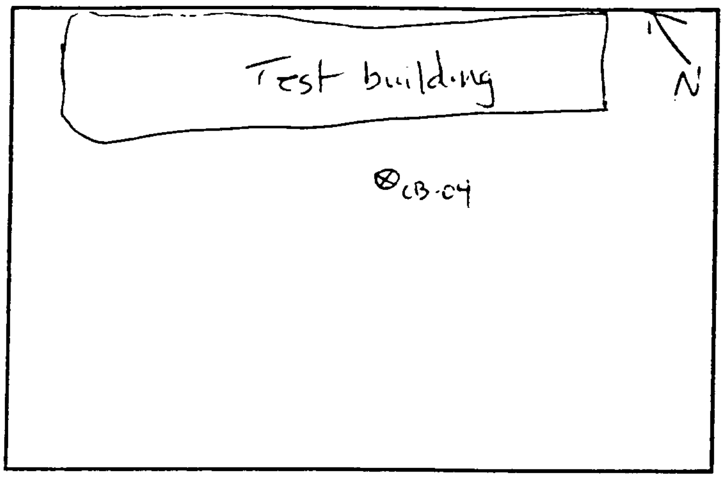
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-04
Laboratory No.: AES

Date: 4/27/94
Time: 0945
Sampler: JSF

Sample Location



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Dark Brown fine to coarse subrn SAND, trace dark gray fine ang. gravel,
~~Structure:~~ trace brown silt, trace plant debris
Moisture: wet/saturated
Grain Size:

Weather

Precipitation: none
Wind: WSW, est. 10-15 mph
Temperature: ± 75°F

Comments:

- catch basin diameter = 3.1'
- sediment depth = < 1 inch
- PID reading = 0 ppm above background (= 0.4 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557 044.01

Sample ID: FRP-CB-05

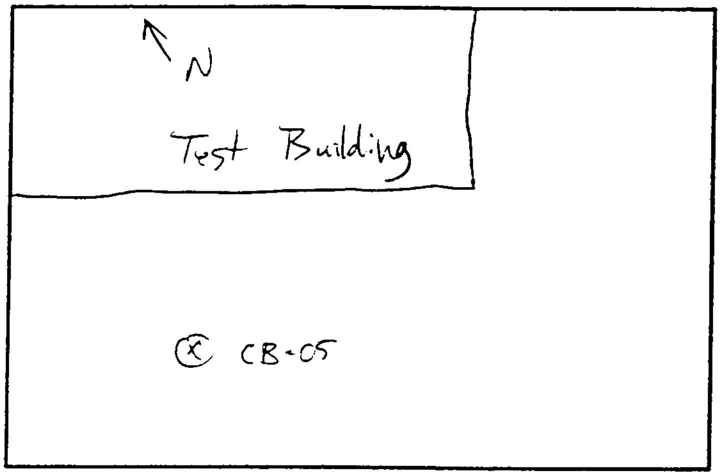
Laboratory No.: AES

Date: 4/26/94

Time: 0830

Sampler: JSF

Sample Location



Description: sediment from catch basin

Sample Method

stainless steel scoop

Sample Description

Color: Brown fine to coarse SAND, little fine subrd. gravel, trace brown silt

Structure: also trace sand-size asphalt

Moisture: saturated

Grain Size:

Weather

Precipitation: none

Wind: light, SW, est. 5 mph.

Temperature: ± 65°F

Comments:

- negligable sediment volume
- catch basin diameter = 4.1'
- PID reading = 0 ppm above background (0 ppm).

NEC:E:\SFORMS\SOILSAM.XLS

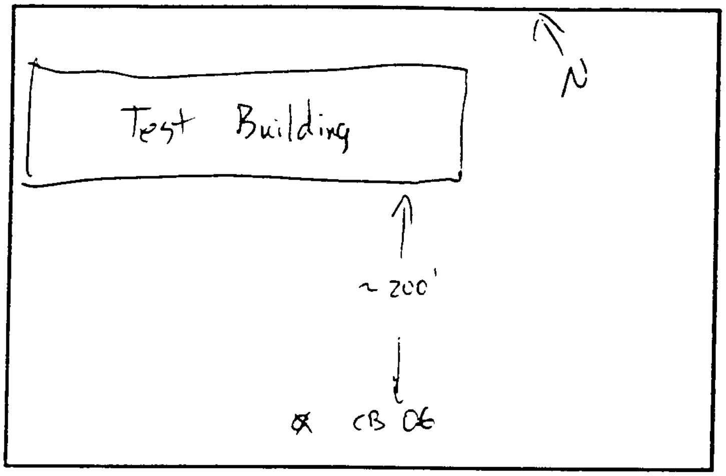
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP CB-06
Laboratory No.: AES

Date: 4/26/94
Time: 0855
Sampler: TSF

Sample Location



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Brownish-gray fine to coarse SAND, little light gray fine gravel, trace brown silt
~~Structure:~~ fine gravel (angular) brick-red clasts of brick in sample
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: SW est 5 mph
Temperature: ± 65 °F

Comments:

- catch basin diameter = 4.1'
- sediment depth = neglible
- PID reading = 0 ppm (background = 0 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

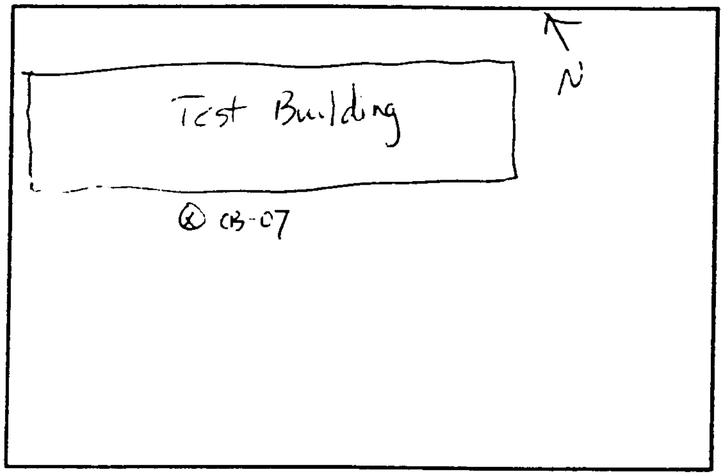
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP - CB - 07
Laboratory No.: AES

Date: 4/26/94
Time: 0915
Sampler: JSF

Sample Location



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Brown-tan fine to coarse SAND, little gray subangular fine gravel, little brown silt,
Structure: little brick-red fine angular gravel-size brick fragments
Moisture: wet
Grain Size:

Weather

Precipitation: none
Wind: SW est. 5 mph.
Temperature: ± 65°F

Comments:

- catch basin diameter = 4.1'
- sediment depth = < 1 inch
- PID reading = 0 ppm above background (0.2 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557 044.01
Sample ID: FRP - DUPE - 01 (CB - 07)
Laboratory No.: AES

Date: 4/26/94
Time: 0935 (put 1800 on vials)
Sampler: JSF

Sample Location

Same as CB-07
(front of test building)

Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Brown - tan fine to coarse SAND, little gray subangular fine gravel, little brown silt
Structure: little brick-red fine angular gravel-size brick fragments
Moisture: wet
Grain Size:

Weather

Precipitation: none
Wind: SW est. 5 mph.
Temperature: ± 65°F

Comments:

Came from Same catch basin as CB-07

ERM

SOIL SAMPLE RECORD

Job Number: 557 044.01

Sample ID: FRP - CB - C8

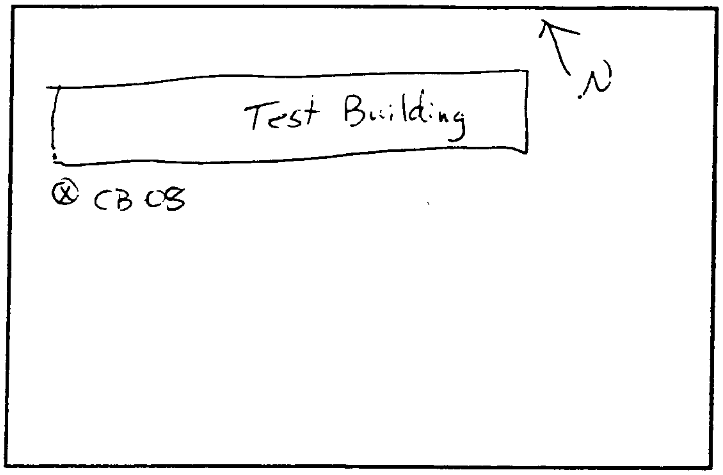
Laboratory No.: AZS

Date: 4/26/94

Time: 1010

Sampler: JSF

Sample Location



Description: catch basin sediment sample

Sample Method

stainless steel spoon

Sample Description

Color: Brown fine to coarse SAND, little brown silt, trace gray fine ang. gravel,

~~Structure~~: trace organics (plants and plant debris

Moisture: wet

Grain Size:

Weather

Precipitation: none

Wind: SW est. 5 mph.

Temperature: ≈ 70°F

Comments:

- catch basin diameter = 4.1'
- sediment depth = 2" (ave.)
- PID reading = 0.3 ppm above background (0 ppm)
- took photo # 2 of CB-08 w/ radio next to it.

NEC:E:\SFORMS\SOILSAM.XLS

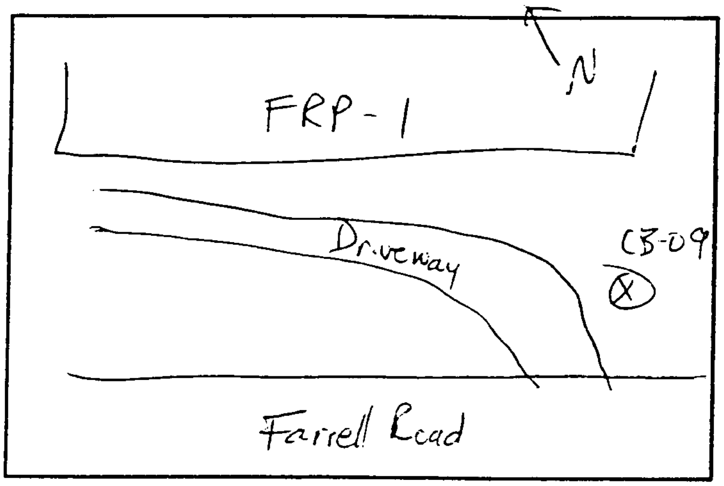
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-09
Laboratory No.: AES

Date: 4/26/94
Time: 1130
Sampler: JSF

Sample Location



Description: catch basin sediment

Sample Method

Stainless steel spoon

Sample Description

Color: Brown SILT and very fine brown SAND, some red fine subangular Gravel
~~Structure:~~ (brick fragments), trace organics (plant debris, annelids).
Moisture: wet
Grain Size:

Weather

Precipitation: none
Wind: SW est. 5 mph.
Temperature: ± 75°F

Comments:

catch basin diameter = 2.2' (square catch basin)
sediment depth = 1.0'
PID reading = 0 ppm above background (0 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

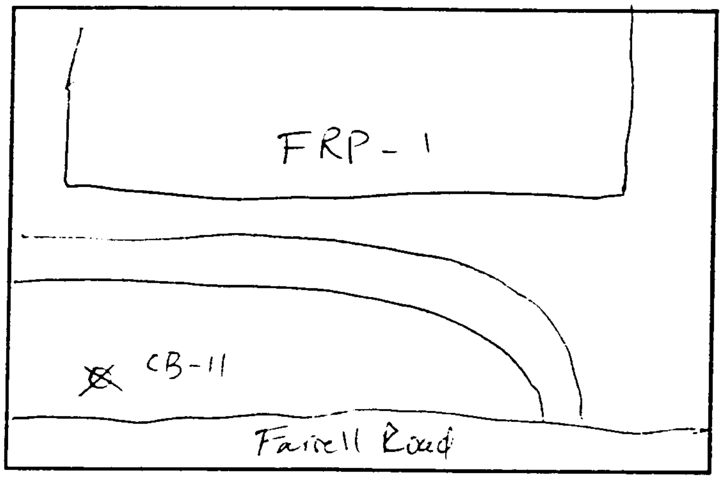
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-11
Laboratory No.: AES

Date: 4/26/94
Time: 1205
Sampler: JSF

Sample Location



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Brown SILT, little very fine brown sand, little red fine subangular gravel
~~Structure:~~ (brick fragments); trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: light and variable, est. < 5 mph.
Temperature: ± 75 °F humid

Comments:

catch basin dimensions - 2.2'
sediment depth - 0.4'
PID reading = 0 ppm above background (0 ppm).

NEC:E:\SFORMS\SOILSAM.XLS

ERM

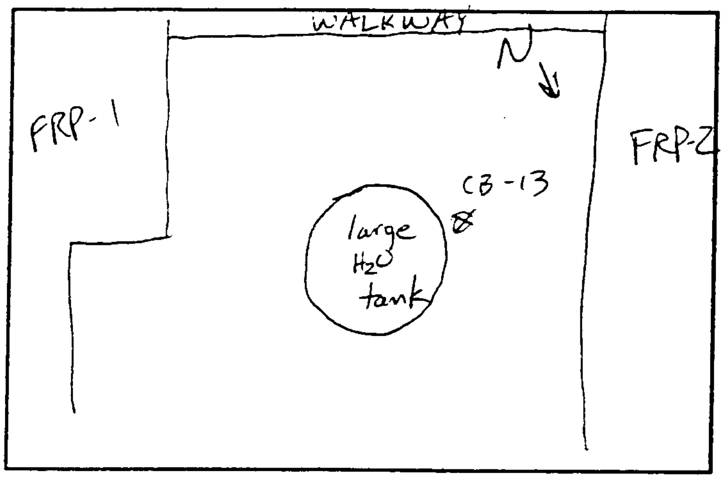
SOIL SAMPLE RECORD

Job Number: 557 044.01
Sample ID: FRP-CB-13
Laboratory No.: AES

Date: 4/26/94
Time: 1345
Sampler: JSF

Sample Location

not to scale



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Grayish-brown fine to course subrn SAND, trace gray fine subrn. gravel,
~~Structure~~: trace plant debris, nuts and bolts, coins, etc.
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: light and variable, est. ~5 mph.
Temperature: ± 80°F

Comments:

- catch basin diameter = ~~4.1~~ JSF 2.1'
- sediment depth = 0.8'
- PID reading = 0.2 ppm above background (0.2 ppm)
- 4" standing water in catch basin; slight sheen on water surface

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

JSF

Job Number: 557.0~~4~~4.01

Sample ID: FRP-CB-13 MS/MSD

Laboratory No.: AES

Date: 4/26/94

Time: 1430

Sampler: JSF

Sample Location

same as CB-13

Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Grayish-brown fine to coarse SAND, trace gray fine subrn. gravel,

~~Structure:~~ trace plant debris, nuts and bolts

Moisture: saturated

Grain Size:

Weather

Precipitation: very light rain, may be approaching thunderstorm

Wind: variable, gusting 10-20 mph

Temperature: ± 80°F

Comments:

catch basin, sediment depth, and PID readings same as CB-13

Thunderstorm @ 1440, work stopped

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01

Sample ID: FRP-CB-15

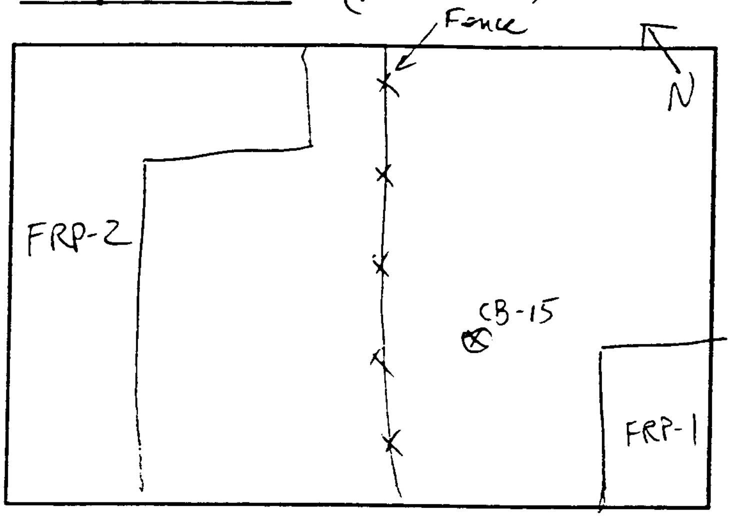
Laboratory No.: AES

Date: 4/21/94

Time: 1025

Sampler: JSF

Sample Location (not to scale)



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Dark brown fine to coarse subang - subrn SAND, little dark gray fine subang.

~~Structure~~: gravel, trace plant debris

Moisture: saturated

Grain Size:

Weather

Precipitation: none (overcast)

Wind: SW - WSW est 10-15 mph

Temperature: ± 75 °F

Comments:

- catch basin diameter = 2.1'
- sediment depth: < 1 inch
- PID readings = ppm above background (= 0. ppm)
- 14" standing water in catch basin

NEC:E:\SFORMS\SOILSAM.XLS

ERM

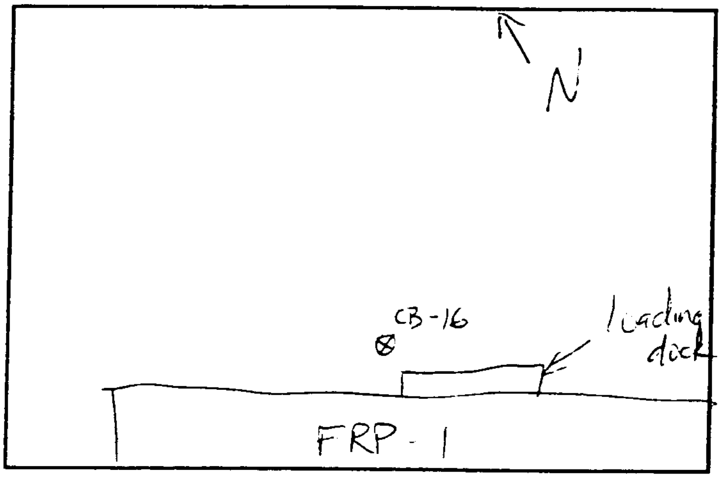
SOIL SAMPLE RECORD

Job Number: 557.C44.01
Sample ID: FRP-CB-16
Laboratory No.: AES

Date: 4/26/94
Time: 1535
Sampler: JSF

Sample Location

not to scale



Description: catch basin sediment

Sample Method

stainless steel spoon

Sample Description

Color: Grayish-brown medium to coarse SAND and gray fine angular GRAVEL, some brown
~~Structure:~~ SILT, trace plant debris, nuts and bolts
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: light, variable
Temperature: ±85°F

Comments:

- catch basin dimensions - 2.1' (square)
- sediment depth - 2"
- PID reading - 0 ppm above background (0.2 ppm)
- 10" standing water in catch basin; moderate petroleum-like sheen on water surface

NEC:E:\SFORMS\SOILSAM.XLS

ERM

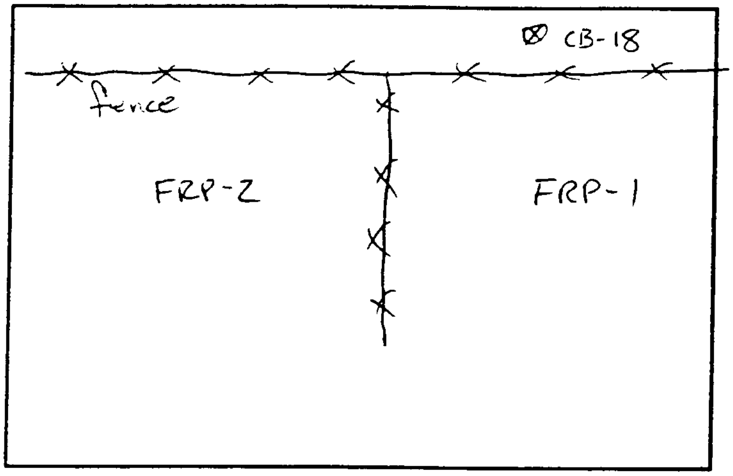
SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-18
Laboratory No.: AES

Date: 4/27/94
Time: 1230
Sampler: JSF

Sample Location

N



Description: catch basin sediment

NOTE: catch basin buried under ~6" of native soil.

Sample Method

stainless steel spoon

Sample Description

Color: Dark Brown fine to coarse subrn. SAND, little dark gray fine subang.
~~Structure:~~ gravel, little organics (plant debris) little red fine brick ~~clots~~ fragments JSF
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: W, est 10-15 mph gusts 20+mph
Temperature: ± 80°F

Comments:

JSF
~~sediment~~ catch basin diameter = 3.1'
sediment depth = 2"
PID reading = 0 ppm above background (= 0.4 ppm)
10" standing water in catch basin

NEC:E:\SFORMS\SOILSAM.XLS

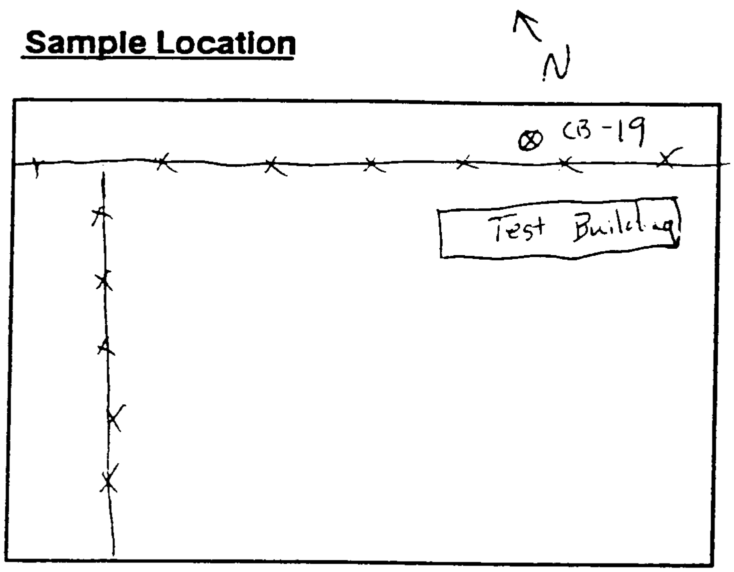
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-CB-19
Laboratory No.: AES

Date: 4/27/94
Time: 1450
Sampler: JSF

Sample Location



Description: catch basin sediment

NOTE: very little sediment mostly plant debris.

Sample Method

stainless steel spoon

Sample Description

Color: Dark Brownish-gray ORGANIC SILT and ORGANIC SAND
~~Structure:~~
Moisture: wet/saturated
Grain Size:

Weather

Precipitation: none
Wind: SW - W est 25-30 mph.
Temperature: ± 80°F

Comments:

catch basin diameter = 3.1'
sediment depth = < 1 inch (very little)
PID reading - 0 ppm above background (0.4 ppm)
no standing water

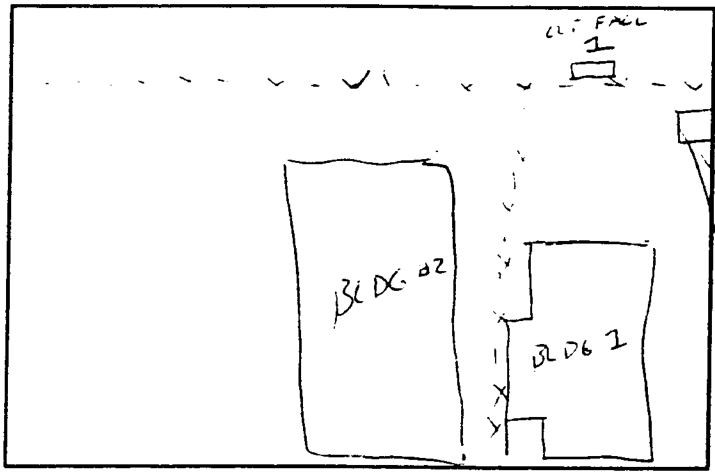
ERM

SOIL SAMPLE RECORD

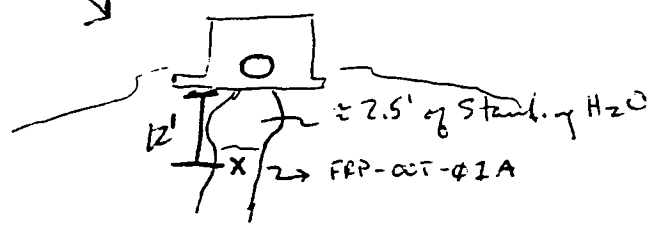
Job Number: 557.044.01
Sample ID: FRP-OUT-01A
Laboratory No.:

Date: 2MAY94
Time: 1500
Sampler: W. MAHONEY

Sample Location



Description: Outfall #1 Sediment surface sample 12' from mouth of Outfall



Sample Method

Stainless steel spoon

Sample Description

Color: DK Brown
Structure: NONE
Moisture: ~~[illegible]~~ SATURATED
Grain Size: f Sands, ~~silt clay~~ medium, course to med sand - red brick fragments

Weather

Precipitation: None
Wind: 10-15 out of W-NW
Temperature: 50°F

Comments:

Analysis: TCL VOA, TCL SVOC, TAL METALS
TCL Cyanide, TCL Pesticide / ~~PE~~ PCBs

NEC:E:\SFORMS\SOILSAM.XLS

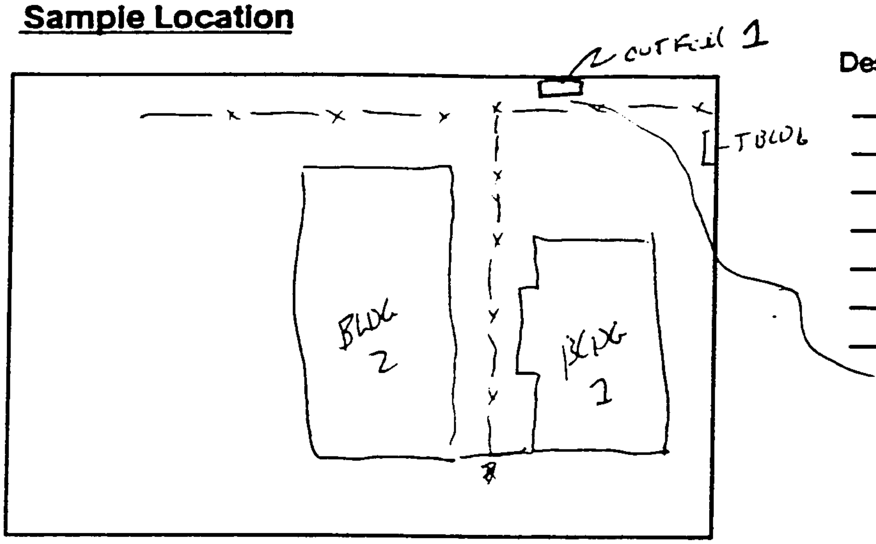
ERM

SOIL SAMPLE RECORD

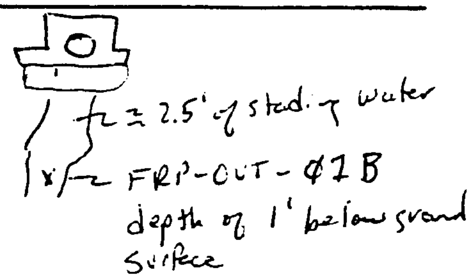
Job Number: 557.644.01
Sample ID: FRP-OUT-Ø1B
Laboratory No.:

Date: 2 MAY 1994
Time: 1515
Sampler: W. MAHONEY

Sample Location



Description: OUTFALL #1 Sediment at a depth of 1' below ground surface



Sample Method

Stainless long handled spoon

Sample Description

Color: Dk Brown
Structure:
Moisture: Saturated
Grain Size: silt + clay, f sand, little med/coarse sands

Weather

Precipitation: NONE
Wind: N-NW - 10-15 mph
Temperature: 50-55°

Comments:

Analysis: TCL VOA, TCL SVOC, TAL METALS
TCL Cyanide, TCL Pesticide/PCBs

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557.~~06~~ 044 .01

Sample ID: FRP-OUT-Ø1C

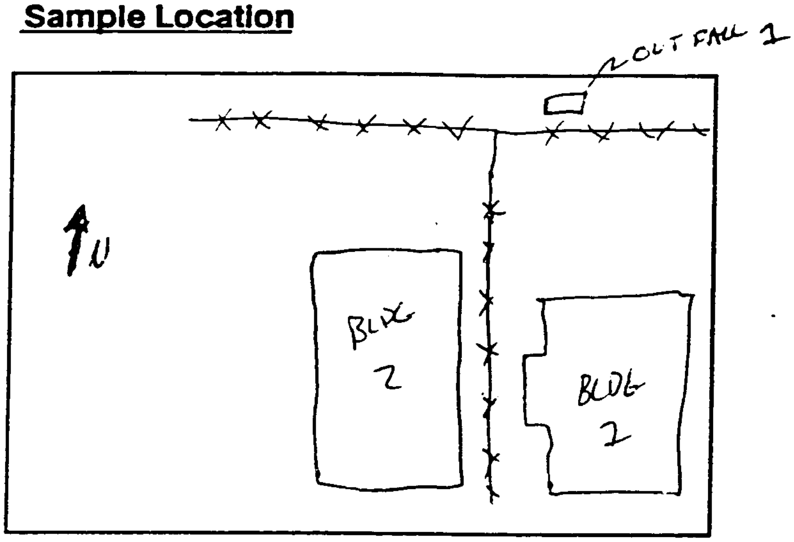
Laboratory No.:

Date: 2 MAY 1994

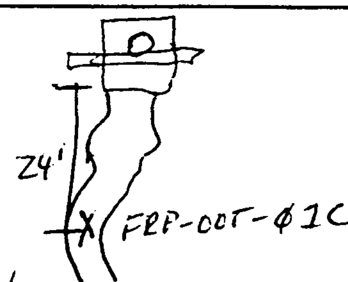
Time: 1545

Sampler: W. MAHONEY

Sample Location



Description: Sediment from OUT FALL #1



Sample Method

~~Stai~~ Stainless Steel Spoon/Scapula

Sample Description

Color: DK Brown

Structure:

Moisture: Saturated

Grain Size: Med/Coarse Sand, some f Sand, trace silt + clay (brick fragments)

Weather

Precipitation: NONE

Wind: N-NW - 10-15

Temperature: 50-55°F

Comments: Analysis: TCL VOA, TCL SVOC, TAL METAL TAL Cyanide, TCL PESTICIDE/PCB

ERM

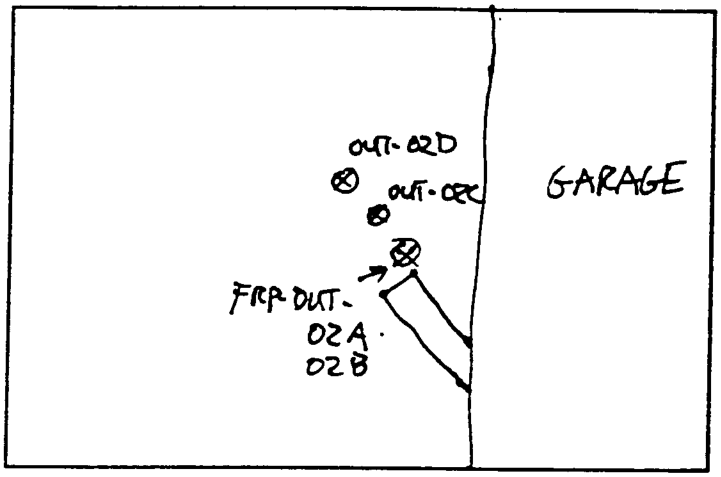
SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP ~~05~~-02A
Laboratory No.: AES

Date: 4/29/94
Time: 1040
Sampler: JSF

Sample Location

N



Description: outfall sediment surface sample

Sample Method

stainless steel spoon

Sample Description

Color: Brown very fine subrn. SAND and SILT, trace plant debris and roots,
Structure: trace gray fine subrn. gravel
Moisture:
Grain Size: saturated

Weather

Precipitation: light rain
Wind: light/var.
Temperature: ± 60 °F

Comments:

PID reading = 0 ppm above background (0.2 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-02B
Laboratory No.: AES

Date: 4/29/94
Time: 1050
Sampler: JSF

Sample Location

See sheet for FRP-OUT-02A

Description: outfall sediment 1 foot below FRP-OUT-02A

Sample Method

stainless steel spoon

Sample Description

Color: Brown very fine subrn SAND and SILT, little dark gray fine
~~Structure:~~ subrn. sand, trace gray fine ang. gravel, trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: mod. rain
Wind: calm
Temperature: ± 60°F

Comments:

PID reading = 0 ppm above background (0.2 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01

Sample ID: FRP-OUT-02C

Laboratory No.: AES

Date: 4/29/94

Time: 1100

Sampler: JSF

Sample Location

See sheet for FRP-OUT-02A

Description: outfall sediment surface sample approx. 5' down from outfall

Sample Method

Stainless steel spoon

Sample Description

Color: Brown v. fine subrn. SAND and SILT, little dark gray fine

Structure: subrn. sand, trace gray fine suban.-ang. gravel trace plant debris

Moisture: saturated

Grain Size:

Weather

Precipitation: light rain

Wind: calm

Temperature: ± 60°F

Comments:

PID reading = 0 ppm above background (0.2 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-02D
Laboratory No.: AES

Date: 4/29/94
Time: 1110
Sampler: JSF

Sample Location

See sheet for FRP-OUT-02D

Description: outfall sediment surface sample ~10' down from outfall (down stream)

Sample Method

stainless steel spoon

Sample Description

Color: Brown SILT and v. fine subrn. SAND, little dark gray v. fine
~~Structure:~~ subrn. sand, little gray fine subrn. gravel, trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: mod. rain / thunderstorm @ 1110
Wind: variable, 5-10 mph.
Temperature: ± 60 °F

Comments:

PID reading = 0 ppm above background (0.2 ppm)

NEC:E:\SFORMS\SOILSAM.XLS

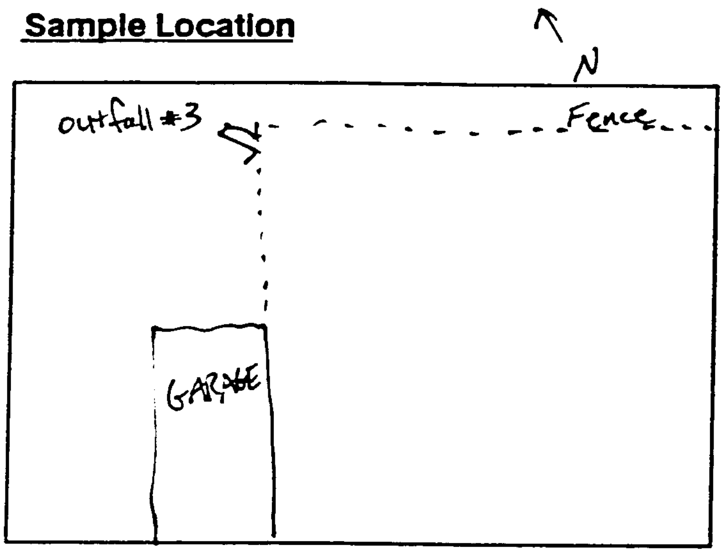
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-03A
Laboratory No.: AES

Date: 4/29/94
Time: 1340
Sampler: JJF

Sample Location



Description: outfall sediment surface sample

Sample Method

stainless steel spoon/scoopula

Sample Description

Color: Brown to gray med to coarse subrn SAND, some gray fine sub an.
Structure: Gravel, trace brown silt, trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: W, est. 10 mph.
Temperature: ± 60°F

Comments:

PID reading = 0.1 ppm above background (0.1 ppm)

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-03B
Laboratory No.: AES

Date: 4/29/94
Time: 1325
Sampler: JJF

Sample Location

See sheet for FRP-OUT-03A

Description: outfall sediment

1' below surface sediment at FRP-OUT-03A

Sample Method

stainless steel spoon

Sample Description

Color: orange-brown SILT and v. fine SAND, trace fine ang. gravel,
Structure: trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: W, est. 10 mph.
Temperature: ± 60°F

Comments:

- PID reading = 0 ppm above background (0.1 ppm).

ERM

SOIL SAMPLE RECORD

Job Number: 557044.01
Sample ID: FRP-OUT-03C
Laboratory No.: AES

Date: 4/29/94
Time: 1355
Sampler: JSF

Sample Location

See sheet for
FRP-OUT-03A

Description: outfall sediment
located 12' (straight line) from ~~in~~ JSF outfall pipe (intersection of 12' radius and stream).

Sample Method

stainless steel spoon

Sample Description

Color: Brown to gray coarse subrn. SAND, little gray to dark gray subang
Structure: gravel, trace plant debris
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: W est. 10-15 mph.
Temperature: ± 60 °F

Comments:

- PID reading = 0 ppm above background (0.1 ppm).

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01

Sample ID: FRP-OUT-Ø4

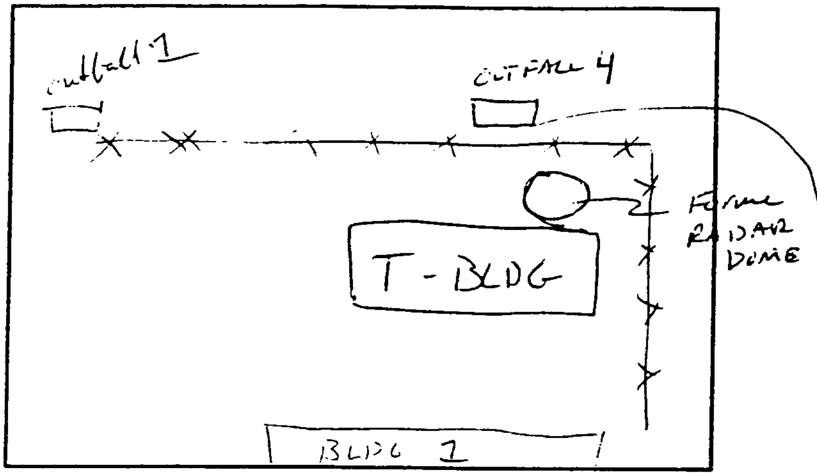
Laboratory No.:

Date: 2 MAY 94

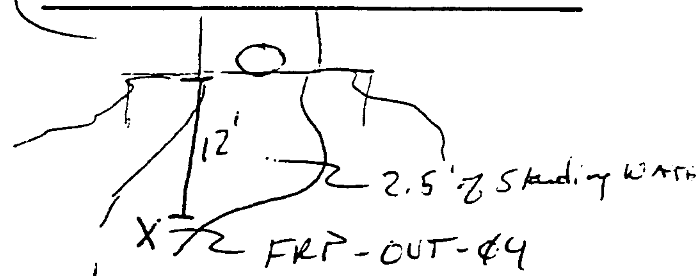
Time: 1610

Sampler: W. MAHONEY

Sample Location



Description: Outfall # 4 sediment sample taken at surface 12' from mouth of outfall



Sample Method

Stainless Steel spoon / scapula

Sample Description

Color: Brown

Structure:

Moisture: Wet

Grain Size: F SAND, ~~[illegible]~~ some M/C Sand, little silt+clay (brick fragments

Weather

Precipitation: ~~Sunny, PRTY Clo~~ warm NONE

Wind: 10-15 N-NW

Temperature: 50°-55°

Comments:

Analysis: TCL VOA, TCL SVOC, TAL METAL
TAL CYANIDE, TCL PESTICIDE / PCB

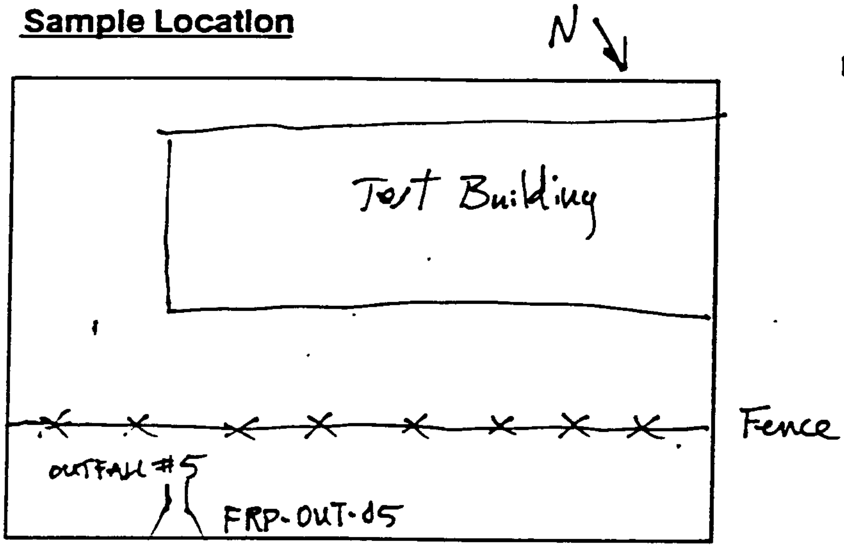
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-05
Laboratory No.: AES

Date: 4/29/94
Time: 1700
Sampler: JSF

Sample Location



Description: outfall sediment surface sample

Sample Method

stainless steel spoon

Sample Description

Color: Brown to gray fine to coarse subrn SAND, trace red sand-size
~~Structure~~: brick fragments, trace plant debris and roots
Moisture: wet/saturated
Grain Size:

Weather

Precipitation: none
Wind: S-SW, est 10-20 mph.
Temperature: ± 70°F

Comments:

PID reading = 0 ppm above background (0.2 ppm).

ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01

Sample ID: FRP-OUT-06

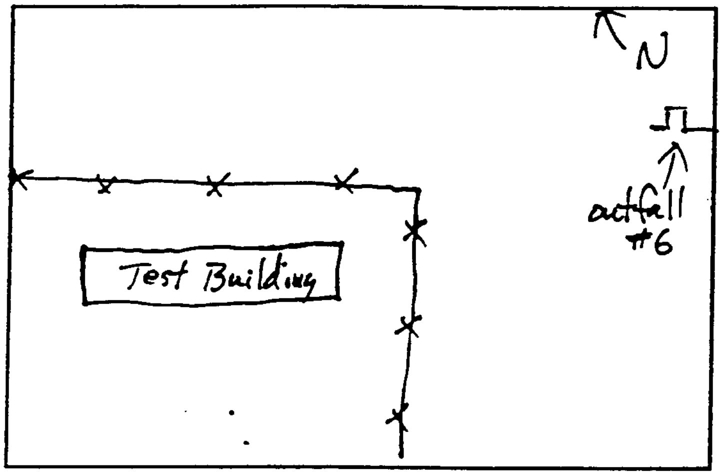
Laboratory No.: AES

Date: 4/29/94

Time: 1600

Sampler: JSF

Sample Location



Description: outfall sediment surface sample

Sample Method

stainless steel spoon

Sample Description

Color: Brown fine to med. subrn. SAND, trace red fine to coarse sand-size

~~Structure~~: brick frags., trace plant debris

Moisture: saturated

Grain Size:

Weather

Precipitation: none

Wind: S, est. 15 mph.

Temperature: ± 70°F

Comments:

PID reading - 0 ppm above background (0.2 ppm).

NEC:E:\SFORMS\SOILSAM.XLS

ERM

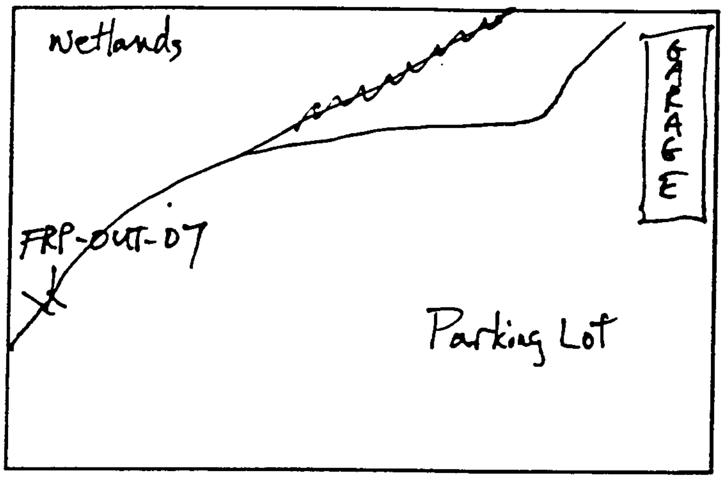
SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP OUT - 07
Laboratory No.: AES

Date: 4/29/94
Time: 0955
Sampler: JSF

Sample Location

NOT TO SCALE



Description: outfall sediment surface sample

Sample Method

stainless steel spoon and scoopula

Sample Description

Color: Brown to gray coarse rounded SAND and gray fine rounded GRAVEL,
~~Structure~~: trace plant debris (sat., loose)
Moisture: saturated
Grain Size:

Weather

Precipitation: mod. rain
Wind: light/var.
Temperature: ± 55°F

Comments:

PID reading = 0.4 ppm above background (0 ppm)

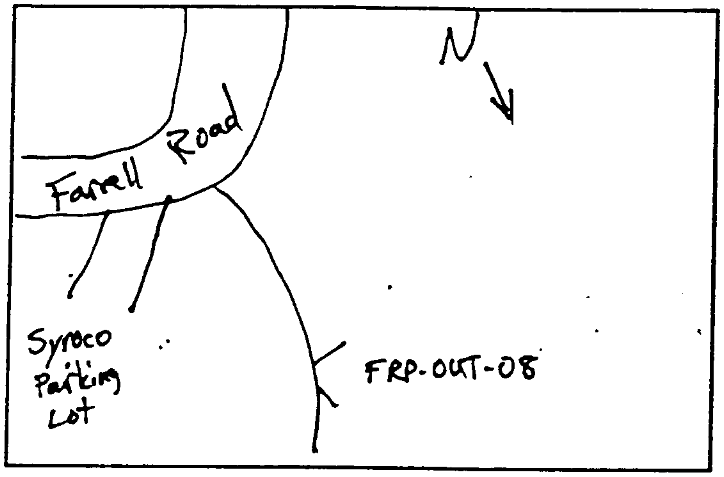
NOTE: ~~D~~ JSF FRP-DUPE-04 taken here @ 1010
Photo #5 (CAM2) taken here

SOIL SAMPLE RECORD

Job Number: 557,044,01
Sample ID: FRP-OUT-08 JSF
Laboratory No.:

Date: 4/29/94
Time: 0910
Sampler: JSF

Sample Location



Description: outfall sediment surface sample

Sample Method

stainless steel spoon

Sample Description

Color: Brown SILT, little gray fine rounded gravel, trace brown very fine sand,
Structure: trace organics (plant debris)
Moisture: wet/saturated
Grain Size:

Weather

Precipitation: light rain
Wind: light/var.
Temperature: ± 50°F

Comments:

- PID reading = 0 ppm above background (0 ppm)

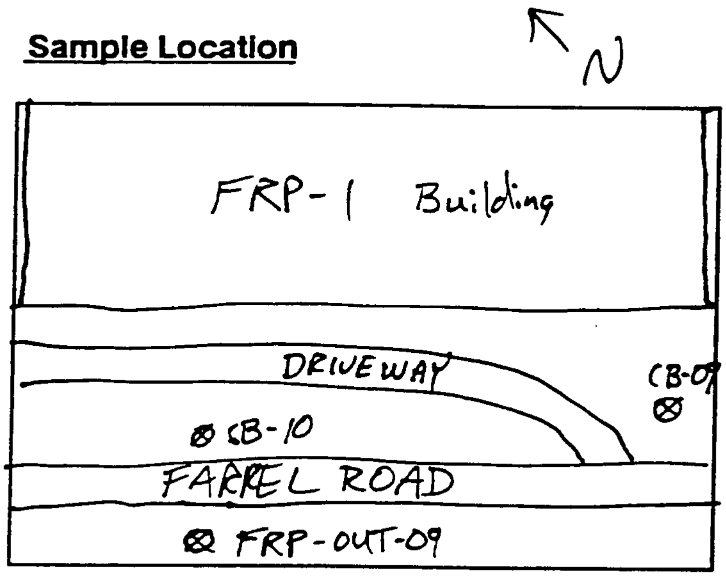
ERM

SOIL SAMPLE RECORD

Job Number: 557.044.01
Sample ID: FRP-OUT-09
Laboratory No.: 425

Date: 4/29/94
Time: 1510
Sampler: JSF

Sample Location



Description: catch basin, listed as outfall sampling point #9 on Plate 3

Sample Method

stainless steel spoon

Sample Description

Color: Brown v. fine SAND and SILT, some gray fine ang. gravel, some
Structure: red fine angular brick frags., little organics (plant debris)
Moisture: saturated
Grain Size:

Weather

Precipitation: none
Wind: var. but mostly SW to S, est. 10 mph.
Temperature: ± 65 °F

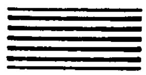
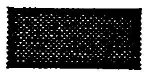
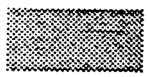
Comments:

- PID reading = 0 ppm above background (0 ppm)
- 10" standing water in catch basin
- sediment depth = 4"

NEC:E:\SFORMS\SOILSAM.XLS

MARTIN MARIETTA CORPORATION
FARRELL ROAD PLANT
ACCELERATED RI/FS TASKS BORING LOGS

GRAPHIC LOG PATTERNS LEGEND

Pattern	Texture/Formation
	Organic Soils/Sediments
	Clay
	Silt
	Sand
	Gravel
	Concrete

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-1

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1445 Date & time completed: 10-26-93, 1545	
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		14	0	SM		Dark brown very fine SAND, some brown Silt, little organic matter (moist, medium dense)	TCL VOCs/TOC Sample
1.5–2.0			0	ML		Brown to light brown very fine SANDY SILT, trace brown clay (damp, medium stiff)	plant roots protrude through core TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-2

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-27-93, 1145	Date & time completed: 10-27-93, 1210
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: ESP
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5		24	0	SM		Dark brown organic fine SAND, (moist, loose)	TCL VOCs/TOC Sample
1.0			0	SM		Same as above grading towards lighter brown	less organics from 0.5' - 1.0'
1.5			0	SM		Light brown to reddish-brown very fine SAND, little brown silt (moist-saturated, medium dense)	TCL VOCs/TOC Sample moist above 1.5'
2.0							towards saturated below 1.5' (approximate water table)
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-3

Project Name & Location	Project Number	Date & time started:	Date & time completed:
MARTIN MARIETTA-FRP	557.008.02	10-27-93, 1211	10-27-93, 1230

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	B. Spizuoco	NA	Manual	ESP

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
	2.0	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet): Date / Time / Depth
Wetlands north of FRP-2	Swamp	NA

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		24	0	SM		Brown very fine SAND and SILT, trace plant debris (damp, medium dense)	**TCL VOCs/TOC Sample**
1.5–2.0			0	SM		Same as above	**TCL VOCs/TOC Sample**
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-4

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-27-93, 1310 Date & time completed: 10-27-93, 1350	
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: ESP
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands north of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time: ; Depth:	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		24	0	SM		Brown very fine SAND and SILT, trace plant debris (damp, medium dense)	**TCL VOCs/TOC Sample**
1.5–2.0			0	SM		Same as above except saturated	water table @ 1.0' **TCL VOCs/TOC Sample**
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-5

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-27-93, 1355	Date & time completed: 10-27-93, 1420
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual / Sampler: ESP
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0		Inspector(s): B. Spizuoco/J. Fox
Location: Wetlands north of FRP-2	Surface Description: Swamp		Water Levels (Feet): Date NA / Time / Depth

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		24	0	SM		Brown very fine SAND and SILT, trace plant debris (damp, medium dense)	TCL VOCs/TOC Sample
1.5–2.0			0	SM		Light brown fine SAND, trace plant debris (damp, medium dense)	TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: SS-6

Project Name & Location	Project Number	Date & time started: 10-27-93, 1423
MARTIN MARIETTA-FRP	557.008.02	Date & time completed: 10-27-93, 1445

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	B. Spizuoco	NA	Manual	Sediment Corer

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
	2.0	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet): Date / Time / Depth
Wetlands northwest of FRP-2	Swamp	NA

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		12	0	ML		Dark brown SILT, some Plant debris (saturated, soft)	TCL VOCs/TOC Sample
1.5–2.0			0	ML		Same as above except wet	DUPLICATE-1 TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'

ERM-Northeast

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LOG OF BORING: SS-7

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-27-93, 1447 Date & time completed: 10-27-93, 1515
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA; Method: Manual; Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox
Location: Wetlands north of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time: ; Depth:

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		9	0	OL		Dark brown ORGANIC SILT, (saturated, soft)	TCL VOCs/TOC Sample
1.5–2.0			0	OL		Same as above	TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

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LOG OF BORING: SS-8

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1635	Date & time completed: 10-26-93, 1720
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual / Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date / Time / Depth: NA	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		10	0	OL		Dark brown ORGANIC SILT, (saturated, soft)	**TCL VOCs/TOC Sample**
1.5–2.0			0	ML		Dark brown SILT, little plant debris (saturated, medium stiff)	**TCL VOCs/TOC Sample**
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

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LOG OF BORING: SS-9

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1545	Date & time completed: 10-26-93, 1630
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		12	0	OL		Dark brown ORGANIC SILT (saturated, soft)	TCL VOCs/TOC Sample
1.5–2.0			0	ML		Dark brown SILT, little plant debris (saturated, medium stiff)	TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

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LOG OF BORING: SS-10

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1220 Date & time completed: 10-26-93, 1250	
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		9.5	0	ML		Dark brown SILT, some Plant Roots, little brown clay, little brown fine sand (saturated, medium stiff)	TCL VOCs/TOC Sample
1.5–2.0			0	SM		Dark brown fine SAND and SILT, little plant roots and debris (moist, medium dense)	TCL VOCs/TOC Sample
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

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LOG OF BORING: SS-11

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1405	Date & time completed: 10-26-93, 1440
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		14	0	SM		Brown to dark brown fine SAND and SILT, little plant debris (damp, dense)	**TCL VOCs/TOC Sample**
1.5–2.0			0	ML		Light brown to gray CLAYEY SILT, trace plant debris, trace light brown fine sand (damp, medium stiff)	**TCL VOCs/TOC Sample** sand at bottom 1" of core
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

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LOG OF BORING: SS-12

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-26-93, 1310	Date & time completed: 10-26-93, 1400
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: Sediment Corer
Elevation and Datum (Feet):	Completion Depth (Feet): 2.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Wetlands northwest of FRP-2	Surface Description: Swamp	Water Levels (Feet): Date: NA; Time: ; Depth:	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background (0 ppm)
0.5–1.0		9	0	ML		Dark brown to black SILT, some Plant Roots and Debris, trace brown clay, trace brown very fine sand (saturated, medium stiff)	**TCL VOCs/TOC Sample**
1.5–2.0			0	ML		Dark brown SILT and fine SAND, some Plant Roots and Debris, trace dark brown clay (moist, medium stiff)	**TCL VOCs/TOC Sample**
2.5							End of Boring @ 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

APPENDIX C

SOIL BORING LOGS

Boring Number B-101

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	4/26/94 - 1426	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/26/94 - 1605	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 381.51	Completion depth: 19'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 9				SURFACE DESCRIPTION: Asphalt	
0						
1		1.2	0.0	4	Red-brown, f/m SAND, some Silt, some Gravel, moist	
				4	Brown, f/SAND, little silt, moist	
2				5		
				5		
3	1	1.6	0.0	3	Brown, f/SAND, little silt, moist	Sample collected for TCL organics.
				3		
4				4		
				5		
5		1.6	0.0	2	Brown, f/SAND, little silt, moist	
				4		
6				3		
				4		
7	2	1.8	0.0	2	Brown, f/SAND, little silt, moist	Sample collected for TCL organics.
				2		
8				3		
				4		
9		1.4	0.0	2	Brown, f/SAND, little silt, wet	
				2		
10						

Boring Number B-101

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				2		
				3		
11		1.7	0.0	WOR	Brown, f/SAND, little silt, wet	
				WOR		
12				WOR		
				WOR		
13		1.8	4.0	3	Brown, f/SAND, little silt, wet	
			59.0	5	Brown-black, f/SAND, little silt, wet	Fuel oil-like odor
14				4		
			17.5	4		
15		2.0	26.0	4	Brown, f/SAND, little silt, wet	Fuel oil-like odor, upper 0.2' of spoon black
				10		
16			0.0	15		
				26	Red, CLAY and SILT, little f/c sand, trace gravel	at 16.9'
17		0.2	0.0	10	Red, CLAY and SILT, little-some, f/c sand, trace gravel, wet, gravel in nose of spoon, subangular, subrounded (quartzite)	
				12		
18				23		
				12		
19						Backfilled w/ cuttings
					Bottom of boring at 19' below ground surface	
20						
21						

Boring Number B-102

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	4/26/94 - 1256
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/46/94 - 1344

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2"OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	381.69	18.6'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 9				SURFACE DESCRIPTION: Asphalt	
0						
1		1.0	0.0	7	Brown, f/SAND, some Silt, dry	Gravel at top 0.2' of spoon
				8		
2				5		
				5		
3	1	1.5	0.0	8	Brown, f/SAND, some Silt, damp	Sample collected for TCL organics
				6		
4				5		
				6		
5	2	1.8	0.0	2	Brown, f/SAND, little silt, moist	Sample collected for TCL organics
				2		
6				3		
				3		
7		1.6	0.0	1	Brown, f/SAND, little silt, wet	
				2		
8				2		
				3		
9		1.5	1.1	3	Brown, f/SAND, little silt, wet	Fuel-like odor, Lower 0.5' of spoon black
			12.0	2		
10						

Boring Number **B-102**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				2		
				3		
11		1.8	32.0	2	Brown-black, f/SAND, little silt, wet	Fuel oil-like odor
				2		
12				1		
				1		
13		1.5	19.0	2	Dk brown, f/SAND, trace silt, wet, (zones of f/sand and silt approximately 0.2' thick thoughout length of spoon)	Fuel oil-like odor
				3		
14				4		
				7		
15		2.0	27.2	6	Dk brown, f/SAND, trace silt, wet, (zones of f/sand and silt approximately 0.2' thick thoughout length of spoon)	Fuel oil-like odor
				6		
16				6		
				8		
17		1.6		15	Dk brown, f/SAND, trace silt, wet, (zones of f/sand and silt approximately 0.2' thick thoughout length of spoon)	Fuel oil-like odor Sheen observed on inside of spoon @ 17.8'
				26	DK brown, f/c SAND and GRAVEL, wet	
18				50/4"	Red, CLAY and SILT, some f/c Sand, little gravel, wet	No odor discernible in clay
						Boring backfilled with cuttings
19					Bottom of boring @ 18.6' below the ground surface	
20						
21						

Boring Number B-103

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/2/94 - 1405 Date & time completed: 5/2/94 - 1525	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb / Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 376.03	Completion depth: 27' / Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 10				SURFACE DESCRIPTION: Asphalt	
0						
1		1.0	0.0	3	Red-brown, f/m SAND and GRAVEL, little silt, dry	
				5		
2				12		
				10		
3	1	1.4	0.0	5	Brown, f/SAND, some Silt, damp	Sample collected for TCL/TAL
				5		
4				3		
				6		
5		1.9	0.0	7	Brown, f/SAND, some Silt, damp	
				7		
6				6		
				6		
7	2	1.4	0.0	4	Brown, f/SAND, some Silt, moist	Sample collected for TCL/TAL
				5		
8				3		
				2		
9		1.6	0.0	1	Brown, f/SAND, little silt, wet	
10				WOR		

Boring Number **B-103**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES				SOIL DESCRIPTION	REMARKS
	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts		
10			WOR			
			WOR			
11		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				6		
12				6		
				6		
13		1.6	0.0	4	Brown, f/SAND, trace silt, wet	
				5		
14				5		
				5		
15		2.0	0.0	6	Brown, f/SAND, little silt, wet	
				6		
16				5		
				6		
17		1.7	0.0	4	Brown, f/SAND, trace silt, wet	
				6		
18				8		
				10		
19		1.9	0.0	4	Brown, f/SAND, trace silt, wet	
				5		
20				7		
				8		
21						

Boring Number B-103

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				6		
22				9		
				11		
23		1.4	0.0	4	Brown, f/SAND, little silt, wet	
				5		
24				7		
				9		
25		1.2	0.0	4	Brown, f/SAND, little silt, wet	
				12		
26				20	Red-brown, f/c SAND, little silt, wet	
				23	Red-brown, CLAY and SILT, some f/c Sand, some Gravel, wet	
27						Boring backfilled with cuttings
					Bottom of boring @ 27' below the ground surface	
28						
29						
30						
31						
32						

Boring Number B-104

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	5/6/94 - 0940	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	5/6/94 - 1130	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 373.1	Completion depth: 21'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 16 South side of the garage				SURFACE DESCRIPTION: Asphalt	
0						
1		0.2	0.0	4	Red-brown, f/c SAND, some Gravel, some silt, damp	
				6		
2				7		
				10		
3		0.1	0.0	10	Brown, f/c SAND and GRAVEL, some Silt, damp	
				10		
4				5		
				7		
5	1	1.5	0.0	4	Brown, f/SAND, little silt, moist	Sample collected for SVOC and lead FRP-DUPE-08 collected
				5		
6				7		
				6		
7	2	1.5	1.1	1	Grey, f/SAND, little silt, moist	Sample collected for SVOC and lead
			3.0	1		
8			80.0	1		
			115.0	6		
9		1.8	188.0	2	Brown-grey, f/SAND, little silt, wet	
				4		
10						

Boring Number B-104

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				6		
				6		
11		2.0	1088.0	2	Grey-brown, f/SAND, little silt, wet	
				3		
12				3		6 ppm @ headspace of augers 0 ppm in breathing zone
			74.0	2		
13		2.0	56.0	1	Brown, f/SAND, little silt, wet	
			61.0	3		
14				5		
			2.2	7		
15		2.0	1.5	4	Brown, f/SAND, little silt, wet	
				4		
16				4		
				5		
17		1.8	2.2	4	Brown, f/SAND, little silt, wet	
				4		
18				5		
				3		
19		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				4		
20				7		
				21	Red, CLAY and SILT, little f/c sand, trace gravel, wet	Boring backfilled with cuttings
21					Bottom of boring @ 21' below ground surface	

Boring Number B-105

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	5/6/94 - 1255	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	5/6/94 - 1345	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 373.02	Completion depth: 21'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 16 South side of the garage				SURFACE DESCRIPTION: Gravel	
0						
1		0.2	0.0	2	Grey, f/c SAND and GRAVEL, trace silt, damp	
				5		
2				5		
				7		
3		0.1	0.0	2	Grey-brown, f/c SAND and GRAVEL, some Silt, moist	
				4		
4				7		
				5		
5	1	0.7	0.0	4	Brown, f/SAND, trace c/sand, little silt, moist	Sample collected for SVOC and lead
				1		
6				4		
				1		
7	2	0.7	0.0	1	Brown, f/SAND, little silt, moist	Sample collected for SVOC and lead MS/MSD collected for lead
				1		
8				1		
				4		
9		1.4	0.0	4	Brown, f/SAND, some silt, wet	
				3		
10						

Boring Number **B-105**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				1		
				1		
11		2.0	0.0	1	Brown, f/SAND, little silt, wet	
				1		
12				1		
				1		
13		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				4		
14				4		
				4		
15		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				4		
16				7		
				9		
17		1.9	0.0	3	Brown, f/SAND, little silt, wet	
				4		
18				7		
				8		
19		1.8	0.0	9	Brown, f/SAND, little silt, wet	
				14		
20				17		
					Red, CLAY and SILT, little f/c sand, wet	
				21		
21						Boring backfilled w/cuttings
					Bottom of boring @ 21' below the ground surface	

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: B-106

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 11-01-93, 1010 Date & time completed: 11-01-93, 1155	
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual Sampler: ESP
Elevation and Datum (Feet): NA, base of floor = 0'	Completion Depth (Feet): 9.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Area 12 of FRP-2	Surface Description: concrete	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0			2.4			approx. 9" concrete floor	* = above background (1.3 ppm)
0.5–3.0		16	0	SM GM SM		Brown to light brown fine SILTY SAND, trace gray fine subangular gravel, trace brown coarse sand (damp, dense)	gravel/sand from 0.3' - 0.6' "fill"? TAL-Metals Sample
3.5–4.0		20	0	SM		Light brown very fine SILTY SAND (damp, medium dense)	
4.5–5.0			0	ML		Brown fine SANDY SILT, trace brown clay (moist, medium stiff)	
5.5–6.0			0	ML		Same as above except damp	TAL-Metals Sample
6.5–7.0		20	0	ML		Light brown very fine SANDY SILT (moist, medium stiff)	
7.5–9.0			0	ML		Brown very fine SANDY SILT, little brown clay (moist, medium stiff)	
9.5–10.0							End of Boring @ 9.0'

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: B-107

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-28-93, 1330	Date & time completed: 10-28-93, 1500
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: ESP
Elevation and Datum (Feet): NA, base of floor = 0'	Completion Depth (Feet): 9.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Area 12 of FRP-2	Surface Description: concrete	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0			0			approx. 9" concrete floor	* = above background (1.3 ppm)
0.5–3.0		10	0	SP		Brown fine to medium SAND, trace brown silt (damp, dense)	TAL-Metals Sample
3.5–6.0		36	0	SM		Light brown very fine SAND and SILT (damp, dense)	TAL-Metals Sample
6.5–9.0		0	NA	NA		No sample	
9.5–10.0							End of Boring @ 9.0'

Boring Number B-108

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/29/94 - 1200	Date & time completed: 4-29-94 - 1355
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb; Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 373.85	Completion depth: 33'; Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: AREA 10				SURFACE DESCRIPTION: Asphalt	
0						
1		1.5	0.0	10	Red-brown, f/c SAND and GRAVEL, some Silt, damp	
				11	Dk brown, f/SAND, little Silt, damp	
2				15		
				15		
3	1	1.5	0.0	15	Dk brown, f/SAND, some Silt, damp	Sample collected for TCL/TAL
				13		
4				11		
				9		
5		1.3	0.0	1	Dk brown, f/SAND, some Silt, moist	
				2		
6				2		
				5		
7	2	2.0	0.0	10	Grey brown, f/SAND, some Silt, moist	Sample collected for TCL/TAL
				7		
8				7		
				7		
9		1.5	0.0	4	Brown, f/SAND, some silt, wet	
				4		
10						

Boring Number B-108

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				4		
				4		
11		2.0	0.0	5	Brown, f/SAND, some Silt, wet	
				6		
12				6		
				7		
13		1.6	0.0	3	Brown, f/SAND, some Silt, wet	
				3		
14				3		
				4		
15		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				4		
16				4		
				4		
17		1.3	0.0	3	Brown, f/SAND, little silt, wet	
				5		
18				4		
				5		
19		2.0	0.0	6	Brown, f/SAND, little silt, wet	
				6		
20				7		
				8		
21						

Boring Number B-108

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.8	0.0	5	Brown, f/SAND, little silt, wet	
				6		
22				7		
				6		
23		1.3	0.0	7	Brown, f/SAND, little silt, wet	
				8		
24				9		
				9		
25		1.4	0.0	7	Brown, f/SAND, little silt, wet	
				8		
26				9		
				9		
27		1.3	0.0	7	Brown, f/SAND, little silt, wet	
				6		
28				7		
				8		
29		1.7	0.0	6	Brown, f/SAND, little silt, wet	
				9	Brown-red, f/c SAND, little gravel, little silt, wet	
30				12	Red, SILT, some f/c Sand, trace gravel, trace clay, wet	
				4		
31		2.0	0.0	16	Red, SILT, some f/c Sand, trace gravel, trace clay, wet	
				12		
32						

Boring Number **B-108**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				18	Red, CLAY and SILT, little f/c sand, little f/gravel, wet	
				21		
33						Boring backfilled w/cuttings
					Bottom of boring @ 33' below the ground surface	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						

Boring Number B-109

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: 5/2/94 - 1030		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed: 5/2/94 - 1245		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 374.6	Completion depth: 33'	Rock depth
Bit(s): Center Bit	Core barrel(s)	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 10				SURFACE DESCRIPTION: Asphalt	
0						
1		1.2	0.0	16	Red-brown, f/c SAND and GRAVEL, trace silt, dry	
				12	Brown, f/SAND, little silt, damp	
2				16		
				18		
3	1	1.4	0.0	12	Brown, f/SAND, little silt, damp	Sample collected for TCL/TAL
				16		
4				12		
				8		
5		1.5	0.0	4	Brown, f/SAND, some Silt, moist	
				3		
6				4	Black, f/SAND, some Silt, organics, moist	
				6		
7		1.4	0.0	3	Dk Brown, SILT and f/SAND, moist	
				7		
8				8		
				6		
9	2	1.5	0.0	4	Brown, f/SAND and SILT, moist	Sample collected for TCL/TAL
				5		
10						

Boring Number B-109

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				4		
				5		
11		2.0	0.0	3	Brown, f/SAND and SILT, wet	
				5		
12				7		
				7		
13		1.5	0.0	5	Brown, f/SAND, some Silt, wet	
				4		
14				4		
				4		
15		2.0	0.0	5	Brown, f/SAND, some Silt, wet	
				4		
16				5		
				5		
17		2.0	0.0	5	Brown, f/SAND, little silt, wet	
				3		
18				5		
				6		
19		1.9	0.0	3	Brown, f/SAND, little silt, wet	
				5		
20				5		
				6		
21						

Boring Number B-109

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.4	0.0	10	Brown, f/SAND, little silt, wet	
				5		
22				7		
				7		
23		1.5	0.0	4	Brown, f/SAND, little silt, wet	
				5		
24				4		
				4		
25		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				5		
26				7		
				8		
27		1.0	0.0	6	Brown, f/SAND, trace silt, wet	
				10		
28				10		
				11		
29		1.2	0.0	5	Brown, f/m SAND, little silt, wet	
				8		
30				10		
				11	Red-brown, f/c SAND and SILT, some Clay, little gravel, wet	
31		0.5	0.0	17	Red, CLAY and SILT, some f/c Sand, some Gravel, wet	
				20		
32						

Boring Number **B-109**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				30	Red, CLAY and SILT, some f/c Sand, some Gravel, wet	
				36		
33						Boring backfilled w/cuttings
					Bottom of boring @ 33' below the ground surface	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						

Boring Number B-110

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	4/28/94 - 1135
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/28/94 - 1335

Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 374.98'	Completion depth: 37'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 10				SURFACE DESCRIPTION: Asphalt	
0						
1		1.2	0.0	4	Brown, f/SAND and SILT, trace f/c sand, damp	
				6		
2				11		
				10		
3	1	1.5	0.0	12	Brown, f/SAND and SILT, trace f/c sand, damp	Sample collected for TCL/TAL
				1		
4				8		
				8		
5		1.6	0.0	3	Dk brown, f/SAND and SILT, little m/c sand, damp	
				4		
6				2		
				3		
7	2	1.6	0.0	3	Dk brown, SILT and f/SAND, trace m/c sand, wood fragments, damp	Sample collected for TCL/TAL Collected FRP-DUPE-02
				3		
8				4		
				5		
9		1.5	0.0	5	Brown, f/SAND, some silt, wet	
				5		
10						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				8		
				7		
11		2.0	0.0	8	Brown, f/SAND, some silt, wet	
				6		
12				6		
				6		
13		1.8	0.0	2	Grey-brown, f/SAND, some silt, wet	
				3		
14				3		
				2		
15		2.0	0.0	3	Grey-brown, f/SAND, some silt, wet	
				3		
16				4		
				4		
17		1.8	0.0	4	Brown, f/SAND, little silt, wet	
				5		
18				7		
				9		
19		1.9	0.0	3	Brown, f/SAND, little silt, wet	
				5		
20				5		
				2		
21						

Boring Number B-110

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				7		
22				6		
				5		
23		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				4		
24				6		
				7		
25		2.0	0.0	6	Brown, f/SAND, little silt, wet	
				6		
26				7		
				7		
27		1.9	0.0	5	Brown, f/SAND, little silt, wet	
				5		
28				7		
				5		
29		1.8	0.0	3	Brown, f/SAND, little silt, wet	
				9		
30				7		
				8		
31		1.1	0.0	5	Brown, f/SAND, little silt, wet	
				5	Brown, f/c SAND, trace silt, wet	
32						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				4		
				5		
33				5	Brown, f/c SAND, trace silt, wet	
				6		
34				8		
				8	Red, CLAY and SILT, some f/C sand, trace gravel, wet	@ 34.8'
35				5	Red, CLAY and SILT, some f/c sand, little gravel, wet	
				7		
36				7		
				16		
37						Boring backfilled w/cuttings
					Bottom of boring @ 37' below the ground surface	
38						
39						
40						
41						
42						
43						

Boring Number B-111

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/25/94 - 1305 Date & time completed: 4/25/94 - 1345
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S; Sampler hammer: 140lb; Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 375.52'; Completion depth: 12'; Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 1 Former debris pile				SURFACE DESCRIPTION: Grass/topsoil	
0		1.0	0.0	1	Brown, f/m SAND, trace silt, trace f/gravel, damp	
				2		
1				3		
				3		
2		0.2	0.0	2	Black, GRAVEL	
				3		
3				4		
				3		
4		0.6	0.0	WOH	Brown, f/m SAND, some Silt, moist	
				WOH		
5				WOH		
				WOH		
6		1.0	0.0	3	Brown, f/m SAND, some Silt, wet	
				4		
7				6		
				5		
8		1.5	0.0	1	Brown, f/m SAND, little-some silt, wet	
				1		
9				2		
	1			6		Sample collected for TCL VOC, SVOC Pesticide/PCB
10					DK Brown, f/SAND and SILT, wet	

Boring Number B-111

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10		1.2	0.0	4	Brown-grey, SILT, little f/sand, wet, mottled	
				6		
11				11		
				12		
12						Boring backfilled w/cuttings
					Bottom of boring @ 12' below the ground surface	
13						
14						
15						
16						
17						
18						
19						
20						
21						

Boring Number B-112

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started / completed
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time started: **4/27/94 - 1655** Date & time completed: **4/28/94 - 1030**

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	375.43'	39'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES: Sample Number	SAMPLES: Recovery (feet)	SAMPLES: HNU/OVA (ppm)	SAMPLES: Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 10				SURFACE DESCRIPTION:	
0						
1		1.0	0.0	5	Brown-grey, SILT, some f/Sand, litle gravel, damp	
				9		
2				10		
				10		
3	1	1.2	0.0	14	Brown, f/SAND, some Silt, damp	
				12		
4				9		
				6		
5		1.6	0.0	2	Dk brown, f/SAND, some m/Sand, some Silt	
				2		
6				2		
				2		
7		2.0	0.0	2	Dk brown, f/SAND and SILT, some m/c Sand, damp (roots and animal bone observed in sample)	
				1		
8				3		
				4		
9		1.7	0.0	4	Dk brown, SILT, some f/Sand, damp	
				5		
10						

Boring Number B-112

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				5	Brown, f/SAND, some Silt, damp	
				6		
11		2.0	0.0	7	Brown, f/SAND, some Silt, wet	
				7		
12				8		
				9		
13		1.4	0.0	6	Brown, f/SAND, some Silt, wet	
				4		
14				6		
				4		
15		2.0	0.0	5	Brown, f/SAND, some Silt, wet	
				4		
16				4		
				4		
17		1.5	0.0	3	Brown, f/SAND, some Silt, wet	
				4		
18				3		
				3		
19		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				4		
20				4		
				4		
21						Stopped drilling on 4-27-94

Boring Number B-112

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.8	NM	6	Brown, f/SAND, some silt, trace gravel, wet	Continued boring from 4/27/94
				8		
22				11		
				10		
23		2.0	NM	12	Brown, f/SAND, litle silt, wet	
				8		
24				11		
				13		
25		1.6	NM	4	Brown, f/SAND, litle silt, wet	
				8		
26				7		
				5		
27		2.0	NM	2	Brown, f/SAND, litle silt, wet	
				3		
28				3		
				3		
29		1.3	NM	WOR	Brown, f/m SAND, trace silt, wet	
				WOR		
30				4		
				5		
31		1.9	NM	5	Brown, f/m SAND, trace silt, wet	
				7		
32						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				9		
				9		
33		2.0	NM	4	Brown, f/m SAND, trace silt, wet	
				6		
34				10		
				10		
35		0.0	NM	7	Brown, f/m SAND, trace silt, wet	
				16		
36				10		
				17		
37		2.0	NM	4	Brown, f/m SAND, trace silt, wet	
				10		
38				23		
				19	Red, CLAY and SILT, some f/c Sand, little f/gravel, wet	
39						Boring backfilled w/cuttings
					Bottom of boring @ 39' below the ground surface	
40						
41						
42						
43						

Boring Number B-113

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	4/25/94 - 1420	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/25/94 - 1452	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 375.26'	Completion depth: 12'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 1 Former debris pile				SURFACE DESCRIPTION: Topsoil	
0		1.1	0.0	1	Brown, f/m SAND, little silt, damp	
				2		
1				1		
				2		
2		1.6	0.0	3	Brown, f/m SAND, trace-little silt, damp	
				4		
3				4		
				4		
4		0.4	0.0	3	Brown, f/m SAND, trace f/gravel, moist	
				3		
5				3		
				3		
6		2.0	0.0	3	Brown f/m SAND, wet	
				3		
7				2		
				1	Organics, last 0.2' of spoon	
8	1	1.9	0.0	1	Brown, f/m SAND, some Silt, wet	Sample collected for TCL VOC, SVOC, Pesticide/PCB
				2		
9				2		
				5	Dk brown, f/SAND, little silt	
10						

Boring Number B-113

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10		1.8	0.0	11	Brown, f/m SAND, little silt, wet	
				7		
11				9		
				8		
12						Boring backfilled w/cuttings
					Bottom of boring @ 12' below the ground surface	
13						
14						
15						
16						
17						
18						
19						
20						
21						

Boring Number B-114

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/4/94 - 1410	Date & time completed: 5/4/94 - 1555		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"	
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 378.80'	Completion depth: 33'	Rock depth:	
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling			

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 11				SURFACE DESCRIPTION: Asphalt	
0						
1		0.0	NM	8	Brown, SAND and GRAVEL, dry	Described from cuttings
				10		
2				20		
				21		
3		0.1	0.0	8	Brown, f/SAND, little gravel, trace silt, damp	No sample collected due to poor recovery
				16		
4				13		
				14		
5	1	1.7	0.0	3	Brown, f/SAND, little silt, damp	Sample collected for TCL VOC
				4		
6				4		
				4		
7	2	1.5	0.0	4	Brown, f/SAND and SILT, moist	Sample collected for TCL VOC
				4		
8				4	Red-brown, f/m SAND, trace silt, moist	
				4		
9		1.7	0.0	1	Brown, f/SAND, little silt, wet	
				2		
10						

Boring Number **B-114**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				1		
				1		
11		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				4		
12				4		
				6		
13		2.0	0.0	4	Brown, red-brown, f/SAND, little silt, oxidized layers, wet	
				5		
14				4		
				5		
15		2.0	0.0	1	Brown, red-brown, f/m SAND, trace silt, wet	Silt lenses
				3		
16				4		
				3		
17		2.0	0.0	4	Brown, f/m SAND, trace silt, wet	
				4		
18				5		
				6		
19		2.0	0.0	3	Brown, red-brown, f/m SAND, little silt, wet	
				2		
20				3		
				3		
21						

Boring Number B-114

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	6	Brown, red-brown, f/m SAND, little silt, wet	
				5		
22				6		
				9		
23		2.0	0.0	3	Brown, f/SAND, trace silt, wet	
				2		
24				1		
				1		
25		2.0	0.0	2	Brown, f/SAND, trace silt, wet	
				4		
26				6	Brown, f/SAND, some Silt, wet	
				6		
27		1.5	0.0	1	Brown, f/SAND, trace silt, wet	
				1		
28				2		
				4		
29		2.0	0.0	2	Brown, f/SAND, trace silt, wet	
				3		
30				6		
				7	Brown-grey, f/c SAND, trace gravel, trace silt, wet	
31		2.0	0.0	19	Red, SILT and CLAY, some f/c sand, trace gravel, wet	
				15		
32						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				20		
				50/3"		Boring backfilled w/cuttings
33					Bottom of boring @ 33' below the ground surface	
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						

Boring Number B-115

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: 4/28/94 - 0945		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:		
Drilling company: ERM	Foreman: J. Fox	Sampler(s): 3" Hand Auger	Sampler hammer: NA	Drop: NA
Drilling equipment: Hand Auger	Method: Manual	Elevation & datum: 368.17'	Completion depth: 6'	Rock depth:
Bit(s): NA	Core barrel(s):	Inspector(s): Jon Fox		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Wetlands north of FRP Area 2				SURFACE DESCRIPTION:	Near previous 62ppm soil vapor survey
0					Brown, SILT, trace vf/sand, trace plant debris, moist, stiff	
1					Brown , f/SAND and SILT, little plant debris, wet	
2					Orange-brown, f/SAND, trace silt, trace plant debris, saturated	
3					Orange-brown, vf/f SAND, trace silt, trace plant debris saturated	Coarser near the top
4					Grey-brown, vf/SAND and SILT, trace clay, saturated	
5						
6					Bottom of boring @ 6' below the ground surface	
7						
8						
9						
10						

Boring Number B-116

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/27/94 - 0940 / 4/27/94 - 1020

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"
Drilling equipment	**Method**	**Elevation & datum**	**Completion depth**	**Rock depth**
Mobile B-57	3 1/4" ID HSA	380.11'	16'	
Bit(s)	**Core barrel(s)**	**Inspector(s)**		
Center Bit		Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 7				SURFACE DESCRIPTION: Gravel	
0		1.8	0.0	3	Dk Brown, f/c SAND, little gravel, trace silt, dry	Fill
				3		
1				6		
				10		
2		0.4	0.0	15	Dk brown-black, f/c SAND and GRAVEL, trace silt, dry	Fill
				5		
3				4		
				5		
4	1	0.7	0.0	4	Dk brown-black, f/c SAND and GRAVEL, little silt, dry	Sample collected for TCL VOC
				4		
5				3		
				4		
6		0.5	0.0	3	Brown, f/SAND, little silt, moist	
				4		
7				8		
				6		
8	2	1.5	0.0	1	Brown, f/SAND, little silt, moist	Sample collected for TCL VOC
				1		
9				2		
				2		
10						

Boring Number **B-116**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10		1.6	14.0	1	Brown-grey, f/SAND, little silt, wet	Fuel oil-like odor
				2		
11			27.0	3		
			18.0	4		
12		1.8	19.0	1	Brown-grey f/m SAND, trace silt, wet	Petroleum odor
			52.0	3		
13			74.0	4		
			105.0	5		
14		2.0	52.0	5	Brown-grey f/m SAND, trace silt, wet	4.2 ppm in headspace of the augers 0 ppm in the breathing
			19.0	5		
15			48.0	16		
			6.3	12	Red, CLAY and SILT, little f/c sand, little gravel, wet	@ 15.8' Boring backfilled w/cuttings
16					Bottom of boring @ 16' below the ground surface	
17						
18						
19						
20						
21						

Boring Number B-117

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/27/94 - 1105 Date & time completed: 4/27/94 - 1200	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb — Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 379.71'	Completion depth: 14' — Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 7				SURFACE DESCRIPTION: Gravel	
0		0.4	0.0	2	Brown, f/c SAND, some silt, little gravel, damp	
				6		
1				18		
				11		
2	1	0.6	0.0	9		
				4		
3				3		
				3		
4		0.8	0.0	2	Brown, f/c SAND, some silt, little gravel, damp	
				1	Brown, f/SAND, little silt, moist	
5				1		
				1		
6		1.0	0.0	1	Brown, f/SAND, little silt, moist	
				1		
7				1		
				1		
8		1.0	1.1	1	Brown, f/m SAND, little gravel, little silt, wet	
			2.6	1		
9			1.8	50/0	Brown-grey, CONCRETE	Driller thinks that it may have debris tossed into the old UST pit
10						

Boring Number B-117

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10		0.2	0.0	50/0.2'	Concrete	
11						
12		1.2	31.0	2	Brown-grey, f/m SAND, trace silt, wet	Diesel-like odor, sheen on split spoon
			52.0	2		
13			61.0	1		1.1 ppm in headspace of augers 0 ppm in the breathing zone
			70.0	3		
14		2.0	168.0	37	Brown-grey, f/m SAND, trace silt, wet	Diesel-like odor
			68.0	27		
15			13.0	18	Red-brown, SILT and CLAY, some f/c sand, little gravel	Odor identified in clay unit
			11.5	12		Boring backfilled w/ cuttings
16					Bottom of boring @ 16' below the ground surface	
17						
18						
19						
20						
21						

Boring Number B-118

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: 4/27/94 - 1340		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed: 4/27/94 - 1418		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 381.07'	Completion depth: 17'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 7				SURFACE DESCRIPTION: Asphalt	
0						
1		1.3	0.0	13	Brown, f/SAND and SILT, trace gravel, dry	
				15		
2				13		
				17		
3	1	1.2	0.0	15	Brown, f/SAND, some silt, dry	Sample collected for TCL VOC
				18		
4				15		
				14		
5		1.6	0.0	2	Brown, f/SAND, some silt, moist	
				2		
6				2		
				2		
7	2	2.0	0.0	2	Brown, f/SAND, some silt, moist	Sample collected for TCL VOC
				2		
8				3		
				4		
9		1.8	0.0	2	Brown, f/SAND, some silt, wet	
				2		
10						

Boring Number B-118

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				2		
				1		
11		2.0	0.0	2	Brown, f/SAND, some silt, wet	
				2		
12				1		
				1		
13		1.6	0.0	2	Brown, f/SAND, some silt, wet	
				3		
14				5		
				8		
15		2.0	0.0	30	Brown, f/SAND, some silt, wet	
				51		
16				12		
				10	Red, CLAY and SILT, some f/c sand, trace gravel	
17						Boring backfilled w/cuttings
					Bottom of boring @ 17' below the ground surface	
18						
19						
20						
21						

Boring Number B-119

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	Date & time completed:
MMC - Farrell Road Plant RI/FS	557.044.01	4/27/94 - 1435	4/27/94 - 1535

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	380.93'	17'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 7				SURFACE DESCRIPTION: Asphalt	
0						
1		1.1	0.0	6	Red-brown, f/SAND and SILT, trace gravel, dry	
				6		
2				6		
				5		
3	1	1.5	0.0	6	Brown, f/SAND, some Silt, damp	Sample collected for TLC VOC
				7		
4				5		
				7		
5		1.7	0.0	2	Brown, f/SAND, some Silt, moist	
				2		
6				2		
				2		
7	2	2.0	0.0	2	Brown, f/SAND, some Silt, moist	Sample collected for TLC VOC
				1		
8				1		
				1		
9		1.4	0.0	2	Brown, f/SAND, little silt, wet	
				1		
10						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				1		
				3		
11		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				3		
12				4		
				3		
13		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				3		
14				4		
				12		
15		2.0	0.0	3	Brown, f/SAND, little silt, wet	
				11		
16				18	Brown, f/m SAND, trace silt, wet	
				12		
17					Red, CLAY and SILT, little f/c sand, trace gravel, wet	@ 16.8'
					Bottom of boring @ 17' below the ground surface	Boring backfilled w/cuttings
18						
19						
20						
21						

Boring Number B-120

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/26/94 - 1040	Date & time completed:
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb; Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 376.16'	Completion depth: 20'; Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 5				SURFACE DESCRIPTION: Grass/topsoil	
0		1.0	0.0	5	Brown, f/SAND, some silt, little gravel, damp	
				2		
1				4		
				4		
2	1	1.3	0.0	5	Brown, f/SAND and SILT, damp	Sample collected for TCL/TAL
				2		
3				5		
				6		
4		1.5	0.0	2	Brown, f/SAND, some Silt, wet	Second sample planned for boring not collected because the 4-6' interval was saturated and a sample was already collected at the 2-4' interval, sampling criteria was met.
				2		
5				3	Brown, f/SAND, little silt, wet	
				3		
6		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				4		
7				5		
				4		
8	2	1.5	54.0	2	Brown, f/SAND, little silt, wet	Sample collected for TCL/TAL
				1		
9				4		
			63.0	5		
10						

Boring Number B-120

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10		2.0	70.0	3	Brown, f/SAND, little silt, wet	
				4		
11				9		
			90.0	12		
12		2.0	5.0	4	Brown, f/SAND, trace silt, wet	
				7		
13				7		
			5.0	11		
14		1.8	39.0	14	Brown, f/SAND, trace silt, wet	
				14		
15				16		
			39.0	13		
16		1.2	50.0	7	Brown, f/SAND, trace silt, wet	
				8		
17				9		
			50.0	11		
18		1.1	16.0	7	Brown, f/SAND, trace silt, wet	
				10		
19				12		
				26	Red, CLAY and SILT, f/c SAND, little gravel, wet	
20						Boring backfilled w/cuttings
					Bottom of boring @ 20' below the ground surface	
21						

Boring Number B-121

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/25/94 - 1325	Date & time completed: 4/25/94 - 1350	
Drilling company: Aquifer ERM	Foreman: Jon Fox	Sampler(s): 3" Hand Auger	Sampler hammer: NA	Drop: NA
Drilling eqDrilling Equipment: Mobile nd Auger	Method: Manual	Elevation & datum: 366.45'	Completion depth: 3'	Rock depth
Bit(s): NA	Core barrel(s)	Inspector(s): Jon Fox		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 1				SURFACE DESCRIPTION:	
0		1.0			Brown, SILT, some f/Sand, trace f/gravel (rounded), damp	
1		1.0			Brown, SILT, some f/Sand, trace f/gravel (rounded), damp	
2		1.0			Orange-brown, SILT, some f/Sand, saturated Orange-brown, SILT, some f/Sand, little f/gravel (rounded), trace clay, saturated	
3					Bottom of boring @ 3' below the ground surface	
4						
5						
6						
7						
8						
9						
10						

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: B-122

Project Name & Location: MARTIN MARIETTA-FRP	Project Number: 557.008.02	Date & time started: 10-28-93, 1045 Date & time completed: 10-28-93, 1102	
Drilling company: ERM Northeast	Foreman: B. Spizuoco	Drilling Equipment: NA	Method: Manual; Sampler: ESP
Elevation and Datum (Feet): NA, base of floor = 0'	Completion Depth (Feet): 1.0	Inspector(s): B. Spizuoco/J. Fox	
Location: Area 3 of FRP-2	Surface Description: concrete	Water Levels (Feet): Date: NA; Time; Depth	

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0			0			approx. 9" concrete floor	* = above background (1.0 ppm)
0.5–1.0		12	0	SP		Brown to light brown fine to medium SAND, trace brown silt (damp, dense)	TAL-Metals PCBs TCL-SVOCs Analyses
1.5							End of Boring @ 1.0'
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: B-123

Project Name & Location	Project Number	Date & time started:	Date & time completed:
MARTIN MARIETTA-FRP	557.008.02	10-28-93, 1105	10-28-93, 1135

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	B. Spizuoco	NA	Manual	ESP

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
NA, base of floor = 0'	1.0	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet): Date	Time	Depth
Area 3 of FRP-2	concrete	NA		

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0			0			approx. 9" concrete floor	* = above background (1.0 ppm)
0.5		12	0	SP		Brown to light brown fine to medium SAND, trace brown silt (damp, dense)	**TAL-Metals** **PCBs** **TCL-SVOCs** **Sample**
1.0							
1.5							End of Boring @ 1.0'
2.0							
2.5							
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

Boring Number B-124

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	Date & time completed:
MMC - Farrell Road Plant RI/FS	557.044.01	4/25/94 - 1600	4/25/94 - 1735

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	379.42'	27'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 4				SURFACE DESCRIPTION: Asphalt	
0						
1		1.6	0.0	9	Red-brown, f/m SAND, trace gravel, dry	
				15		
2				14		
				14		
3	1	1.8	0.0	12	Red-brown, f/m SAND, trace gravel, dry	Sample collected for TCL VOC, SVOC Pesicide/PCB
				11		
4				9		
				9		
5		1.4	0.0	4	Red-brown, f/m SAND, trace gravel, dry	
				5		
6				4	Silt zone from 6.1'-6.3'	
				5		
7	2	1.7	0.0	6	Red-brown, f/m SAND, trace gravel, damp	Sample collected for TCL VOC, SVOC Pestide/PCB
				6		
8				6		
				6		
9		2.0	0.0	4	Red-brown, f/m SAND, trace gravel, wet	
				6		
10						

Boring Number B-124

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				7		
				9		
11		2.0	0.0	7	Red-brown, f/m SAND, trace gravel, wet	
				9		
12				11		
				10		
13		1.8	0.0	3	Brown, f/m SAND, wet	
				4		
14				6		
				3		
15		2.0	0.0	4	Brown, f/m SAND, wet	
				5		
16				4		
				5		
17		2.0	0.0	2	Brown, f/m SAND, wet	
				4		
18					Red-brown, f/c SAND, wet	
				6		
				8		
19		2.0	0.0	6	Red-brown, f/c SAND, wet	
				9		
20				11		
				10		
21						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	3	Red-brown, f/c SAND, wet	
				4		
22				3		
				8	Brown, f/m SAND, little silt, wet	
23		2.0	0.0	5	Brown, f/m SAND, little silt, wet	
				6		
24				8		
					Brown, SILT and f/SAND, wet	
				8		Sharp contact
					Brown, f/c SAND, wet	
25				1	Brown, f/c SAND, wet	
				1		
26				5		
				17	Red, CLAY and SILT, some f/c sand, trace gravel, damp	@ 26.5' Boring backfilled w/cuttings
27					Bottom of boring @ 27' below the ground surface	
28						
29						
30						
31						
32						

Boring Number B-125

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started / completed		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time started: 4/26/94 - 0810; Date & time completed: 4/26/94 - 0915		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 379.86'	Completion depth: 23'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 4				SURFACE DESCRIPTION: Asphalt	
0						
1		0.9	0.0	8	Brown, SAND and GRAVEL, little silt, dry Red-brown, f/m SAND, dry	
				9		
2				11		
				9		
3	1	1.5	0.0	9	Red-brown, f/m SAND, dry	Sampled for TCL organics
				9		
4				8		
				9		
5		2.0	0.0	4	Brown, f/m SAND, damp	
				4		
6				5		
				6	Brown, f/m SAND and SILT	
7	2	2.0	0.0	8	Brown, f/m SAND and SILT	Sampled for TCL organics
				8		
8				9	Brown, f/m SAND, damp	
				8		
9		1.6	0.0	3	Brown, f/m SAND, wet	
				3		
10						

Boring Number B-125

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				3		
				5		
11		2.0	0.0	6	Brown, f/m SAND, trace silt, wet	
				6		
12				6		
				9		
13		1.5	0.0	2	Brown, f/m SAND, trace silt, wet	
				4		
14				5		
				7		
15		2.0	0.0	2	Brown, f/m SAND, trace silt, wet	
				4		
16				7		
				9		
17		2.0	0.0	1	Brown, f/m SAND, trace silt, wet	
				1		
18				6		
				8		
19		1.1	0.0	1	Brown, f/m SAND, trace silt, wet	
				1	Brown, f/m SAND and SILT, wet	@ 19.4-19.6'
20				2		
				5		
21						

Boring Number B-125

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES				SOIL DESCRIPTION	REMARKS
	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts		
21		2.0	0.0	12	Brown, f/m SAND, trace silt, wet	
				13		
22				18		
				18	Red, CLAY and SILT, little f/c sand, wet	@ 22.7'
23					Bottom of boring @ 23' below the ground surface	Boring backfilled w/cuttings
24						
25						
26						
27						
28						
29						
30						
31						
32						

Boring Number B-126

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	4/28/94 - 1250
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	4/28/94 - 1315

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
ERM		3' core	12.5lb	

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Environmentalist Sub-Soil Probe	Manual	379.68'	6	

Bit(s)	Core barrel(s)	Inspector(s)
		Jon Fox

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 2				SURFACE DESCRIPTION:	
0				5	Orange-brown, m/SAND, moist	
1				20		
2				10	Dk Grey, m/c SAND, trace silt, moist, dense	Trace asphalt fragments
3				27		
4				16	Dk Grey, m/c SAND, trace silt, moist, dense	
5				14	Orange-brown, m/SAND, wet, dense	
6					Bottom of boring @ 6' below the ground surface	
7						
8						
9						
10						

Boring Number B-127

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 4/28/94 - 1345	Date & time completed: 4/28/94 - 1405
Drilling company: ERM	Foreman:	Sampler(s): 3' core	Sampler hammer: 12.5lb	Drop:
Drilling equipment: Environmentalist Sub-Soil Probe	Method: Manual	Elevation & datum: 379.64'	Completion depth: 6'	Rock depth:
Bit(s):	Core barrel(s):	Inspector(s): Jon Fox	

DEPTH (ft below grade)	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 2				SURFACE DESCRIPTION:	
0				10	Orange-brown, m/SAND, trace f/ gravel (angular), moist	
1				6	Orange-brown, m/SAND, trace f/ gravel (angular), trace clay, moist	
2				14		FRP-DUPE-03 (2-4)
3				20		
4				10	Orange-brown, f/m SAND, f/gravel (angular), wet	
5				8		Sands begin to coarse
6					Bottom of boring @ 6' below the ground surface	
7						
8						
9						
10						

Boring Number B-128

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started / completed		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time started: 4/28/94 - 1325; Date & time completed: 4/28/94 - 1345		
Drilling company: ERM	Foreman:	Sampler(s): 3' core	Sampler hammer: 12.5lb	Drop:
Drilling equipment: Environmentalist Sub-Soil Probe	Method: Manual	Elevation & datum: 379.87'	Completion depth: 6'	Rock depth:
Bit(s):	Core barrel(s):	Inspector(s): Jon Fox		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 2				SURFACE DESCRIPTION:	
0		2.1	0.0	37	Orange-brown, f/m SAND, trace silt, trace brick and asphalt, moist	MS/MSD (1-3')
1			0.0	22		
2			0.0	8		
3		0.9	0.0	10	Orange-brown, f/m SAND, trace silt, moist	
4			0.0	10		
5			0.0	9		
6					Bottom of boring @ 6' below the ground surface	
7						
8						
9						
10						

Boring Number B-129

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/5/94 - 0840	Date & time completed: 5/5/94 - 1025		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"	
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 379.64'	Completion depth: 27'	Rock depth:	
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling			

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 11				SURFACE DESCRIPTION: Asphalt	
0						
1		1.0	0.0	7	Red -brown, f/m SAND and SILT, some f/Gravel, dry	
				7		
2				8		
				3		
3	1	0.3	0.0	6	Red -brown, f/m SAND and SILT, some f/Gravel, dry	Sample collected for TCL VOC FRP-DUPE-06
				6		
4				4		
				3		
5		0.4	0.0	2	Red -brown, f/m SAND and SILT, some f/Gravel, damp	
				3		
6				2		
				2		
7		0.1	0.0	4	Brown-green-red, f/c SAND and SILT, trace f/gravel, damp	
				9		
8				9		
				6		
9	2	2.0	0.0	3	Brown, f/SAND, some Silt, wet (oxidized zones)	Sample collected for TCL VOC MS/MSD for TCL VOC
				3		
10						

Boring Number **B-129**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10	3		1.3	2		Sample collected above water
			1.3	1		
11		2.0	0.0	1	Brown, f/SAND, some Silt, wet	Oxidized zones
				1		
12				1		
				1		
13		1.7	0.0	4	Brown, f/SAND, little to some silt, wet	
				4		
14				2		
				2		
15		0.0	NM	7		
				7		
16				8		
				9		
17		1.6	0.0	5	Brown, f/SAND, some Silt, wet	
				4		
18				3	Brown, f/m SAND, trace silt, wet	
				3		
19		1.8	0.0	4	Brown, f/m SAND, trace silt, wet	
				4	Brown, f/m SAND, some Silt, wet	
20				1		
				3		
21						

Boring Number B-129

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES				SOIL DESCRIPTION	REMARKS
	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts		
21		2.0	0.0	1	Brown, f/m SAND, little silt, wet	
				4		
22					Brown, f/c SAND, trace silt, wet	From 21.7-21.9'
				5	Brown, f/m SAND, little silt, wet	
				5		
23					Brown, f/SAND, some Silt, wet	@ 22.8
		2.0	0.0	1	Brown, f/m SAND, trace to little silt, wet	
				WOH		
24				WOH		
				WOH		
25		2.0	0.0	3	Brown, f/m SAND trace silt, wet	
			11.1	16	Grey, f/m SAND, trace silt, wet	
26			10.3	30	Grey, f/m SAND, little gravel, trace silt, wet	
			0.0	42	Red, CLAY and SILT, little f/c sand, wet	
27						Boring backfilled w/cuttings, cold patch at the surface
					Bottom of boring @ 27' below the ground surface	
28						
29						
30						
31						
32						

Boring Number B-130

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started	Date & time completed
MMC - Farrell Road Plant RI/FS	557.044.01	5/4/94 - 0825	5/4/94 - 1030

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	378.61'	31'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES				SOIL DESCRIPTION	REMARKS
	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts		
	LOCATION: Area 11				SURFACE DESCRIPTION: Asphalt	
0						
1		1.2	0.0	7	Red-brown, f/c SAND and GRAVEL, little silt, dry	
				10	Brown, f/SAND, some Silt, damp	
2				12		
				12		
3	1	1.4	0.0	7	Brown, f/SAND, some Silt, damp	Sample collected for TCL VOC FRP-DUPE-05
				9		
4				20		
				23		
5		1.9	0.0	3	Brown, f/SAND, some Silt, trace organics, moist	
				2		
6				1		
				1		
7		1.8	0.0	6	Brown, f/SAND, some Silt, moist	
				10		
8				9		
				5		
9	2	1.8	0.0	4	Brown, f/SAND, some Silt, moist	Sample collected for TCL VOC MS/MSD
				4		
10						

Boring Number B-130

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				1		
				1		
11		2.0	0.0	1	Brown, f/SAND, little silt, wet	
				1		
12				1		
				7		
13		1.3	0.0	5	Brown, f/SAND, some Silt, wet	
				5		
14				4		
				6		
15		2.0	0.0	5	Brown, f/SAND, some Silt, wet	
				4		
16				3		
				3		
17		1.2	0.0	1	Brown, f/SAND, little silt, wet	
				WOR		
18				WOR		
				WOR		
19		1.6	0.0	6	Brown, f/m SAND, wet	
				4		
20				2	Brown, SILT, trace f/sand, wet	
				1		
21						

ERM-Northeast
5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.6	0.0	1	Brown, SILT, little f/sand, wet	
				2		
22				2	Brown, f/SAND, some Silt, wet	
				2	Brown, SILT, wet	
23		1.3	0.0	1	Brown, f/SAND, little silt, wet	
				3		
24				4		
				4	Brown, SILT, little f/sand, wet	
25		1.5	0.0	3	Brown, f/SAND, little silt, wet	
				4		
26				7		
				7	Brown, m/SAND, some f/Sand, wet	
27		1.5	0.0	4		
				5		
28				5		
				5	Brown, m/SAND. wet	
29		1.5	0.0	4	Brown, f/m SAND, trace silt, wet	
				4	Brown, SILT, trace f/sand, wet	
30				11		
				23	Brown, c/SAND, little gravel, wet Red, CLAY, f/m sand, trace gravel	
31					Bottom of boring @ 31' below the ground surface	Boring backfilled w/cuttings
32						

Boring Number B-131

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/4/94 - 1107	Date & time completed: 5/4/94 - 1340
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb / Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 379.26'	Completion depth: 29' / Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 11				SURFACE DESCRIPTION: Asphalt	
0						
1		1.1	0.0	4	Red-brown, f/c SAND and SILT, some Gravel, dry	
				18		
2				10		
				14		
3	1	1.5	0.0	4	Brown, f/SAND, some Silt, damp	Sample collected for TCL VOC
				12		
4				11		
				16		
5		1.7	0.0	4	Brown, f/SAND, little silt, damp	
				6		
6				8		
				4		
7	2	13.0	0.0	4	Brown, f/SAND, little silt, damp	Sample colledted for TCL VOC
				6		
8				6		
				4		
9		0.9	0.0	1	Brown, f/SAND, little silt, wet	
				2		
10						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				2		
				2		
11		2.0	0.0	1	Brown, f/SAND, little silt, wet	
				1		
12				2		Black zone from 11.7-11.9'
				3		
13		1.3	0.0	3	Red-brown, f/m SAND, trace silt, wet	Orange-brown zone from 12.9-13.0'
				1		
14				4		
				4		
15		1.8	0.0	1	Red-brown, f/m SAND, trace silt, wet	
				3		
16				4		
				4	Red-brown, f/m SAND, some Silt, wet	@ 16.8'
17		2.0	0.0	1	Brown, f/m SAND, little silt, wet	
				2		
18				1		
				3		
19		2.0	0.0	4	Brown, f/m SAND, trace silt, wet	
				4		
20				8		
				8		
21						

Boring Number B-131

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	3	Brown, f/m SAND, some Silt, wet	
				4		
22				8		
				8		
23		2.0	0.0	2	Brown, f/m SAND, trace silt, wet	
				3		
24				3		
				2		
25		2.0	0.0	5	Brown, f/m SAND, trace silt, wet	
				5		
26				5		
				7		
27		2.0	0.0	10	Brown, f/m SAND, trace silt, wet	
				12		
28				15		
				26	Red, CLAY and SILT, some f/c Sand, wet	
29					Bottom of boring @ 29' below the ground surface	Boring backfilled w/cuttings
30						
31						
32						

Boring Number B-132

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	5/5/94 - 1127
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	5/5/94 - 1255

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	379.34'	29'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 11				SURFACE DESCRIPTION: Gravel	
0						
1		0.8	0.0	4	Grey, GRAVEL	
				6	Lt brown, f/SAND, trace silt, damp	
2				7		
				5		
3	1	0.9	0.0	3	Brown, f/SAND, litttle silt, damp	Sample collected for TCL VOC
				4		
4				5		
				5		
5	2	1.4	0.0	2	Brown, f/SAND, litttle silt, moist	Sample collected for TCL VOC
				2		
6				2		
				3		
7		1.8	0.0	2	Brown, f/SAND, little silt, wet	
				2		
8				3		
				5		
9		1.5	0.0	2	Brown, f/SAND, little-some silt, wet	
				1		
10						

Boring Number B-132

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				1		
				1		
11		1.8	0.0	4	Brown, f/SAND, little silt, wet	
				3		
12				3		
				5	Brown, f/SAND, some m/Sand, little silt, wet	
13		1.6	0.0	1	Brown, f/SAND, some Silt, wet	
				4		
14				4		
				3		
15		2.0	0.0	1	Brown, f/SAND, little silt, wet	
				3		
16				3		
				5		
17		2.0	0.0	6	Brown, f/SAND, little silt, trace gravel, wet	
				6		
18				5		
				7		
19		2.0	0.0	5	Brown, f/m SAND, trace silt, wet	
				5		
20				6		
				6		
21						

Boring Number B-132

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		2.0	0.0	2	Brown, f/SAND, little silt, wet	
				3		
22				3		
				5		
23		2.0	0.0	1	Brown, f/m SAND, little silt, wet	
				2		
24				6		
				6		
25		2.0	0.0	4	Brown, f/m SAND, little-some silt, wet	
				6		
26				8		
				10		
27				13	Brown, f/m sand, little silt, wet	Oxidized zone 0.1' thick @ 26.8'
				1		
28				3		
				32	Red, CLAY and SILT, some f/c Sand, little gravel, wet	
29					Bottom of boring @ 29' below ground surface	Boring backfilled w/cuttings
30						
31						
32						

Boring Number B - 133

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/9/94 - 0930 Date & time completed: 5/9/94 - 1000		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 379.55'	Completion depth: 11'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Storm Sewer south of the Test Building, SVS-004-005				SURFACE DESCRIPTION: Asphalt	
0						
1	1	0.1	0.0	19	Grey-brown, f/c SAND and GRAVEL, little silt, dry	Remobed to B-133 on 5-10-94 @ 1000, drilled adjacent to original borehole and collected a split sspoon sample from 1-3' for TCL.
				15		
2				11		
				4		
3		0.2	0.0	7	Grey-brown, f/c SAND and GRAVEL, little silt, dry	
				50/0.1		
4						
5	2	1.6	0.0	5	Lt grey-brown, f/SAND, trace silt, damp	Collected sample for TCL Collected duplicate for TCL Pesticide & TCL PCB
				7		
6				7		
				8		
7		1.6	0.0	4	Lt grey-brown, f/SAND, trace silt, damp	
				5	Brown, f/SAND, little silt, damp	
8				7		Becomes wet
				6		
9		1.3	0.0	5	Brown, f/SAND, little silt, wet	
				6		
10						

Boring Number B-133

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES				SOIL DESCRIPTION	REMARKS
	Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts		
10				8		
				8		Boring backfilled w/ cuttings, cold patch surface
11					Bottom of boring at 11' below ground surface	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

Boring Number B-134

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	Date & time completed:
MMC - Farrell Road Plant RI/FS	557.044.01	5/9/94 - 1030	5/9/94 - 1415

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-57	3 1/4" ID HSA	380.65'	49'	

Bit(s)	Core barrel(s)	Inspector(s)
Center Bit		Sean Pepling

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (inches)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Storm sewer southeast of the Test Building				SURFACE DESCRIPTION: Asphalt	
0						
1	1	1.3	0.0	11	Grey-brown , f/s SAND and SILT, some gravel, dry	Remobed to B-134 on 5-10-94 @ 1018, drilled adjacent to the original borehole and collected a split spoon sample from1-3' for TCL.
				8	Brown, f/SAND, some Silt, damp	
2				12		
				12		
3		1.7	0.0	15	Brown, f/SAND, trace silt, damp	
				11		
4				8		
				8		
5		1.2	0.0	2	Brown, f/SAND, little silt, moist	
				2		
6				4		
				7		
7	2	1.4	0.0	7	Brown, f/SAND, some Silt, moist	Collected sample for TCL
				5		
8				7		
				8		
9		1.5	0.0	7	Brown, f/m SAND, trace c/sand, trace silt, wet	
				8		
10						

Boring Number B-134

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				10		
				12		
11		1.2	0.0	12	Brown, f/c SAND, trace silt, wet	
				10		
12				7		
				7		
13		1.2	0.0	7	Grey-brown, f/c SAND, trace silt, wet	
				10		
14				8		
				9		
15		1.8	0.0	7	Grey-brown, f/c SAND, trace silt, wet	
				8		
16				9		
				11		
17		1.4	0.0	6	Grey-brown, f/c SAND, trace silt, wet	
				8		
18				7	Brown, f/SAND, some Silt, wet	
				7		
19		0.8	0.0	11	Brown, f/SAND, little silt, wet	
				7		
20				8		
				8		
21						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.9	0.0	11	Brown, f/SAND, little silt, wet	
				7	Brown, f/c SAND, trace silt, wet	
22				8	Brown, f/SAND, little silt, wet	
				8	Brown, f/m SAND, little silt, wet	
23		0.5	0.0	WOR	Brown, f/m SAND, little silt, wet	
				WOR		
24				4		
				7		
25		1.3	0.0	7	Brown, f/m SAND, little silt, wet	
				10		
26				10		
				13		
27		0.6	0.0	4	Brown, f/m SAND, little silt, trace c/SAND, wet	
				5		
28				13		
				13		
29		1.5	0.0	5	Brown, f/m SAND, little silt, trace c/SAND, wet	
				5		
30				8	Brown, f/SAND, little silt, wet	
				10		
31		2.0	0.0	11	Brown f/m SAND, little silt, wet	
				11		
32						

Boring Number B-134

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				13	Grey-brown, f/SAND, trace silt, wet	
				11		
33		1.5	0.0	WOR	Grey-brown, f/c SAND, trace silt, wet	
				4		
34				5		
				6		
35		2.0	0.0	4	Grey-brown, f/c SAND, trace silt, wet	
				5		
36				12		
				9	Red-brown, SILT, trace f/sand, wet	Silt Lense
					Grey-brown, f/SAND , little silt, wet	
37		2.0	0.0	4	Grey-brown, f/m SAND, trace silt, wet	
				7		
38				5	Grey-brown, f/SAND , little silt, wet	
				10		
39		1.6	0.0	1	Grey-brown, f/m SAND, little silt, wet	
				1		
40				2	Grey-brown, SILT, wet	Silt lense
				5	Grey-brown, f/m SAND, little silt, wet	
41		2.0	0.0	5	Grey-red-brown, f/c SAND, little silt, wet	
				7		
42				8		
				10		
43						

Boring Number B-134

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
43		2.0	0.0	12	Grey-brown, f/m SAND, trace silt, wet	
				13		
44				9	Red-brown, f/c SAND, little silt, wet	
				12		
45		2.0	0.0	10	Red-brown, f/c SAND, some Silt, trace f/gravel, wet	
				15		
46				12		
				9		
47		1.1	0.0	WOR		
				10	Red-brown, f/c SAND, some Silt, wet	
48				34	Red-brown, CLAY and SILT, trace f/c sand, wet	
				48		
49					Bottom of boring at 49' below ground surface.	Boring backfilled w/cuttings, cold patch @ surface.
50						
51						
52						
53						
54						

Boring Number B - 135

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started:	5/9/94 - 1525	
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed:	5/9/94 - 1600	
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb	Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 380.76'	Completion depth:	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Storm Sewer North of FRP-1 SVS-001-019 location				SURFACE DESCRIPTION: Asphalt	
0						
1	1	1.1	0.0	12	Red Brown, f/c SAND and GRAVEL, some Silt, damp Brown, f/SAND, trace silt, moist	Remobed to B-135 on 5/10/94 @ 1030, drilled adjacent to original borehole and collected a split spoon sample from 1-3' for TCL.
				12		
2				10		
				10		
3		1.3	0.0	8	Brown, f/SAnd, some Silt, moist	
				8		
4				9	Lt Brown, f/SAND, trace silt, damp	
				8		
5		1.4	0.0	8	Lt Brown, f/SAND, trace silt, damp	
				8		
6				12		
				13		
7	2	1.9	0.0	8	Lt Brown, f/SAND, trace silt, damp	Collected sample for TCL
				8		
8				7		
				8		
9		1.6	0.0	9	Brown, f/SAND, some Silt, wet	
				9		
10						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				9		
				8		
11					Bottom of boring at 11' below ground surface	Boring backfilled w/cuttings, cold patch surface
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

Boring Number B-136

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location: MMC - Farrell Road Plant RI/FS	Project number: 557.044.01	Date & time started: 5/10/94 - 0830	Date & time completed: 5/10/94 - 0930
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): 2" OD S/S	Sampler hammer: 140lb / Drop: 30"
Drilling equipment: Mobile B-57	Method: 3 1/4" ID HSA	Elevation & datum: 380.94'	Completion depth: 11' / Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling	

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Storm Sewer North of FRP-1 Adjacent to CB-06				SURFACE DESCRIPTION:	
0						
1	1	0.5	0.0	19	Grey, f/c SAND and GRAVEL, some Silt, dry	Sample collected for TCL
				8		
2				6		
				6		
3		1.3	0.0	2	Brown, f/SAND, some Silt , damp	
				1		
4				2		
				2		
5		1.8	0.0	2	Brown, f/SAND, little silt, moist	
				2		
6				3		
				3		
7	2	1.6	0.0	3	Brown, f/SAND, little silt, moist	Collected sample for TCL
				3		
8				4		
				4		
9		1.9	0.0	3	Brown. f/SAND, little silt, wet	
				3		
10						

Boring Number B-136

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (inches)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				4		
11				5		Boring backfilled w/ cuttings
					Bottom of boring at 11' below ground surface	
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						

Boring Number MW-26S

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started / completed		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time started: 5/3/94 - 1330 Date & time completed: 5/3/94 - 1415		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede	Sampler(s): NA	Sampler hammer: NA	Drop: NA
Drilling equipment: Mobile B-57	Method: 4 1/4" ID HSA	Elevation & datum: 374.27'	Completion depth: 15'	Rock depth:
Bit(s): Center Bit	Core barrel(s):	Inspector(s): Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 10				SURFACE DESCRIPTION: Asphalt	
0						No sample collected from boring MW-26S, see "Log of Boring" for MW-26D for lithologic description.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Boring Number MW-26S

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10						
11						
12						
13						
14						
15					Bottom of boring @ 15' below the ground surface	MW-26S installed, see Monitoring Well Construction Log
16						
17						
18						
19						
20						
21						

Boring Number **MW-26D**

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: / completed:		
MMC - Farrell Road Plant RI/FS	557.044.01	5/3/94 - 0825 / 5/3/94 - 1055		
Drilling company	**Foreman**	**Sampler(s)**	**Sampler hammer**	**Drop**
Aquifer Drilling & Testing	M. Mede	2" OD S/S	140lb	30"
Drilling equipment	**Method**	**Elevation & datum**	**Completion depth**	**Rock depth**
Mobile B-57	4 1/4" ID HSA	374.23'	34'	
Bit(s)	**Core barrel(s)**	**Inspector(s)**		
Center Bit		Sean Pepling		

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: Area 10				SURFACE DESCRIPTION: Asphalt	
0						
1		1.1	0.0	9	Red-brown, f/c SAND and GRAVEL, some Silt, dry	
				10		
2				9		
				13		
3	1	1.3	0.0	9	Brown, f/SAND, little silt, damp	Sample collected for TCL/TAL
				10		
4				12		
				15		
5		1.6	0.0	5	Brown, f/SAND, some Silt, moist	
				3		
6				3		
				2		
7		1.3	0.0	5	Brown, f/SAND, some Silt, wood fragments, moist	
				3		
8				12		
				15		
9		1.0	0.0	5	Brown, f/SAND, some Silt, wood fragments, moist	
				9		
10						

Boring Number MW-26D

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
10				11		
				12		
11	2	2.0	0.0	11	Brown, f/SAND, some Silt, moist	Sample collected for TCL/TAL
				12		
12				13		
				15		
13		1.7	0.0	4	Brown, f/SAND, some Silt, wet	
				6		
14				5		
				5		
15		2.0	0.0	6	Brown, f/SAND, little silt, wet	
				7		
16				6		
				7		
17		1.8	0.0	3	Brown, f/SAND, little silt, wet	
				2		
18				3		
				3		
19		0.9	0.0	5	Brown, f/SAND, some Silt	
				4		
20				5		
				5		
21						

Boring Number MW-26D

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
21		1.7	0.0	3	Brown, f/SAND, little silt, wet	
				4		
22				3		
				3		
23		2.0	0.0	4	Brown, f/SAND, little silt, wet	
				3		
24				7		
				2		
25		2.0	0.0	5	Brown, f/SAND, little silt, wet	
				7		
26				9		
				9		
27		1.5	0.0	4	Brown, f/SAND, little silt, wet	
				4		
28				6		
				7		
29		1.3	0.0	4	Brown, f/SAND, little silt, wet	
				4		
30				5		
				6		
31		1.8	0.0	4	Brown, f/SAND, little silt, wet	
				4		
32						

Boring Number MW-26D

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
32				5		
				5		
33		0.7	0.0	8	Brown, f/SAND, little silt, wet	
				50/4	Red-brown, CLAY and SILT, little f/c sand, trace gravel, wet	
34						MW-26D installed, see Monitoring Well Contruction Log
					Bottom of boring @ 34' below the ground surface	
35						
36						
37						
38						
39						
40						
41						
42						
43						

Boring Number BR-1

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started / completed
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time started: 4/28/94 Date & time completed: 5/10/94

Drilling company	Foreman	Sampler(s)	Sampler hammer	Drop
Aquifer Drilling & Testing	Matt Adams	S/S & Denison Core		

Drilling equipment	Method	Elevation & datum	Completion depth	Rock depth
Mobile B-61 & Schramm Rig	HSA & Mud Rotary	378.79	140'	

Bit(s)	Core barrel(s)	Inspector(s)
Tricone Bit		Bill Mahoney

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: 40' south of SE corner of FRP 2				SURFACE DESCRIPTION: Grass, topsoil	
0					Brown, f/SAND, little clay, trace silt, moist	B-61, from cuttings
5	1	1.5	0.0	3,4,4,4	Brown, f/SAND and SILT, little clay, moist	
10	2	2.0	0.0	1,3,4,4	Brown, f/SAND, some Silt, saturated	
15	3	2.0	0.0	3,3,4,5	Brown, f/SAND, little silt, saturated	
20	4	1.5	0.0	5,6,8,7	Brown, m/c SAND, trace silt, saturated Brown, SILT, trace f/sand, saturated Brown, m/c SAND, trace silt, saturated	
25	5	1.5	0.0	7,9,10,9	Brown, m/c SAND, trace silt, wet	
30	6	2.0	0.0	6,8,10,12	Brown, f/c SAND, trace-little silt, wet	
	7	0.5	0.0		Red, CLAY and SILT, little f/sand, little f/gravel, damp	
35						8" steel casing set 3.5' into the till, grouted to the surface Schramm Mud Rotary Rig
40						
45						
50						

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES: Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
50						
55						
60					Red, CLAY and SILT, little f/m gravel, trace sand, Rx fragments from cobbles (green & black)	
65						
70						
75					Red, CLAY and SILT, little f/m gravel (shaley)	
80						
85						
90						
95					Red, CLAY and SILT, some Gravel (lt-med green, shale) White, CLAY and SILT, shale fragments more prevalent	
100					Red, CLAY and SILT	
105						

Boring Number BR-1

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
105					Red, SILT and CLAY, black rounded gravel, little green shale fragments	
110					Red, CLAY and SILT, some white-gray Clay, trace green shale fragments	
115					Red, CLAY and SILT, some f/m Gravel	
120					Red, SILT and CLAY, trace white-gray clay, green shale fragments	
125						
130						
135					Red, CLAY and SILT, some Gravel (various colors)	
140					Bottom of boring @ 140' below the ground surface	Set monitoring well
145						
150						
155						
160						

Boring Number BR-2

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: 4/29/94
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed: 5/12/94
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede/M Adams	Sampler(s): / Sampler hammer: / Drop:
Drilling equipment: Mobile B-57 & Schramm Mud Rig	Method: HSA & Mud Rotary	Elevation & datum: 372.40 / Completion depth: 103' / Rock depth:
Bit(s): Tricone Bit	Core barrel(s):	Inspector(s): Bill Mahoney

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: NW corner of FRP-2 North of the garage				SURFACE DESCRIPTION: Asphalt	
0						
5	1			1,1,4,4,	DK Brown, SILT and f/SAND, trace organics, moist	
10	2	1.6	0.0	4,4,5,4	Brown, f/SAND, some Silt, wet	
15	3	1.8	0.0	3,4,3,4	Brown, f/SAND, little silt, wet	
20	4	1.4	0.0	1,2,3,5	Brown, f/SAND, little silt, wet	
25	5	1.7	0.0	4,4,6,5	Brown, f/SAND, little silt, wet	
30	6	1.3	0.0	4,4,18,24	Brown, f/SAND, little silt, wet Red, CLAY and SILT, some f/Sand, some f/Gravel, wet	@ 31.9'
35						
40		1.7			RED, CLAY and SILT, some f/m Gravel (subrounded), moist, hard	Denison core Hydraulic conductivity test
45						
50					Red, Clay and SILT, little white clay, gravel	

Boring Number BR-2

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
50					Red, CLAY and SILT, little white clay, little gravel	
55						
60						
65						
70						
75						
80					Red, CLAY and SILT, little white clay, little green shale fragments	
85						
90						
95						
100		2.2			Red, CLAY and SILT, some f/Gravel, damp, very stiff	Denison Core Set monitorring well
105					Bottom of boring @ 103' below the ground surface	

Boring Number BR-3

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

Project name & location	Project number	Date & time started: 5/2/94		
MMC - Farrell Road Plant RI/FS	557.044.01	Date & time completed: 5/16/94		
Drilling company: Aquifer Drilling & Testing	Foreman: M. Mede/M. Adams	Sampler(s):	Sampler hammer:	Drop:
Drilling equipment: Mobile B-57 & Schramm Mud Rig	Method: HSA & Mud Rotary	Elevation & datum: 378.18	Completion depth: 103'	Rock depth:
Bit(s): Tricone Bit	Core barrel(s):	Inspector(s): Bill Mahoney		

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
	LOCATION: North center of the property line along the rear fence				SURFACE DESCRIPTION: Asphalt	
0						
5	1	1.6	0.0	1,2,4,6	Brown, f/SAND, some Silt, moist Dk brown, f/SAND and SILT, moist	
10	2	2.0	0.0	3,4,14,14	Brown, f/SAND, some Silt, moist	
15	3	1.8	0.0	1,4,7,6	Grey-brown, f/SAND, trace silt, wet Red-brown, f/SAND, trace silt, wet	
20	4	2.0	0.0	3,3,4,5	Brown, f/m SAND, trace silt, wet	
25	5	2.0	0.0	6,6,6,7	Brown, f/SAND, trace silt, wet	
30	6	2.0	0.0	2,3,6,7,	Brown, f/SAND, little silt, wet	
35	7	2.0	0.0	5,5,8,10	Brown, f/SAND, little silt, wet	
40	8	2.0	0.0	3,3,4,2 4,10,19,25	Brown, f/SAND, little silt, wet Red, f/SAND, some c/Sand, some Silt Red, CLAY and SILT, some f/c Sand, trace gravel, wet	
45						
50						

Boring Number BR-3

ERM-Northeast

5788 Widewaters Parkway, Dewitt, New York 13214

LOG OF BORING

DEPTH (ft below grade)	SAMPLES Sample Number	Recovery (feet)	HNU/ OVA (ppm)	Blow Counts	SOIL DESCRIPTION	REMARKS
50					Brown, f/SAND, some Silt, little gravel, trace clay	
55					Red, CLAY and SILT, some Gravel	
60						
65					Red, CLAY and SILT, some Gravel (green and black)	
70						
75					Red, CLAY and SILT, f/gravel (green and black)	
80						
85						
90						
95					Red, CLAY and SILT, gravel	
100					Red, CLAY and SILT, some f/m Sand, green shale fragments, damp Red, CLAY and SILT, little f/sand, dry, stiff,	Set monitoring well Denison core
105					Bottom of boring @ 103' below the ground surface	

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-17S

Project Name & Location	Project Number	Date & time started / completed
MARTIN MARIETTA-FRP	557.008.02	Date & time started: 11-02-93 Date & time completed: 11-02-93

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	B. Spizuoco	ESP	Manual	NA

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
364.97 (M.S.L.), surface = 0'	3.2	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet Below Top Casing):
Wetlands north of FRP	Swamp; ground was saturated Stick-up = 1.79	Date: 11-15-93 Time: 0840 Depth: 1.81

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5 – 2.5		NA	NA	OL		Dark brown ORGANIC SILT (saturated, soft)	top of screen @ 1.0'
3.0				SW		Light brown fine SAND (saturated, medium dense)	base of screen @ 3.0'
3.5 – 10.0							End of Boring @ 3.2'

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-17D

Project Name & Location	Project Number	Date & time started:	Date & time completed:
MARTIN MARIETTA-FRP	557.008.02	11-09-93	11-09-93

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	J. Fox	Hand auger	Manual	NA

Elevation and Datum (Fee:	Completion Depth (Feet)	Inspector(s):
364.96 (M.S.L.), surface = 0'	7.5	J. Fox

Location	Surface Description:	Water Levels (Feet Below Top Casing):
Wetlands north of FRP	Swamp; ground was wet Stick-up = 2.70'	Date: 11-15-93; Time: 0841; Depth: 2.80

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5		NA	NA	OL		Dark brown to black ORGANIC SILT (damp, soft)	
1.0				CL		Gray CLAY, trace gray silt, trace plant debris (wet, stiff)	
1.5				SM		Brown SILTY SAND, trace plant debris (wet-saturated, medium dense)	
2.0							wet above 2.0'
2.5							saturated below 2.0'
3.0							
3.5							
4.0							
4.5							
5.0							
5.5							top of screen @ 5.3'
6.0							
6.5							
7.0							
7.5							base of screen @ 7.3'
8.0							End of Boring @ 7.5'
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-18S

Project Name & Location	Project Number	Date & time started / completed		
MARTIN MARIETTA-FRP	557.008.02	Date & time started: 11-04-93		
		Date & time completed: 11-04-93		
Drilling company	**Foreman**	**Drilling Equipment**	**Method**	**Sampler**
ERM Northeast	B. Spizuoco	ESP	Manual	NA

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
363.46 (M.S.L.), surface = 0'	3.0	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet Below Top Casing):		
Wetlands north of FRP	Swamp; ground was wet Stick-up = 2.50'	Date	Time	Depth
		11-15-93	0920	2.19

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5		NA	NA	OL		Dark brown ORGANIC SILT (saturated, soft)	
1.0				CL		Gray CLAY, trace gray silt (saturated, stiff)	top of screen @ 0.8'
1.5–3.0				CL		Reddish-brown CLAY, little brown silt, trace brown very fine sand, trace plant debris (saturated, stiff)	sand/silt more prevalent towards base base of screen @ 2.8'
3.5							End of Boring @ 3.0'
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-18D

Project Name & Location	Project Number	Date & time started / completed
MARTIN MARIETTA-FRP	557.008.02	Date & time started: 11-09-93 Date & time completed: 11-09-93

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	J. Fox	Hand auger	Manual	NA

Elevation and Datum (Feet	Completion Depth (Feet)	Inspector(s):
363.66 (M.S.L), surface = 0'	7.75	J. Fox

Location	Surface Description:	Water Levels (Feet Below Top Casing):
Wetlands north of FRP	Swamp; ground was wet Stick-up = 2.53'	Date: 11-15-93 Time: 0921 Depth: 2.21

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5		NA	NA	OL		Dark brown to black ORGANIC SILT (wet-saturated, soft)	
1.0–2.5				CL		Gray CLAY, trace plant debris (saturated, stiff)	
3.0–3.5				ML		Reddish-brown SILT and CLAY, trace plant debris (saturated, stiff)	
4.0–7.5				SM		Reddish-brown very fine SILTY SAND (saturated, medium dense)	top of screen @ 5.5' base of screen @ 7.5'
8.0–10.0							End of Boring @ 7.75

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-19S

Project Name & Location	Project Number	Date & time started / completed
MARTIN MARIETTA-FRP	557.008.02	Date & time started: 11-04-93 Date & time completed: 11-04-93

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	B. Spizuoco	ESP	Manual	NA

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
363.84 (M.S.L.), surface = 0'	3.2	B. Spizuoco/J. Fox

Location	Surface Description:	Water Levels (Feet Below Top Casing):
Wetlands north of FRP	Swamp; ground was saturated Stick-up = 1.90'	Date: 11-15-93, Time: 0930, Depth: 1.98

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5		NA	NA	OL		Dark brown ORGANIC SILT (saturated, soft)	
1.0–2.0				CL		Gray CLAY, trace gray silt, trace plant debris (saturated, stiff)	top of screen @ 0.9'
2.5–3.0				CL		Reddish-brown SILTY CLAY, trace plant debris (saturated, stiff)	base of screen @ 2.9'
3.5							End of Boring @ 3.1'
4.0							
4.5							
5.0							
5.5							
6.0							
6.5							
7.0							
7.5							
8.0							
8.5							
9.0							
9.5							
10.0							

ERM-Northeast

5488 Widewaters Parkway
Dewitt, New York 13214

LOG OF BORING: P-19D

Project Name & Location	Project Number	Date & time started	Date & time completed
MARTIN MARIETTA-FRP	557.008.02	11-09-93	11-09-93

Drilling company	Foreman	Drilling Equipment	Method	Sampler
ERM Northeast	J. Fox	Hand auger	Manual	NA

Elevation and Datum (Feet)	Completion Depth (Feet)	Inspector(s):
363..74 (M.S.L.), surface = 0'	7.25	J. Fox

Location: Wetlands north of FRP

Surface Description: Swamp; ground was wet

Stick-up = 2.97'

Water Levels (Feet Below Top Casing):

Date	Time	Depth
11-15-93	0931	3.17

DEPTH (ft)	TIME	Recovery (inches)	PID (ppm*)	USCS SYMBOL	GRAPHIC LOG	SEDIMENT/SOIL DESCRIPTION	REMARKS
0							* = above background
0.5		NA	NA	OL		Dark brown to black ORGANIC SILT (wet, soft)	
1.0–1.5				CL		Gray CLAY, trace gray silt, trace plant debris (wet-saturated, stiff)	wet above 0.7' saturated below 0.7'
2.0–6.0				CL		Reddish-brown SILTY CLAY, trace reddish-brown very fine sand, trace plant debris (saturated, stiff)	top of screen @ 5.0'
6.5–7.0				CL		Same as above except little sand	base of screen @ 7.0'
7.5							End of Boring @ 7.25'
8.0							
8.5							
9.0							
9.5							
10.0							

APPENDIX D

SURFACE WATER SAMPLE RECORDS

Sw-1

ERM

SURFACE WATER FIELD SAMPLING RECORD

Project Name: MMC-FRP Project No.: 557.008.02 Date: 11-4-93

Samplers Name(s): Bill Spizzoco

SAMPLING SW-1

Time of Collection: 8:45

Sample Type: Surface Water

Sample Method: Grab

Description of Sample Location: Due north of MW-9

Drainage Direction: Standing

Upstream From: NR

Downstream From: NR

Physical Appearance and Odor: NR

Wildlife Observed: NR

Sampling Description: NR

Suspended Matter: NR

Color/Strain: NR

Odor: NR

Other: NR

Texture: NR

Preservative: NR

Analyze For: VOC and hardness

Field Tests:

Temp: 4.6°C pH: 7.05 Eh: NR Spec. Cond.: 0.11 umhos/cm Filt. Alk.: NR

Weather: overcast, 40-45°F, light breeze

Comments: Copied data from field logbook.

NEC:E:\SFORMS\SURFWAT.XLS

SW-2

ERM

SURFACE WATER FIELD SAMPLING RECORD

Project Name: MMC-FRP Project No.: 557.008.02 Date: 11-4-93

Samplers Name(s): Bill Spizuoco

SAMPLING SW-2

Time of Collection: 10:30

Sample Type: Surface Water

Sample Method: Grab

Description of Sample Location: D ½ way between P19 S/D and SS-8

Drainage Direction: Standing

Upstream From: NR

Downstream From: NR

Physical Appearance and Odor: NR

Wildlife Observed: NR

Sampling Description: NR

Suspended Matter: NR

Color/Strain: NR

Odor: NR

Other: NR

Texture: NR

Preservative: NR

Analyze For: VOC and hardness

Field Tests:

Temp: 6.0°C pH: 7.29 Eh: NR Spec. Cond.: 0.49 umhos/cm Filt. Alk.: NR

Weather: Overcast, 40-45°F, light breeze

Comments: Data copied from field logbook.

SW-3

ERM

SURFACE WATER FIELD SAMPLING RECORD

Project Name: HMC-FRP Project No.: 557.008.02 Date: 11-4-93

Samplers Name(s): Bill Spizuoco

SAMPLING SW-3

Time of Collection: 9:40
Sample Type: Surface Water
Sample Method: Grab
Description of Sample Location: Base of huge toppled tree, north of SS-3
Drainage Direction: Standing
Upstream From: NR
Downstream From: NR
Physical Appearance and Odor: NR

Wildlife Observed: NR

Sampling Description: NR
Suspended Matter: NR
Color/Strain: NR
Odor: NR
Other: NR
Texture: NR
Preservative: NR
Analyze For: VOC and hardness

Field Tests:
Temp: 6.8°C pH: 7.07 Eh: NM Spec. Cond.: 0.36 umhos/cm Filt. Alk.: NM

Weather: Overcast, 40-45°F, light breeze

Comments: Data copied from field log book.

NEC:E:\SFORMS\SURFWAT.XLS

APPENDIX E

GROUND WATER SAMPLE RECORDS

ERM

MW-1

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC FRP RI/FS

DATE: 16 May 1994

SAMPLE ID: FRP-MW01 (051694)

SAMPLERS: J. Fox

Time Onsite: 1245

Time Offsite: 1445

Depth of well (from top of casing)	17.33'	Time:	1254
Initial static water level (from top of casing)	9.82'	Time:	1255
Water level after purging (from top of casing)	14.29'	Time:	1326
Water level before sampling (from top of casing)		Time:	

17.33
9.82
7.51
.16
4506
7510
12016

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

2 in. casing: 7.51 ft. of water x 0.16 = 1.20 gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:
>3 volumes: yes X no ___

purged dry? yes ___ no X

Field Tests:

Temp: 10.8 °C
pH: 7.52
Eh: NA

~~Alkalinity (filtered)~~ turbidity: 169 NTU
Alkalinity (unfiltered): NA
Spec. Conductivity: 0.53 mS/cm

temp	pH	turb	cond.
10.8	7.49	700	0.60
10.6	7.61	463	0.59
10.7	7.69	310	0.60
10.4	7.73	335	0.56
10.4	7.71	330	0.56

Sampling

Time of Sample Collection: 1437

Method:
- ___ Stainless steel bailer
- ___ Teflon bailer
- ___ Pos. Disp. Pump
- X Disposable bailer
- ___ Dedicated pump
- ___ Other: ______

Analyses:
- X VOCs - 602 ___ 503.1 ___ Other TCL
- X SVOCs
- X Metals → too turbid, return later 5-17-94 @ 0930
- X PCB/Pest
- ___ Physical
- ___ Other ______

Observations

Weather/Temperature: overcast, temp. ± 50°F winds W-NW, est. 5-10 mph.

Sample description: turbid, brown

Free Product? yes ___ no X describe ______

Sheen? yes ___ no X describe ______

Odor? yes ___ no X describe ______

Comments:

- 1.20 gallons × 5 (well volumes) = 6.0 gallons
- total removed (H_2O) = ~ 14.2 gallons

NEC:E:\SFORMS\GWFLDSAM.XLS

RM

MW - Ø2

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC - FRP

DATE 20MAY94

SAMPLE ID : FRP MWØ2 (0594)

SAMPLERS : W. MAHONEY

Time Onsite: 0810

Time Offsite:

13.47 DTP

Depth of well (from top of casing) .... 22.0 Time:

Initial static water level (from top of casing) .... 13.79 Time: 0815

Water level after purging (from top of casing) .... Time:

Water level before sampling (from top of casing) ...... Time:

Purging Method:

Airlift ___ Centrifugal ___

Bailer ___ Pos. Displ. ___

Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing:_____ ft. of water x 0.16 = _____ gallons

3 in. casing:_____ ft. of water x 0.36 = _____ gallons

4 in. casing: 8.21 ft. of water x 0.65 = 5.34 gallons

volume of water removed:

>3 volumes: yes X no ___

purged dry? yes ___ no X

Field Tests:

	1	2	3		1	2	3
Temp:	12.9	12.9	12.9	Turbidity ~~Alkalinity (filtered)~~:	29.6	28.4	28.8
pH:	7.25	7.31	7.34	~~Alkalinity (unfiltered)~~:			
~~Eh:~~				Spec. Conductivity:	0.54	0.56	0.59

Sampling

Time of Sample Collection: 11:00

Method:

___ Stainless steel bailer

___ Teflon bailer

___ Pos. Disp. Pump

X Disposable bailer

___ Dedicated pump

___ Other:

Analyses:

X VOCs - 602 ___ 503.1 ___ Other TCL

X SVOCs

X Metals

X PCB/Pest

___ Physical

___ Other

Observations

Weather/Temperature: Sunny - 65°F

Sample description: WATER, gobules of petroleum

Free Product? yes X no ___ describe 0.32'

Sheen? yes X no ___ describe

Odor? yes X no ___ describe petroleum Odor #2 fuel

Comments:

5.34 x 5 = 26.7 gallon = 5 volumes Start Purge 0825 STOP Purging 0855 removed 27 gals

3 volume stable @ 10.53

NEC:E:\SFORMS\GWFLDSAM.XLS

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

ERM

MW-03S

SITE MMC-FRP DATE 18 May 1994

SAMPLE ID: FRP-MW03S(0594)

SAMPLERS:	Time Onsite:	Time Offsite:
Sean Popling	1045	1205

Depth of well (from top of casing)	18.93	Time: 1055
Initial static water level (from top of casing)	9.34	Time: 1055
Water level after purging (from top of casing)	9.41	Time: 1140
Water level before sampling (from top of casing)	9.41	Time: 1140

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 9.59 ft. of water x 0.16 = 1.5 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes ✓ no ___
8 gallons Additional volumes

purged dry? yes ___ no X

Field Tests:

	1	2	3
(°C) Temp:	9.7	9.8	9.6
pH:	9.96	10.34	9.80
Eh:	10.96		

	1	2	3
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity (mv/cm):	0.69	0.70	0.70

	1	2	3
Turbidity (NTUs)	26.3	28.7	26.3

Sampling

Time of Sample Collection: 1145

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL Lists
X SVOCs
X Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, some rain, 40°s F, calm
Sample description: Clear Water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:

NEC:E:\SFORMS\GWFLDSAM.XLS

MW-3D

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC FRP DATE 18 MAY 94

SAMPLE ID : MW-3D FRP-MW3D(0594) 30

SAMPLERS : W. MAHONEY

Time Onsite: 1020 Time Offsite: 1225

Depth of well (from top of casing) .... 33.50 Time:

Initial static water level (from top of casing) .... 8.93 Time: 1025

Water level after purging (from top of casing) .... 17.75 Time: 1155

Water level before sampling (from top of casing) ...... Time:

Purging Method:

Airlift ___ Centrifugal ___

Bailer ___ Pos. Displ. ___

Submersible X Ded. Pump ___

~~WATERA X~~ W.M.

volume of water removed:

>3 volumes: yes X no ___

Well Volume Calculation

2 in. casing:____ ft. of water x 0.16 = ____ gallons

~~3 in. casing:____ ft. of water x 0.36 = ____ gallons~~

4 in. casing: 24.57 ft. of water x 0.65 = 15.9 gallons

purged dry? yes____ no X

Field Tests:

	1	2	3		1	2	3
Temp:	12.3	12.3	12.1	Turbidity ~~Alkalinity (filtered)~~:	0.85	0.92	0.85
pH:	8.02	7.96	7.91	~~Alkalinity (unfiltered)~~:			
Eh:				Spec. Conductivity:	1.39	1.39	1.40

Sampling

Time of Sample Collection: 1210

Method:

___ Stainless steel bailer

___ Teflon bailer

___ Pos. Disp. Pump

X Disposable bailer

___ Dedicated pump

___ Other:

Analyses:

X VOCs - 602____ 503.1____ Other____

X SVOCs

X Metals

X PCB/Pest

___ Physical

___ Other

Observations

Weather/Temperature: Overcast, Rain 45°F

Sample description: Clear

Free Product? yes___ no X describe

Sheen? yes___ no X describe

Odor? yes___ no X describe

Comments:

15.9 x 5 = 79.85 Start Purge 1040

NEC:E:\SFORMS\GWFLDSAM.XLS

MW-4

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC-FRP
DATE: 16 May 1994

SAMPLE ID: FRP-MW4 (051694)

SAMPLERS: Sean Pepling

Time Onsite: 1055
Time Offsite: 1200

Depth of well (from top of casing)	11.74	Time: 1059
Initial static water level (from top of casing)	8.39	Time: 1059
Water level after purging (from top of casing)	9.75	Time: 1135
Water level before sampling (from top of casing)	8.86	Time: 1143

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 3.35 ft. of water x 0.16 = 0.54 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
3 gallons removed
Additional volumes (total removed 5 gallons)

Field Tests:

	1	2	3
(C) Temp:	10.0	10.0	9.8
pH:	7.34	7.40	7.40
Eh:			

	1	2	3
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity: (mmho/cm)	3.75	3.88	3.83

	1	2	3
Turbidity (NTUs)	1075	1085	1063

Sampling

Time of Sample Collection: 1145

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals - 5/17/94 @ 0915 see
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, calm 0-2 mph NW, warm 60°F
Sample description: Red Brown turbid water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
Metals not collected at 1145 due to turbidity greater than 50 NTU
Metals collected at 1535

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MW-5

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC-FRP DATE 16 May 1994

SAMPLE ID : FRP-MW5(051694)

SAMPLERS : Sean Pepling Time Onsite: 1415 Time Offsite: 1525

Depth of well (from top of casing) .... 19.39 Time: 1422
Initial static water level (from top of casing) .... 10.77 Time: 1421
Water level after purging (from top of casing) .... 11.37 Time: 1504
Water level before sampling (from top of casing) .... 10.75 Time:

Purging Method:

Airlift ___ Centrifugal ___
Bailer x Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 8.62 ft. of water x 0.16 = 1.4 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes ✓ no ___ 7 gallons purged dry? yes ___ no ___

Field Tests: additional volumes

	1	2	3	4
Temp:	10.7	10.4	10.3	10.5
pH:	7.28	7.33	7.35	7.36
Eh:	NA			

	1	2	3	4
Alkalinity (filtered):	NA			
Alkalinity (unfiltered):	NA			
Spec. Conductivity:	1.15	1.14	1.16	1.16

	1	2	3	4
Turbidity	306	>1000	>1000	>1000

Sampling

Time of Sample Collection: 1515

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
x Disposable bailer
___ Dedicated pump
___ Other:

Analyses:
x VOCs - 602 ___ 503.1 ___ Other TCL VOAs
x SVOCs
x Metals -
Ø PCB/Pest
___ Physical
___ Other

Observations

Weather/Temperature: Overcast, slight breeze (0-5mph W) occas. gusts to 10mph+, 50s°F
Sample description:
Free Product? yes ___ no ___ describe
Sheen? yes ___ no ___ describe
Odor? yes ___ no ___ describe

Comments:
Metals not collected at 1515 because turbidity > 50 NTUs
Metals collected at 1726 on 5-16-94

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FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-6

SITE MMC-FRP   DATE 17 May 1994

SAMPLE ID : FRP-MW06(0594)

SAMPLERS : Sean Pepling   Time Onsite: 1215   Time Offsite: 1325

Depth of well (from top of casing)	12.90	Time:	1220
Initial static water level (from top of casing)	0.34	Time:	1220
Water level after purging (from top of casing)	0.37	Time:	1310
Water level before sampling (from top of casing)	0.37	Time:	1315

Purging Method:

Airlift ___ Centrifugal ___
Bailer ___ Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 12.56 ft. of water x 0.16 = 2.01 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___   purged dry? yes ___ no X
12 gallons

Field Tests: (at 1, 2, 3 equal volumes)

	1	2	3
Temp:	10.4	10.2	10.0
pH:	7.20	7.40	7.40
Eh:			
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity:	1.61	1.56	1.56
Turbidity	12.3	11.9	12.1

Sampling

Time of Sample Collection: 1320

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
___ Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, occas rain, 50°F, calm 0-5mph SW
Sample description: clear water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:

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ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-7

SITE: MMC-FRP

DATE: 17 May 1994

SAMPLE ID: FRP-MW07(0594)

SAMPLERS: Sean Pepling

Time Onsite: 1325

Time Offsite: 1440

Depth of well (from top of casing)	12.30	Time:	1330
Initial static water level (from top of casing)	1.52	Time:	1330
Water level after purging (from top of casing)		Time:	
Water level before sampling (from top of casing)	1.57	Time:	1410

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 10.78 ft. of water x 0.16 = 1.7 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___
10 gallons

purged dry? yes ___ no X

Field Tests: (Additional Volumes)

	1	2	3
(°C) Temp:	10.1	9.9	9.9
pH:	7.43	7.50	7.52
Eh:			

	1	2	3
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity: (mS/cm)	2.47	2.45	2.43

	1	2	3
Turbidity (NTUs)	>100	>1000	>100

Sampling

Time of Sample Collection: 1415

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals @ 1645
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, occas. rain, 50's F, 0-5 mph SW
Sample description:
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
Metals not collected at 1415, Turbidity > 50 NTUs
Metals collected @ 1645

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ERM

MW-08

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MAC FRP RI/FS DATE 5/17/94

SAMPLE ID : FRP-MW08 (0594)

SAMPLERS : J. Fox

Time Onsite: 1225 Time Offsite: 1432

11.63
3.02
8.61
.16
5166
8610
13776

Depth of well (from top of casing)	11.63	Time:	1241
Initial static water level (from top of casing)	3.02	Time:	1240
Water level after purging (from top of casing)	3.17	Time:	1340
Water level before sampling (from top of casing)	3.13	Time:	1348

1.38
5
6.90

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 8.61 ft. of water x 0.16 = 1.38 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
total vol. H_2O removed ≈ 14.5 gallons

Field Tests:

Temp: 9.0 °C ~~Alkalinity (filtered)~~ turbidity: 32 NTU
pH: 7.03 Alkalinity (unfiltered): NA
Eh: NA Spec. Conductivity: 1.05 mS/cm

temp.	pH	turb.	cond.
8.9	7.09	35	1.07
8.8	7.12	43	1.06
9.0	7.18	36	1.06
8.9	7.12	37	1.07
8.9	7.13	35	1.07

stabilization

Sampling

Time of Sample Collection: 1350

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL
X SVOCs
X Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: overcast light rain, temp. ≈ 55°F, winds calm (in words)
Sample description: clear water, low turbidity
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
- 1.38 gallons × 5 (well volumes) = 6.90 gallons
- metals + cyanide collected also because turbidity consistently < 50 NTU

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ERM

MW-09

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC FRP RI/FS DATE: 5/17/94

SAMPLE ID: FRP-MW09 (0594)

SAMPLERS: J. Fox Time Onsite: 1438 Time Offsite: 1620

Depth of well (from top of casing)	14.52'	Time:	1450
Initial static water level (from top of casing)	4.00'	Time:	1449
Water level after purging (from top of casing)	5.38'	Time:	1533
Water level before sampling (from top of casing)	4.08'	Time:	1548

14.52
4.00
10.52'
.16
6312
10520
1.6832

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

1.68
5
8.40

2 in. casing: 10.52' ft. of water x 0.16 = 1.68 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
total vol. H_2O removed ~ 16.5 gallons

Field Tests:

Temp: 8.3 °C ~~Alkalinity (filtered):~~ Turbidity 185 NTU
pH: 8.25 Alkalinity (unfiltered): NA
Eh: NA Spec. Conductivity: 0.54 mS/cm

temp.	pH	turb.	cond.
8.1	8.24	150	0.54
8.1	8.19	145	0.54
8.1	8.13	147	0.54

stabilization

Sampling

Time of Sample Collection: 1550

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL
X SVOCs
X Metals → too turbid; wait ~ 30 min. to settle
X PCB/Pest → sampled @ 1615; turbidity reading = 23 NTU
___ Physical
___ Other ___

Observations

Weather/Temperature: overcast, temp. ± 55°F, winds calm (woods)
Sample description: mostly clear, slight turbidity (~ 100 NTU est. at end of sampling)
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
– 1.68 gallons × 5 (well volumes) = 8.40 gallons

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MW-10

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

ERM

SITE: MMC FRP RI/FS   DATE: 5/20/94

SAMPLE ID: FRP-MW10 (0594)

SAMPLERS: J. Fox   Time Onsite: 1230   Time Offsite: 1340

Depth of well (from top of casing) .... 18.21'   Time: from well development data sheet
Initial static water level (from top of casing) .... 10.20'   Time: 1237
Water level after purging (from top of casing) .... 10.28'   Time: 1319
Water level before sampling (from top of casing) .... 10.20'   Time: 1324

1.28 × 5 = 6.40

18.21 − 10.20 = 8.01

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

2 in. casing: 8.01 ft. of water x 0.16 = 1.28 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___   purged dry? yes ___ no X
total vol. removed ~ 9.0 gallons

Field Tests:

Temp: 13.9 °C   Turbidity ~~Alkalinity (filtered)~~: 235 NTU
pH: 7.03   Alkalinity (unfiltered): NA
Eh: NA   Spec. Conductivity: 1.27 ms/cm

temp	pH	turb.	cond.
13.3	7.01	242	1.28
13.7	7.03	220	1.25

stabilization achieved

Sampling

Time of Sample Collection: 1325

Method:
- ___ Stainless steel bailer
- ___ Teflon bailer
- ___ Pos. Disp. Pump
- X Disposable bailer
- ___ Dedicated pump
- ___ Other:

Analyses:
- X VOCs - 602 ___ 503.1 ___   Other TCL
- X SVOCs
- X Metals; too turbid; wait for it to settle → time 1628 - turbidity = 32 NTU collect sample
- X PCB/Pest
- ___ Physical
- ___ Other

Observations

Weather/Temperature: sunny, temp. ± 65 °F, winds W, est. 5 mph.
Sample description: turbid, light brown → silt?
Free Product? yes ___ no X describe
Sheen? yes ___ no X describe
Odor? yes ___ no X describe

Comments:
- 1.28 gallons × 5 (well volumes) = 6.40 gallons

MW-11

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC FRP RI/FS DATE: 5/20/94

SAMPLE ID: FRP-MW11(0594)

SAMPLERS: J. Fox Time Onsite: 0812 Time Offsite: 1023

18.90
9.89
9.01

Depth of well (from top of casing)	18.90' *	Time:	* taken from development data
Initial static water level (from top of casing)	9.89'	Time:	0828
Water level after purging (from top of casing)	10.17'	Time:	1005
Water level before sampling (from top of casing)	10.05'	Time:	1010

9.01
.65
4505
54060
5.8565

Purging Method:

Airlift	___	Centrifugal	___
Bailer	X	Pos. Displ.	___
Submersible	___	Ded. Pump	___

Well Volume Calculation

2 in. casing: ____ ft. of water x 0.16 = ____ gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: 9.01 ft. of water x 0.65 = 5.86 gallons

5.86
5
29.30

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
total vol. H_2O removed ~450 gallons

Field Tests:

Temp: 10.9 °C ~~Alkalinity (filtered)~~ turbidity: 31 NTU
pH: 7.03 Alkalinity (unfiltered): NA
Eh: NA Spec. Conductivity: 1.30 mS/cm

temp.	pH	turb.	cond.
10.3	7.08	18	1.30
10.3	7.05	17	1.30
10.3	7.09	16	1.31

stabilization achieved

Sampling

Time of Sample Collection: 1013

Method:		Analyses:	
___	Stainless steel bailer	X	VOCs - 602 ___ 503.1 ___ Other TCL
___	Teflon bailer	X	SVOCs
___	Pos. Disp. Pump	X	Metals
X	Disposable bailer	X	PCB/Pest
___	Dedicated pump	___	Physical
___	Other: ___	___	Other ___

Observations

Weather/Temperature: sunny, temp. ± 55°F, winds light and variable
Sample description: clear
Free Product? yes ___ no X describe clear
Sheen? yes X no ___ describe slight, hydrocarbon-like
Odor? yes X no ___ describe fuel ~~oil~~ oil-like odor JF

Comments:
- 5.86 gallons x 5 (well volumes) = 29.30 gallons

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MW-12

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

1.16
5
5.80

18.01
10.76
7.25

SITE: MMC FRP RI/FS

DATE: 5/20/94

SAMPLE ID: FRP-MW12(0594)

SAMPLERS: J. Fox / T. Fox

	Time Onsite:	Time Offsite:
J. Fox	0920	0930
T. Fox	1037 JSF	1150

Depth of well (from top of casing) .... 18.01' * Time: * taken from MW development data sheet

Initial static water level (from top of casing) .... 10.76' ☆ Time: 0930

Water level after purging (from top of casing) .... dry Time: 1100

Water level before sampling (from top of casing) .... NA Time:

7.25
.16
4350
7250
11600

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

2 in. casing: 7.25 ft. of water x 0.16 = 1.16 gallons

3 in. casing: ____ ft. of water x 0.36 = ____ gallons

4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:

>3 volumes: yes X no ____ purged dry? yes X no ____

@ 1100 → removed ~5.25 gallons, well went dry **

Field Tests:

temp. pH turb cond.

Temp: ____ °C

pH: ____

Eh: NA

~~Alkalinity (filtered)~~ turbidity: 405 NTU ☆☆

Alkalinity (unfiltered): NA

Spec. Conductivity: ____ mS/cm

Sampling

Time of Sample Collection: ____

Method:

	Stainless steel bailer
	Teflon bailer
	Pos. Disp. Pump
X	Disposable bailer
	Dedicated pump
	Other:

Analyses:

X	VOCs -	602 ____ 503.1 ____ Other TCL
X	SVOCs	
X	Metals	☆☆ - turbidity too high; wait for it to settle → metals collected @ 1610, turbidity = 206 NTU
X	PCB/Pest	
	Physical	
	Other	

Observations

Weather/Temperature: sunny, temp. ± 55°F

Sample description: turbid, olive color

Free Product? yes X no ____ describe: oily; 0.51' product on water table

Sheen? yes X no ____ describe: oily

Odor? yes X no ____ describe: fuel-oil-like odor

Comments:

- ☆ - .51' feet of product on top of water table as measured with interface probe
- 1.16 gallons × 5 (well volumes) = 5.80 gallons
- ** - well went dry short of 5 well volumes; will allow to recharge slightly, collect VOC sample, then sample for turbidity to see if can collect TAL metals

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MW-13

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC-FRP DATE 16 May 1994

SAMPLE ID : ~~MW-13(051694)~~ 88 FRP-MW13(051694)

SAMPLERS : Sean Pepling

Time Onsite: ______ Time Offsite: ______

Depth of well (from top of casing)	~~9.30~~ 88 14.78	Time:	~~0922~~ 88 0923
Initial static water level (from top of casing)	9.30	Time:	0922
Water level after purging (from top of casing)	12.02	Time:	1028
Water level before sampling (from top of casing)	11.37	Time:	1035

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 5.48 ft. of water x 0.16 = 0.88 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
5 volumes

Field Tests: Additional volumes

	1	2	3
Temp:	9.6	9.5	9.4
pH:	7.48	7.44	7.46
Eh:			

	1	2	3
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity:	0.32	0.34	0.33

Turbidity: 1 169 / 2 178 / 3 160

Sampling

Time of Sample Collection: 1040

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals - 5/16/94 @ 1535 88
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, drizzle, 60°F, slight wind 0-2 mph NW
Sample description: slightly brown turbid water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:

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MW-14

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC FRP RI/FS

DATE: 16 May 1994

SAMPLE ID: FRP-MW14 (051694)

SAMPLERS: J. Fox

Time Onsite: 1052

Time Offsite: 1237 JSF

Depth of well (from top of casing)	23.47'	Time:	1100
Initial static water level (from top of casing)	7.36'	Time:	1102
Water level after purging (from top of casing)	22.31'	Time:	1125
Water level before sampling (from top of casing)	22.31'	Time:	1125

23.47
7.36
16.11
.16
9666
16110
25776

2.58
5
1290

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 16.11 ft. of water x 0.16 = 2.58 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed: total removed ≈ 5.3 gallons

>3 volumes: yes ___ no X

purged dry? yes X no ___

Field Tests:

temp. pH turb. cond.

NA

Temp: ___ °C
pH: ___
Eh: NA

~~Alkalinity (filtered)~~ turbidity: ___ NTU
Alkalinity (unfiltered): NA
Spec. Conductivity: ___ m&/cm

Sampling

Time of Sample Collection: 1140

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL
X SVOCs
X Metals @ 1623
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: overcast, temp. ≈ 50°F

Sample description: very turbid, pink color

Free Product? yes ___ no X describe ___

Sheen? yes ___ no X describe ___

Odor? yes ___ no X describe ___

Comments:

- 16.11 2.58 gallons x 5 (well volumes) = 12.90 gallons
- Bailing @ 1000 ml/min produced a dry well; ~~do~~ purging complete (1120)
- ground water too turbid to sample for metals - will return later

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MW-15

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

ERM

SITE: MMC-FRP DATE: 16 May 1994

SAMPLE ID: FRP-MW15(051694)

SAMPLERS: Sean Pepling

Time Onsite: 1240 ~~1400~~ 1350

Time Offsite: 1400

Depth of well (from top of casing)	21.32	Time: 1248
Initial static water level (from top of casing)	11.10	Time: 1248
Water level after purging (from top of casing)	11.10	Time: 1339
Water level before sampling (from top of casing)	11.10	Time: 1346

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 10.22 ft. of water x 0.16 = 1.6 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed: 10 gallons
>3 volumes: yes X no ___ purged dry? yes ___ no X
5 volumes + 5 additional volumes for fld. parameters

Field Tests: Additional Volumes

	1	2	3	4	5
Temp:	12.6	12.4	12.4	12.3	12.5
pH:	7.08	7.22	7.22	7.22	7.21
Eh:					
Alkalinity (filtered):					
Alkalinity (unfiltered):					
Spec. Conductivity:	1.36	2.33	1.87	1.37	1.86
Turbidity	+1000	+1000	+1000	+1000	

Sampling

Time of Sample Collection: 1350

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOCs
X SVOCs
X Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, slight breeze (0-10 mph W), low 50°F
Sample description: Red Brown turbid water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
Metals sample not collected at 1350 because turbidity > 50 NTU's
Metals collected at 1710

MW-16

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC FRP RI/FS

DATE: 5/17/94

SAMPLE ID: FRP-MW~~2~~16(0594)

SAMPLERS: J. Fox

Time Onsite: 0945

Time Offsite: 1144

Depth of well (from top of casing)	28.73'	Time:	0956
Initial static water level (from top of casing)	7.05'	Time:	0955
Water level after purging (from top of casing)	11.32'	Time:	1114
Water level before sampling (from top of casing)	8.87'	Time:	1128

28.73
7.05
21.65
.16
13008
21680
34650

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

3.47
5
17.35

2 in. casing: 21.68 ft. of water x 0.16 = 3.47 gallons

3 in. casing: ____ ft. of water x 0.36 = ____ gallons

4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:

>3 volumes: yes X no ___ purged dry? yes ___ no X

total vol. H_2O removed ~ 28.5 gallons

Field Tests:

Temp: 10.9 °C

pH: 6.70

Eh: NA

turbidity ~~Alkalinity (filtered)~~: 831 NTU

Alkalinity (unfiltered): NA

Spec. Conductivity: 1.17 mmhos/cm

temp.	pH	turb.	cond.
10.8	6.75	822	1.13
10.8	6.71	790	1.14

stabilization achieved

Sampling

Time of Sample Collection: ________

Method:

- ___ Stainless steel bailer
- ___ Teflon bailer
- ___ Pos. Disp. Pump
- X Disposable bailer
- ___ Dedicated pump
- ___ Other: ________

Analyses:

- X VOCs - 602 ___ 503.1 ___ Other TCL
- X SVOCs
- X Metals → too turbid (>50 NTU); collect later 5-18-94 @ 0807
- X PCB/Pest
- ___ Physical
- ___ Other ________

Observations

Weather/Temperature: light rain, overcast, temp. ± 50°F, winds N-NW est. 5 mph.

Sample description: olive-brown turbid

Free Product? yes ___ no X describe ________

Sheen? yes X no ___ describe very slight

Odor? yes ___ no X describe ________

Comments:

~ 3.47 gallons x 5 (well volumes) = 17.35 gallons

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-17

SITE ~~FRP~~ ~~#~~. (new) MMC FRP DATE 18 MAY 94

SAMPLE ID : MW-17 FRP-MW17(0594)

SAMPLERS : W. MAHONEY

Time Onsite: 1345

Time Offsite: ~~1445~~ 1500

Depth of well (from top of casing)	15.15	Time:	Silt on top of H2O meter
Initial static water level (from top of casing)	1.66	Time:	1350
Water level after purging (from top of casing)	~~2.20~~	Time:	~~1440~~
Water level before sampling (from top of casing)	2.20	Time:	1440

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 13.49 ft. of water x 0.16 = 2.16 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___

purged dry? yes ___ no X

Field Tests:

	1	2	3		1	2	3
Temp:	8.5	8.3	8.3	Turbidity ~~Alkalinity (filtered)~~:	>1000	>1000	>1000
pH:	5.81	5.91	5.46	~~Alkalinity (unfiltered)~~:			
Eh:				Spec. Conductivity:	1.61	1.60	1.61

Sampling

Time of Sample Collection: ___

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer *
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other ___
X SVOCs
X Metals / Filtered Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, 50°F
Sample description: Brown, water
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
2.16 x 5 = 10.8 gal = 5 well volumes Start Purge 1400 Stop 1413
*Filtered Sample was obtained using a Waterra pump w/ a QED 8200 inline filter.

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FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-18

SITE: MMC FRP

DATE: 18 MAY 94

SAMPLE ID: MW-18 FRP: MW18(0594)

SAMPLERS: W. MAHONEY

Time Onsite: 1505

Time Offsite: 1630

Depth of well (from top of casing) .... 14.12 Time: ____

Initial static water level (from top of casing) .... 1.28 Time: 15.08 s. ft on tip of H_2O meter

Water level after purging (from top of casing) .... ____ Time: ____

Water level before sampling (from top of casing) .... 2.16 Time: 16:05

Purging Method:

Airlift ____
Bailer X
Submersible ____
Centrifugal ____
Pos. Displ. ____
Ded. Pump ____

Well Volume Calculation

2 in. casing: 12.84 ft. of water x 0.16 = 2.05 gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:
>3 volumes: yes X no ____

purged dry? yes ____ no X

Field Tests:

	1	2	3
Temp:	8.6	8.6	8.7
9.10 pH:	[illegible]	9.75	9.50
Eh:			

	1	2	3
Turbidity ~~Alkalinity (filtered)~~:	>1000	>1000	>1000
~~Alkalinity (unfiltered)~~:			
Spec. Conductivity:	1.75	1.75	1.76

Sampling

Time of Sample Collection: 1610

Method:
____ Stainless steel bailer
____ Teflon bailer
____ Pos. Disp. Pump
X Disposable bailer *
____ Dedicated pump
____ Other: ____

Analyses:
X VOCs - 602 ____ 503.1 ____ Other ____
X SVOCs
X Metals + Filtered metals
X PCB/Pest
____ Physical
____ Other ____

Observations

Weather/Temperature: Overcast, 50°F

Sample description: Brown water

Free Product? yes ____ no X describe ____

Sheen? yes ____ no X describe ____

Odor? yes ____ no X describe ____

Comments:
2.05 x 5 = 10.3 gallons = 5 volumes
* Filtered metal samples obtained w/ a waterra pump using a QED 8200 inline filter

ERM

MW-19

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC FRP RI/FS

DATE 5/16/94

SAMPLE ID : FRP-MW-19 (051694)

		Time Onsite:	Time Offsite:
SAMPLERS :	J. Fox	0850	1010
	S. Pepling	0950	1005

7.81
.16
4686
7810
12476

16.86
9.05
7.81

1.25
5
6.25

Depth of well (from top of casing)	16.86'	Time:	0858
Initial static water level (from top of casing)	9.05'	Time:	0856
Water level after purging (from top of casing)	9.06'	Time:	0928
Water level before sampling (from top of casing)	9.07'	Time:	0956

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 7.81 ft. of water x 0.16 = 1.25 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X

Field Tests:

Temp: 11.2 °C
pH: 7.16
Eh: NA

turb. ~~Alkalinity (filtered)~~: 420 NTU
Alkalinity (unfiltered): NA
Spec. Conductivity: 0.66 mΩ/cm

temp.	pH	turb.	cond
11.0	7.23	366	0.66
11.0	7.23	355	0.66

Sampling

Time of Sample Collection: 1000

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL
X SVOCs
X Metals @ 0845 on 5/17/94 SD
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: overcast, light rain, temp. ± 50°F
Sample description: brown - slightly cloudy
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
- 1.25 gallons x 5 (well volumes) = 6.25 gallons
- field tests performed after removal of each one well volume after initial 5 well volumes
- water too turbid for metals collection (>50 NTU); will come back at end of day to sample
- total vol. water removed ~ 9.75 gallons

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MW-2C

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC FRP RI/FS

DATE 17 May 1994

SAMPLE ID : FRP-MW2O (0594)

SAMPLERS : J Fox

Time Onsite: 0819

Time Offsite: 0940

Depth of well (from top of casing) .... 17.17' Time: 0823

Initial static water level (from top of casing) .... 8.12' Time: 0822

Water level after purging (from top of casing) .... 9.34' Time: 0845

Water level before sampling (from top of casing) .... Time:

17.17
8.12
9.05
.16
5430
9050
1.4480

1.45
5
7.25

Purging Method:

Airlift ____ Centrifugal ____

Bailer X Pos. Displ. ____

Submersible ____ Ded. Pump ____

Well Volume Calculation

2 in. casing: 9.05 ft. of water x 0.16 = 1.45 gallons

3 in. casing: ____ ft. of water x 0.36 = ____ gallons

4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:

>3 volumes: yes X no ____ purged dry? yes ____ no X

total removed including samples ≈ 14.5 gallons

Field Tests:

Temp: 10.4 °C

pH: 7.31

Eh: NA

~~Alkalinity (filtered)~~ turbidity: >1000 NTU

Alkalinity (unfiltered): NA

Spec. Conductivity: 2.40 mS/cm

temp.	pH	turb.	cond.
10.0	7.44	>1000	2.42
10.0	7.42	>1000	2.45
10.0	7.44	>1000	2.53

stabilization

Sampling

Time of Sample Collection: 0923

Method:

____ Stainless steel bailer

____ Teflon bailer

____ Pos. Disp. Pump

X Disposable bailer

____ Dedicated pump

____ Other: ____

Analyses:

X VOCs - 602 ____ 503.1 ____ Other TCL

X SVOCs

X Metals → collect later; too turbid @ 1555

X PCB/Pest

____ Physical

____ Other ____

Observations

Weather/Temperature: rain, overcast, temp. ± 50°F, winds N-NW, < 5 mph.

Sample description: light brown turbid to very turbid w/silt

Free Product? yes ____ no X describe ____

Sheen? yes ____ no X describe ____

Odor? yes ____ no X describe ____

Comments:

- 1.45 gallons x 5 (well volumes) = 7.25 gallons

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ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-21

SITE MMC-FRP   DATE 19 May 1994

SAMPLE ID : FRP-MW21(0594)

SAMPLERS :	Time Onsite:	Time Offsite:
Sean Pepling	0720	0755
W. MAHONEY	1640	

Depth of well (from top of casing)	16.71	Time:	0726
Initial static water level (from top of casing)	9.26	Time:	0726
Water level after purging (from top of casing)		Time:	
Water level before sampling (from top of casing)		Time:	

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

2 in. casing: 7.45 ft. of water x 0.16 = 1.2 gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:
>3 volumes: yes X no ____   purged dry? yes ____ no X
6 gallons purged

Field Tests: (Additional Volumes)

Temp:	10.6	10.6	10.5	~~Alkalinity (filtered)~~ turbidity:	105	49.3	47.8
pH:	6.74	6.76	6.78	Alkalinity (unfiltered):			
~~Eh:~~				Spec. Conductivity:	0.66	0.64	0.65

4th volume
Temp - 10.4
pH - 6.78
Turb - 48.8
Spec Con - 0.65

Sampling

Time of Sample Collection: 1730

Method:		Analyses:	
	Stainless steel bailer	X	VOCs - 602 ____ 503.1 ____ Other TCL VOA
	Teflon bailer	X	SVOCs
	Pos. Disp. Pump	X	Metals
X	Disposable bailer	X	PCB/Pest
	Dedicated pump		Physical
	Other:		Other

Observations

Weather/Temperature: PTLY Sunny, 60°F
Sample description: Clear, water
Free Product? yes ____ no X   describe
Sheen? yes ____ no X   describe
Odor? yes X no ____   describe Slight petroleum odor

Comments:

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FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-22

SITE: MMC FRP RI/FS
DATE: 5/19/94

SAMPLE ID: FRP-MW22(0594)

SAMPLERS: J. Fox / J. Fox

	Time Onsite:	Time Offsite:
J. Fox	0720	
J. Fox	1650	1755

14.34
7.75
6.59
.16
3954
659
1.0544

		Time
Depth of well (from top of casing)	14.34'	0731
Initial static water level (from top of casing)	7.75'	0730
Water level after purging (from top of casing)		
Water level before sampling (from top of casing)		

1.05
5
5.25

Purging Method:

Airlift		Centrifugal	
Bailer	X	Pos. Displ.	
Submersible		Ded. Pump	

Well Volume Calculation

2 in. casing: 6.59 ft. of water x 0.16 = 1.05 gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:
>3 volumes: yes ____ no ____

purged dry? yes ____ no ____

Field Tests:

Temp: 10.7 °C
pH: 6.64
Eh: NA

~~Alkalinity (filtered)~~ Turbidity: 105 NTU
Alkalinity (unfiltered): NA
Spec. Conductivity: 2.03 m-S/cm

temp	pH	turb.	con
10.4	6.55	110	1.9
10.7	6.60	97	2.0

stabilization achieved

Sampling

Time of Sample Collection: ____

Method:
- ____ Stainless steel bailer
- ____ Teflon bailer
- ____ Pos. Disp. Pump
- X Disposable bailer
- ____ Dedicated pump
- ____ Other: ____

Analyses:
- X VOCs - 602 ____ 503.1 ____ Other TCL
- X SVOCs
- X Metals
- X PCB/Pest
- ____ Physical
- ____ Other ____

Observations

Weather/Temperature: mostly cloudy, temp. ± 45 °F, winds calm
Sample description: relatively clear water, turbidity < 100 NTU
Free Product? yes ____ no X describe ____
Sheen? yes ____ no X describe ____
Odor? yes ____ no X describe ____

Comments:
- 1.05 gallons x 5 (well volumes) = 5.25 gallons
- collected water sample for turbidity @ 1728 - turbidity = 45 NTU; then collected TAL metals + cyanide samples at same time (first) as the rest of the parameters

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FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-23

SITE MMC-FRP

DATE 19 MAY 94

SAMPLE ID : FRP MW-23 (0594)

SAMPLERS : W. MAHONEY

Time Onsite: 0715 / 1540

Time Offsite: ~~1635~~ w/m 0830 / 1635

Depth of well (from top of casing)	19.90	Time:	
Initial static water level (from top of casing)	11.24	Time:	0722
Water level after purging (from top of casing)		Time:	
Water level before sampling (from top of casing)		Time:	

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: ___ ft. of water x 0.16 = ___ gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: 8.66 ft. of water x 0.65 = 5.63 gallons

volume of water removed:
>3 volumes: yes X no ___

purged dry? yes ___ no X

Field Tests:

	1	2	3		1	2	3
Temp:	11.8	11.9	12.0	turbidity ~~Alkalinity (filtered)~~:	29.9	27.3	28.7
pH:	6.77	6.77	6.77	~~Alkalinity (unfiltered)~~:			
Eh:				Spec. Conductivity:	1.77	1.81	1.85

Sampling

Time of Sample Collection: 1630

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOA
X SVOCs TCL
X Metals TAL + Cyanide
X PCB/Pest TAL
___ Physical
___ Other ___

Observations

Weather/Temperature: PTLY Sunny 60°F
Sample description: w/m
Free Product? yes ~~X~~ no X describe
Sheen? yes X no ___ describe Petroleum sheen, light → moderate
Odor? yes X no ___ describe strong petroleum odor

Comments:
~~5.63 x 43~~ 5.63 x 5 = 43.3 gallons 0725 → 0812

0745 20 gallons removed
0812 25 gallon removed
1545 begin purging 1st well volume
1615 purged 3 volumes w/stable parameters

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MW-24

ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE: MMC-FRP   DATE: 17 May 1994

SAMPLE ID: FRP-MW24(0594)

SAMPLERS: Sean Pepling   Time Onsite: 0943   Time Offsite: 1110

Depth of well (from top of casing) .... 17.55   Time: 0952
Initial static water level (from top of casing) .... 8.43   Time: 0952
Water level after purging (from top of casing) .... 12.00   Time: 1037
Water level before sampling (from top of casing) .... 11.29   Time: 1041

Purging Method:

Airlift ___   Centrifugal ___
Bailer X   Pos. Displ. ___
Submersible ___   Ded. Pump ___

Well Volume Calculation

2 in. casing: 9.1 ft. of water x 0.16 = 1.46 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___   purged dry? yes ___ no ___
8 gallons removed

Field Tests: (additional volumes)

	1	2	3	4
Temp:	10.2	9.7	9.9	
pH:	6.70	6.80	6.77	
Eh:				

	1	2	3	4
Alkalinity (filtered):				
Alkalinity (unfiltered):				
Spec. Conductivity:	1.36	1.36	1.34	

	1	2	3	4
Turbidity	588	602	599	

Sampling

Time of Sample Collection: 1050

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals @ 1515 2.5
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, drizzle, 50°sF
Sample description: Turbid water brown
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
Metals not collected at 1050 because turbidity > 50 NTU's

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MW-25

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

SITE MMC-FRP DATE 19 May 1994

SAMPLE ID: FRP-MW25(0594)

SAMPLERS:	Time Onsite:	Time Offsite:
Sean Popling	0755	0815
Jon Fox	1530	1645

Depth of well (from top of casing)	17.5	Time:	0757
Initial static water level (from top of casing)	7.87	Time:	0757
Water level after purging (from top of casing)	NA	Time:	
Water level before sampling (from top of casing)	NA	Time:	

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 9.63 ft. of water x 0.16 = 1.54 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X
8 gallons removed (additional volumes)

Field Tests:

Temp: 12.5 °C ~~Alkalinity (filtered)~~ turbidity: 635 NTU
pH: 6.45 Alkalinity (unfiltered): NA
Eh: NA Spec. Conductivity: 1.43 mΩ/cm

temp.	pH	turb.	cond
12.3	6.51	603	1.4[illegible]
12.4	6.57	652	1.4[illegible]

stabilization

Sampling

Time of Sample Collection: 1615

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL
X SVOCs
X Metals → too turbid; hold for now
X PCB/Pest
___ Physical
___ Other ___

Observations

(@ 1530)
Weather/Temperature: partly sunny, temp. ± 65°F, no wind (indoors)
Sample description: turbid, olive-brown color
Free Product? yes ___ no X describe none apparent
Sheen? yes ___ no X describe
Odor? yes X no ___ describe moderate gasoline-like odor

Comments:
- FRP-DUPE 11 (0594) collected from this well right after FRP-MW25 (0594)

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FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-26S

SITE: MMC-FRP DATE: 18MAY94

SAMPLE ID: MW26S FRP-MW26S(0594)

SAMPLERS: W. MAHONEY Time Onsite: 0825 Time Offsite: 1015

Depth of well (from top of casing) .... 14.45 Time: ____
Initial static water level (from top of casing) .... 6.65 Time: 0830
Water level after purging (from top of casing) .... 12.95 Time: 0950
Water level before sampling (from top of casing) .... 8.83 Time: 0955

Purging Method:

Airlift ___ Centrifugal ___
Bailer X Pos. Displ. ___
Submersible ___ Ded. Pump ___

Well Volume Calculation

2 in. casing: 7.8 ft. of water x 0.16 = 1.27 gallons
3 in. casing: ____ ft. of water x 0.36 = ____ gallons
4 in. casing: ____ ft. of water x 0.65 = ____ gallons

volume of water removed:
>3 volumes: yes X no ___ purged dry? yes ___ no X

Field Tests:

Temp: ____ Alkalinity (filtered): ____
pH: ____ Alkalinity (unfiltered): ____
Eh: ____ Spec. Conductivity: ____

Field Test

	1	2	3
Temp	9.2	9.7	9.4
pH	7.71	8.15	8.43
Turbid.	229	247	185
Spec. Cond.	1.428	1.42	1.42

Sampling

Time of Sample Collection: 1000

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ____

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals — Time 1640
X PCB/Pest
___ Physical
___ Other ____

Observations

Weather/Temperature: Overcast, ~~55~~ 45°F warm light winds
Sample description: ____
Free Product? yes ___ no X describe ____
Sheen? yes ___ no ___ describe ____
Odor? yes ___ no ___ describe ____

Comments:
1.27 gal x 5 = 6.4 gals = 5 volumes Purge Time 0935 - 0850

Duplicate ID Turbidity before sampling for metals was 46 NTUs

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ERM

FIELD OBSERVATION LOG
GROUND WATER SAMPLING RECORD

MW-26D

SITE MMC-ERP   DATE 18 May 1994

SAMPLE ID : ERP-MW26D(0594)

SAMPLERS : Sean Pepling   Time Onsite: 0815   Time Offsite: 1045

Depth of well (from top of casing) .... 32.57   Time: 0834
Initial static water level (from top of casing) .... 6.21   Time: 0834
Water level after purging (from top of casing) .... 6.56   Time: 1000
Water level before sampling (from top of casing) ...... 6.25   Time: 1015

Purging Method:

Airlift ___   Centrifugal ___
Bailer X   Pos. Displ. ___
Submersible ___   Ded. Pump ___

Well Volume Calculation

2 in. casing: 26.36 ft. of water x 0.16 = 4.2 gallons
3 in. casing: ___ ft. of water x 0.36 = ___ gallons
4 in. casing: ___ ft. of water x 0.65 = ___ gallons

volume of water removed:
>3 volumes: yes X no ___ 21 gallons   purged dry? yes ___ no X

Field Tests: (Additional Volumes)

	1	2	3
Temp:	11.3	11.3	11.2
pH:	8.20	8.44	8.47
Eh:			

	1	2	3
Alkalinity (filtered):			
Alkalinity (unfiltered):			
Spec. Conductivity:	1.24	1.25	1.24

Turbidity

1	2	3
47.6	45.3	41.8

Sampling

Time of Sample Collection: 1020

Method:
___ Stainless steel bailer
___ Teflon bailer
___ Pos. Disp. Pump
X Disposable bailer
___ Dedicated pump
___ Other: ___

Analyses:
X VOCs - 602 ___ 503.1 ___ Other TCL VOAs
X SVOCs
X Metals
X PCB/Pest
___ Physical
___ Other ___

Observations

Weather/Temperature: Overcast, calm, 40°F
Sample description: ___
Free Product? yes ___ no X describe ___
Sheen? yes ___ no X describe ___
Odor? yes ___ no X describe ___

Comments:
Collected MS and MSD for same parameters from this well.

NEC:E:\SFORMS\GWFLDSAM.XLS

APPENDIX F

DATA VALIDATION REPORTS

DATA VALIDATION OF GROUND WATER SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. BR-01

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by USEPA Method 524.2 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
BR-01	MW-16	MW-21 MS/MSD
BR-02	MW-17	MW-21 Spike and Duplicate (Inorganics)
BR-03	MW-18	DUPE-10 (MW-26S Field Duplicate)
MW-02	MW-21	DUPE-11 (MW-25 Field Duplicate)
MW-3D	MW-22	RB051994
MW-3S	MW-23	TB5 (0518)
MW-10	MW-25	TB6 (0518)
MW-11	MW-26S	TB7 (0519)
MW-12	Faucet 01	TB8 (0519)
		TB9 (0519)
		TB10 (0520)
		TB11 (0522)
		MSB 5/23/94 (SVOC)
		PBMSB6 (Pest/PCB)

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field and trip blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Methylene chloride, acetone and toluene are negated in a sample if the sample concentration is less than or equal to ten times the highest associated blank concentration. For all other compounds an action level of five times the highest associated blank concentration is used.

Blank ID	Compound (Concentration)	Associated Samples
VBLK053	N-butylenzene (0.1J) sec-butylbenzene (0.06J) chloroform (0.42J) 1,3-dichlorobenzene (0.24J) hexachlorobutadiene (0.5J) isopropylbenzene (0.03J) methylene chloride (1.7) naphthalene (0.89J) tetrachloroethene (0.02J) 1,2,4-trichlorobenzene (0.66J) 1,1,1-trichloroethane (0.04J) trichloroethene (0.04J) 1,2,4-trimethylbenzene (0.09J) o-xylene (0.13J) m&p xylene (0.19J) acetone (22J)	TB-05, TB-06, TB-07
VBLK054	n-butylbenzene (0.09J) chloroform (0.34J) 1,3-dichlorobenzene (0.08J) hexachlorobutadiene (0.52J) methylene chloride (1.6) 1,2,4-trichlorobenzene (0.64J) o-xylene (0.04J) m&p xylene (0.07J)	MW-03S, MW-03D, MW-18, MW-17, MW-26S, DUPE-10
VBLK055	chloroform (0.5J) 1,3-dichlorobenzene (0.05J) hexachlorobutadiene (0.1J) methylene chloride (2.2) naphthalene (0.14J) trichloroethene (0.15J) 1,2,4-trimethylbenzene (0.03J) o-xylene (0.08J) m&p xylene (0.14J)	TB-08

Blank ID	Compound (Concentration)	Associated Samples
VBLK056	benzene (0.08J) sec-butylbenzene (0.06J) tert-butylbenzene (0.05J) chloroform (0.42J) 2-chlorotoluene (0.05J) 1,3-dichlorobenzene (0.18J) hexachlorobutadiene (0.50) isopropylbenzene (0.02J) methylene chloride (1.7) naphthalene (1.2) n-propylbenzene (0.04J) tetrachloroethene (0.01J) 1,2,3-trichlorobenzene (0.97) 1,2,4-trichlorobenzene (0.62) 1,1,1-trichloroethane (0.05J) trichloroethene (0.03J) 1,2,3-trimethylbenzene (0.12J) 1,3,5-trimethylbenzene (0.06J) o-xylene (0.16J) m&p xylene (0.26J) acetone (22J)	TB-09, RB051994, FAUCET-01, MW-21 MS/MSD
VBLK057	benzene (0.07J) n-butylbenzene (0.10J) sec-butylbenzene (0.07J) chloroform (0.43J) 1,3-dichlorobenzene (0.20J) hexachlorobutadiene (0.52) isopropylbenzene (0.03J) naphthalene (0.94) toluene (0.37J) 1,2,3-trichlorobenzene (0.92) 1,2,4-trichlorobenzene (0.58) 1,2,4-trimethylbenzene (0.10J) 1,3,5-trimethylbenzene (0.05J) o-xylene (0.14J) m&p xylene (0.25J) acetone (17J)	MW-21, MW-22, MW-23, TB-10, DUPE-11, MW-25

Blank ID	Compound (Concentration)	Associated Samples
VBLK058	benzene (0.06J) n-butylbenzene (0.1J) sec-butylbenzene (0.06J) tert-butylbenzene (0.05J) chloroform (0.39J) 1,3-dichlorobenzene (0.23J) hexachlorobutadiene (0.50) ispropylbenzene (0.03J) methylene chloride (1.6) naphthalene (0.97) n-propylbenzene (0.04J) toluene (0.34J) 1,2,3-trichlorobenzene (0.95) 1,2,4-trichlorobenzene (0.61) 1,2,4-trimethylbenzene (0.09J) o-xylene (0.15J) m&p xylene (0.24J) acetone (15J)	MW-11, MW-10, MW-02, MW-23, MW-12
RB051994	benzene (0.05BJ) chloroform (0.11BJ) 1,3-dichlorobenzene (0.15BJ) 1,4-dichlorobenzene (0.18J) methylene chloride (0.13BJ) tetrachloroethene (0.01BJ) toluene (0.48J) 1,1,1-trichloroethane (0.03BJ) trichloroethene (0.02BJ) 1,2,4-trimethylbenzene (0.05BJ) o-xylene (0.16BJ) m&p xylene (0.2BJ)	All Samples
TB-05	chloroform (0.04BJ) 1,4-dichlorobenzene (0.09J) cis-1,2-dichloroethene (0.12J) methylene chloride (0.17BJ) tetrachloroethene (0.09BJ) trichloroethene (0.30BJ) 1,2,4-trimethylbenzene (0.04BJ) o-xylene (0.05BJ) m&p xylene (0.12BJ)	MW-26D

Blank ID	Compound (Concentration)	Associated Samples
TB-06	chloroform (0.3BJ) 1,3-dichlorobenzene (1B) cis-1,2-dichloroethene (0.1J) methylene chloride (0.36BJ) tetrachloroethene (0.06BJ) trichloroethene (0.29BJ) 1,2,4-trimethylbenzene (0.03BJ) o-xylene (0.06BJ) m&p xylene (0.09BJ)	MW-17, MW-18
TB-07	chloroform (0.07BJ) 1,3-dichlorobenzene (0.05BJ) 1,4-dichlorobenzene (0.09J) methylene chloride (0.23BJ) tetrachloroethene (0.08BJ) trichloroethene (0.34BJ) 1,2,4-trimethylbenzene (0.03BJ) o-xylene (0.05BJ) m&p xylene (0.11BJ)	MW-26S, DUPE-10, MW-03S, MW-03D
TB-08	benzene (0.87) n-butylbenzene (0.19J) sec-butylbenzene (0.02J) chloroform (0.07BJ) isopropylbenzene (0.1J) 4-isopropyltoluene (0.05J) methylene chloride (0.34BJ) naphthalene (26B) n-propylbenzene (0.3J) tetrachloroethene (0.07J) toluene (4.6) 1,1,1-trichloroethane (0.04J) trichloroethene (0.04BJ) 1,2,4-trimethylbenzene (3.1B) 1,3,5-trimethylbenzene (0.92) o-xylene (2B) m&p xylene (2B)	MW-23, MW-21

Blank ID	Compound (Concentration)	Associated Samples
TB-09	benzene (0.06BJ) n-butylbenzene (0.03BJ) sec-butylbenzene (0.02BJ) chloroform (0.05BJ) hexachlorobutadiene (0.13BJ) methylene chloride (0.14BJ) naphthalene (0.46BJ) n-propylbenzene (0.02BJ) tetrachloroethene (0.09BJ) toluene (0.2J) 1,2,4-trichlorobenzene (0.14BJ) 1,1,1-trichloroethane (0.04BJ) trichloroethene (0.06BJ) 1,2,4-trimethylbenzene (0.05BJ) 1,3,5-trimethylbenzene (0.02BJ) o-xylene (0.05BJ) m&p xylene (0.11BJ)	MW-22, MW-25, DUPE-11, RB051994, FAUCET-01
TB-10	benzene (0.13BJ) chloroform (0.05BJ) 1,4-dichlorobenzene (0.12J) methylene chloride (0.21BJ) nephthalene (0.59B) toluene (0.26BJ) 1,2,4-trimethylbenzene (0.14BJ) 1,3,5-trimethylbenzene (0.03BJ) m&p xylene (0.16BJ)	MW-02, MW-10, MW-11, MW-12

- The laboratory was requested to analyze the ground water samples for TCL volatiles by method 524.2. Since method 524.2 does not account for all TCL volatile compounds, specifically acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone and carbon disulfide, the calibration solutions did not contain these compounds. Therefore the laboratory amended the 524.2 analytical and reporting protocols to account for these five compounds as follows:

  1. A 50 ppb standard of TCL compounds was purged to use as a reference standard (file name "EHSL") for spectra and retention times. Response factors were calculated using this one point curve. (This procedure gives a better estimated concentration than using an RF of 1.0 for all compounds.)

2. All samples and blanks were quantitated to the 50 ppb standard ("EHSL").

3. Only hits with areas greater than 10% of the respective internal standard areas were reported. This procedure is consistent with TIC reporting rules.

4. The response factors used for detected compounds are as follows:

Acetone	0.069
Carbon Disulfide	0.719
4-Methyl-2-Pentanone	0.220

- The laboratory did not analyze fortified blanks as required by method. Given that the laboratory performed all other QC requirements, this protocol deficiency is judged to have no effect on the technical useability of the data.

- All samples were analyzed within the 14 day holding time except for samples BR-01, BR-02, NR-03 and the associated trip blank TB-11. These samples were broken in shipment to the laboratory. They were resampled and analyzed for VOCs in a separate QC package.

- The following table lists compounds that exceeded 20.0% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 30% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Method 524.2 does not discuss QC criteria for minimum response factor, therefore the 0.05 minimum technical criteria from the National Functional Guidelines is used, with any compounds exhibiting an RF less than 0.05 having all results considered estimated and flagged "J" for positive results and "UJ" for non-detects.

Calibration	Compound	Deficiency	Associated Samples
I - 5/24/94 (14:49-18:15)	vinyl chloride	%RSD = 22.8	All Samples
	chloroethane	%RSD = 26.1	
		RF = 0.003	
	methylene chloride	%RSD = 32.2	
	tetrachloroethane	%RSD = 36.1	
C - 5/25/94 (18:39)	dichlorodifluoromethane	%D = 32.32	TB-05, TB-06, TB-07
	chloromethane	RF = 0.048	
		%D = 35.28	
	vinyl chloride	%D = 72.40	
	chloroethane	RF = 0.002	
	trichlorofluoromethane	%D = 170.99	
	1,2,3-trichloropropane	RF = 0.046	
	1,2-dibromo-3-chloropropane	RF = 0.046	
	1,2,4-trichlorobenzene	%D = 45.48	
	naphthalene	%D = 51.43	
	1,2,3-trichlorobenzene	%D = 52.9	
C - 5/26/94 (14:40)	dichlorodifluoromethane	%D = 43.15	MW-03S, MW-03D, MW-17, MW-18, MW-26S, DUPE-10
	chloromethane	RF = 0.040	
		%D = 45.48	
	trichlorofluoromethane	%D = 163.10	
	chloroethane	RF = 0.004	
	tetrachloroethene	%D = 70.40	
C - 5/27/94 (12:00)	dichlorodifluoromethane	%D = 31.67	TB-08
	chloromethane	RF = 0.047	
		%D = 36.17	
	vinyl chloride	%D = 47.96	
	chloroethane	%D = 0.004	
	trichlorofluoroethane	%D = 83.42	
	tetrachloroethene	%D = 71.88	
	nephthalene	%D = 79.83	
	1,2,3-trichlorobenzene	%D = 39.19	
C - 5/28/94 (15:32)	trichlorofluoromethane	%D = 54.03	TB-09, RB051994, FAUCET-01, MW-21 MS/MSD
	chloromethane	RF = 0.034	
		%D = 53.32	
	dichlorodifluoromethane	%D = 48.99	
	vinyl chloride	RF = 0.049	
	chloroethane	RF = 0.002	
		%D = 35.21	
	tetrachloroethene	%D = 73.13	
	1,2,3-trichloropropane	RF = 0.046	
	1,2-dibromo-3-chloropropane	RF = 0.046	
	1,2,4-trichlorobenzene	%D = 34.90	
	1,2,3-trichlorobenzene	%D = 43.27	

C - 5/29/94 (13:12)	dichlorodifluoromethane	%D = 41.83	MW-21, MW-22, MW-25, TB-10, DUPE-11
	chloromethane	RF = 0.038 %D = 48.17	
	chloroethane	RF = 0.003	
	trichlorofluoromethane	%D = 31.36	
	tetrachloroethene	%D = 73.94	
	1,2,3-trichloropropane	RF = 0.048	
	1,2-dibromo-3-chloropropane	RF = 0.048	
	1,2,4-trichlorobenzene	%D = 31.59	
	naphthalene	%D = 32.98	
	1,2,3-trichlorobenzene	%D = 40.04	
C - 5/31/94 (11:36)	bromomethane	RF = 0.044 %D = 38.83	MW-02, MW-10, MW-11, MW-12, MW-23
	chloroethane	RF = 0.002 %D = 42.88	
	trichlorofluoromethane	%D = 41.09	
	tetrachloroethene	%D = 72.61	
	1,2,3-trichlorobenzene	%D = 33.17	

- The tables below present a comparison of field duplicate data. All results are within the USEPA Region II guidelines (QC limit = 50% RPD) for aqueous samples, indicating acceptable sampling precision.

Compound	MW-25 ($\mu g/\ell$)	DUPE-11	RPD
benzene	16000	14000	13
ethylbenzene	660	500	28
toluene	12000	11000	8.7
o-xylene	1400U	1200B	--
m&p xylene	1400U	1100B	--
acetone	3000UJ	4000J	--

Compound	MW-26S	DUPE-10	RPD
1,1-dichloroethane	58	57	1.7
1,1-dichloroethene	24	24	0
ethylbenzene	68	68	0
1,1,1-trichloroethane	18	19	5.4
1,2,4-trimethylbenzene	24	24	0
1,3,5-trimethylbenzene	9.0	9.6	6.5
o-xylene	4.6	4.6	0
m&p xylene	180	180	0
acetone	125J	110J	13

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Pthalates are negated in associated samples if the sample concentrations is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Bis(2-ethylhexyl)phthalate (0.6J $\mu g/\ell$) Unknown @ 4.35 (3J) Unknown @ 4.57 (3J) Unknown @ 4.75 (7J) Unknown @ 5.77 (2J) Unknown @ 5.90 (2J)	MW-17, MW-18, MW-3S, MW-3D, DUPE-10, MW-26S
SBLK02	1,4-Dichlorobenzene (0.7J $\mu g/\ell$) Unknown Oxy Compound @ 5.42 (5J) Unknown @ 25.54 (30J) Unknown @ 27.75 (20J) Unknown Alkane @ 25.66 (6J) Unknown Alkane @ 26.79 (8J) Unknown Alkane @ 27.85 (8J) Unknown Alkane @ 29.88 (6J) Unknown Alkane @ 30.83 (4J)	RB051994, MW-23, MW-21, MW-21 MS/MSD, MSB 5/23/94

Blank ID	Compound (Concentration)	Associated Samples
SBLK03	Bis(2-ethylhexyl)phthalate (0.8J $\mu g/\ell$) Unknown Alkane @ 28.89 (4J) Unknown Alkane @ 29.87 (6J) Unknown Alkane @ 30.82 (5J) Unknown Alkane @ 31.74 (50J) Unknown Alkane @ 32.63 (8J)	MW-22, MW-25, DUPE-11, BR-01, BR-02, BR-03
SBLK04	Bis(2-ethylhexyl)phthalate (0.9J $\mu g/\ell$) Unknown @ 13.93 (2J) Unknown @ 25.54 (80J) Unknown @ 27.74 (40J) Unknown @ 31.73 (200J) Unknown @ 32.07 (20J) Unknown Alkane @ 25.66 (9J) Unknown Alkane @ 26.78 (10J) Unknown Alkane @ 27.85 (20J) Unknown Alkane @ 28.88 (8J) Unknown Alkane @ 29.87 (10J) Unknown Alkane @ 30.81 (10J) Unknown Alkane @ 32.63 (20J)	MW-02, MW-02 Re, MW-10, MW-11, MW-11 Re, MW-12, MW-12 Re
RB051994	Unknown @ 26.01 (3J)	All Samples

- MW-21 MS/MSD exhibited several compounds with spike recoveries outside of QC limits. None of the matrix spiking compounds were detected in the unspiked portion of this sample, therefore qualification of compound non-detect results was not performed.

- The MSB exhibited high recovery for pentachlorophenol (147%; QC limits = 9%-103%) and 4-nitrophenol (95%; QC limits = 10%-80%). Neither compound was detected in any of the samples, therefore results are not qualified.

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ."

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94 (1905-2228)/A	1,2-Dichlorobenzene 4-Chlorophenyl-phenylether 2-Chlorophenol-d4 (surrogate)	%RSD = 23.7 %RSD = 28.0 %RSD = 22.3	All Samples
C - 6/24/94 (1085)A	Hexachloroethane Bis(2-chlorethoxy)methane 2-Methylnaphthalene Pyrene	%D = 29.0 %D = 33.3 %D = 34.8 %D = 36.8	MW-23, MW-21, MW-22, MW-25, DUPE-11, DUPE-10, RB051994, BR-01, BR-02, MW-21 MS/MSD
C - 6/28/94 (1746)A	Hexachloroethane	%D = 36.6	BR-03, MW-02, MW-10, MW-11, MW-12, MW-02 Re, MW-11 Re, MW-12 Re
C - 7/1/94 (1155)A	Bis(2-chloroethyl)ether Acenaphthene Benzo(b)fluoroanthene	%D = 34.9 %D = 29.8 %D = 28.7	MW-26S
C - 6/23/94 (0842)A	Hexachloroethane 2-Methylnaphthalene Fluorene Benzo(b)fluoranthene	%D = 32.0 %D = 33.3 %D = 34.2 %D = 32.4	MW-17, MW-18, MW-3S, MW-3D

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that MW-12 exhibited 0% recovery of 2,4,6-tribromophenol in both the initial and re-analysis. The re-analysis also exhibited 0% recovery of terphenyl-d14. The initial analysis of this sample will be used, with all non-detect acid fraction compound results rejected. MW-02 initial and re-analysis exhibited 0% recovery for all surrogates except 2-fluorobiphenyl and nitrobenzene-d5. However, the poor surrogate recovery in these samples is due to analysis of the extract at a 50-fold dilution level, effectively diluting out the surrogates. Therefore no qualification of the MW-02 results is performed based on surrogate recovery. No qualification of any of the other samples listed is required due to poor surrogate recovery, as each had no more than one non-advisory base/neutral or acid extractable surrogate compound outside of QC limits.

Sample	Surrogate	% Recovery	QC Limits
MW-21 MS	Nitrobenzene-d5	32	35-114
	2-Fluorobiphenyl	41	43-116
MW-23	2-Fluorobiphenyl	41	43-116
MW-22	2-Fluorobiphenyl	41	43-116
	2-Chlorophenol	29	33-110 (advisory)
MW-25	2-Fluorobiphenyl	34	43-116
	2-Chlorophenol	31	33-110 (advisory)
DUPE-11	2-Fluorobiphenyl	40	43-116
	2-Chlorophenol	31	33-110 (advisory)
MW-21 MSD	2-Fluorobiphenyl	42	43-116
BR-01	2-Fluorobiphenyl	31	43-116
SBLK01	2-Chlorophenol	136	33-110 (advisory)
BR-03	2-Fluorobiphenyl	38	43-116
MW-12	2,4,6-Tribromophenol	0	10-123
MW-12 Re	2,4,6-Tribromophenol	0	10-123
	Terphenyl-d14	0	33-141

- The following table lists samples that exhibited internal standards with area counts outside of the +100%/-50% QC limits. Based on these results, as well as other QC criteria (surrogate recovery, compound concentrations, etc.), the initial analyses of MW-02, MW-11 and MW-12 should be used, with all compounds quantitated against the affected internal standards considered estimated and flagged "J" for positive results and "UJ" for non-detects. (Note - A indicates area count within QC limits and N/A indicates QC limits not applicable for this internal standard for sample of interest.)

	Internal Standards				
Sample	Nap-d8	Acenap-d10	Phen-d10	Chry-d12	Peryl-d12
MW-02	A	A	55527	14635	A
MW-02 Re	103230	47934	47550	13396	7201
MW-11	A	A	58823	14852	A
MW-11 Re	A	53752	52526	14269	A
MW-12	A	A	59877	15481	A
MW-12 Re	A	54635	48312	15537	A

	Internal Standards				
Sample	Nap-d8	Acenap-d10	Phen-d10	Chry-d12	Peryl-d12
QC Limits	436382-109096	57115-228460	69511-278042	16091-64362	7251-29004
MW-21 MS	A	A	A	A	3302
QC Limits	N/A	N/A	N/A	N/A	5651-22602

PESTICIDE/PCB

- The 4,4´-DDT exhibited a percent relative standard deviation (%RSD) of 20.9% in the initial calibration on column DB-1701 (QC limit = 20.0%). The methoxychlor standard exhibited 27.9%RSD on the DB-608 column. The %RSD reported for heptachlor epoxide and endosulfan II on the DB-608 column also exhibited the QC limit, however they were incorrectly calculated and are not actually in exceedance of the QC limit. All sample results for 4,4´-DDT and methoxychlor are considered estimated with positive results flagged "J" and non-detect results flagged "UJ."

- The calibration verification standard INDBM03 exhibited 27.5% relative percent difference from the initial calibration on the DB-1701 column (QC limit = 25.0%). All samples results for this compound are therefore considered estimated, with positive results flagged "J" and non-detect results flagged "UJ."

- The initial calibration retention time windows for heptachlor epoxide and endosulfan II on the DB-608 column and for endosulfan II on the DB-1701 column were incorrectly calculated. All sample data was received to ensure proper analyte identification was made. No additional qualification to the data is warranted.

- The table below lists samples and standards which exhibited retention times outside of the retention time windows. The raw data for field samples was reviewed carefully to ensure that all target analytes were properly identified. No further qualification to the data is necessary.

Sample ID	Tetrachloro-m-xylene (RT Window = 6.64 min to 6.74 min)	Decachlorobiphenyl (RT Window = 27.34 min to 27.54 min)
PEM03	6.73	27.55
INDAM02	6.75	27.55
BR-03	6.73	27.55
MW-02	6.76	27.57
MW-11	6.74	27.56

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that it is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
DUPE-10	beta-BHC	1073.9	
	delta-BHC	493.8	
	dieldrin	50.0	
	4,4´-DDE	26.0	
	endosulfan II	222.0	
	4,4´-DDD	75.0	
	4,4´-DDT	115.1	
	endrin aldehyde	275.0	Negated - RT out
	gamma-chlordane	969.0	
	Ar 1254	37.5	
BR-01	alpha-BHC	890.1	
BR-02	alpha-BHC	150.0	
	endosulfan sulfate	1017.6	
BR-03	alpha-BHC	157.1	
	methoxychlor	361.5	
MW-02	beta-BHC	1304.3	
	delta-BHC	287.1	
	heptachlor	80.6	
	aldrin	50.0	
	endosulfan I	70.2	Negated - RT out
	dieldrin	83.3	
	4,4´-DDE	300.0	Negated - RT out
	endrin	34.5	
	endosulfan II	428.3	
	4,4´-DDD	118.2	
	endosulfan sulfate	640.0	
	alpha-chlordane	733.3	
	gamma-chlordane	60.0	
MW-10	alpha-BHC	30.4	
	aldrin	100.0	Negated - RT out
MW-11	alpha-BHC	28.2	
	beta-BHC	3620.9	
	delta-BHC	200.0	
	heptachlor	28.6	Negated - RT out
	aldrin	111.8	
	endosulfan I	83.3	Negated - RT out
	4,4´-DDE	76.9	Negated - RT out
MW-12	beta-BHC	3025.0	
	delta-BHC	50.0	
	heptachlor epoxide	2709.5	
	dieldrin	726.1	
	4,4´-DDE	150.0	
	endrin	77.8	
	gamma-chlordane	547.1	
MW-3D	alpha-BHC	660.9	

Sample	Compound	RPD	Notes
MW-17	gamma-BHC	257.9	
	heptachlor	66.7	Negated - RT out
MW-18	beta-BHC	2828.6	
MW-23	delta-BHC	69.5	
MW-25	aldrin	56.2	
	dieldrin	233.3	
MW-26S	beta-BHC	542.9	
	delta-BHC	341.6	
	heptachlor epoxide	800.0	Negated - RT out
	endosulfan I	290.6	Negated - RT out
	dieldrin	39.3	
	4,4´-DDE	226.7	
	endosulfan II	209.7	
	4,4´-DDD	83.3	
	4,4´-DDT	57.1	
	endrin aldehyde	48.3	Negated - RT out
	Ar 1254	70.0	
RB051994	alpha-BHC	365.1	
PBLKE13	alpha-BHC	337.5	
	endosulfan sulfate	34.1	

- Sample MW-02 exhibited a RT for alpha-BHC on the DB-608 column of 8.80 minutes which is outside the RT window of 8.68 to 8.78 minutes. Alpha-BHC results for this sample have been negated.

- The table below lists samples and associated sample results that were negated because they were reported below the reported method detection limit (MDL).

Sample ID	Compound/ Result $\mu g/\ell$		MDL
BR-02	Endosulfan sulfate	0.002	0.007
BR-03	4,4´-DDE	0.003	0.006
	methoxychlor	0.013	0.030
MW-10	heptachlor	0.002	0.003
	4,4´-DDE	0.001	0.006
MW-12	gamma-chlordane	0.002	0.003
MW-17	gamma-BHC	0.001	0.003
	heptachlor	0.001	0.003
MW-22	gamma-BHC	0.002	0.003
MW-25	dieldrin	0.001	0.002

- The method blank PBLKE13 exhibited 0.002 μg/ℓ of alpha-BHC and 0.008 μg/ℓ of endosulfan sulfate. The field blank RB051994 exhibited 0.001 μg/ℓ of alpha-BHC. All sample results for these analytes that are less than five times the associated blank result have been negated.

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
DUPE-11	50	43	33	36
BR-01	55	43	33	36
BR-02	–	50	42	44
BR-03	55	55	46	49
MW-11	–	–	45	47
MW-12	–	–	33	34
MW-02	27	–	–	–
MW-18	55	43	–	–
MW-21	–	55	55	55
MW-21 MS	–	50	43	42
MW-21 MSD	–	–	44	45
MW-22	–	–	42	44
MW-3D	–	55	–	–
PBLKE2	50	35	–	–
RB051994	–	55	50	55

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Unfiltered mercury (202.8%), filtered mercury (199.4%), unfiltered selenium (135.0%), filtered cadmium (66.1%) and filtered silver (0%) spiked sample recoveries were outside of 75%-125% QC limits. Positive sample results for each of these metals should be considered estimated and flagged "J." Non-detect filtered cadmium results should be flagged "UJ." Non-detect filtered silver results are rejected.

- Filtered and unfiltered BR-03 were analyzed at secondary dilution factor for selenium and unfiltered BR-01, BR-02 and BR-03 were analyzed at a secondary dilution factor for thallium, due to interferences. The dilution analyses also exhibited interferences, therefore the non-detect results in these samples are flagged "UJ."

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- Cyanide LCS recovery (78%) was below 80% lower QC limit. All cyanide results are considered estimated, with non-detect results flagged "UJ."

- The lead CRDL standard associated with samples BR-01 and BR-02 unfiltered and MW-12 filtered and the selenium CRDL standard associated with BR-01, BR-02 and BR-03 unfiltered and filtered exhibited slightly high recoveries (130.0% and 132.0%, respectively). Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery greater than 120% (USEPA Region II upper QC limit) may indicate potential high bias in positive sample results at concentrations near the CRDL. Therefore positive concentrations for these metals in the noted samples should be considered estimated and flagged "J."

- Note that several metals in several samples analyzed by GFAA have a "W" qualifier on the sample data sheet. This indicates that the GFAA post-digestive spike recovery was outside of 85%115% QC limits, and the sample results were less than 50% of the spike added. If the spike recovery is less than 85%, then both positive results and non-detects are considered estimated and flagged "J" or "UJ," respectively. If the recovery is greater than 115%, only positive values are flagged. The following table presents samples which had spike recoveries outside of QC limits for one or more GFAA metal. (Note: U = unfiltered, F = filtered.)

Sample	Metal	% Recovery	Sample	Metal	% Recovery
BR-01	arsenic - F	59.0	DUPE-11	lead - U	83.0
	lead - F	63.0		selenium - U	81.0
	selenium - U	82.0			
	selenium - F	62.0	MW-02	lead - U	76.5
	thallium - F	58.0		thallium - U	73.0
BR-02	arsenic - U	73.5	MW-10	lead - U	76.5
	arsenic - F	63.0		selenium - U	79.0
	lead - U	83.0		thallium - U	53.5
	lead - F	64.0			
	selenium - U	66.0	MW-11	lead - U	72.5
	selenium - F	77.0		selenium - U	53.0
	thallium - F	74.0		thallium - U	64.5
BR-03	lead - U	46.0	MW-12	thallium - U	69.0
	lead - F	53.0		selenium - F	76.0
	thallium - F	144.5			
DUPE-10	lead - U	79.0	MW-17	selenium - U	46.0
MW-22	lead - U	82.5	MW-18	arsenic - U	79.5
				arsenic - F	152.5
MW-23	lead - U	79.0		selenium - U	49.0
				selenium - F	80.0
MW-25	lead - U	83.5		thallium - F	81.5
MW-26S	lead - U	78.0	MW-3D	selenium - U	145.0
			MW-3S	lead - U	83.5
				selenium - U	64.0
			RB051994	selenium - U	69.0

- The filtered laboratory duplicate exhibited an absolute difference of 6247 $\mu g/\ell$ for potassium (CRDL = 5000 $\mu g/\ell$). This is above the QC limit of $\pm$CRDL for metals whose concentration in the sample is less than five times the CRDL. Silver exhibited a relative percent difference (RPD) result of 61.4% (QC limit = 20%). Positive potassium and silver results in all filtered samples are considered estimated and flagged "J."

- The unfiltered arsenic analysis in MW-12 was performed by Method of Standards Additions (MSA) and exhibited a linear correlation coefficient less than 0.995 (0.9940). The unfiltered arsenic result in this sample (a non-detect) is therefore flagged "UJ."

- The filtered ICP serial dilution analysis exhibited calcium (13.2%), magnesium (13.9%) and sodium (29.0%) with percent difference results greater than 10% for metals whose initial concentration exceeded 50 times the IDL. Positive results for these metals in the filtered sample analyses are considered estimated and flagged "J."

- The following is a list of metals whose dissolved concentrations exceeded their total concentrations by 10% or more in the specified sample. Concentrations for these metals in these samples are considered estimated, with positive results flagged "J" and non-detects flagged "UJ." Note - N.C. = Not Calculable. Metal was detected in the filtered sample but not in the unfiltered sample.

Sample	Metal	%D	Sample	Metal	%D
BR-01	Antimony	N.C.	BR-02	Calcium	16.2
	Copper	524		Copper	616
	Magnesium	11.3		Sodium	11.7
	Manganese	16.2			
MW-12	Antimony	N.C.	BR-03	Copper	321
	Arsenic	N.C.		Magnesium	18.5
	Copper	175		Manganese	32.9
	Silver	N.C.		Mercury	156
	Zinc	47.0		Potassium	17.0
				Sodium	11.0
MW-17	Cadmium	N.C.			
	Potassium	176			
	Silver	N.C.			
	Sodium	21.8			

- The reported antimony results in unfiltered MW-02 and filtered MW-12 and BR-01 are considered estimated due to very poor precision in duplicate burns for each analysis (%RSD's of 91.36, 117.1 and 245.1, respectively). Although no QC criteria exist for ICP, a QC limit of 20% is used for GFAA duplicate injection precision and represents an acceptable level of precision.

- RB051994 contained 22.7 $\mu g/\ell$ copper. Concentrations of copper in all samples less than five times the concentration in the rinsate blank are rejected.

- Samples were analyzed for mercury 32 to 34 days after receipt by the lab. The NYSDEC ASP required that mercury analyses be performed within 26 days of receipt, therefore holding times for mercury were exceeded. Flag all mercury data as estimated, with positive results flagged "J" and non-detect "UJ."

- The mercury calibration linear correlation was less than 0.995 (0.9935), therefore all mercury results are considered estimated and flagged "J" for positive results, "UJ" for non-detects. The arsenic analytical runs associated with all filtered and unfiltered sample analyses except MW-12 and MW-17 unfiltered exhibited calibration linear correlation coefficients less than 0.995 (0.9944, 0.9880 and 0.9740), therefore all arsenic results except unfiltered MW-12 and MW-17 are considered estimated and flagged "J" for positive results, "UJ" for non-detects.

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: C. Brett Mongillo
C. Brett Mongillo

Douglas A. Wolf
Douglas A. Wolf, P.G.

Dated: 2 August 1994

DATA VALIDATION OF GROUND WATER SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. MW-1 (0516)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by USEPA Method 524.2 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
MW-01	MW-13	MW-26D MS/MSD
MW-04	MW-14	MW-26D Spike and Duplicate (Inorganics)
MW-05	MW-15	RB051694
MW-06	MW-16	TB1 (0516)
MW-07	MW-19	TB2 (0516)
MW-08	MW-20	TB3 (0517)
MW-09	MW-24	TB4 (0517)
	MW-26D	MSB 5/19/94 (SVOC)
		PBMSB5 (Pest/PCB)

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field and trip blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- MW-26D MS/MSD exhibited 1,1-dichloroethene (449%/443%; QC limits = 61%-145%) and trichloroethene (256%/220%; QC limits = 71%-120%) with recoveries outside of QC limits due to interferences. The positive results for these two compounds in the unspiked portion of this sample are considered estimated and flagged "J."

- The following table lists blanks, blank contaminants and concentrations and associated samples. Methylene chloride, acetone and toluene are negated in a sample if the sample concentration is less than or equal to ten times the highest associated blank concentration. For all other compounds an action level of five times the highest associated blank concentration is used.

Blank ID	Compound (Concentration)	Associated Samples
VBLK052	tert-butylbenzene (0.05J μg/ℓ) n-butylenzene (0.1J) sec-butylbenzene (0.06J) chloroform (0.47J) 1,3-dichlorobenzene (0.16J) hexachlorobutadiene (0.5J) benzene (0.07J) methylene chloride (2) n-propylbenzene (0.04J) 1,2,4-trichlorobenzene (0.62J) 1,2,4-trimethylbenzene (0.1J) o-xylene (0.14J) m&p xylene (0.22J) acetone (10J)	TB#3, TB#4, MW-6, MW-7, MW-8, MW-9, MW-16, MW-20, MW-24
VBLK051	toluene (0.32 μg/ℓ) 1,2,4-trimethylbenzene (0.07J) chloroform (0.47J) 1,3-dichlorobenzene (0.1J) hexachlorobutadiene (0.16J) methylene chloride (1.9) 1,2,4-trichlorobenzene (0.16J) o-xylene (0.14J) m&p xylene (0.22J)	TB#2, MW-1, MW-4, MW-5, MW-13, MW-14, MW-15, MW-19
VBLK055	chloroform (0.5J μg/ℓ) 1,3-dichlorobenzene (0.05J) hexachlorobutadiene (0.1J) methylene chloride (2.2) naphthalene (0.14J) trichloroethene (0.15J) 1,2,4-trimethylbenzene (0.03J) o-xylene (0.08J) m&p xylene (0.14J)	MW-26D, MW-26D MS/MSD
VBLK049	chloroform (0.3J μg/ℓ) 1,4-dichlorobenzene (0.05J) hexachlorobutadiene (0.4J) methylene chloride (1.7) 1,2,3-trichlorobenzene (0.3J) 1,2,4-trichlorobenzene (0.2J) 1,2,4-trimethylbenzene (0.04J) m&p xylene (0.03J)	TB#1

Blank ID	Compound (Concentration)	Associated Samples
RB051994	benzene (0.05BJ $\mu g/\ell$) chloroform (0.11BJ) 1,3-dichlorobenzene (0.15BJ) 1,4-dichlorobenzene (0.18J) methylene chloride (0.13BJ) tetrachloroethene (0.01BJ) toluene (0.48J) 1,1,1-trichloroethane (0.03BJ) trichloroethene (0.02BJ) 1,2,4-trimethylbenzene (0.05BJ) o-xylene (0.16BJ) m&p xylene (0.2BJ)	All Samples
TB-01	1,4-dichlorobenzene (0.11BJ $\mu g/\ell$) toluene (0.19J) methylene chloride (0.18BJ) tetrachloroethene (0.08J) trichloroethene (0.12J) m&p xylene (0.12BJ)	All Samples Shipped on 5/16/94
TB-02	benzene (0.06J $\mu g/\ell$) chloroform (0.32BJ) 1,3-dichlorobenzene (1B) toluene (0.25BJ) methylene chloride (0.72B) tetrachloroethene (0.05BJ) trichloroethene (0.12J) acetone (7J) o-xylene (0.06BJ) m&p xylene (0.09BJ)	All Samples Shipped on 5/16/94
TB-03	chloroform (0.08BJ $\mu g/\ell$) benzene (0.06BJ) methylene chloride (0.31BJ) tetrachloroethene (0.08J) trichloroethene (0.06J) 1,2,4-trichlorobenzene (0.15BJ) o-xylene (0.05BJ) m&p xylene (0.1BJ)	All Samples Shipped on 5/17/94
TB-04	chloroform (0.07BJ $\mu g/\ell$) 1,3-dichlorobenzene (0.04BJ) cis-1,3-dichloroethene (0.07J) methylene chloride (0.36BJ) tetrachloroethene (0.07J) trichloroethene (0.12J) m&p xylene (0.11BJ)	All Samples Shipped on 5/17/94

- The laboratory was requested to analyze the ground water samples for TCL volatiles by method 524.2. Since method 524.2 does not account for all TCL volatile compounds, specifically acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone and carbon disulfide, the calibration solutions did not contain these compounds. Therefore the laboratory amended the 524.2 analytical and reporting protocols to account for these five compounds as follows:

  1. A 50 ppb standard of TCL compounds was purged to use as a reference standard (file name "EHSL") for spectra and retention times. Response factors were calculated using this one point curve. (This procedure gives a better estimated concentration than using an RF of 1.0 for all compounds.)

  2. All samples and blanks were quantitated to the 50 ppb standard ("EHSL").

  3. Only hits with areas greater than 10% of the respective internal standard areas were reported. This procedure is consistent with TIC reporting rules.

  4. The response factors used for detected compounds are as follows:

Acetone	0.069
Carbon Disulfide	0.719
4-Methyl-2-Pentanone	0.220

- The laboratory did not analyze fortified blanks as required by method. Given that the laboratory performed all other QC requirements, this protocol deficiency is judged to have no effect on the technical useability of the data.

- The following table lists compounds that exceeded 20.0% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 30% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Method 524.2 does not discuss QC criteria for minimum response factor, therefore the 0.05 minimum technical criteria from the National Functional Guidelines is used, with any compounds exhibiting an RF less than 0.05 having all results considered estimated and flagged "J" for positive results and "UJ" for non-detects.

Calibration	Compound	Deficiency	Associated Samples
I - 5/23/94	vinyl chloride	%RSD = 22.8	All Samples
(14:49-18:15)	chloroethane	%RSD = 26.1	
		RF = 0.003	
	methylene chloride	%RSD = 32.2	
	tetrachloroethene	%RSD = 36.1	
	trichlorofluoromethane	%RSD = 47.5	
C - 5/24/94	dichlorodifluoromethane	%D = 50.2	TB#2, MW-1, MW-4,
(17:39)	chloromethane	RF = 0.033	MW-5, MW-13, MW-14,
		%D = 54.4	MW-15, MW-19
	chloroethane	RF = 0.002	
	tetrachloroethane	%D = 73.3	
	hexachlorobutadiene	%D = 32.6	
	1,2,4-trichlorobenzene	%D = 31.4	
	naphthalene	%D = 42.7	
	1,2,3-trichlorobenzene	%D = 42.7	
C - 5/25/94	chloromethane	RF = 0.044	TB#3, TB#4, MW-6, MW-7,
(08:49)		%D = 40.05	MW-8, MW-9, MW-16,
	trichlorofluoromethane	%D = 156.5	MW-20, MW-24
	chloroethane	RF = 0.003	
	tetrachloroethene	%D = 71.5	
C - 5/27/94	dichlorodifluoromethane	%D = 31.67	MW-26D,
(12:00)	chloromethane	RF = 0.047	MW-26D MS/MSD
		%D = 36.17	
	vinyl chloride	%D = 47.96	
	chloroethane	%D = 0.004	
	trichlorofluoroethane	%D = 83.42	
	tetrachloroethene	%D = 71.88	
	naphthalene	%D = 79.83	
	1,2,3-trichlorobenzene	%D = 39.19	

Calibration	Compound	Deficiency	Associated Samples
C - 5/24/94	trichlorofluoromethane	%D = 80.4	TB#1
(09:30)	chloromethane	RF = 0.038	
		%D = 48.7	
	dichlorodifluoromethane	%D = 45.6	
	chloroethane	RF = 0.004	
	tetrachloroethene	%D = 74.0	

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Pthalates are negated in associated samples if the sample concentrations is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Bis(2-ethylhexyl)phthalate (1.6J $\mu g/\ell$)	MW-01, MW-14, MW-13, MW-05,
	Unknown @ 4.38 (4J)	MW-19, RB051694
	Unknown Alkane @ 26.86 (2J)	
	Unknown Alkane @ 27.91 (3J)	
SBLK02	Unknown @ 4.25 (4J $\mu g/\ell$)	MW-04, MW-08, MW-09, MW-15,
	Unknown @ 4.35 (6J)	MW-16, MW-20
	Unknown @ 4.88 (4J)	
	Unknown Alkane @ 27.92 (4J)	
	Unknown Alkane @ 28.95 (4J)	
	Unknown Alkane @ 29.93 (8J)	
	Unknown Alkane @ 30.89 (7J)	
	Unknown Alkane @ 31.80 (10J)	
	Unknown Alkane @ 32.69 (8J)	
SBLK03	Unknown @ 4.39 (4J $\mu g/\ell$)	MW-06, MW-07, MW-24, MW-26D,
	Unknown @ 31.73 (10J)	MW-26D MS/MSD, MSB 5/19/94
	Unknown Alkane @ 27.87 (2J)	
	Unknown Alkane @ 29.90 (2J)	
RB05194	Unknown @ 4.34 (8BJ $\mu g/\ell$)	All Samples
	Unknown @ 4.89 (4J)	
	Unknown Alkane @ 5.24 (2J)	
	Unknown Alkane @ 9.15 (8J)	
	Unknown Aromatic @ 11.79 (2J)	
	Unknown Aromatic @ 12.62 (3J)	
	Unknown Oxy Compound @ 5.42 (4J)	

- MW-26D MS/MSD exhibited several compounds with spike recoveries and/or RPD results outside of QC limits. None of the matrix spiking compounds were detected in the unspiked portion of this sample, therefore qualification of compound non-detect results was not performed. The majority of the noted MS/MSD deficiencies were due to poor spike recoveries in the MSD and likely represent an analytical problem with the MSD analysis rather than the sample.

- The MSB exhibited low recovery for acenaphthene (40%; QC limits = 46%-118%) and high recovery for 4-nitrophenol (104%; QC limits = 10%-80%). Neither compound was detected in any of the samples, therefore acenaphthene non-detect results in all samples are flagged "UJ." Non-detect 4-nitrophenol results are not qualified.

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ."

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94 (1905-2228)/A	1,2-Dichlorobenzene	%RSD = 23.7	All Samples
	4-Chlorophenyl-phenylether	%RSD = 28.0	
	2-Chlorophenol-d4 (surrogate)	%RSD = 22.3	
C - 6/21/94 (1049)A	Bis(2-chloroethyl)ether	%D = 30.8	MW-01, MW-04, MW-05, MW-08, MW-09, MW-13, MW-14, MW-15, MW-16, MW-19, MW-20, RB051694
	4-Methylphenol	%D = 28.1	
	2-Fluorophenol (surrogate)	%D = 30.9	
C - 6/22/94 (1902)A	Hexachloroethane	%D = 27.5	MW-07, MSB 5/19/94
	Benzo(k)fluoranthene	%D = 27.7	
	Benzo(g,h,i)perylene	%D = 26.8	
C - 6/23/94 (0842)A	Hexachloroethane	%D = 32.0	MW-06, MW-24, MW-26D, MW-26D MS/MSD
	2-Methylnaphthalene	%D = 33.3	
	Fluorene	%D = 34.2	
	Benzo(b)fluoranthene	%D = 32.4	

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that MW-26D exhibited less than 10% recovery of phenol-d5, however recovery of this surrogate in both the MS and MSD was acceptable, therefore non-detect acid fraction compound results (phenolics) are qualified as "UJ."

Sample	Surrogate	% Recovery	QC Limits
MW-26D	Phenol-d5	4	10-110
MW-26D MS	2-Fluorobiphenyl	42	43-116
MW-26D MSD	2-Fluorobiphenyl	35	43-116

PESTICIDE/PCB

- The 4,4´-DDT exhibited a percent relative standard deviation (%RSD) of 20.9% in the initial calibration on column DB-1701 (QC limit = 20.0%). The methoxychlor standard exhibited 27.9%RSD on the DB-608 column. The %RSD reported for heptachlor epoxide and endosulfan II on the DB-608 column also exceeded the QC limit, however they were incorrectly calculated and are not actually in exceedance of the QC limit. All sample results for 4,4´-DDT and methoxychlor are considered estimated with positive results flagged "J" and non-detect results flagged "UJ."

- The calibration verification standard INDBM03 exhibited 27.5% relative percent difference from the initial calibration on the DB-1701 column (QC limit = 25.0%). All samples results for this compound are therefore considered estimated, with positive results flagged "J" and non-detect results flagged "UJ."

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that it is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
MW-06	endrin aldehyde	319.4	
MW-07	beta-BHC	2214.3	Negated - RT out
MW-14	beta-BHC	2900.0	
	delta-BHC	420.0	
	heptachlor epoxide	4471.4	
	4,4´-DDE	116.7	
	endrin ketone	208.3	
MW-26	heptachlor	84.2	
	heptachlor epoxide	775.0	
	dieldrin	464.1	
	4,4´-DDD	1275.0	

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
MSB5	--	44	--	--
MW-01	--	48	--	--
MW-13	43	32	--	--
MW-14	50	34	55	55
MW-15	55	45	--	--
MW-16	50	42	--	--
MW-19	205	180	--	--
MW-20	55	48	38	38
MW-26D	--	55	--	--
MW-26D MS	--	55	--	--
MW-04	49	35	--	--
MW-05	39	27	--	--
MW-06	55	44	--	--
MW-07	--	50	50	55
MW-08	42	35	--	--
MW-09	55	46	--	--
PBLKE10	--	39	--	--
PBLKE11	55	46	--	--
RB051694	47	35	--	--

- Sample MW-24 exhibited a retention time (RT) for the surrogate decachlorobiphenyl (27.55 minutes) outside of the RT window of 27.34 minutes to 27.54 minutes on the DB-608 column. The calibration verification standard PEM03 exhibited a 27.55 minute RT for decachlorobiphenyl on DB-608. The standard INDAM02 experienced a RT shift for the surrogate tetrachloro-m-xylene (6.75 min; RT window = 6.64 minutes to 6.74 minutes) and decachlorobiphenyl (27.55 minutes) on the same column. All sample raw data was reviewed to ensure that proper identification of target compounds was made. No further qualification to the data is necessary.

- The table below lists samples and associated sample results that were negated because they were reported below the reported method detection limit (MDL).

Sample ID	Compound/ Result $\mu g/\ell$		MDL ($\mu g/\ell$)
MW-06	endrin aldehyde	0.003	0.005
MW-14	heptachlor epoxide	0.001	0.002
MW-26	heptachlor epoxide	0.001	0.002

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Arsenic (137.5%), mercury (216.8%), silver (59.6%) and thallium (66.2%) spiked sample recoveries were outside of 75%-125% QC limits. Positive sample results for each of these metals should be considered estimated and flagged "J." Non-detect silver and thallium results should be flagged "UJ."

- MW-07 and MW-15 were analyzed at a 1:5 dilution factor for thallium due to interferences. The dilution analyses also exhibited interferences, therefore the thallium non-detect result in these samples are flagged "UJ."

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- Cyanide LCS recovery (78%) was below 80% lower QC limit. All cyanide results are considered estimated, with non-detect results flagged "UJ."

- The initial cadmium CRDL standard recovery is slightly high (124.7%). Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery greater than 120% (USEPA Region II upper QC limit) may indicate potential high bias in positive sample results at concentrations near the CRDL. Therefore positive sample cadmium concentrations should be considered estimated and flagged "J."

- Note that several metals in several samples analyzed by GFAA have a "W" qualifier on the sample data sheet. This indicates that the GFAA post-digestive spike recovery was outside of 85%115% QC limits, and the sample results were less than 50% of the spike added. If the spike recovery is less than 85%, then both positive results and non-detects are considered estimated and flagged "J" or "UJ," respectively. If the recovery is greater than 115%, only positive values are flagged. The following table presents samples which had spike recoveries outside of QC limits for one or more GFAA metal.

Sample	Metal	% Recovery	Sample	Metal	% Recovery
MW-01	arsenic	118.5	MW-14	arsenic	130.0
MW-04	arsenic	130.0	MW-15	selenium	61.0
	selenium	47.0			
	thallium	115.5	MW-20	selenium	71.0
				thallium	64.5
MW-05	arsenic	134.5	MW-24	arsenic	117.5
	selenium	72.0		thallium	54.0
MW-06	arsenic	142.0	MW-26D	selenium	72.0
	selenium	44.0		thallium	55.5
MW-07	selenium	65.0			
MW-13	selenium	77.0			

- RB051994 (contained in SDG BR-01) contained 22.7 $\mu g/\ell$ copper. Concentrations of copper in all field samples less than five times the concentration in the rinsate blank are rejected.

- Samples were analyzed for mercury 32 to 34 days after receipt by the lab. The NYSDEC ASP required that mercury analyses be performed within 26 days of receipt, therefore holding times for mercury were exceeded. Flag all mercury data as estimated, with positive results flagged "J" and non-detect "UJ."

- The mercury calibration linear correlation was less than 0.995 (0.9926), therefore all mercury results are considered estimated and flagged "J" for positive results, "UJ" for non-detects.

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: C. Brett Mongillo

C. Brett Mongillo

Douglas A. Wolf

Douglas A. Wolf, P.G.

Dated: 2 August 1994

DATA VALIDATION OF GROUND WATER SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. BR-01 Resample

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by USEPA Method 524.2. The data have been validated according to the protocols and QC requirements of the ASP, USEPA Method 524.2, the USEPA National Functional Guidelines for Organic Data Review (June 1991) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples	QC Samples
BR-01	BR-03 MS/MSD
BR-02	TB062394
BR-03	

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Trip blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

- The laboratory was requested to analyze the ground water samples for TCL volatiles by method 524.2. Since method 524.2 does not account for all TCL volatile compounds, specifically acetone, 2-butanone, 2-hexanone, 4-methyl-2-pentanone and carbon disulfide, the calibration solutions did not contain these compounds. Therefore the laboratory amended the 524.2 analytical and reporting protocols to account for these five compounds as follows:

    1. A 50 ppb standard of TCL compounds was purged to use as a reference standard (file name "EHSL") for spectra and retention times. Response factors were calculated using this one point curve. (This procedure gives a better estimated concentration than using an RF of 1.0 for all compounds.)

    2. All samples and blanks were quantitated to the 50 ppb standard ("EHSL").

3. Only hits with areas greater than 10% of the respective internal standard areas were reported. This procedure is consistent with TIC reporting rules.

4. The response factors used for detected compounds are as follows:

Acetone	0.069
Carbon Disulfide	0.719
4-Methyl-2-Pentanone	0.220

- The laboratory did not analyze fortified blanks as required by the method. Given that the laboratory performed all other QC requirements, this protocol deficiency is judged to have no effect on the technical useability of the data.

- The following table lists blanks, blank contaminants and concentrations and associated samples. Methylene chloride, acetone and toluene are negated in a sample if the sample concentration is less than or equal to ten times the highest associated blank concentration. For all other compounds an action level of five times the highest associated blank concentration is used.

Blank ID	Compound (Concentration)	Associated Samples
VBLK065	Benzene (0.05J $\mu g/\ell$) n-Butylbenzene (0.18J) sec-Butylbenzene (0.06J) tert-Butylbenzene (0.05J) Chloroform (0.02J) 1,3-Dichlorobenzene (0.07J) Hexachlorobutadiene (0.68) Methylene Chloride (0.15J) Naphthalene (1) n-Propylbenzene (0.04J) 1,2,3-Trichlorobenzene (1.2) 1,2,4-Trichlorobenzene (0.77) Acetone (29J) 1,2,4-Trimethylbenzene (0.07J) 1,3,5-Trimethylbenzene (0.05J) m&p Xylene (0.06J)	BR-01, BR-02, BR-03, TB062394

Blank ID	Compound (Concentration)	Associated Samples
VBLK066	Methylene Chloride (0.31J) o-Xylene (0.03J) m&p Xylene (0.02J)	BR-03 MS/MSD
TB062394	Benzene (0.08J) Chloroform (0.1BJ) 1,3-Dichlorobenzene (0.06BJ) Ethylbenzene (0.22J) Hexachlorobutadiene (0.2BJ) Methylene Chloride (0.82BJ) Naphthalene (0.27BJ) Toluene (0.47J) 1,2,3-Trichlorobenzene (0.26BJ) 1,2,4-Trichlorobenzene (0.17BJ) 1,2,4-Trimethylbenzene (0.07BJ) m&p Xylene (0.45BJ) o-Xylene (0.21J) Acetone (10J)	BR-01, BR-02, BR-03

- The MS and MSD both exhibited the surrogate compound 1,2-dichlorobenzene-d4 with slightly low recovery (67% and 65%, respectively; QC limits = 70%-130%). Since the unspiked analysis of BR-03 exhibited acceptable surrogate recovery, no action is necessary to qualify the sample data.

- The MSD exhibited 1,1-dichloroethene with slightly high recovery (155%; QC limits = 61%-145%). This compound was not detected in the unspiked portion of this sample, therefore no qualification of the sample data is necessary.

- The following table lists compounds that exceeded 20.0% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 30% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Method 524.2 does not discuss QC criteria for minimum response factor, therefore the 0.05 minimum technical criteria from the National Functional Guidelines is used, with any compounds exhibiting an RF less than 0.05 having all results considered estimated and flagged "J" for positive results and "UJ" for non-detects.

Calibration	Compound	Deficiency	Associated Samples
I - 5/23/94	Trichlorofluoromethane	%RSD = 47.5	All Samples
(1449-1815)	Chloroethane	%RSD = 26.1	
		RF = 0.003	
	Methylene Chloride	%RSD = 32.2	
	Tetrachloroethene	%RSD = 36.1	
	Vinyl Chloride	%RSD = 22.8	
C - 6/27/94	Dichlorodifluoromethane	%D = 38.4	BR-01, BR-02, BR-03,
(0846)	Chloroethane	RF = 0.002	TB062394
	Trichlorofluoromethane	%D = 46.2	
	Methylene Chloride	%D = 48.0	
	Tetrachloroethene	%D = 71.9	
	1,3-Dichloropropane	%D = 30.5	
	1,2,3-Trichloropropane	%D = 30.6	
	1,2-Dibromo-3-chloropropane	%D = 30.6	
C - 6/28/94	Dichlorodifluoromethane	%D = 35.3	BR-03 MS/MSD
(0958)	Chloroethane	RF = 0.004	
	Trichlorofluoromethane	%D = 50.4	
	Methylene Chloride	%D = 45.0	
	1,3-Dichloropropane	%D = 37.1	
	Tetrachloroethene	%D = 75.3	
	1,2,3-Trichloropropane	%D = 42.4	
	1,2-Dibromo-3-chloropropane	%D = 42.4	
		RF = 0.04	
	Vinyl Chloride	%D = 86.4	
	Dibromochloromethane	%D = 32.7	
	1,2-Dibromoethane	%D = 31.5	
	Bromoform	%D = 38.1	
	1,1,2,2-Tetrachloroethane	%D = 34.0	
	tert-Butylbenzene	%D = 33.2	
	sec-Butylbenzene	%D = 39.3	
	4-Isopropyltoluene	%D = 38.0	
	n-Butylbenzene	%D = 45.5	
	1,2,4-Trichlorobenzene	%D = 48.9	
	Hexachlorobutadiene	%D = 54.6	
	Naphthalene	%D = 45.2	
	1,2,3-Trichlorobenzene	%D = 47.5	

Package Summary

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: ______________________
Douglas A. Wolf, P.G.

Dated: 20 August 1994

DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-103 (3-5)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
B-103 (3-5)	OUT-03A	MW-26D (11-13) MS/MSD (VOC, SVOC, Pest/PCB)
B-103 (7-9)	OUT-03B	MW-26D (11-13) Spike (Metals)
B-109 (3-5)	OUT-03C	MW-26D (11-13) Duplicate (Metals)
B-109 (9-11)		RB052994 (Rinsate Blank)
MW-26D (3-5)		RB053094 (Rinsate Blank)
MW-26D (11-13)		MSB 5/11/94 (VOC)
OUT-01A		MSB 5/6/94 (SVOC)
OUT-01B		MSB3 (Pest/PCB)
OUT-01C		
OUT-04		
OUT-05		
OUT-08		
OUT-09		

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants, concentrations and associated samples. Sample results for methylene chloride (a common laboratory contaminant) less than ten times the associated blank results are negated. Sample results for all other listed analytes less than five times the associated blank result are negated.

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	None	OUT-03A, OUT-03B, OUT-03C, OUT-05, OUT-08, OUT-09
VBLK02	Methylene Chloride (9J μg/kg) Acetone (15 μg/ℓ)	RB050294, RB050394
VBLK03	Methylene Chloride (6J μg/kg) Acetone (10J μg/kg) Trichloroethene (3J μg/kg)	OUT-01A, OUT-01B, OUT-04, B-103 (3-5), B-103 (7-9), B-109 (9-11)
VBLK04	None	OUT-01C, B-109 (3-5), B-103 (7-9)DL
VBLK05	Methylene Chloride (10J μg/kg) Trichloroethene (3J μg/kg) 1,1,2,2-Tetrachloroethane (5J μg/kg) Toluene (3J μg/kg)	MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD, MSB 5/11/94
RB050294	Methylene Chloride (3BJ μg/ℓ)	B-103 (3-5), B-103 (7-9), B-109 (3-5), B-109 (9-11), OUT-01A, OUT-01B, OUT-01C, OUT-04
RB040394	Methylene Chloride (2BJ μg/ℓ)	MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD

- Sample B-103 (7-9) DL (dilution) exhibited internal standard responses for bromochloromethane (5645), 1,4-difluorobenzene (20455) and chlorobenzene-d5 (16236) below their respective lower limits of 6764, 28827, and 28807. The dilution analysis was performed due to the presence of 1,1-dichloroethane and 1,1,1-trichloroethane concentrations in the original sample above the analytical linear range. Per the validator's professional judgement all data for this sample should be taken from the initial analysis with the 1,1-dichloroethane and 1,1,1-trichloroethane results considered estimated and flagged "J." The dilution analysis is rejected due to poor instrument response to the internal standards.

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration (I) or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration (C) response factor. Associated field samples are also listed. Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed. All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of 1,1,2,2-tetrachloroethane results is necessary. All other sample results associates with deficient calibration data are considered estimated with positive results flagged "J" and non-detect results flagged "UJ."

Calibration	Compound	Deficiency	Associated Samples
I - 5/2/94 (11:12-14:25)C	1,1,2,2-Tetrachloroethane	RF = 0.301	OUT-03A, OUT-03B, OUT-03C, OUT-05, OUT-08, OUT-09
I - 5/7/94 (13:49-17:00)C	1,1,2,2-Tetrachloroethane	RF = 0.376	RB050294, RB050394, OUT-01A, OUT-01B, OUT-01C, OUT-04, B-103 (3-5), B-103 (7-9), B-103 (7-9) DL, B-109 (3-5), B-109 (9-11), MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD, MSB 5/11/94
C - 5/6/94 (16:47)C	1,1,2,2-Tetrachloroethane	RF = 0.305	OUT-03A, OUT-03B, OUT-03C, OUT-05, OUT-08, OUT-09
C - 5/9/94 (10:08)C	1,1,2,2-Tetrachloroethane	RF = 0.316	RB050294, RB050394
C - 5/10/94 (08:05)C	1,1,2,2-Tetrachloroethane	RF = 0.299	OUT-01A, OUT-01B, OUT-04, B-103 (3-5), B-103 (7-9), B-109 (9-11)
C - 5/10/94 (16:37)C	1,1,2,2-Tetrachloroethane	RF = 0.302	OUT-01C, B-109 (3-5), B-103 (7-9) DL
C - 5/11/94 (08:40)C	1,1,2,2-Tetrachloroethane Carbon Tetrachloride	RF = 0.278 %D = 28.5	MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD, MSB 5/11/94

- The system monitoring compounds percent recovery for toluene-d8 for samples RB050394 (86%) and B-109 (3-5) (83%) were below the QC limits of 88%-110%. Neither of these samples were re-analyzed which is a protocol deficiency. All sample results for both samples are considered estimated and positive results are flagged "J;" non-detect results are flagged "UJ."

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Pthalates are negated in associated samples if the sample concentration is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	None	OUT-01A, OUT-01B, OUT-01C, OUT-01A Re, OUT-01B Re, OUT-01C Re, OUT-03A, OUT-03B, OUT-03C, OUT-04, OUT-04 Re, B-103 (3-5), B-103 (7-9), B-103 (7-9) Re, B-109 (3-5), B-109 (9-11), OUT-05, OUT-08, OUT-09
SBLK02	Unknown Siloxane @ 10.49 (8J μg/ℓ) Unknown @ 30.26 (5J μg/ℓ) Unknown @ 31.22 (6J μg/ℓ) Unknown @ 33.02 (6J μg/ℓ) Unknown @ 33.89 (4J μg/ℓ) Unknown Aromatic @ 32.13 (20J μg/ℓ)	RB050294
SBLK03	Aldol Condensate @ 4.67 (7000AJ μg/kg) Unknown Alkane @ 5.50 (200J μg/kg) Unknown Alkane @ 6.13 (300J μg/kg) Unknown Alkane @ 6.28 (200J μg/kg) Unknown Alkane @ 6.68 (300J μg/kg) Unknown Alkane @ 7.90 (400J μg/kg) Unknown Alkane @ 8.74 (300J μg/kg) Unknown Alkane @ 8.87 (200J μg/kg) Hydrocarbon @ 6.57 (300J μg/kg) Hydrocarbon @ 6.73 (300J μg/kg) Hydrocarbon @ 6.87 (300J μg/kg) Unknown @ 7.12 (300J μg/kg) Unknown @ 8.60 (400J μg/kg) Unknown @ 25.92 (700J μg/kg) Substituted Aromatic @ 7.97 (300J μg/kg) Substituted Aromatic @ 8.52 (200J μg/kg)	MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD

Blank ID	Compound (Concentration)	Associated Samples
SBLK04	Unknown @ 4.34 (4J $\mu g/\ell$) Unknown Alkane @ 26.81 (2J $\mu g/\ell$) Unknown Alkane @ 27.86 (4J $\mu g/\ell$) Unknown Alkane @ 29.88 (3J $\mu g/\ell$) Unknown Alkane @ 30.83 (2J $\mu g/\ell$) Unknown Alkane @ 31.74 (10J $\mu g/\ell$)	RB050394
RB050294	None	OUT-01A, OUT-01B, OUT-01C, B-103 (3-5), B-103 (7-9), B-109 (3-5), B-109 (9-11), OUT-04
RB050394	Isophrone (3J $\mu g/\ell$) Unknown @ 4.58 (90J $\mu g/\ell$) Unknown @ 4.92 (4J $\mu g/\ell$) Unknown @ 5.14 (2J $\mu g/\ell$) Unknown @ 5.85 (3J $\mu g/\ell$) Unknown @ 14.80 (8J $\mu g/\ell$) Unknown @ 15.96 (8J $\mu g/\ell$) Unknown @ 16.92 (10J $\mu g/\ell$) Unknown Substituted Aromatic @ 6.86 (4J $\mu g/\ell$) Unknown Siloxane @ 10.45 (4BJ $\mu g/\ell$) Unknown Aromatic @ 13.73 (10J $\mu g/\ell$) Unknown Aromatic @ 14.05 (3J $\mu g/\ell$) Unknown Aromatic @ 17.81 (2J $\mu g/\ell$) Unknown Aromatic @ 18.76 (4J $\mu g/\ell$) Unknown Hydrocarbon @ 16.78 (4J $\mu g/\ell$) Unknown Phthalate @ 23.40 (6J $\mu g/\ell$)	MW-26D (3-5), MW-26D (11-13), MW-26D (11-13) MS/MSD

- The MS/MSD (MW-26D (11-13)) exhibited RPD results between spike recoveries for 1,2,4-trichlorobenzene (35%) above the QC limit of 23%. This compound was not detected in the unspiked portion of the sample, therefore no qualification of the sample data is necessary.

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that no sample contained more than one acid fraction or more than one non-advisory base/neutral fraction surrogate outside of QC limits, therefore qualification of the sample data due to surrogate recovery is not required.

Sample	Surrogate	% Recovery	QC Limits
OUT-03B	2-fluorobiphenyl	23	30-115
	phenol-d5	22	24-113
	1,2-dichlorobenzene	17	20-130 (advisory)
B-109 (9-11)	2-fluorobiphenyl	26	30-115
	2,4,6-tribromophenol	18	19-122
B-103 (3-5)	2,4,6-tribromophenol	17	19-122
B-109 (3-5)	2,4,6-tribromophenol	13	19-122
B-103 (7-9)	2-fluorobiphenyl	25	30-115
	2,4,6-tribromophenol	10	19-122
	1,2-dichlorobenzene	19	20-130 (advisory)
OUT-01B	nitrobenzene-d5	17	23-120
	2,4,6-tribromophenol	11	19-122
OUT-04	nitrobenzene-d5	21	23-120
	2,4,6-tribromophenol	14	19-122
B-103 (7-9) Re	2-fluorobiphenyl	26	30-115
	2,4,6-tribromophenol	17	19-122
OUT-01C	2-fluorobiphenyl	25	30-115
OUT-01C Re	2-fluorobiphenyl	23	30-115
	1,2-dichlorobenzene	18	20-130 (advisory)

- The following table lists samples that exhibited internal standard with area counts outside of the +100%/-50% QC limits (Note - "A" indicates area count within QC limits and "NA" indicates QC limits not applicable for this internal standard for sample of interest). Samples OUT-09 and B-103 (7-9) should have been re-analyzed, since one or more internal standard was out of control, but were not. This is a protocol deficiency. Sample MW-26D (11-13) was not re-analyzed however since the MS/MSD analyzed on this sample exhibited similar internal standard response, a re-analysis was technically unnecessary. All sample results quantified against an out-of-control internal standard are considered estimated with positive results flagged "J" and non-detect results flagged "UJ."

Sample ID	d10-acenaphthlene	d8-naphthalene	d10-phenanthrene	d12-chrysene	d12-prylene
OUT-09 QC Limit	A NA	A NA	A NA	11091 14791-59162	3883 8370-33478
OUT-04 QC Limit	48215 49762-199048	A NA	26281 46745-186978	3922 8905-35618	3019 3144-12576
OUT-01A QC Limit	A NA	A NA	32850 46745-186978	3964 8905-35618	A NA
OUT-01B QC Limit	A NA	A NA	45919 46745-186978	4968 8905-35618	A NA
B-103 (7-9) QC Limit	A NA	A NA	A NA	7380 8905-35618	A NA
OUT-01C QC Limit	A NA	A NA	70494 78834-315336	10761 17421-69684	7442 8969-35874
B-103 (7-9) Re QC Limit	A NA	A NA	68770 78834-315336	14330 17241-69684	A NA
OUT-01A Re QC Limit	A NA	A NA	56424 78834-315336	11186 17421-69684	8132 8969-3587
OUT-01B Re QC Limit	A NA	A NA	75425 78834-315336	13836 17421-69684	8825 8969-35874
OUT-04 Re QC Limit	A NA	A NA	53152 78834-315336	8708 17421-69684	3838 8969-35874
OUT-01C Re QC Limit	A NA	42572 81595-326378	A NA	9485 15567-62266	A NA
MW-26D (11-13) QC Limit	A NA	A NA	67679 71832-287326	A NA	A NA
MW-26D (11-13) MS QC Limit	A NA	A NA	70247 71832-287326	A NA	A NA
MW-26D (11-13) MSD QC Limit	A NA	A NA	62414 71832-287326	A NA	A NA
MW-26D (3-5) QC Limit	A NA	A NA	40624 43892-175566	A NA	A NA

- The following table lists compounds that exceeded 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94	1,2-dichlorobenzene	%RSD = 23.7	All Samples
(19:05-22:28)A	4-chlorophenyl-phenylether	%RSD = 28.0	
	2-chlorophenol-d4	%RSD = 22.3	
C - 6/8/94	Phenol	%D = 40.0	OUT-05, OUT-08, OUT-09
(17:07)A	Bis(2-chloroethyl)ether	%D = 35.2	
	4-methyl phenol	%D = 35.8	
	N-nitroso-di-n-propylamine	%D = 27.1	
	Phenol-d5	%D = 26.3	
	2-fluorophenol	%D = 28.5	
C - 6/9/94	Phenol	%D = 28.8	OUT-03A, OUT-03B, OUT-03C
(09:29)A	Bis(2-chloroethyl)ether	%D = 42.4	
	2-methylnaphthalene	%D = 27.0	
	2-chlorophenol	%D = 27.4	
C - 6/10/94	2-methyl phenol	%D = 29.1	OUT-01A, OUT-01B, OUT-04,
(19:06)A	Hexachloroethane	%D = 42.4	B-109 (3-5), B-109 (9-11),
	Pentachlorophenol	%D = 32.0	B-103 (3-5), B-103 (7-9),
	Pyrene	%D = 37.7	RB050294
C - 6/11/94	Hexachloroethane	%D = 40.4	OUT-01C, OUT-01A Re,
(13:01)A	Pyrene	%D = 36.9	OUT-01B Re, OUT-04 Re,
	Indeno(1,2,3-cd)pyrene	%D = 35.3	B-103 (7-9) Re
C - 6/12/94	Hexachloroethane	%D = 31.2	OUT-01C Re, MW-26D (11-13),
(10:45)A	4-chloro-3-methyl phenol	RF = 0.000	MW-26D (11-13) MS/MSD,
		%D = 100%	MSB 5/6/94
	Acenapthene	%D = 25.4	
	4-chlorophenyl-phenylether	%D = 31.3	
	Pentachlorophenol	%D = 27.9	
C - 6/13/94	Hexachloroethane	%D = 34.4	MW-26D (3-5), RB050394
(11:01)A	4-chlorophenyl-phenylether	%D = 42.2	
	Benzo(g,h,i)perylene	%D = 41.3	
C - 6/23/94	Hexachloroethane	%D = 32.0	None
(08:42)A	2-methylnaphthalene	%D = 33.3	
	Fluoroanthene	%D = 34.2	
	Benzo(b)fluoroanthene	%D = 32.4	

- SBLK04, a method blank prepared in association with RB050394, was analyzed 47 days after the extraction which is a technical and protocol deficiency. Since this blank is not associated with any soil samples, no qualification to sample data is necessary.

PESTICIDE/PCB

- 4,4´-DDT exhibited a percent relative standard deviation (%RSD) of 33.9% in the initial calibration on column DB-1701 (QC limit = 20%). This is a protocol deficiency as well as a technical deficiency as up to two compounds are allowed to exceed 20% as long as they have less than 30% RSD. Endosulfan sulfate exhibited 20.8% RSD on the DB 608 column as well. Due to these deficiencies, all 4,4´-DDT and endosulfan sulfate results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- The method blank PBLKE6 and the rinsate blank RB050394 were reported to have endrin ketone and methoxychlor, respectively, at concentrations below the reported method detection limits. Therefore, no qualifications to the sample data is made due to these blank contaminants. No other blank contamination was reported.

- Several PEM, INDA, and INDB calibration verification standards exhibit compounds that exceed the 25% RPD QC limit on one or both columns. Positive sample results for these affected compounds are qualified as estimated and flagged "J" and non-detects "UJ" for associated samples. Associated samples are all those that were analyzed between the last in-control standard and the next in-control standard. The following table lists PEMs, INDA and INDB standards, associated with sample quantification, deficient compounds and RPDs and associated samples.

Standard	Compound	RPD	Associated Samples
INDAM06 (DB-1701)	4,4´-DDT	40.0	All Samples
INDAM06 (DB-1701)	Methoxychlor	26.7	
INDAM06 (DB-608)	Heptachlor	30.0	
INDAM06 (DB-608)	Endosulfan I	30.0	
INDAM06 (DB-608)	Methoxychlor	26.7	
PEM08 (DB-1701)	4,4´-DDT	46.7	
INDAM08 (DB-1701)	4,4´-DDT	50.0	
INDAM08 (DB-1701)	Methoxychlor	26.7	
INDAM08 (DB-608)	gamma-BHC	40.0	

Standard	Compound	RPD	Associated Samples
INDAM08 (DB-608)	Heptachlor	46.7	All Samples (continued)
INDAM08 (DB-608)	Endosulfan I	30.0	
INDAM08 (DB-608)	Tetrachloro-m-xylene	40.0	
INDBM08 (DB-608)	delta-BHC	30.0	
INDBM08 (DB-608)	Aldrin	30.0	
INDBM08 (DB-608)	Heptachlor epoxide	30.0	
INDBM08 (DB-608)	4,4′-DDE	27.5	
INDBM08 (DB-608)	Endrin aldehyde	27.5	
INDBM08 (DB-608)	alpha-chlordane	30.0	
PEM10 (DB-1701)	4,4′-DDT	40.0	
INDAM09 (DB-1701)	4,4′-DDT	26.7	
INDAM09 (DB-608)	gamma-BHC	30.0	
INDAM09 (DB-608)	Heptachlor	33.3	
INDAM09 (DB-608)	Tetrachloro-m-xylene	30.0	
INDAM08 (DB-608)	alpha-BHC	33.3	OUT-03C, B-103 (3-5), B-103 (7-9), B-109 (3-5), B-109 (9-11), OUT-01A, OUT-01B, OUT-01C, OUT-04, MW-26D (3-5), MW-26D (11-13)
INDBM09 (DB-608)	alpha-BHC		None

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that it is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
MW-26D (11-13)	4,4´-DDD	181.2	
B-109 (3-5)	Dieldrin	296.2	
	4,4´-DDT	38.6	
OUT-01A	delta-BHC	133.3	
	Aldrin	207.4	
	Endosulfan I	281.0	
	Endosulfan II	363.6	
	4,4´-DDD	38.5	
	Endosulfan sulfate	72.2	
	4,4´DDT	50.0	
	Ar 1254	49.3	
OUT-01B	delta-BHC	71.9	
	Aldrin	42.9	
OUT-01C	Aldrin	84.4	
	Endosulfan I	320.0	
	Endrin	442.4	
	4,4´-DDD	26.5	
	Endosulfan sulfate	105.3	
	4,4´-DDT	64.4	
OUT-03A	delta-BHC	935.7	
	Heptachlor	39.1	
	Aldrin	27.8	
	Heptachlor epoxide	122.2	
	Dieldrin	27.3	
	4,4´-DDE	35.7	
	Endrin	828.6	
	Endosulfan II	750.0	
	4,4´-DDD	66.7	
	Endosulfan sulfate	332.1	
	4,4´-DDT	66.7	
	Ar 1254	49.3	
OUT-03B	delta-BHC	87.5	
	Dieldrin	362.7	Negated - RT out
	4,4´-DDE	265.4	
	Endrin	57.9	Negated - RT out
	4,4´-DDD	354.5	
	4,4´-DDT	270.4	
	Endrin aldehyde	515.4	

Sample	Compound	RPD	Notes
OUT-03C	Heptachlor	36.2	
	Aldrin	159.3	
	Endosulfan I	605.9	
	Endosulfan II	284.6	
	Endosulfan sulfate	276.5	
	4,4´-DDT	95.6	
	Endrin ketone	61.1	
	Endrin aldehyde	475.0	Negated - RT out
	Ar 1254	35.3	
OUT-04	delta-BHC	420.0	Negated - RT out
	Aldrin	233.3	
	4,4´-DDE	27.3	
	Endosulfan II	93.8	
	Endosulfan sulfate	66.7	
	4,4´-DDT	66.7	
	alpha-chlordane	215.4	
OUT-05	beta-BHC	1766.7	
	delta-BHC	566.7	
	Aldrin	104.5	
	4,4´-DDE	35.0	
	Endosulfan II	38.9	
	Endosulfan sulfate	260.0	
	alpha-chlordane	191.7	
OUT-08	Dieldrin	38.2	
	4,4´-DDE	28.6	
	Endrin	201.9	
	Endosulfan II	158.3	
	4,4´-DDD	32.7	
	Endosulfan sulfate	146.7	
	4,4´-DDT	109.5	
	Methoxychlor	112.0	
	gamma-chlordane	58.3	
OUT-09	Aldrin	331.8	
	4,4´-DDD	57.6	
	Endosulfan sulfate	163.6	
RB050394	Methoxychlor	30.0	

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
B-103 (3-5)	--	13	--	25
B-109 (3-5)	54	52	--	--
OUT-03C	--	--	51	54
OUT-08	--	--	56	--
PBLKE5	--	50	--	--
PBLKE7	59	57	--	--

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Laboratory spike sample recoveries (MW-26D (11-13)) for arsenic (0.0%), lead by GFAA 961.3%), lead by ICP (140.9%), mercury (30.0%), silver (41.2%), and thallium

(128.1%) were outside of 75%-125% QC limits. The lead ICP post-digestion spike recovery (139.2%) was outside of these QC limits. Positive results for all of these metals are considered estimated and are flagged "J." Non-detect results for lead by GFAA, mercury and silver are considered estimated and are flagged "UJ." Non-detect results for arsenic are rejected.

- The laboratory duplicate exhibited RPDs greater than 35% or absolute difference (a.d.) greater than ±2 times CRDL (USEPA Functional Guidelines) for arsenic (RPD = 48.2%) and lead (a.d. = 2.9488 mg/kg; ±2 times CRDL = 1.46). All results for these two metal are considered estimated with positive results flagged "J" and non-detects flagged "UJ."

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- The method spike for cyanide exhibited a percent recovery (18%) outside the 75%-125% QC limits. All cyanide results are considered estimated with positive results flagged "J" and non-detect results flagged "UJ."

- Cyanide continuing calibration verification standard number 4 (CCV4) recovery (117%) exceeded the 115% upper QC limit. All positive cyanide results associated with this continuing calibration standard (OUT-09, 3.7 mg/kg) are considered estimated and are flagged "J."

- The CRDL standards for arsenic (78.2%; initial), nickel (121.2%; initial), cadmium (121.4%; final) and thallium (125.0%; final) were slightly outside the USEPA Region II QC guidelines of 80%-120%. Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery outside of the USEPA Region II QC limits may indicate biased sample results at concentrations near the CRDL. Therefore all results for arsenic and all positive results for nickel, cadmium and thallium are considered estimated and are flagged accordingly.

- Note that several metals in several samples analyzed by GFAA have a "W" qualifier on the sample data sheet. This indicates that the GFAA post-digestive spike recovery was outside of 85%115% QC limits, and the sample results were less than 50% of the spike added. If the spike recovery is less than 85%, then both positive results and non-detects are considered estimated and flagged "J" or "UJ," respectively. If the recovery is greater than 115%, only positive values are flagged. The following table presents samples which had spike recoveries outside of QC limits for one or more GFAA metal.

Sample	Metal	% Recovery	Sample	Metal	% Recovery
MW-26D (11-13)	arsenic	446.3	OUT-03C	selenium	68.6
OUT-01C	lead	69.9	OUT-04	selenium	61.8
B-103 (3-5)	lead selenium thallium	24.3 124.0 58.1	OUT-05	selenium thallium	68.1 83.2
OUT-01A	selenium	79.8	OUT-08	selenium	62.5
OUT-03A	selenium	77.0	B-109 (3-5)	selenium	125.0
OUT-03B	thallium	77.9			

- RB050294 contained 50.3 $\mu g/\ell$ lead and RB050394 contained 19.0 $\mu g/\ell$ lead. Concentrations of lead in the associated field samples less than five times the concentrations in the rinsate blank are negated (concentrations comparisons are made from the raw GFAA data).

- The laboratory control sample exhibited 0.0% recovery for sodium which is outside the QC range of 250 mg/kg to 750 mg/kg. All positive sample results for sodium are considered estimated and are flagged "J." All non-detect sodium results are rejected and are flagged "R."

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: C. Brett Mongillo
C. Brett Mongillo

Dated: July 27, 1994

DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-108(3-5)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

<u>Samples</u>	<u>QC Samples</u>
B-108 (3-5)	OUT-06 MS/MSD (VOC, SVOC, Pest/PCB)
B-108 (7-9)	OUT-06 Spike and Duplicate (Metals)
B-110 (3-5)	DUPE-02 (B-110 (7-9) Duplicate)
B-110 (7-9)	DUPE-03 (B-127 (2-4) Duplicate, TPH)
B-115 (2-3)	DUPE-04 (OUT-07 Duplicate)
B-115 (5-6)	RB042894 (Rinsate Blank)
B-126 (3-5)	RB042994 (Rinsate Blank)
B-127 (2-4)	TB042994 (Trip Blank, VOC)
B-128 (1-3)	MSB 5/11/94 (VOC)
OUT-02A	MSB 5/6/94 (SVOC)
OUT-02B	MSB3 (Pest/PCB)
OUT-02C	
OUT-02D	
OUT-06	
OUT-07	

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Sample results for methylene chloride (a common laboratory contaminant) less than ten times the associated blank results are negated. Sample results for all other listed analytes less than five times the associated blank result are negated.

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	Methylene Chloride (3J µg/kg)	B-115 (5-6), B-110 (3-5)
VBLK02	Methylene Chloride (8J µg/kg) 1,1,2,2-Tetrachloroethane (5J µg/kg)	B-115 (2-3), B-108 (3-5), B-110 (7-9), B-115 (5-6) Re, B-110 (3-5) Re
VBLK03	Methylene Chloride (9J µg/kg) 1,1,2,2-Tetrachloroethane (4J µg/kg)	DUPE-02, B-108 (7-9), OUT-02A, OUT-02B, OUT-02C, OUT-02D
VBLK04	None	OUT-06 MS/MSD, MSB
VBLK05	Methylene Chloride (7J µg/kg)	OUT-07, OUT-06
VBLK06	Methylene Chloride (9J µg/ℓ) Acetone (15 µg/ℓ)	RB042994, TB042994
VBLK07	Methylene Chloride (18 µg/ℓ)	RB042894
RB042894	Methylene Chloride (19B µg/ℓ)	B-110 (3-5), B-110 (7-9), B-115 (2-3), B-115 (5-6), DUPE-02
RB042994	Methylene Chloride (8BJ µg/ℓ)	B-108 (3-5), B-108 (7-9), OUT-2A, OUT-2B, OUT-2C, OUT-2D, OUT-04, OUT-06, OUT-07, OUT-08, DUPE-04
TB042994	Methylene Chloride (8BJ µg/ℓ)	B-108 (3-5), B-108 (7-9), OUT-2A, OUT-2B, OUT-2C, OUT-2D, OUT-04, OUT-06, OUT-07, OUT-08, DUPE-04

- Sample B-115 (3-5) exhibited system monitoring compound (SMC) recovery for toluene-d8 (83%) below the QC limit of 84% to 138%. Per USEPA validation guidelines, all analytical results for this sample are considered estimated and are flagged "J."

- Samples B-110 (3-5) and B-115 (5-6) exhibited internal standard area counts below the QC limits for bromochloromethane, 1,4-difluorobenzene and chlorobenzene-d5. Per the ASP, the samples were re-analyzed within the appropriate holding time. Sample B-110 (3-5) Re again exhibited low internal standard response for all three compounds. B-115 (5-6) Re exhibited low internal standard response for 1,4-difluorobenzene and chlorobenzene-d5. Data reported for sample B-110 (3-5) should be taken from the initial analysis, and results for sample B-115 (5-6) should be taken from the re-analysis. All results quantitated against an out-of-control internal standard are considered estimated and are flagged "J."

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration (I) or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration (C) response factor. Associated field samples are also listed. None of the listed compounds were detected in the associated samples, therefore all non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed. All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of 1,1,2,2-tetrachloroethane results is necessary.

Calibration	Compound	Deficiency	Associated Samples
I - 5/2/94 (11:12-14:25)/C	1,1,2,2-Tetrachloroethane	RF = 0.301	B-115 (5-6), B-110 (3-5), B-110 (3-5)Re, B-115 (5-6)Re, B-115 (2-3), B-110 (7-9), B-108 (3-5), DUPE-02, B-108 (7-9), OUT-02A, OUT-02B, OUT-02C, OUT-02D, OUT-06 MS/MSD
I - 5/3/94 (01:53-05:26)/D	Bromomethane 1,1,2,2-Tetrachloroethane	%RSD = 32.4 RF = 0.327	RB042894
I - 5/7/94 (13:49-17:00)/C	1,1,2,2-Tetrachloroethane	RF = 0.376	OUT-07, OUT-06, TB042994, RB042994
C - 5/3/94 (14:54)/C	Cis-1,3-dichloropropane 1,1,2,2-Tetrachloroethane	%D = 25.3 RF = 0.350	B-115 (5-6), B-110 (3-5)
C - 5/4/94 (11:17)/C	1,1,2,2-Tetrachloroethane	RF = 0.314	B-110 (3-5)Re, B-115 (5-6)Re, B-115 (2-3), B-110 (7-9), B-108 (3-5)
C - 5/5/94 (07:50)/C	1,1,2,2-Tetrachloroethane	RF = 0.293	DUPE-02, B-108 (7-9), OUT-2A, OUT-2B, OUT-2C, OUT-2D
C - 5/6/94 (16:47)/C	1,1,2,2-Tetrachloroethane	RF = 0.305	OUT-06 MS/MSD, MSB
C - 5/7/94 (10:40)/C	1,1,2,2-Tetrachloroethane 1,1-dichloroethane	RF = 0.316 %D = 30.2	OUT-06, OUT-07

Calibration	Compound	Deficiency	Associated Samples
C - 5/9/94 (10:08)/C	1,1,2,2-Tetrachloroethane	RF = 0.316	RB042994, TB042994
C - 5/5/94 (16:22)/D	1,1,2,2-Tetrachloroethane	RF = 0.349	RB042894

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Pthalates are negated in associated samples if the sample concentration is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank. Note that the large number of TICs present in SBLK01 blank did not interfere with the ability to recover and identify compounds in RB042894.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Butylbenzylphthalate (1.J μg/ℓ) Bis(2-ethylhexyl)phthalate (2J μg/ℓ) Unknown Phthalate @ 23.14 (2J μg/ℓ) Unknown Alkane @ 27.92 (4J μg/ℓ) Unknown Alkane @ 28.94 (6J μg/ℓ) Unknown Alkane @ 29.94 (7J μg/ℓ) Unknown Alkane @ 30.89 (8J μg/ℓ) Unknown Alkane @ 31.81 (10J μg/ℓ) Unknown Alkane @ 32.70 (9J μg/ℓ) Unknown @ 31.93 (20J μg/ℓ) Unknown @ 32.16 (6J μg/ℓ) Unknown Siloxane @ 35.44 (6J μg/ℓ) Unknown Siloxane @ 36.92 (4J μg/ℓ)	RB042894
SBLK02	Aldol Condensate @ 4.92 (7000JA μg/kg) Aldol Condensate @ 4.96 (70JA μg/kg) Unknown @ 32.75 (70J μg/kg)	B-115 (5-6), B-115 (2-3), B-110 (3-5), DUPE-02, B-110 (7-9), DUPE-02Re
SBLK03	None	OUT-02A, OUT-02B, OUT-02C, OUT-2D, OUT-06, OUT-07, B-108 (3-5), B-108 (7-9), DUPE-04, OUT-06 MS/MSD, MSB
SBLK04	Unknown Siloxane @ 10.49 (4J μg/ℓ) Unknown Alkane @ 30.26 (5J μg/ℓ) Unknown Alkane @ 31.22 (6J μg/ℓ) Unknown Alkane @ 33.02 (6J μg/ℓ) Unknown Alkane @ 33.89 (4J μg/ℓ) Unknown Aromatic @ 32.13 (20J μg/ℓ)	RB042994

Blank ID	Compound (Concentration)	Associated Samples
RB042894	Bis(2-ethylhexyl)phthalates (3BJ $\mu g/\ell$) Unknown @ 5.55 (2J $\mu g/\ell$) Unknown @ 28.84 (2J $\mu g/\ell$) Unknown Alkane @ 28.94 (2BJ $\mu g/\ell$) Unknown Alkane @ 29.92 (4BJ $\mu g/\ell$) Unknown Alkane @ 30.88 (4BJ $\mu g/\ell$) Unknown Alkane @ 31.80 (6BJ $\mu g/\ell$) Unknown Alkane @ 32.69 (6BJ $\mu g/\ell$) Unknown @ 31.94 (30BJ $\mu g/\ell$) Unknown @ 32.15 (7BJ $\mu g/\ell$) Unknown @ 37.81 (3J $\mu g/\ell$)	B-115 (2-3), B-115 (5-6), B-110 (3-5), B-110 (7-9), DUPE-02
RB042994	Unknown Siloxane @ 21.63 (3J $\mu g/\ell$) Unknown Siloxane @ 23.62 (2J $\mu g/\ell$) Unknown Siloxane @ 27.11 (3J $\mu g/\ell$) Unknown Siloxane @ 28.63 (2J $\mu g/\ell$)	B-108 (3-5), B-108 (7-9), OUT-2A, OUT-2B, OUT-2C, OUT-2D, OUT-04, OUT-06, OUT-07, OUT-08

- The matrix spike sample (OUT-06) was not spiked with any of the required acid extractable compounds, which is a protocol deficiency. All MS and MSD spike recoveries and relative percent differences (RPD) were acceptable for those compounds present. No qualification to the data is made based on the missing spiking compounds.

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that no sample contained more than one acid fraction or more than one non-advisory base/neutral fraction surrogate outside of QC limits, therefore qualification of the sample data due to surrogate recovery is not required.

Sample	Surrogate	% Recovery	QC Limits
RB02994	2-fluorobiphenyl	42	(43-116)
B-108 (3-5)	2-fluorobiphenyl	29	(30-115)
B-108 (7-9)	2-fluorobiphenyl	22	(30-115)
	1,2-dichlorobenzene-d4	15	(20-130)
OUT-02A	2-fluorobiphenyl	29	(30-115)
OUT-02C	2-fluorobiphenyl	26	(30-115)
OUT-02D	2-fluorobiphenyl	25	(30-115)

- Sample DUPE-02 exhibited internal standard responses for d-12-chrysene (16320) and d-12-perylene (8550) below their respective lower QC limits of 25174 and 9466. Sample

OUT-06 exhibited internal standard response for d-12-chrysene (12614) below the lower QC limit of 16041. Sample DUPE-02 was re-analyzed and again exhibited low internal standard response for d-12-chrysene and d-12-perylene. Sample OUT-06 was not re-analyzed which is a protocol deficiency. All sample results quantitated against internal standards with low instrument responses are considered estimated and flagged "J."

- The following table lists compounds that exceeded 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94 (1905-22:28)A	1,2-dichlorobenzene 4-chlorophenyl-phenylether 2-chlorophenol-d4	%RSD = 23.7 %RSD = 28.0 %RSD = 22.3	MSB 5/3/94, OUT-06, OUT-06 MS/MSD, DUPE-02Re, OUT-07, DUPE-04, B-108 (3-5), B-108 (7-9), OUT-02A, OUT-02B, OUT-02C, OUT-02D, RB042994, B-115 (5-6), B-115 (2-3), B-110 (3-5), DUPE-02, B-110 (7-9)
I - 5/28/94 (17:39-20:53)B	None	None	RB042894
C - 6/1/94 (12:08)B	2,4,5-trichlorophenol	%D = 41.7	RB042894
C - 6/8/94 (09:10)A	phenol bis(2-ethylhexyl)phthalate N-nitrso-di-n-propylamine phenol-d5	%D = 40.2 %D = 33.1 %D = 28.2 %D = 33.4	B-108 (3-5), B-108 (7-9), OUT-02C, OUT-02A, OUT-02B, OUT-02D
C - 6/8/94 (17:07)A	phenol bis(2-chloroethyl)ether 4-methyl phenol N-nitrso-di-n-propylamine phenol-d5 2-fluorophenol	%D = 40.0 %D = 35.2 %D = 35.8 %D = 27.1 %D = 26.3 %D = 28.5	OUT-07, DUPE-04

C - 6/9/94 (09:29)A	phenol	%D = 28.8	OUT-06, OUT-06 MS/MSD, DUPE-02 Re
	bis(2-chloroethyl)ether	%D = 42.4	
	2-methyl naphthalene	%D = 27.0	
	2-chlorophenol	%D - 27.4	
C - 6/10/94 (19:06)A	2-methyl phenol	%D = 29.1	MSB 5/3/94
	hexachloroethane	%D = 42.4	
	pentachlorophenol	%D = 32.0	
	pyrene	%D = 37.7	

PESTICIDE/PCB

- 4,4′-DDT exhibited a percent relative standard deviation (%RSD) of 33.9% in the internal calibration on column DB-1701 (QC limit = 20%). This is a protocol deficiency as well as a technical deficiency as up to two compounds are allowed to exceed 20% as long as they have less than 30% RSD. Due to this deficiency, all 4,4′-DDT results are considered estimated, with positive results flagged "J" and non-detects "UJ." Endosulfan sulfate exhibited a %RSD on column DB-608 of 20.8%. Due to this technical deficiency, all endosulfan sulfate results are considered estimated, with positive results flagged "J" and non-detects flagged "UJ."

- The method blank PBLKE6 was reported to have 0.003J $\mu g/\ell$ of endrin ketone, however this result is below the reported 0.009 $\mu g/\ell$ method detection limit and is therefore negated. All other method and instrument blank results were non-detect.

- Several PEM, INDA, and INDB calibration verification standards exhibit compounds that exceed the 25% RPD QC limit on one or both columns. Positive sample results for these affected compounds are qualified as estimated and flagged "J" and non-detects "UJ" for associated samples. Associated samples are all those that were analyzed between the last in-control standard and the next in-control standard. The following table lists PEMs, INDA and INDB standards, deficient compounds and RPDs and associated samples.

Standard	Compound	RPD	Associated Samples
PEM06 (DB-1701)	4,4´-DDT	46.7	All Samples
PEM07 (DB-1701)	4,4´-DDT	46.7	
PEM07 (DB-1701)	methoxychlor	28.0	
PEM06 (DB-608)	alpha-BHC	33.3	
PEM06 (DB-608)	endrin	32.0	
PEM06 (DB-608)	4,4´-DDT	33.2	
PEM06 (DB-608)	methoxychlor	36.0	
PEM07 (DB-608)	4,4´-DDT	28.0	
INDAM04 (DB-1701)	4,4´-DDT	33.3	
INDAM04 (DB-608)	alpha-BHC	30.0	
INDAM04 (DB-608)	endrin	33.3	
INDAM04 (DB-608)	4,4´-DDT	33.3	
INDAM04 (DB-608)	methoxychlor	30.0	
INDAM06 (DB-1701)	4,4´-DDT	40.0	
INDAM06 (DB-1701)	methoxychlor	26.7	
INDBM06 (DB-608)	methoxychlor	26.7	
INDAM04 (DB-608)	gamma-BHC	40.0	RB042894, RB042994, B-115 (5-6), B-115 (2-3), B-110 (3-5), B-110 (7-9), DUPE-02
INDAM04 (DB-608)	heptachlor	53.3	
INDAM04 (DB-608)	endosulfan I	40.0	
INDAM04 (DB-608)	dieldrin	30.0	
INDAM04 (DB-608)	4,4´-DDD	26.7	
INDAM04 (DB-608)	tetrachloro-m-xylene	33.3	
INDAM04 (DB-608)	decachlorobiphenyl	33.3	
INDBM04 (DB-608)	endrin ketone	25.0	
INDBM04 (DB-608)	endrin ketone	27.5	
INDBM04 (DB-608)	decachlorobiphenyl	40.0	
INDBM06 (DB-608)	heptachlor	30.0	B-108 (3-5), B-108 (7-9), OUT-02A, OUT-02B, OUT-02C, OUT-02D, OUT-06, OUT-07, DUPE-04, OUT-06 MS/MSD, MSB2

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that it is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
B-108 (3-5)	delta-BHC	334.8	
	alpha-chlordane	206.5	
B-108 (7-9)	delta-BHC	115.4	Negated - RT out
	4,4´-DDT	869.7	
B-110 (7-9)	delta-BHC	93.0	
	4,4´-DDE	35.7	
B-115 (2-3)	dieldrin	83.3	
	4,4´-DDD	47.4	
	4,4´-DDT	45.5	
	gamma-chlordane	60.0	
DUPE-02	dieldrin	368.1	
	4,4´-DDT	35.7	
	alpha-chlordane	116.9	
DUPE-04	aldrin	167.6	
	endosulfan II	100.0	
OUT-02A	alpha-BHC	78.9	
	beta-BHC	746.2	Negated - RT out
	delta-BHC	30.8	
	4,4´-DDD	37.0	
	Ar 1254	66.7	
OUT-02B	4,4´-DDD	26.6	
	endosulfan sulfate	479.5	
OUT-02C	beta-BHC	3650.0	Negated - RT out
	delta-BHC	237.5	Negated - RT out
	endosulfan II	880.0	
	4,4´-DDD	36.4	
	endosulfan sulfate	150.0	
	methoxychlor	103.3	
OUT-02D	4,4´-DDD	78.2	
	endosulfan sulfate	633.2	
OUT-06	endosulfan I	169.2	
	dieldrin	56.9	
	4,4´-DDE	50.0	
	4,4´-DDD	157.1	
	endosulfan sulfate	136.0	
	gamma-chlordane	167.6	
OUT-07	delta-BHC	53.3	
	aldrin	211.1	Negated - RT out
	endosulfan I	100.0	
	endosulfan II	33.3	
	endosulfan sulfate	26.4	

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of <u>advisory</u> QC limits is limited to those samples that exhibit a surrogate outside of QC limits on <u>both</u> GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
B-108 (3-5)	--	11	--	23
B-108 (7-9)	--	44	--	--
B-110 (3-5)	--	--	44	--
DUPE-02	52	53	--	--
DUPE-04	--	--	46	47
OUT-02A	--	36	--	48
OUT-02C	56	50	--	--
OUT-06	--	--	51	66
OUT-06 MS	--	--	46	47
OUT-06 MSD	--	--	--	54
PBLKE2	55	45	--	--
MSB2	--	--	--	173

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Matrix spike (OUT-06) recoveries for cadmium (133.0%), mercury (39.5%), and silver (61.6%) were outside of the 75%-125% QC limits. Post-digestion spike recovery for cadmium (141.5%) was also outside of the QC limits. All positive results for these analytes are considered estimated and flagged "J." Non-detect results for mercury and sodium are considered estimated and are flagged "UJ."

- The laboratory duplicate analysis of OUT-06 exhibited 23.3% relative percent difference between chromium results, which is over the 20% QC limit for aqueous samples. As such, the laboratory flagged chromium results with an asterisk indicating the QC deficiency. However, OUT-06 is a soil sample which has a RPD QC limit of 35% (USEPA Functional Guidelines), therefore no flags should have been used.

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- The initial selenium (124.0%) and final cadmium (122.2%) CRDL standards exhibited recoveries that are slightly high. Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery greater than 120% (USEPA Region II upper QC limit) may indicate potential high bias in positive sample results at concentrations near the CRDL. Therefore positive sample concentrations of these metals should be considered estimated and flagged "J."

- Note that several metals in several samples analyzed by GFAA have a "W" qualifier on the sample data sheet. This indicates that the GFAA post-digestive spike recovery was outside of 85%115% QC limits, and the sample results were less than 50% of the spike added. If the spike recovery is less than 85%, then both positive results and non-detects are considered estimated and flagged "J" or "UJ," respectively. If the recovery is greater than 115%, only positive values are flagged. The following table presents samples which had spike recoveries outside of QC limits for one or more GFAA metal.

Sample	Metal	% Recovery	Sample	Metal	% Recovery
B-108 (3-5)	selenium	67.1	OUT-02A	lead	73.2
				selenium	58.7
B-108 (7-9)	lead	73.0	OUT-02B	lead	77.1
	selenium	60.0		selenium	41.9
B-110 (3-5)	arsenic	82.5	OUT-02C	lead	73.3
	selenium	65.4		selenium	56.7
				thallium	78.8
B-110 (7-9)	lead	70.5	OUT-02D	lead	72.8
	selenium	51.5		selenium	71.7
				thallium	84.5
B-115 (2-3)	selenium	63.5	OUT-07	selenium	79.3
DUPE-02	lead	76.0	RB042994	selenium	77.9
	selenium	117.3			
DUPE-04	lead	68.5	B-115 (5-6)	lead	67.8
	selenium	79.3		selenium	52.5

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: C Brett Mongillo
C. Brett Mongillo

Dated: July 26, 1994

DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-114 (5-7)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
B-114 (5-7)	B-133 (5-7)	DUPE-05 (B-130 (3-5) Field Duplicate)
B-114 (7-9)	B-134 (1-3)	DUPE-09 (B-133 (5-7) Field Duplicate)
B-130 (3-5)	B-134 (7-9)	B-136 (1-3) MS/MSD (VOC)
B-130 (9-11)	B-135 (1-3)	B-134 (7-9) MS/MSD (SVOC, Pest/PCB)
B-131 (3-5)	B-135 (7-9)	RB050494 (VOC only)
B-131 (3-5)	B-136 (1-3)	RB050994
B-133 (1-3)	B-136 (7-9)	RB051094
		MSB 5/17/94 (VOC)
		MSB 6/16/94 (SVOC)
		PMSB4 (Pest/PCB)

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Field duplicate results
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Based on the observed concentrations of methylene chloride in these blanks, the observed concentration of this compound in associated field samples is negated (all less than ten times the concentration in the highest associated blank). For blank contaminants other than methylene chloride or acetone, an action level of five times the highest associated blank concentration is used.

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	Methylene Chloride (9J μg/ℓ) Acetone (15)	RB050494
VBLK02	Methylene Chloride (8J μg/kg) Chloroform (3J) Trichloroethene (2J)	B-114 (5-7), B-114 (7-9), B-130 (3-5), B-130 (9-11), B-131 (3-5)
VBLK03	Trichloroethene (3J μg/kg)	B-131 (7-9), DUPE-05
VBLK04	Methylene Chloride (12 μg/kg)	B-133 (1-3), B-134 (1-3), B-135 (1-3), B-136 (7-9)
VBLK05	None	RB050994, RB051094
VBLK06	Methylene Chloride (6J μg/kg) Chloroform (3J) Trichloroethene (2J)	B-134 (7-9), B-135 (7-9), DUPE-09, B-133 (1-3), B-136 (1-3) MS/MSD, MSB 5/17/94
RB050494	Methylene Chloride (8J μg/ℓ)	B-114 (5-7), B-114 (7-9), B-130 (3-5), B-130 (9-11), B-131 (3-5), B-131 (7-9), DUPE-05
RB050994	None	B-133 (5-7), B-134 (7-9), B-135 (7-9), DUPE-09
RB051094	Methylene Chloride (8J μg/ℓ)	B-133 (1-3), B-134 (1-3), B-135 (1-3), B-136 (1-3), B-136 (7-9)

- The initial calibration from 5/3/94 (0153-0526) on instrument D, associated with RB050994 and RB051094, exhibited bromomethane with 32.4% relative standard deviation (%RSD) for response factors, in exceedance of the 20.5% QC limit. Bromomethane was not detected in these rinsate blanks, therefore the non-detect bromomethane results in these blanks are flagged "UJ." All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of 1,1,2,2-tetrachloroethane results is necessary.

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Pthalates are negated in associated samples if the sample concentrations is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Aldol Condensate @ 4.52 (10000JA µg/kg) Unknown Siloxane/Column bleed @ 10.28 (70J)	B-133 (5-7), B-134 (7-9), B-135 (7-9), DUPE-09, B-133 (5-7)Re, DUPE-09 Re
SBLK02	Aldol Condensate @ 4.51 (10000JA µg/kg)	B-135 (1-3), B-136 (7-9), B-134 (1-3), B-136 (1-3), B-136 (1-3)Re, B-134 (7-9) MS/MSD, MSB 6/16/94
SBLK03	None	RB050994, RB051094
SBLK04	Unknown Alkane @ 25.59 (500J µg/kg) Unknown Alkane @ 25.69 (70J) Unknown Alkane @ 26.89 (100J) Unknown Alkane @ 27.87 (100J) Unknown Alkane @ 29.90 (70J) Unknown Alkane @ 30.85 (70J) Unknown Alkane @ 31.77 (70J) Unknown @ 27.78 (200J)	B-133 (1-3)
RB050994	Bis(2-ethylhexyl)phthalate (0.7J µg/ℓ) Unknown @ 5.04 (2J) Unknown @ 31.82 (4J) Unknown @ 32.21 (2J) Unknown Alkane @ 29.99 (4J) Unknown Alkane @ 30.05 (4J) Unknown Alkane @ 31.86 (6J) Unknown Alkane @ 32.76 (3J) Unknown Alkane @ 33.62 (2J) Unknown Siloxane/Column bleed @ 10.26 (5J)	B-133 (5-7), B-134 (7-9), B-135 (7-9), DUPE-09
RB051094	Bis(2-ethylhexyl)phthalate (2J µg/ℓ) Unknown @ 33.55 (4J) Unknown Alkane @ 29.93 (2J) Unknown Alkane @ 30.87 (2J) Unknown Alkane @ 31.78 (10J) Unknown Alkane @ 32.67 (5J)	B-133 (1-3), B-134 (1-3), B-135 (1-3), B-136 (1-3), B-136 (7-9)

- B-134 (7-9) MS/MSD exhibited several compounds with spike recoveries and/or RPD results outside of QC limits. None of the matrix spiking compounds were detected in the unspiked portion of this sample, therefore qualification of compound non-detect results was not performed. The majority of the noted MS/MSD deficiencies were due to poor spike recoveries in the MSD, an analysis that also exhibited poor surrogate spike recoveries, and likely represent an analytical problem with the MSD analysis rather than the sample.

- The following table lists samples that exhibited internal standards with area counts outside of the +100%/-50% QC limits. Based on these results, as well as other QC criteria (surrogate recovery, compound concentrations, etc.), the initial analysis of DUPE-09 and the re-analyses of B-133 (5-7) and B-136 (1-3) should be used, with all compounds quantitated against the affected internal standards considered estimated and flagged "J" for positive results and "UJ" for non-detects. (Note - A indicates area count within QC limits and N/A indicates QC limits not applicable for this internal standard for sample of interest.) Note that the laboratory analyzed B-133 (1-3) as an extra MS/MSD and, although they did not report the results in the data package, they present the RICs and quant reports following the package case narrative. B-135 (7-9) was not re-analyzed, resulting in a protocol deficiency.

	Internal Standards					
Sample	1,4-DCB-d4	Nap-d8	Acenap-d10	Phen-d10	Chry-d12	Peryl-d12
B-133 (5-7)	12915	39615	29129	A	A	A
B-134 (7-9)	13386	A	A	A	A	A
B-135 (7-9)	A	41619	A	A	A	A
DUPE-09	12417	41710	27461	A	A	A
QC Limits	13613-54450	46327-185306	30893-123570	N/A	N/A	N/A
B-133 (5-7)Re	A	A	30067	A	A	A
DUPE-09Re	A	A	26929	A	21971	A
QC Limits	N/A	N/A	32767-131068	N/A	22419-89676	N/A
B-136 (1-3)	A	A	18412	29226	2620	3716
B-136 (1-3)Re	A	A	19217	28978	4450	3216
B-133 (1-3)	A	A	21022	30364	9946	A
QC Limits	N/A	N/A	21885-87450	47990-191960	10128-40510	4485-17938

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94 (1905-2228)/A	1,2-Dichlorobenzene	%RSD = 23.7	All Samples
C - 6/16/94 (1348)/A	Hexachloroethane 4-Chlorophenyl-phenylether Pentachlorophenol	%D = 33.2 %D = 51.5 %D = 31.1	B-133 (5-7), B-134 (7-9), B-135 (7-9), DUPE-09
C - 6/17/94 (1105)/A	Hexachloroethane 4-Chlorophenyl-phenylether Fluorene	%D = 37.2 %D = 62.3 %D = 40.9	B-133 (5-7)Re, DUPE-09 Re, RB050994, B-134 (7-9) MS/MSD
C - 6/18/94	Hexachloroethane 4-Chlorophenyl-phenylether Pyrene	%D = 37.2 %D = 60.4 %D = 35.4	B-135 (1-3), B-136 (7-9), RB051094, B-134 (1-3), B-136 (1-3), B-136 (1-3)Re, B-133 (1-3)

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that no sample (other then the MSD) contained more than one acid fraction or more than one non-advisory base/neutral fraction surrogate outside of QC limits, therefore qualification of the sample data due to surrogate recovery is not required.

Sample	Surrogate	% Recovery	QC Limits
DUPE-09Re	2,4,6-Tribromophenol	0	19-122
B-136 (1-3)	2,4,6-Tribromophenol	13	19-122
B-136 (1-3)Re	2,4,6-Tribromophenol	12	19-122
B-136 (7-9)	1,2-Dichlorobenzene-d4	12	20-130 (advisory)
B-134 (7-9)MSD	Nitrobenzene-d5	13	23-120
	2-Fluorobiphenyl	19	30-115
	1,2-Dichlorobenzene-d4	14	20-130 (advisory)

PESTICIDE/PCB

- 4,4´-DDT exhibited a percent relative standard deviation (%RSD) of 33.9% in the initial calibration on column DB-1701 (QC limit = 20%). This is a protocol deficiency in addition to a technical deficiency as up to two compounds are allowed to exceed 20% as long as they are less than 30% RSD. Due to this deficiency, all 4,4´-DDT results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- Several PEM, INDA, and INDB calibration verification standards exhibit compounds that exceed the 25% RPD QC limit on one or both columns. Positive sample results for these affected compounds are qualified as estimated and flagged "J" and non-detects "UJ" for associated samples. Associated samples are all those that were analyzed between the last in-control standard and the next in-control standard. The following table lists PEMs, INDA and INDB standards, deficient compounds and RPDs and associated samples.

Standard	Compound	RPD	Associated Samples
PEM10 (DB-1701)	4,4´-DDT	40.0	All Samples
PEM11 (DB-1701)	4,4´-DDT	40.0	All Samples
PEM11 (DB-608)	4,4´-DDT	33.3	
PEM11 (DB-608)	gamma-BHC	33.3	
PEM11 (DB-608)	Methoxychlor	28.0	
PEM11 (DB-608)	alpha-BHC	33.3	
INDAM08 (DB-1701)	4,4´-DDT	50.0	All Samples
INDAM08 (DB-1701)	Methoxychlor	26.7	
INDAM08 (DB-608)	gamma-BHC	40.0	
INDAM08 (DB-608)	Heptachlor	46.7	
INDAM08 (DB-608)	Endosulfan I	30.0	
INDAM08 (DB-608)	alpha-BHC	33.3	
INDAM08 (DB-608)	TCMX (surrogate)	40.0	
INDBM08 (DB-608)	delta-BHC	30.0	All Samples
INDBM08 (DB-608)	Aldrin	30.0	
INDBM08 (DB-608)	Heptachlor Epoxide	30.0	
INDBM08 (DB-608)	4,4´-DDE	27.5	
INDBM08 (DB-608)	gamma-chlordane	30.0	
INDBM08 (DB-608)	Endrin Aldehyde	27.5	
INDAM10 (DB-1701)	4,4´-DDT	33.3	All Samples
INDAM10 (DB-608)	alpha-BHC	33.3	
INDAM10 (DB-608)	gamma-BHC	40.0	
INDAM10 (DB-608)	Heptachlor	46.7	
INDAM10 (DB-608)	Endosulfan I	33.3	
INDAM10 (DB-608)	Dieldrin	26.7	
INDAM10 (DB-608)	Endrin	26.7	
INDAM10 (DB-608)	4,4´-DDT	30.0	
INDAM10 (DB-608)	Methoxychlor	26.7	
INDAM10 (DB-608)	TCMX (surrogate)	40.0	
INDBM10 (DB-608)	delta-BHC	30.0	All Samples
INDBM10 (DB-608)	Aldrin	30.0	
INDBM10 (DB-608)	4,4´-DDE	27.5	
INDBM10 (DB-608)	Endrin Aldehyde	30.0	
INDBM10 (DB-608)	beta-BHC	30.0	
INDBM10 (DB-608)	TCMX (surrogate)	35.0	

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
B-133 (5-7)	Endosulfan Sulfate	19.2	Negated - RT out
B-135 (7-9)	beta-BHC	757.1	

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
PBLKE9	43	42	--	--
RB050994	47	50	--	--
RB051094	58	--	--	--
B-133 (5-7)	54	56	--	--
B-134 (7-9)	52	54	--	--
B-134 (7-9)MS	49	48	--	--
B-134 (7-9)MSD	49	52	--	--
B-136 (7-9)	55	--	--	--
DUPE-09	55	--	--	--

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: Douglas A. Wolf
Douglas A. Wolf, P.G.

Dated: 25 July 1994

***DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-112(3-5)***

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
B-112 (3-5)	B-119 (3-5)	CB-03 MS/MSD (VOC)
B-112 (9-11)	CB-03	OUT-6 MS/MSD (SVOC, Pest/PCB-from SDG B-108 (3-5))
B-116 (4-6)	CB-04	CB-13 Spike and Duplicate (Metals from SDG B-101 (3-5))
B-116 (8-10)	CB-08	RB042694
B-117 (2-4)	CB-15	RB042794
B-117 (6-8)	CB-16	MSB 5/3/94 (VOC)
B-118 (3-5)	CB-18	MSB 5/3/94 (SVOC)
B-118 (7-9)	CB-19	PMSB2 (Pest/PCB)
B-119 (7-9)		

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Based on the observed concentrations of methylene chloride in these blanks, the observed concentration of this compound in associated field samples is negated (all less than ten times the concentration in the highest associated blank). 1,1,2,2-Tetrachloroethane was not detected in B-116 (4-6).

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	None	CB-08, CB-16, CB-03, CB-04, CB-15, CB-18, CB-19, B-118 (3-5), B-118 (7-9), B-119 (3-5), B-119 (7-9). B-112 (3-5), B-112 (9-11)
VBLK02	Methylene Chloride (3J μg/kg)	B-116 (8-10), B-117 (2-4), B-117 (6-8), CB-03 MS/MSD, MSB 5/3/94
VBLK03	Methylene Chloride (8J ug/kg) 1,1,2,2-Tetrachloroethane (5J)	B-116 (4-6)
VBLK04	None	RB042694, RB0422794
RB042694	None	All Samples
RB042794	None	All Samples

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration (I) or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration (C) response factor. Associated field samples are also listed. None of the listed compounds were detected in the associated samples, therefore all non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed. All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of 1,1,2,2-tetrachloroethane results is necessary.

Calibration	Compound	Deficiency	Associated Samples
I - 5/3/94 (0153-0526)/D(NH)	Bromomethane 1,1,2,2-Tetrachloroethane	%RSD = 32.4 RF = 0.327	RB042694, RB042794
C - 5/3/94 (1454)/C(H)	Cis-1,2-Dichloropropene 1,1,2,2-Tetrachloroethane	%D = 25.3 RF = 0.350	B-116 (8-10), B-117 (2-4), B-117 (6-8), CB-03 MS/MSD, MSB 5/3/94

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Pthalates are negated in associated samples if the sample concentrations is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank. Note that the large number of TICs present in SBLK01 blank did not interfere with the ability to recover and identify compounds in RB042694 and RB042794.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Butylbenzylphthalate (1J $\mu g/\ell$) Bis(2-ethylhexyl)phthalate (2J) Unknown Phthalate @ 23.14 (2J) Unknown @ 31.93 (20J) Unknown @ 32.16 (6J) Unknown Alkane @ 27.92 (4J) Unknown Alkane @ 28.94 (6J) Unknown Alkane @ 29.94 (7J) Unknown Alkane @ 30.89 (8J) Unknown Alkane @ 31.81 (10J) Unknown Alkane @ 32.70 (9J) Unknown Siloxane @ 35.44 (6J) Unknown Siloxane @ 36.92 (4J)	RB042694, RB042794
SBLK02	Aldol Condensate @ 4.92 (7000JA $\mu g/kg$) Aldol Condensate @ 4.96 (70JA) Unknown @ 32.75 (70J)	All Soil Samples
SBLK03	None	OUT-6, OUT-6 MS/MSD, MSB 5/3/94
RB042694	Bis(2-ethylhexyl)phthalate (1BJ $\mu g/\ell$) Unknown Subs Phenol @ 16.65 (2J) Unknown @ 29.93 (4J) Unknown @ 31.98 (6BJ)	All Soil Samples
RB042794	Bis(2-ethylhexyl)phthalate (2BJ $\mu g/\ell$) Unknown Alkane @ 28.94 (3BJ) Unknown Alkane @ 30.89 (4BJ) Unknown Alkane @ 31.80 (6BJ) Unknown Alkane @ 31.94 (20BJ) Unknown Alkane @ 32.69 (6BJ) Unknown Alkane @ 34.44 (2J) Unknown @ 29.92 (10BJ) Unknown @ 32.15 (8BJ)	All Soil Samples

- CB-08 DL exhibited high recovery for the phenol-d8 surrogate. Since only one acid fraction surrogate compound recovery is outside of QC limits, qualification of the sample is not required.

- Use CB-08 DL for bis(2-ethylhexyl)phthalate and butylbenzylphthalate results only. Note that this dilution analysis was not performed at a high enough dilution level to bring the bis(2-ethylhexyl)phthalate concentration into the instrument's linear range, therefore the bis(2-ethylhexyl) phthalate result is considered estimated and flagged "J."

- Note that sample OUT-6 was used for MS/MSD analysis for semi-volatiles and pesticide/PCB analysis, although it was analyzed and used for QC sample analysis in SDG B-108 (3-5). Although this results in a QC sample analysis frequency of one per twenty samples, it is a breach of protocol as the ASP requires QC sample analysis at a frequency of one per twenty samples or one per SDG, whichever is more frequent. Also note that no base/neutral spiking compounds were added to the MS by mistake, therefore an assessment of precision (RPD) cannot be made. Recovery for these compounds in the MSD was acceptable.

- The following table lists samples that exhibited internal standards with area counts outside of the +100%/-50% QC limits. Based on these results, as well as other QC criteria (surrogate recovery, compound concentrations, etc.) the initial analyses of samples CB-15 and CB-08 should be used, with all compounds quantitated against the affected internal standards considered estimated and flagged "J" for positive results and "UJ" for non-detects. (Note - A indicates area count within QC limits and N/A indicates QC limits not applicable for this internal standard for sample of interest.) Note also that Out-6 and Out-6 MS/MSD internal standard deficiencies are discussed in the SDG B-108 (3-5) validation report.

Sample ID	Phenanthrene-d10	Chrysene-d12	Perylene-d12
CB-08	A	23894	13248
QC Limits	N/A	33030-132120	22274-89096
CB-15	A	7948	A
QC Limits	N/A	12295-49178	N/A
CB-15 Re	34007	4784	6062
QC Limits	64936-259744	16041-64164	7893-31572

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
I - 6/6/94 (1905-2228)/A	1,2-Dichlorobenzene	%RSD = 23.7	B-112 (9-11), OUT-6, OUT-6 MS/MSD, C-15 RE, MSB 5/3/94
C - 6/1/94 (1208)/B	2,4,5-Trichlorophenol	%D = 41.7	RB042694, RB042794
C - 6/3/94 (1128)/B	2,4,6-Trichlorophenol 2-Fluorobiphenyl (surr.)	%D = 26.0 %D = 25.2	CB-08
C - 6/5/94 (1635)/B	4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Dibenzo(a,h)Anthracene 2-Fluorobiphenyl (surr.)	%D = 44.8 %D = 28.6 %D = 49.7 %D = 32.2	CB-08 DL, CB-16, CB-03, CB-04, CB-15, CB-18, B-112 (3-5)
C - 6/7/94 (1846)/A	Indeno(1,2,3-cd)pyrene Dibenzo(a,h)anthracene Benzo(g,h,i)perylene	%D = 38.3 %D = 40.7 %D = 53.1	B-112 (9-11)
C - 6/9/94 (0929)/A	Phenol Bis(2-chloroethyl)ether 2-Methylphenol 2-Chlorophenol-d4 (surr.)	%D = 28.8 %D = 43.4 %D = 27.0 %D = 27.4	OUT-6, OUT-6 MS/MSD, CB-15 Re

PESTICIDE/PCB

- 4,4′-DDT exhibited a percent relative standard deviation (%RSD) of 33.9% in the initial calibration on column DB-1701 (QC limit = 20%). This is a protocol deficiency in addition to a technical deficiency as up to two compounds are allowed to exceed 20% as long as they are less than 30% RSD. Due to this deficiency, all 4,4′-DDT results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- Rinsate blank RB042794 contained 0.013 μg/ℓ endosulfan sulfate. This compound was also detected in CB-18, at 3.27 μg/kg, and is negated based on a comparison to the rinsate blank on a raw data basis.

- Several PEM, INDA, and INDB calibration verification standards exhibit compounds that exceed the 25% RPD QC limit on one or both columns. Positive sample results for these affected compounds are qualified as estimated and flagged "J" and non-detects "UJ" for associated samples. Associated samples are all those that were analyzed between the last in-control standard and the next in-control standard. The following table lists PEMs, INDA and INDB standards, deficient compounds and RPDs and associated samples.

Standard	Compound	RPD	Associated Samples
PEM05 (DB-1701)	4,4′-DDT	33.3	All Samples
PEM05 (DB-608)	alpha-BHC	33.3	
PEM05 (DB-608)	gamma-BHC	33.3	
PEM05 (DB-608)	Methoxychlor	28.0	
PEM06 (DB-1701)	4,4′-DDT	46.7	All Samples
PEM06 (DB-608)	alpha-BHC	33.3	
PEM06 (DB-608)	Endrin	32.0	
	4,4′-DDT	33.3	
	Methoxychlor	36.0	
PEM07 (DB-1701)	4,4′-DDT	46.7	All Samples
PEM07 (DB-1701)	Methoxychlor	28.0	
PEM07 (DB-608)	Methoxychlor	28.0	

Standard	Compound	RPD	Associated Samples
INDAM04 (DB-1701)	4,4´-DDT	33.3	All Samples
INDAM04 (DB-608)	alpha-BHC	30.0	
INDAM04 (DB-608)	gamma-BHC	40.0	
INDAM04 (DB-608)	Heptachlor	53.3	
INDAM04 (DB-608)	Endosulfan I	40.0	
INDAM04 (DB-608)	Dieldrin	30.0	
INDAM04 (DB-608)	Endrin	33.3	
INDAM04 (DB-608)	4,4´-DDD	26.7	
INDAM04 (DB-608)	4,4´-DDT	33.3	
INDAM04 (DB-608)	Methoxychlor	30.0	
INDAM04 (DB-608)	TCMX (Surrogate)	33.3	
INDAM04 (DB-608)	DCB (Surrogate)	33.3	
INDB04 (DB-608)	Endrin Aldehyde	27.5	
INDB04 (DB-608)	DCB (Surrogate)	40.0	
INDAM05 (DB-1701)	4,4´-DDT	45.0	All Samples
INDAM05 (DB-608)	alpha-BHC	40.0	
INDAM05 (DB-608)	gamma-BHC	46.7	
INDAM05 (DB-608)	Heptachlor	60.0	
INDAM05 (DB-608)	Endosulfan I	33.3	
INDAM05 (DB-608)	Dieldrin	33.3	
INDAM05 (DB-608)	Endrin	30.0	
INDAM05 (DB-608)	4,4´-DDD	33.3	
INDAM05 (DB-608)	4,4´-DDT	35.0	
INDAM05 (DB-608)	Methoxychlor	33.3	
INDAM05 (DB-608)	TCMX (surrogate)	50.0	
INDAM05 (DB-608)	DCB (surrogate)	33.3	
INDBM05 (DB-608)	Delta-BHC	30.0	No Samples
INDBM05 (DB-608)	Aldrin	30.0	
INDBM05 (DB-608)	4,4´-DDE	30.0	
INDBM05 (DB-608)	Endrin Aldehyde	30.0	
INDBM05 (DB-608)	alpha-Chlordane	26.6	
INDBM05 (DB-608)	gamma-Chlordane	26.6	
INDBM05 (DB-608)	TCMX (surrogate)	35.0	
INDBM05 (DB-608)	DCB (surrogate)	27.5	
INDAM06 (DB-1701)	4,4´-DDT	40.0	No Samples
INDAM06 (DB-608)	Heptachlor	30.0	
INDAM06 (DB-608)	Methoxychlor	26.7	

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
CB-03	alpha-chlordane	93.3	
	Aroclor-1254	34.8	
CB-04	Aldrin	80.0	
	Endosulfan II	70.0	
CB-15	4,4´-DDE	30.0	
	Endosulfan II	592.9	
	Endrin Aldehyde	182.1	
CB-18	Aldrin	73.3	
	4,4´-DDE	77.3	Negated - RT out
	Endosulfan II	44.0	
	Endosulfan Sulfate	96.9	
	Aroclor-1254	27.3	

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
PBLKE2	55	45	--	--
B-112 (3-5)	--	--	--	57
CB-03	--	--	55	--
CB-04	152	--	32	58
CB-08	--	--	45	50
CB-15	--	--	41	44
CB-16	--	--	47	54
CB-18	--	--	56	--
PMSB2	--	--	--	173

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Antimony (56.2%), chromium (134.5%), lead by ICP (140.5%), lead by GFAA (647.8%), mercury (373.8%), cyanide (22%), silver (0.0%), selenium (61.1%) and zinc (157.7%) spiked sample recoveries were outside of 75%-125% QC limits. Lead by ICP post-digestion spike recovery (139.2%) was outside of these QC limits. Positive sample results for each of these metals should be considered estimated and flagged "J." Non-detect arsenic and selenium results should be flagged "UJ." Non-detect silver and cyanide results are rejected. Note that soil sample spike recovery results do not apply to RB042694 and RB042794. Also note that sample CB-13 was used for all QC sample analysis in this package (spike, duplicate, serial dilution, etc.) although it was analyzed and used for QC sample analysis in SDG B-101 (3-5). Although this results in a QC sample analysis frequency of one per twenty samples, it is a breach of protocol as the ASP requires QC sample analysis at a frequency of one per twenty or one per SDG, whichever is more frequent.

- The laboratory duplicate exhibited RPDs greater than 35% or absolute difference (a.d.) greater than $\pm$ 2 times CRDL (USEPA Functional Guidelines) for copper (a.d. = 22.61 mg/kg; 2 times CRDL = 11.4 mg/kg), chromium (a.d. = 6.34 mg/kg; 2 times CRDL - 4.6 mg/kg), zinc (142%) and lead by GFAA (101.4%). Positive results for these parameters in these samples only, should be considered estimated and flagged "J," non-detects "UJ."

- RB042694 and RB042794 were analyzed at a 1:5 dilution factor for thallium due to interferences. The dilution analyses also exhibited interferences, therefore the thallium non-detect result in these blanks are flagged "UJ."

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- Cyanide LCS recovery (72%) was below 80% lower QC limit. All cyanide results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- Cyanide continuing calibration verification standard number 4 (CCV4) recovery (117%) exceeded the 115% upper QC limit. As such, positive cyanide results only would be considered estimated. Since all samples are non-detect for cyanide, no qualification of the sample data is necessary.

- The initial cobalt (124.3%), nickel (128.3%), silver (123.5%), zinc (121.8%), and cadmium (121.6%) and final lead by ICP (121.7%) recoveries that are slightly high. Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery greater than 120% (USEPA Region II upper QC limit) may indicate potential high bias in positive sample results at concentrations near the CRDL. Therefore positive sample concentrations of these samples should be considered estimated and flagged "J."

- The selenium analytical spike recoveries in CB-03 (66%), CB-15 (58%), CB-16 (68%), B-112 (9-11) (67%), CB-08 (83%) and RB042694 (62%) were outside of 85%-115% QC limits. Selenium results in these samples are considered estimated, with positive results flagged "J" and non-detects "UJ."

- RB042694 contained 127 $\mu g/\ell$ copper and 35.6 $\mu g/\ell$ zinc. RB042794 contained 139 $\mu g/\ell$ copper and 36.4 $\mu g/\ell$ zinc. Concentrations of these metals in the associated field samples less than five times the concentration in the rinsate blanks are rejected (concentration comparisons are made from the raw ICP data).

- The mercury calibration linear correlation was less than 0.995 (0.9918), therefore all mercury results are considered estimated and flagged "J" for positive results, "UJ" for non-detects.

- ICP serial dilution percent difference results for aluminum (18.6%), calcium (12.6%), iron (13.0%), magnesium

(11.5%), manganese (12.5%) and zinc (12.8%) exceeded the 10% QC limit with the initial sample concentration greater than 50 times the instrument detection limits (IDL) for these metals. All positive sample results for these metals are considered estimated and flagged "J."

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: Douglas A. Wolf
Douglas A. Wolf, P.G.

Dated: 19 July 1994

DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-101(3-5)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Pesticide/PCB analyses were performed by NYSDEC ASP Method 91-3. Target Analyte List (TAL) inorganic analyses were performed according to various NYSDEC Superfund Methods. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

Samples		QC Samples
B-101 (3-5)	B-125 (3-5)	B-125 (3-5) MS/MSD (VOC - low level)
B-101 (7-9)	B-125 (7-9)	CB-13 MS/MSD (VOC - med level, SVOC, Pest/PCB)
B-102 (3-5)	CB-01	CB-13 Spike and Duplicate (Metals)
B-102 (5-7)	CB-05	DUPE-01 (CB-07 Field Duplicate)
B-111 (8-10)	CB-06	RB042594
B-113 (8-10)	CB-07	MSB 5/4/94 (VOC)
B-120 (2-4)	CB-09	MSB 4/29/94 (SVOC)
B-121 (0-3)	CB-11	PMSB1 (Pest/PCB)
B-124 (3-5)	CB-13	
B-124 (7-9)		

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Based on the observed concentrations of methylene chloride in these blanks, the observed concentration of this compound in all field samples is negated (all less than ten times the concentration in the highest associated blank).

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	None	B-113 (8-10), B-121 (0-3), B-124 (7-9), CB-11
VBLK02	Methylene Chloride (6J μg/kg)	B-111 (8-10), B-124 (3-5), CB-01, B-125 (3-5), B-125 (7-9), CB-07, B-101 (3-5), B-101 (5-7), CB-09
VBLK03	None	RB042594
VBLK04	Methylene Chloride (4J μg/kg)	DUPE-01, CB-05, CB-06
VBLK05	Methylene Chloride (1000J μg/kg)	CB-13, CB-13 MS/MSD, MSB 5/4/94
VBLK06	Methylene Chloride (8J μg/kg) 1,1,2,2-Tetrachloroethane (5J μg/kg)	B-120 (2-4), B-102 (3-5), B-102 (5-7), B-125 (3-5) MS/MSD, MSB 5/4/94
RB042594	None	All Samples

- B-125 (3-5) MS/MSD (Low Level) exhibited relative percent difference (RPD) results between spiking compound recoveries in the MS and MSD outside of QC limits for 1,1-dichloroethene (24%; QC limit = 22%), benzene (25%; QC limit = 21%), toluene (23%; QC limit = 21%) and chlorobenzene (24%; QC limit = 21%). None of these compounds were detected in the unspiked portion of this sample, therefore no qualification of the sample data is necessary.

- CB-13 MSD exhibited the system monitoring compounds (SMC) bromofluorobenzene (119%; QC limits = 59%-113%) and 1,2-dichloroethane-d4 (127%; QC limits = 70%-121%) with spike recoveries outside of QC limits. The MS and the unspiked portion of the sample exhibited acceptable SMC recoveries, therefore no action taken to qualify the sample data.

- Sample CB-11 exhibited the internal standard chlorobenzene-d5 with a low area count (32450; QC limits = 36794-147176). The sample was not re-analyzed, resulting in a protocol deficiency. On a technical basis, all results (all non-detects) for compounds quantitated against this internal standard are considered estimated and flagged "UJ."

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration (I) or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration (C) response factor. Associated field samples are also listed. None of the listed compounds were detected in the associated samples, therefore all non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed. All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of 1,1,2,2-tetrachloroethane results is necessary.

Calibration	Compound	Deficiency	Associated Samples
I - 4/30/94 (1018-1415)/D(H)	Bromomethane Vinyl Chloride 1,1,2,2-Tetrachloroethane	%RSD = 45.0 %RSD = 50.6 RF = 0.415	B-113 (8-10), B-121 (0-3), B-124, (7-9), CB-11, B-111 (8-10), B-124 (3-5), CB-01, B-125 (3-5), B-125 (7-9), CB-07, B-101 (5-7), CB-09, CB-05, CB-06, DUPE-01
I - 5/3/94 (0153-0526)/D(NH)	Bromomethane 1,1,2,2-Tetrachloroethane	%RSD = 32.4 RF = 0.327	RB042594, CB-13, CB-13 MS/MSD, MSB 5/4/94
I - 5/2/94 (1112-1425)/C(H)	1,1,2,2-Tetrachloroethane	RF = 0.301	B-120 (2-4), B-102 (3-5), B-102 (5-7), B-125 (3-5) MS/MSD, MSB 5/4/94
C - 4/30/94 (1604)/D(H)	1,1,2,2-Tetrachloroethane	RF = 0.370	B-113 (8-10), B-121 (0-3), B-124 (7-9), CB-11
C - 5/2/94 (1329)/D(H)	Vinyl Chloride 1,1,2,2-Tetrachloroethane	%D = 55.1 RF = 0.433	B-111 (8-10), B-124 (3-5), CB-01, B-125 (3-5), B-125 (7-9), CB-07, B-101 (3-5), CB-09, B-101 (5-7)
C - 5/3/94 (1553)/D(H)	Vinyl Chloride Bromoform 1,1,2,2-Tetrachloroethane	%D = 28.3 %D = 25.1 RF = 0.472	DUPE-01, CB-05, CB-06
C - 5/3/94 (0339)/D(NH)	1,1,2,2-Tetrachloroethane	RF = 0.327	RB042594

Calibration	Compound	Deficiency	Associated Samples
C - 5/4/94 (1144)/D(NH)	1,1,2,2-Tetrachloroethane	RF = 0.311	CB-13, CB-13 MS/MSD, MSB 5/4/94
C - 5/4/94 (1117)/C(H)	1,1,2,2-Tetrachloroethane	RF = 0.314	B-120 (2-4), B-102 (3-5), B-102 (5-7), B-125 (3-5) MS/MSD, MSB 5/4/94

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Pthalates are negated in associated samples if the sample concentration is less than ten times that of the blank. All other compounds are negated if their concentration in the sample is less than five times that of the highest associated blank. Note that the large number of TICs present in SBLK01 blank did not interfere with the ability to recover and identify compounds in RB042594.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Butylbenzylphthalate (1J $\mu g/\ell$) Bis(2-ethylhexyl)phthalate (2J) Unknown Phthalate @ 23.14 (2J) Unknown @ 31.93 (20J) Unknown @ 32.16 (6J) Unknown Alkane @ 27.92 (4J) Unknown Alkane @ 28.94 (6J) Unknown Alkane @ 29.94 (7J) Unknown Alkane @ 30.89 (8J) Unknown Alkane @ 31.81 (10J) Unknown Alkane @ 32.70 (9J) Unknown Siloxane @ 35.44 (6J) Unknown Siloxane @ 36.92 (4J)	RB042594
SBLK02	Bis(2-ethylhexyl)phthalate (51J $\mu g/kg$) Aldol Condensate @ 4.43 (3000JA) Unknown Oxy Cmpd @ 31.96 (5000J) Unknown @ 32.14 (70J)	All Soil Samples

Blank ID	Compound (Concentration)	Associated Samples
RB042594	Bis(2-ethylhexyl)phthalate (1BJ $\mu g/\ell$)	All Soil Samples
	Unknown Alkane @ 27.92 (2BJ)	
	Unknown Alkane @ 28.94 (4BJ)	
	Unknown Alkane @ 29.92 (6BJ)	
	Unknown Alkane @ 30.87 (5BJ)	
	Unknown Alkane @ 31.80 (30BJ)	
	Unknown Alkane @ 32.68 (40BJ)	
	Unknown Alkane @ 34.43 (80BJ)	
	Unknown Alkane @ 35.53 (30BJ)	
	Unknown @ 31.96 (10J)	
	Unknown @ 32.17 (8J)	

- CB-13 MS/MSD exhibited RPD results between spiking compound recoveries in the MS and MSD outside of QC limits for 1,2,4-trichlorobenzene (34%; QC limit = 23%) and acenaphthene (23%; QC limit = 19%). Neither of these compounds were detected in the unspiked portion of this sample, therefore no qualification of the sample data is necessary.

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that no sample contained more than one acid fraction or more than one non-advisory base/neutral fraction surrogate outside of QC limits, therefore qualification of the sample data due to surrogate recovery is not required.

Sample	Surrogate	% Recovery	QC Limits
CB-01	Phenol-d5	13	24-113
B-125 (7-9)	Phenol-d5	11	24-113
B-101 (3-5)	Phenol-d5	20	24-113
CB-05	2-Chlorophenol-d4	16	20-130 (advisory)
CB-06	2-Fluorophenol	20	25-121

- Sample CB-01 exhibited the initial standard chrysene-d12 with a low area count (39152; QC limits = 39478-157912). The sample was not re-analyzed, resulting in a protocol deficiency. On a technical basis, all results for compounds quantitated against this internal standard are considered estimated, with positive results flagged "J" and non-detects flagged "UJ." CB-13 MS and CB-13 MSD each exhibited low area counts for internal standards chrysene-d12 (20862 and 26016, respectively; QC limits = 33030-132120) and perylene-d12 (13012 and 15330, respectively; QC limits = 22274-89096). The unspiked portion of this sample exhibited acceptable internal standard response, therefore no qualification of the sample data is necessary.

- The following table lists compounds that exceeded 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. Positive results for these compounds in associated samples are considered estimated and flagged "J." All non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these calibrations and associated samples should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
6/1/94 (1208)	2,4,5-Trichlorophenol	%D = 41.7	RB042594, B-111 (8-10), B-113 (8-10), B-121 (0-3), B-124 (3-5), B-124 (7-9), MSB 4/29/94
6/2/94 (1457)	None	None	CB-01, CB-09, DUPE-01, B-125 (3-5), B-125 (7-9), B-120 (2-4), B-102 (3-5), B-102 (5-7), B-101 (3-5), B-101 (5-7)
6/3/94 (1128)	2,4,6-Trichlorophenol 2-Fluorobiphenyl	%D = 26.0 %D = 25.2	CB-07, CB-11, CB-13, CB-13 MS/MSD
6/5/94 (1635)	4-Chlorophenyl-phenylether 4-Bromophenyl-phenylether Dibenzo(a,h)Anthracene 2-Fluorobiphenyl	%D = 44.8 %D = 28.6 %D = 49.7 %D = 32.2	CB-05, CB-06

PESTICIDE/PCB

- 4,4´-DDT exhibited a percent relative standard deviation (%RSD) of 33.9% in the initial calibration on column DB-1701 (QC limit = 20%). This is a protocol deficiency as well as a technical deficiency as up to two compounds are allowed to exceed 20% as long as they have less than 30%

RSD. Due to this deficiency, all 4,4′-DDT results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- Rinsate blank RB042594 contained 0.003 $\mu g/\ell$ delta-BHC. This compound was also detected in CB-11, at 0.87 $\mu g/kg$, and is negated based on a comparison to the rinsate blank on a raw data basis.

- Several PEM, INDA, and INDB calibration verification standards exhibit compounds that exceed the 25% RPD QC limit on one or both columns. Positive sample results for these affected compounds are qualified as estimated and flagged "J" and non-detects "UJ" for associated samples. Associated samples are all those that were analyzed between the last in-control standard and the next in-control standard. The following table lists PEMs, INDA and INDB standards, deficient compounds and RPDs and associated samples.

Standard	Compound	RPD	Associated Samples
PEM03 (DB-1701)	4,4′-DDT	46.7	B-111 (8-10), B-113 (8-10),
PEM03 (DB-608)	4,4′-DDT	33.3	B-121 (0-3), B-124 (3-5),
PEM03 (DB-608)	Methoxychlor	28.0	B-124 (7-9), B-125 (3-5),
			B-125 (7-9), B-120 (2-4),
			B-102 (3-5), B-102 (5-7),
			B-101 (3-5), B-101 (7-9),
			CB-01, CB-09, CB-11
PEM05 (DB-1701)	4,4′-DDT	33.3	None
PEM05 (DB-608)	alpha-BHC	33.3	
PEM05 (DB-608)	gamma-BHC	33.3	
PEM05 (DB-608)	Methoxychlor	28.0	
INDAM04 (DB-1701)	4,4′-DDT	33.3	CB-05, CB-07, CB-13,
INDAM04 (DB-608)	alpha-BHC	30.0	CB-06, CB-13 MS/MSD,
INDAM04 (DB-608)	gamma-BHC	40.0	DUPE-01
INDAM04 (DB-608)	Heptachlor	53.3	
INDAM04 (DB-608)	Endosulfan I	40.0	
INDAM04 (DB-608)	Dieldrin	30.0	
INDAM04 (DB-608)	Endrin	33.3	
INDAM04 (DB-608)	4,4′-DDD	26.7	
INDAM04 (DB-608)	4,4′-DDT	33.3	
INDAM04 (DB-608)	Methoxychlor	30.0	
INDAM04 (DB-608)	TCMX (Surrogate)	33.3	
INDAM04 (DB-608)	DCB (Surrogate)	33.3	
INDBM04 (DB-608)	Endrin Aldehyde	27.5	
INDBM04 (DB-608)	DCB (Surrogate)	40.0	

- The following table lists samples in which compounds were detected but quantitated at concentrations differing by more than 25% RPD on the two GC columns. As such, the sample results have been flagged "J." Note that several compounds in several samples exhibited extremely high RPDs and in several cases the compound "peak" fell outside of the retention time window for that compound on the particular GC column. Those results are negated. Also note that it is the professional opinion of the data reviewer that the large RPD values are due, in many instances, to the coincidental occurrence of peaks falling within the retention time window for a given compound on both GC columns. However it is likely that these peaks do not, in fact, represent the actual compound of interest, but rather extraneous peaks occurring within that particular time window. Since this hypothesis cannot be conclusively proved, the results will be reported, but qualified as estimated ("J" flag).

Sample	Compound	RPD	Notes
B-102 (3-5)	Endosulfan Sulfate	96.8	
	4,4'-DDT	59.7	
B-102 (5-7)	gamma-BHC	54.5	
	4,4'-DDD	60.0	
B-120 (2-4)	4,4'-DDT	36.1	
B-121 (0-3)	4,4'-DDE	36.4	
	4,4'-DDD	50.0	
	4,4'-DDT	70.0	
B-124 (3-5)	beta-BHC	1459	
	Endosulfan Sulfate	395	Negated - RT out
B-124 (7-9)	Endrin	94.4	
	Endosulfan Sulfate	662	Negated - RT out
B-125 (3-5)	Heptachlor	30.0	
	4,4'-DDE	64.7	
	Endrin	48.6	
	Endosulfan Sulfate	429	Negated RT out
CB-01	Aldrin	110.5	Negated - RT out
	Endrin	1727	
	Endosulfan II	204.3	
	4,4'-DDT	42.4	
	gamma-Chlordane	72.0	
	Aroclor - 1254	27.3	

Sample	Compound	RPD	Notes
CB-05	Aldrin	294	
	Endosulfan I	313	
	4,4´-DDE	50.0	
	Endosulfan Sulfate	93.5	
CB-09	4,4´-DDD	63.2	
CB-11	delta-BHC	256	
	Endosulfan Sulfate	340	
	Endrin Aldehyde	40.9	
	4,4´-DDT	29.6	
CB-13	Endosulfan I	42.9	Negated - RT out
	4,4´-DDE	26.1	
	Endosulfan II	300	
	Methoxychlor	813	Negated - RT out

- The following table lists samples that exhibited one or more surrogates outside of 60%-150% QC limits. Qualification of sample data due to surrogates outside of advisory QC limits is limited to those samples that exhibit a surrogate outside of QC limits on both GC columns. If tetrachlorometaxylene is deficient, pesticide compounds are qualified. If decachlorobiphenyl is deficient, PCB aroclors and toxaphene are qualified. Positive results are flagged "J" and non-detects "UJ." (Note that a dash (-) indicates acceptable surrogate recovery.)

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
PBLKE2	55	45	--	--
B-101 (7-9)	--	52	--	--
B-102 (3-5)	52	41	--	--
B-102 (5-7)	56	40	--	--
B-111 (8-10)	184	34	--	54
B-113 (8-10)	--	33	57	--
B-120 (2-4)	52	39	--	--
B-121 (0-3)	--	--	--	59
B-124 (3-5)	--	47	--	--
B-124 (7-9)	--	48	--	--
B-125 (3-5)	58	42	--	--

	Surrogate			
Sample ID	TCMX (1701)	TCMX (608)	DCB (1701)	DCB (608)
B-125 (7-9)	--	50	--	--
CB-01 DL	--	--	54	41
CB-05 DL	--	55	--	--
CB-06 DL	--	--	52	--
CB-07 DL	--	--	--	46
CB-09 DL	--	--	33	44
CB-11 DL	--	--	51	--
CB-13 DL	172	--	--	159
CB-13 MS	--	--	--	152
PBLKE1	59	36	--	--
PBLKE5	--	50	--	--
PMSB1	--	58	--	--

INORGANICS

The following items/criteria were reviewed:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- ICP interference check sample analysis
- CRDL standard analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- ICP serial dilution analysis
- GFAA post-digestion spike results
- Method of standard additions (MSA) results
- Detection limits

The items listed above were technically acceptable and in compliance with NYSDEC ASP and USEPA CLP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly.

- Antimony (56.2%), chromium (134.5%), lead by ICP (140.3%), lead by GFAA (647.8%), mercury (373.8%), cyanide (22%), silver (0.0%), selenium (61.1%) and zinc (157.7%) spiked sample recoveries were outside of 75%-125% QC limits. Lead by ICP post-digestion spike recovery (139.2%) was outside of these QC limits. Positive sample results for each of these metals should be considered estimated and flagged "J." Non-detect arsenic and selenium results should be flagged "UJ." Non-detect silver and cyanide results are rejected. Note that soil sample QC analysis results do not apply to RB042594.

- The laboratory duplicate exhibited RPDs greater than 35% or absolute difference (a.d.) greater than ± 2 times CRDL (USEPA Functional Guidelines) for copper (a.d. = 22.61 mg/kg; 2 times CRDL = 11.4 mg/kg), chromium (a.d. = 6.34 mg/kg; 2 times CRDL = 4.6 mg/kg), zinc (142%) and lead by GFAA (101.4%). Positive results for these metals should be considered estimated and flagged "J," non-detects "UJ."

- RB042594 was analyzed at a 1:5 dilution factor for thallium due to interferences. The dilution analysis also exhibited interferences, therefore the thallium non-detect result in this blank is flagged "UJ."

- Note that the method used for cyanide analysis did not conform to the QC requirements of the ASP Superfund level in terms of not having a daily calibration curve or running calibration verification standards at the correct frequency (one every ten samples or two hours, whichever is more frequent).

- Cyanide LCS recovery (72%) was below 80% lower QC limit. All cyanide results are considered estimated, with positive results flagged "J" and non-detects "UJ."

- Cyanide continuing calibration verification standard number 4 (CCV4) recovery (117%) exceeded the 115% upper QC limit. As such, positive cyanide results only would be considered estimated. Since all samples are non-detect for cyanide, no qualification of the sample data is necessary.

- The initial cobalt (124.3%), nickel (128.3%), silver (123.5%), zinc (121.8%), and cadmium (121.6%) and final lead by ICP (121.7%) standards exhibited recoveries that are slightly high. Although the ASP and the USEPA Functional Guidelines do not address CRDL standard recoveries, it is the professional judgement of the data reviewer that recovery greater than 120% (USEPA Region II upper QC limit) may indicate potential high bias in positive sample results at concentrations near the CRDL. Therefore positive sample concentrations of these metals should be considered estimated and flagged "J."

- The selenium analytical spike recoveries in CB-07 (51%), CB-13 (46%), DUPE-1 (63%), B-120 (2-4) (74%) and RB042594 (62%) were outside of 85%-115% QC limits. Selenium results in these samples are considered estimated, with positive results flagged "J" and non-detects "UJ."

- RB042594 contained 166 $\mu g/\ell$ copper and 59.9 $\mu g/\ell$ zinc. Concentrations of these metals in the associated field samples less than five times the concentration in the rinsate blank are rejected (concentration comparisons are made from the raw ICP data).

- The field duplicate pair CB-07/DUPE-01 exhibited copper (174%) and lead by ICP (141%) whose RPDs exceeded the USEPA Region II QC limit of 100% RPD for soil field duplicates. Results for these two metals in these two samples only are considered estimated and flagged "J."

- The mercury calibration linear correlation was less than 0.995 (0.9918), therefore all mercury results are considered estimated and flagged "J" for positive results, "UJ" for non-detects.

- ICP serial dilution percent difference results for aluminum (18.6%), calcium (12.6%), iron (13.0%), magnesium (11.5%), manganese (12.5%) and zinc (12.8%) exceeded the 10% QC limit with the initial sample concentration greater than 50 times the instrument detection limits (IDL) for these metals. All positive sample results for these metals are considered estimated and flagged "J."

Package Summary

Several protocol deficiencies associated with the analyses of the samples have been noted in this review. These deficiencies in protocol will not affect the technical useability of the sample data, as discussed in the relevant sections of the text.

The sample data are valid and useable with qualifications as noted in this review.

Signed: Douglas A. Wolf

Douglas A. Wolf, P.G.

Dated: 19 July 1994

DATA VALIDATION OF SEDIMENT AND SOIL SAMPLE ANALYSES
MARTIN MARIETTA CORPORATION FARRELL ROAD PLANT
REMEDIAL INVESTIGATION
ERM-NORTHEAST PROJECT NUMBER 557.044.02
ADIRONDACK ENVIRONMENTAL SERVICES, INC.
CASE NO. E31000, SDG NO. B-104(5-7)

ERM

Deliverables

The above referenced Data Summary Package and Sample Data Package contain all required deliverables as stipulated under the 1991 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocols (ASP) Superfund Category deliverables for Target Compound List (TCL) Volatile Organic Compound (VOC) analyses performed by NYSDEC ASP Method 91-1 and TCL Semi-Volatile Organic Compound (SVOC) analyses performed by NYSDEC ASP Method 91-2. Lead analyses were performed according to NYSDEC Method 239.2 CLP-M. The data have been validated according to the protocols and QC requirements of the ASP, the USEPA National Functional Guidelines for Organic Data Review (June 1991), the USEPA Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses (July 1988) and the reviewer's professional judgement.

The validation report pertains to the following samples:

<u>Samples</u>		<u>QC Samples</u>
B-104 (5-7)	B-129 (3-5)	B-129 (9-11) MS/MSD (VOC)
B-104 (7-9)	B-129 (9-11)	B-105 (7-9) MS/MSD (SVOC, Lead)
B-105 (5-7)	B-132 (3-5)	DUP-06 (B-129 (3-5) Field Duplicate)
B-105 (7-9)	B-132 (5-7)	DUP-07 (Out-7 (0-0.5) Field Duplicate)
Out-7 (0-0.5)		DUP-08 (B-104 (5-7) Field Duplicate)
		RB050594 (VOC)
		RB050694 (SVOC, Lead)
		MSB 5-13-94 (VOC)
		MSB 5-16-94 (SVOC)

ORGANICS

The following items/criteria were reviewed for this report:

- Quantitation/detection limits
- Holding times
- GC/MS tuning and performance
- Initial and continuing calibration data
- Procedural blank data
- Field blank data
- Field duplicate results
- Internal standard areas, retention times, summary and data
- Surrogate recoveries, summary and data
- MS/MSD/MSB recoveries, summary and data
- Chromatograms and mass spectra
- Data system printouts
- Qualitative and quantitative compound identification
- Case narrative and deliverables compliance

The items listed above were technically and contractually in compliance with USEPA CLP and NYSDEC ASP protocols with the exceptions discussed in the text below. The data have been validated according to the procedures outlined above and qualified accordingly. Summary forms, narrative and chain-of-custody forms are attached.

VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Based on the observed concentrations of methylene chloride in these blanks, the observed concentration of this compound in all field samples except B-129 (9-11) is negated (all less than ten times the concentration in the highest associated blank).

Blank ID	Compound (Concentration)	Associated Samples
VBLK01	Methylene Chloride (9J $\mu g/\ell$) Acetone (15 $\mu g/\ell$)	RB050594
VBLK02	Trichloroethene (3J μg/kg)	B-129 (3-5), B-129 (9-11)
VBLK03	Methylene Chloride (10J μg/kg)	B-132 (5-7), DUP-06, Out-07 (0-0.5), DUP-07, B-132 (3-5), B-129 (9-11) MS/MSD, MSB 5-13-94

- Field duplicate pair DUP-07/Out-7 (0-0.5) exhibited acceptable precision between results. Field duplicate pair DUP-06/B-129 (3-5) each contained methylene chloride (22B μg/kg and 11 μg/kg), respectively) however methylene chloride was also detected in the method blank associated with DUP-06 at 10 μg/kg and this sample result is therefore negated. Based on this result, it is the reviewer's professional judgement that the methylene chloride detected in B-129 (3-5) is also a laboratory artifact and is therefore negated.

- All calibrations contained the compound 1,1,2,2-tetrachloroethane with a response factor less than the 0.500 contractual limit, but greater than the 0.050 technical limit (USEPA Functional Guidelines). No qualification of the sample data is necessary.

SEMI-VOLATILES

- The following table lists blanks, blank contaminants and concentrations and associated samples. Aldol condensation products are negated in all samples in which they occur. Note that SBLK03 is associated with the MS/MSD and MSB and that the large number of TICs present in this blank did not interfere with the ability to recover matrix spiking compounds.

Blank ID	Compound (Concentration)	Associated Samples
SBLK01	Unknown @ 31.84 (2J μg/ℓ)	RB050694
SBLK02	Aldol Condensate @ 4.52 (10000J μg/kg) Unknown Siloxane/Column bleed @ 10.28 (70J)	B-104 (5-7), B-104 (7-9), B-105 (5-7), B-105 (7-9), DUPE-08, B-104 (7-9) Re, DUPE-08 Re

SBLK03	Naphthalene (32J $\mu g/kg$) Aldol Condensate @ 4.52 (8000JA) Unknown Alkane @ 5.30 (300J) Unknown Alkane @ 5.93 (300J) Unknown Alkane @ 6.08 (300J) Unknown Alkane @ 6.36 (300J) Unknown Alkane @ 6.47 (300J) Unknown Aromatic @ 6.53 (300J) Unknown Alkane @ 6.66 (300J) Unknown Alkane @ 6.89 (200J) Unknown Alkane @ 7.26 (1000J) Unknown Alkane @ 7.69 (600J) Unknown Aromatic @ 8.29 (200J) Unknown Alkane @ 8.38 (400J) Unknown Hydrocarbon @ 8.44 (200J) Unknown Alkane @ 8.52 (300J) Unknown Alkane @ 8.64 (200J) Unknown Alkane @ 9.25 (1000J) Unknown Alkane @ 11.16 (200J) Unknown @ 25.66 (200J)	B-105 (7-9) MS/MSD, MSB 5-16-94
RB050694	Unknown Siloxane/Column bleed @ 10.48 (8J $\mu g/\ell$) Unknown Substituted Aromatic @ 12.99 (8J) Unknown Alkane @ 28.27 (2J) Unknown Alkane @ 29.29 (4J) Unknown Alkane @ 30.28 (4J) Unknown Alkane @ 31.22 (5J) Unknown Alkane @ 32.14 (8J) Unknown Alkane @ 33.03 (6J)	All Samples

- B-105 (7-9) MS/MSD were extracted nine days past receipt by the laboratory. Holding time limit for extraction is seven days from receipt. The unspiked portion of this sample was extracted within holding times therefore no qualification of the sample data is necessary.

- The MS/MSD exhibited 1,4-dichlorobenzene (32%; QC limit = 27%) and acenaphthene (22%; QC limit = 19%) with RPD results above QC limits. Spike recoveries for these compounds in both the MS and MSD were acceptable and these compounds were not detected in the unspiked portion of this sample, therefore no qualification of the sample data is necessary.

- The following table lists samples that exhibited one or more surrogate compounds with recoveries outside of their respective QC limits. Note that no sample contained more than one acid fraction or more than one non-advisory base/neutral fraction surrogate outside of QC limits, therefore qualification of the sample data due to surrogate recovery is not required.

Sample	Surrogate	% Recovery	QC Limits
RB050694	Nitrobenzene-d5	27	35-114
B-104 (7-9)	1,2-Dichlorobenzene-d4	17	20-130 (advisory)
	2-Fluorobiphenyl	28	30-115
B-105 (5-7)	1,2-Dichlorobenzene-d4	15	20-130 (advisory)
	2-Fluorobiphenyl	22	30-115
B-105 (7-9)	1,2-Dichlorobenzene-d4	19	20-130 (advisory)

- The following table lists samples that exhibited internal standards with area counts outside of the +100%/-50% QC limits. Based on these results, as well as other QC criteria (surrogate recovery, compound concentrations, etc.), the initial analysis of sample DUP-08 and the re-analysis of sample B-104 (7-9) should be used, with all compounds quantitated against the affected internal standards considered estimated and flagged "J" for positive results and "UJ" for non-detects. (Note - A indicates area count within QC limits and N/A indicates QC limits not applicable for this internal standard for sample of interest.)

Sample ID	1,4-Dichlorobenzene-d4	Naphthalene-d8	Acenaphthene-d10	
B-104 (7-9) QC Limits	12410 13613-54450	40866 46327-185306	30862 30893-123570	
B-104 (7-9) Re QC Limits	13920 14251-57002	A N/A	27885 32767-131068	
	Acenaphthene-d10	Phenanthrene-d10	Chrysene-d12	Perylene-d12
DUPE-08 QC Limits	A N/A	58322 64032-256128	9792 22419-89676	4204 15581-62322
DUPE-08 Re QC Limits	14395 21885-87540	19750 47990-191960	4030 10128-40510	3971 4485-17938

- The following table lists compounds that exceeded 20.5% percent relative standard deviation (%RSD) for response factors (RF) in the initial calibration or 25% percent difference (%D) between the initial calibration average response factor and the continuing calibration response factor. Associated field samples are also listed. None of the listed compounds were detected in the associated samples, therefore all non-detect results for the compound of interest in the appropriate sample are flagged "UJ." Note that several compounds exceeded 40% percent difference, a contractual deficiency, and that ASP protocol dictates that these samples and associated calibrations should have been re-analyzed.

Calibration	Compound	Deficiency	Associated Samples
Initial - 6/6/94 (1905-2228)	1,2-Dichlorobenzene	%RSD = 23.7	All Samples
Continuing - 6/13/94 (1101)	Hexachloroethane Acenaphthylene 4-Chlorophenyl-phenyl ether Benzo(g,h,i)perylene	%D = 34.4 %D = 31.2 %D = 42.2 %D = 41.3	RB050694
Continuing - 6/16/94 (1348)	Hexachloroethane 4-Chlorophenyl-phenyl ether Pentachlorophenol	%D = 33.3 %D = 51.5 %D = 31.1	B-104 (5-7), B-104 (7-9), B-105 (5-7), B-105 (7-9)
Continuing - 6/17/94 (1105)	Hexachloroethane 4-Chlorophenyl-phenyl ether Fluorene	%D = 37.2 %D = 62.3 %D = 40.8	B-104 (7-9) Re, DUP-08, B-105 (7-9) MS/MSD, MSB 5/16/94
Continuing - 6/18/94 (1336)	Hexachloroethane 4-Chlorophenyl-phenyl ether Pyrene	%D = 37.2 %D = 60.4 %D = 35.4	DUP-08 Re

LEAD

The following items/criteria were reviewed and found to be acceptable:

- Case narrative
- Deliverable requirements
- Holding times
- Calibrations
- Lab blanks
- Field blanks
- CRDL standards analysis
- Matrix spike analysis
- Lab duplicate sample analysis
- Laboratory control sample results
- GFAA post-digestion spike results
- Detection limits

Package Summary

The sample data are valid and usable with qualifications as noted in this review.

Signed: Douglas A. Wolf

Douglas A. Wolf, P.G.

Dated: 6 July 1994

APPENDIX G

HYDRAULIC CONDUCTIVITY TEST RECORDS

Report
ate: June 1, 1994

Test Start
Date May 20, 1994

Measurement of Hydraulic Conductivity
of Saturated Porous Materials
Using a Flexible Wall Permeameter
ASTM D5084

Project No: L-94061 / Project Title: Laboratory Testing Project #557.044.01

ST No: -- / Lab ID#: 5092 / Test Sample Location: FRP-BPZ

Depth/Lift/Elev.: 41.0'-44.0' / Type of Sample: Undisturbed X Remolded --

Method of Compaction: -- / Percent Compaction: --

Dry Unit Weight (PCF):
Maximum: -- Initial: 147.3 / Moisture Content (% of Dry Weight):
Optimum: -- Initial: 5.7

Initial Height (cm): 13.09 / Initial Diameter (cm): 7.25 / Initial Gradient: 21.5

Initial Degree of Saturation (B Value)(%): 100 / Permeant Liquid Used: Deaired Deionized Water

Confining
Pressure (PSI): 71.0 / Test (head)
Pressure (PSI): 68.0 / Tail (back)
Pressure (PSI): 64.0

ial Degree Of
Saturation (B Value)(%): 102 / Final Dry
Unit Weight (PCF): 152.9 / Final
Gradient: 22.3

Final
Height (cm): 12.61 / Final
Diameter (cm): 7.25 / Final Moisture Content
(% of Dry Weight): 7.0

Final Four Determinations k (cm/sec)

7.44×10^{-8} 7.45×10^{-8} 8.96×10^{-8} 8.98×10^{-8}

Mean Value of Final Four Consecutive Determinations:

Coefficient of Permeability
k (cm/sec): 8.21×10^{-8}

Project
Specifications: --

Notes:

APPENDIX G

ANALYTICAL DATA SUMMARY TABLES

Site analytical data are compound to SCGs previously identified in this report. The term "Guidance" is used to refer to SCGs identified in Section 1.2.

TABLE G-1
SUMMARY OF TCL VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI

LOCATION / DEPTH / DATE / COMPOUND	GUIDANCE (ug/Kg)	CB-01 4/25/94	CB-03 4/27/94	CB-04 4/27/94	CB-05 4/26/94	CB-06 4/26/94	CB-07 4/26/94	DUPE-01 CB-07 4/26/94	CB-08 4/26/94	CB-09 4/26/94	CB-11 4/26/94	CB-13 4/26/94	CB-15 4/27/94	CB-16 4/26/94	CB-18 4/27/94	CB-19 4/27/94	OUT-01A 5/2/94	OUT-01B 5/2/94	OUT-01C 5/2/94	OUT-02A 4/29/94	OUT-02B 4/29/94	OUT-02C 4/29/94	OUT-02D 4/29/94
chloromethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
bromomethane	NG	<12 J	<10	<12	<11 J	<13 J	<12 J	<12 J	<13	<14 J	<14 J	<1400 J	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
vinyl chloride	70	<12 J	<10	<12	<11 J	<13 J	<12 J	<12 J	<13	<14 J	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
chloroethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
methylene chloride	NG	<12	**4 J**	**4 J**	<12	<13	<12	<12	<13	<14	<14	<1400	<12	**4 J**	**5 J**	**6 J**	<14	<13	<14	<29	<18	<22	<13
acetone	NG	<12	**15**	<12	<11	<13	<12	<12	**27**	<14	<14	**2000**	<12	**18**	<13	<17	<14	<13	<14	<14	<13	<13	<13
carbon disulfide	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,1-dichloroethene	20	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,1-dichloroethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	**1400 J**	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,2-dichloroethene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
chloroform	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,2-dichloroethane	700	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
2-butanone	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,1,1-trichloroethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	**15000**	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
carbon tetrachloride	600	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
bromodichloromethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,2-dichloropropane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
cis-1,3-dichloropropene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
trichloroethene	2000	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	**3 J**	<13	<13
dibromochloromethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,1,2-trichloroethane	600	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
benzene	600	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
trans-1,3-dichloropropene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
bromoform	NG	<12	<10	<12	<11 J	<13 J	<12	<12 J	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
4-methyl-2-pentanone	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
2-hexanone	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
tetrachloroethene	800	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
1,1,2,2-tetrachloroethane	300	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14 J	<13 J	<13 J	<13 J
toluene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
chlorobenzene	3500	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
ethylbenzene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
styrene	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
xylenes (total)	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
trichlorofluoromethane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14 J	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
methyl-t-butyl ether	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13
hexane	NG	<12	<10	<12	<11	<13	<12	<12	<13	<14	<14	<1400	<12	<11	<13	<17	<14	<13	<14	<14	<13	<13	<13

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-1 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI

LOCATION		OUT-03A	OUT-03B	OUT-03C	OUT-04	OUT-05	OUT-06	OUT-07	DUPE-07 OUT-07	OUT-08	OUT-09	SS-1	SS-1	SS-2	SS-2	SS-3	SS-3	SS-4	SS-4	SS-5	SS-5	SS-6	SS-6
DEPTH												0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2	0-1	1-2
DATE	GUIDANCE	4/29/94	4/29/94	4/29/94	5/2/94	4/29/94	4/29/94	5/5/94	5/5/94	4/29/94	4/29/94	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93	10/27/93
COMPOUND	(ug/Kg)																						
chloromethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
bromomethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
vinyl chloride	70	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
chloroethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
methylene chloride	NG	**9 J**	**16 J**	**8 J**	<12	<13	<14	<29	<12	**23**	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
acetone	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	**10J**	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
carbon disulfide	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,1-dichloroethene	20	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,1-dichloroethane	NG	<13	<16	<13	<12	<13	<14 J	<14	<12	<16	<15	**4J**	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,2-dichloroethene	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
chloroform	NG	<13	<16	<13	**5 J**	<13	<14	**2 J**	1 J	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,2-dichloroethane	700	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
2-butanone	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	**10J**	<15	**7J**	<13	<12	<37 J	<50 J
1,1,1-trichloroethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
carbon tetrachloride	600	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
bromodichloromethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,2-dichloropropane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
cis-1,3-dichloropropene	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
trichloroethene	2000	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	**7J**	**3J**	<14	<15	<18	<13	<12	**27J**	<50 J
dibromochloromethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,1,2-trichloroethane	600	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
benzene	600	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
trans-1,3-dichloropropene	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
bromoform	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
4-methyl-2-pentanone	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
2-hexanone	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
tetrachloroethene	800	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
1,1,2,2-tetrachloroethane	300	<13	<16	<13	<12	<13	<14 J	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
toluene	NG	<13	<16	<13	<12	<13	<14	<14	<12	**5 J**	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
chlorobenzene	3500	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
ethylbenzene	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
styrene	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
xylenes (total)	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
trichlorofluoromethane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
methyl-t-butyl ether	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J
hexane	NG	<13	<16	<13	<12	<13	<14	<14	<12	<16	<15	<17	<15	<15 J	<13	<13	<14	<15	<18	<13	<12	<37 J	<50 J

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-1 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI

LOCATION DEPTH DATE COMPOUND	GUIDANCE (ug/Kg)	DUP-1 SS-6 1-2 10/27/93	SS-7 0-1 10/27/93	SS-7 1-2 10/27/93	SS-8 0-1 10/27/93	SS-8 1-2 10/27/93	SS-9 0-1 10/27/93	SS-9 1-2 10/27/93	SS-10 0-1 10/27/93	SS-10 1-2 10/27/93	SS-11 0-1 10/27/93	SS-11 1-2 10/27/93	SS-12 0-1 10/27/93	SS-12 1-2 10/27/93
chloromethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
bromomethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
vinyl chloride	70	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
chloroethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
methylene chloride	NG	<54 J	<51 J	<57 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
acetone	NG	<36 J	<51 J	<45 J	**490 J**	**530 J**	**150 J**	**84 J**	**24 J**	<51 J	<18	<13	**62 J**	**150 J**
carbon disulfide	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
1,1-dichloroethene	20	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
1,1-dichloroethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	**10 J**	<27 J	<51 J	<18	<13	<41 J	<25 J
1,2-dichloroethene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
chloroform	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
1,2-dichloroethane	700	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
2-butanone	NG	<36 J	<51 J	<45 J	**150 J**	**230 J**	<80 J	**33 J**	<27 J	<51 J	<18	<13	**42 J**	**34 J**
1,1,1-trichloroethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
carbon tetrachloride	600	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
bromodichloromethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
1,2-dichloropropane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
cis-1,3-dichloropropene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
trichloroethene	2000	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	**30 J**	<25 J
dibromochloromethane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
1,1,2-trichloroethane	600	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
benzene	600	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	**66 J**	<18	<13	<41 J	<25 J
trans-1,3-dichloropropene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
bromoform	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18	<13	<41 J	<25 J
4-methyl-2-pentanone	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
2-hexanone	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
tetrachloroethene	800	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
1,1,2,2-tetrachloroethane	300	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
toluene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
chlorobenzene	3500	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
ethylbenzene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
styrene	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
xylenes (total)	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
trichlorofluoromethane	NG	**15 JN**	<51 J	**18NJ**	<65 J	<43 J	<80 J	<37 J	<27 J	<51 J	<18 J	<13	<41 J	<25 J
methyl-t-butyl ether	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	**170 JN**	**360 JN**	<18 J	<13	<41 J	<25 J
hexane	NG	<36 J	<51 J	<45 J	<65 J	<43 J	<80 J	<37 J	<27 J	**26 JN**	<18 J	<13	<41 J	**12 JN**

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION / DATE / COMPOUND	GUIDANCE (ug/Kg)	CB-01 4/25/94	CB-03 4/27/94	CB-04 4/27/94	CB-05 4/26/94	CB-06 4/26/94	CB-07 4/26/94	DUPE-01 CB-07 4/26/94	CB-08 4/26/94	CB-09 4/26/94	CB-11 4/26/94	CB-13 4/26/94
phenol	500	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
bis (-2-chloroethyl) ether	30	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2-chlorophenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
1,3-dichlorobenzene	12,000	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
1,4-dichlorobenzene	12,000	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
1,2-dichlorobenzene	12,000	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2-methylphenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,2-oxybis (1-chloropropane)	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
4-methylphenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
N-nitroso-di-n-propylamine	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
hexachloroethane	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
nitrobenzene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
isophrone	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2-nitrophenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,4-dimethylphenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
bis (-2-chloroethoxy) methane	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,4-dichlorophenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
1,2,4-trichlorobenzene	91,000	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
naphthalene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
4-chloroaniline	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
hexachlorobutadiene	300	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
4-chloro-3-methylphenol	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2-methylnaphthalene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
hexachlorocyclopentadiene	4,400	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,4,6-trichlorophenol	NG	<390	<390	<410	<380	<400	<410 J	<420	<400 J	<440	<460 J	<380 J
2,4,5-trichlorophenol	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
2-chloronaphthalene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2-nitroaniline	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
dimethyl phthalate	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
acenaphthylene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,6-dinitrotoluene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
3-nitroaniline	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
acenaphthene	140,000	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,4-dinitrophenol	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
4-nitrophenol	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
dibenzofuran	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
2,4-dinitrotoluene	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
diethylphthalate	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
4-chlorophenyl-phenylether	NG	<390	<390 J	<410 J	<380 J	<400 J	<410	<420	<400	<440	<460	<380
fluorene	NG	<390	<390	**98 J**	<380	<400	<410	<420	<400	<440	<460	<380
4-nitroaniline	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
4,6-dinitro-2-methylphenol	NG	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
n-nitrosodiphenylamine	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
4-bromophenyl-phenylether	NG	<390	<390 J	<410 J	<380 J	<400 J	<410	<420	<400	<440	<460	<380
hexachlorobenzene	150	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
pentachlorophenol	40,000	<980	<970	<1000	<960	<1000	<1000	<1000	<1000	<1100	<1100	<950
phenanthrene	120,000	<390	<390	**660**	<380	<400	**100 J**	<420	**33 J**	**450**	<460	<380
anthracene	NG	<390	<390	**210 J**	<380	<400	<410	<420	<400	<440	<460	<380
carbazole	NG	<390	<390	<410	<380	<400	<410	<420	<400	<440	<460	<380
di-n-butylphthalate	NG	**88 J**	**330 J**	**150 J**	<380	<400	<410	**160 J**	**680**	<440	<460	<380
fluoranthene	1,020,000	<390	**200 J**	**600**	**80 J**	**79 J**	**96 J**	**39 J**	**110 J**	**660**	<460	**45 J**
pyrene	NG	<390 J	**160 J**	**510**	**54 J**	**66 J**	**110 J**	**40 J**	**160 J**	**680**	<460	**64 J**
butylbenzylphthalate	NG	<390 J	**230 J**	**240 J**	**300 J**	<400	**410**	**550**	**4400 D**	<440	<460	**43 J**
3,3-dichlorobenzidine	NG	<390 J	<390	<410	<380	<400	<410	<420	<400 J	<440	<460	<380
benzo (a) anthracene	NG	<390 J	<390	**290 J**	<380	<400	<410	<420	<400 J	**500**	<460	<380
chrysene	NG	<390 J	<390	**220 J**	<380	<400	<410	<420	<400 J	**480**	<460	<380
bis (2-ethylhexyl) phthalate	199,500	**650 B**	**2200**	**1300**	**620 B**	<400	**820 B**	<420	**9500 JED**	<440	<460	<380
di-n-octyl phthalate	NG	<390	**180 J**	<410	<380	<400	<410	<420	<400 J	<440	<460	<380
benzo (b) fluoranthene	NG	**40 J**	**230 J**	**740**	**970**	**110 J**	<410	<420	**140 J**	**410 J**	**25 J**	**34 J**
benzo (k) fluoranthene	NG	**49 J**	<390	**300 J**	<380	**89 J**	<410	<420	<400 J	**330 J**	<460	**50 J**
benzo (a) pyrene	1,300	<390	<390	**210 J**	<380	<400	<410	<420	**100 J**	**430 J**	<460	<380
indeno (1,2,3-cd) pyrene	NG	<390	<390	<410	<380	<400	<410	<420	<400 J	**230 J**	<460	<380
dibenzo (a,h) anthracene	NG	<390	<390 J	<410	**1400 J**	<400 J	<410	<420	<400 J	**140 J**	<460	<380
benzo (g,h,i) perylene	NG	<390	<390	<410	**970**	<400	<410	<420	<400 J	**300 J**	<460	<380
Tenatively Identified Compounds		8	9	9	13	10	14	5	11	5	9	13

NOTES:

- concentrations reported as micrograms per kilogram (ug/Kg).

B - Compound also detected in reagent blank.

J - Value is estimated since it falls below the detection limit.

E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.

D - Reported concentration value reflects dilution.

GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/Kg)	CB-15 4/27/94	CB-16 4/26/94	CB-18 4/27/94	OUT-01A 5/2/94	OUT-01B 5/2/94	OUT-01C 5/2/94	OUT-02A 4/29/94	OUT-02B 4/29/94	OUT-02C 4/29/94	OUT-02D 4/29/94	OUT-03A 4/29/94
phenol	500	<400	<390	<430	<430	<430	<460	<460 J	<410 J	<440 J	**420 J**	<410 J
bis (-2-chloroethyl) ether	30	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410 J
2-chlorophenol	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410 J
1,3-dichlorobenzene	12,000	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
1,4-dichlorobenzene	12,000	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
1,2-dichlorobenzene	12,000	<400	<390	<430	<430 J	<430 J	<460 J	<460 J	<410 J	<440 J	<430 J	<410 J
2-methylphenol	NG	<400	<390	<430	<430 J	<430 J	<460	<460	<410	<440	<430	<410
2,2-oxybis (1-chloropropane)	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
4-methylphenol	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
N-nitroso-di-n-propylamine	NG	<400	<390	<430	<430	<430	<460	<460 J	<410 J	<440 J	<430 J	<410
hexachloroethane	NG	<400	<390	<430	<430 J	<430 J	<460 J	<460	<410	<440	<430	<410
nitrobenzene	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
isophrone	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
2-nitrophenol	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
2,4-dimethylphenol	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
bis (-2-chloroethoxy) methane	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
2,4-dichlorophenol	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
1,2,4-trichlorobenzene	91,000	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
naphthalene	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
4-chloroaniline	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
hexachlorobutadiene	300	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410
4-chloro-3-methylphenol	NG	<400	<390	<430	<430	<430	<460 JR	<460	<410	<440	<430	<410
2-methylnaphthalene	NG	<400	<390	<430	<430	<430	<460 J	<460	<410	<440	<430	<410 J
hexachlorocyclopentadiene	4,400	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
2,4,6-trichlorophenol	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
2,4,5-trichlorophenol	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
2-chloronaphthalene	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
2-nitroaniline	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
dimethyl phthalate	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
acenaphthylene	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
2,6-dinitrotoluene	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
3-nitroaniline	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
acenaphthene	140,000	<400	<390	**160 J**	<430	<430	<460	<460	<410	<440	<430	<410
2,4-dinitrophenol	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
4-nitrophenol	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
dibenzofuran	NG	<400	<390	**60 J**	<430	<430	<460	<460	<410	<440	<430	<410
2,4-dinitrotoluene	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
diethylphthalate	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
4-chlorophenyl-phenylether	NG	<400 J	<390 J	<430	<430 J	<430 J	<460 J	<460 J	<410 J	<440 J	<430 J	<410 J
fluorene	NG	<400	<390	**130 J**	<430	<430	<460	<460	<410	<440	<430	<410
4-nitroaniline	NG	<1000	<970	<1100	<1100	<1100	<1200	<1100	<1000	<1100	<1100	<1000
4,6-dinitro-2-methylphenol	NG	<1000	<970	<1100	<1100 J	<1100 J	<1200	<1100	<1000	<1100	<1100	<1000
n-nitrosodiphenylamine	NG	<400	<390	<430	<430 J	<430 J	<460	<460	<410	<440	<430	<410
4-bromophenyl-phenylether	NG	<400 J	<390 J	<430	<430 J	<430 J	<460	<460	<410	<440	<430	<410
hexachlorobenzene	150	<400	<390	<430	<430 J	<430 J	<460	<460	<410	<440	<430	<410
pentachlorophenol	40,000	<1000	<970	<1100	<1100 J	<1100 J	<1200	<1100	<1000	<1100	<1100	<1000
phenanthrene	120,000	**390 J**	<390	**370 J**	**30 J**	<430 J	**52 J**	<460	**23 J**	<440	<430	**160 J**
anthracene	NG	<400	<390	**250 J**	<430 J	<430 J	<460	<460	<410	<440	<430	**35 J**
carbazole	NG	<400	<390	<430	<430 J	<430 J	<460	<460	<410	<440	<430	<410
di-n-butylphthalate	NG	**200 J**	**210 J**	**88 J**	<430 J	<430 J	<460	<460	**95 J**	<440	<430	<410
fluoranthene	1,020,000	**380 J**	**210 J**	**600**	<430 J	<430 J	**63 J**	**26 J**	**37 J**	<440	<430	**200 J**
pyrene	NG	**510 J**	**300 J**	**580**	<430 J	<430 J	**110 J**	<460	**28 J**	<440	<430	**150 J**
butylbenzylphthalate	NG	**110 J**	**140 J**	**74 J**	<430 J	<430 J	<460 J	<460	<410	<440	<430	<410
3,3-dichlorobenzidine	NG	<400	<390	<430	<430 J	<430 J	<460 J	<460	<410	<440	<430	<410
benzo (a) anthracene	NG	**280 J**	**390 J**	**350 J**	<430 J	<430 J	<460 J	<460	<410	<440	<430	**70 J**
chrysene	NG	**210 J**	**300 J**	**270 J**	<430 J	<430 J	<460 J	<460	<410	<440	<430	**100 J**
bis (2-ethylhexyl) phthalate	199,500	**1000**	**500**	<430	<430 J	**120 J**	**83 J**	**49 J**	**39 J**	**96 J**	**98 J**	**81 J**
di-n-octyl phthalate	NG	**85 J**	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
benzo (b) fluoranthene	NG	**540**	**650**	**1000**	<430	<430	<460	<460	<410	<440	<430	**220 J**
benzo (k) fluoranthene	NG	<400	**430**	<430	<430	<430	**110 J**	<460	<410	<440	<430	**230 J**
benzo (a) pyrene	1,300	<400	**400**	**340 J**	<430	<430	<460	<460	<410	<440	<430	<410
indeno (1,2,3-cd) pyrene	NG	<400	<390	<430	<430	<430	<460	<460	<410	<440	<430	<410
dibenzo (a,h) anthracene	NG	<400 J	<390 J	<430	<430	<430	<460	<460	<410	<440	<430	<410
benzo (g,h,i) perylene	NG	<400	**490**	<430	<430	<430	<460	<460	<410	<440	<430	<410
Tenatively Identified Compounds		12	10	3	1	0	5	10	2	7	14	2

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
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E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
D - Reported concentration value reflects dilution.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/Kg)	OUT-03B 4/29/94	OUT-03C 4/29/94	OUT-04 5/2/94	OUT-05 4/29/94	OUT-06 4/29/94	OUT-07 4/29/94	DUPE-04 OUT-07 4/29/94	OUT-08 4/29/94	OUT-09 4/29/94
phenol	500	<510 J	<420 J	<400	<410 J	<460 J	<410 J	<410 J	<410 J	<510 J
bis (-2-chloroethyl) ether	30	<510 J	<420 J	<400	<410 J	<460 J	<410 J	<410 J	<410 J	<510 J
2-chlorophenol	NG	<510 J	<420 J	<400	<410	<460 J	<410	<410	<410	<510
1,3-dichlorobenzene	12,000	<510	<420	<400	<410	<460	<410	<410	<410	<510
1,4-dichlorobenzene	12,000	<510	<420	<400	<410	<460	<410	<410	<410	<510
1,2-dichlorobenzene	12,000	<510 J	<420 J	<400 J	<410 J	<460 J	<410 J	<410 J	<410 J	<510 J
2-methylphenol	NG	<510	<420	<400	<410	<460	<410	<410	<410 J	<510
2,2-oxybis (1-chloropropane)	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
4-methylphenol	NG	<510	<420	<400	<410 J	<460	<410 J	<410 J	<410	<510 J
N-nitroso-di-n-propylamine	NG	<510	<420	<400	<410 J	<460	<410 J	<410 J	<410 J	<510 J
hexachloroethane	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510
nitrobenzene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
isophrone	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2-nitrophenol	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4-dimethylphenol	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
bis (-2-chloroethoxy) methane	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4-dichlorophenol	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
1,2,4-trichlorobenzene	91,000	<510	<420	<400	<410	<460	<410	<410	<410	<510
naphthalene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
4-chloroaniline	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
hexachlorobutadiene	300	<510	<420	<400	<410	<460	<410	<410	<410	<510
4-chloro-3-methylphenol	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2-methylnaphthalene	NG	<510 J	<420 J	<400	<410	<460 J	<410	**76 J**	<410	<510
hexachlorocyclopentadiene	4,400	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4,6-trichlorophenol	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4,5-trichlorophenol	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
2-chloronaphthalene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2-nitroaniline	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
dimethyl phthalate	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
acenaphthylene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,6-dinitrotoluene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
3-nitroaniline	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
acenaphthene	140,000	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4-dinitrophenol	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
4-nitrophenol	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
dibenzofuran	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
2,4-dinitrotoluene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
diethylphthalate	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
4-chlorophenyl-phenylether	NG	<510 J	<420 J	<400 J	<410 J	<460 J	<410 J	<410 J	<410 J	<510 J
fluorene	NG	<510	<420	<400	<410	<460	<410	<410	<410	<510
4-nitroaniline	NG	<1300	<1100	<1000	<1000	<1100	<1000	<1000	<1000	<1300
4,6-dinitro-2-methylphenol	NG	<1300	<1100	<1000 J	<1000	<1100	<1000	<1000	<1000	<1300
n-nitrosodiphenylamine	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510
4-bromophenyl-phenylether	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510
hexachlorobenzene	150	<510	<420	<400 J	<410	<460	<410	<410	<410	<510
pentachlorophenol	40,000	<1300	<1100	<1000 J	<1000	<1100	<1000	<1000	<1000	<1300
phenanthrene	120,000	<510	<420	<400 J	**99 J**	**77 J**	**37 J**	**37 J**	**34 J**	**270 J**
anthracene	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	**37 J**
carbazole	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	**99 J**
di-n-butylphthalate	NG	<510	**90 J**	<400 J	**62 J**	<460	<410	<410	<410	<510
fluoranthene	1,020,000	**29 J**	**55 J**	**24 J**	**110 J**	**100 J**	<410	<410	**58 J**	**250 J**
pyrene	NG	**32 J**	**46 J**	**35 J**	**93 J**	**100 J**	**24 J**	<410	**60 J**	**320 J**
butylbenzylphthalate	NG	<510	<420	<400 J	<410	<460 J	<410	<410	<410	<510 J
3,3-dichlorobenzidine	NG	<510	<420	<400 J	<410	<460 J	<410	<410	<410	<510 J
benzo (a) anthracene	NG	<510	<420	<400 J	**63 J**	<460 J	<410	<410	<410	**140 J**
chrysene	NG	<510	<420	<400 J	**59 J**	<460 J	<410	<410	<410	**160 J**
bis (2-ethylhexyl) phthalate	199,500	**37 J**	**150 J**	**110 J**	**200 J**	**170 J**	**36 J**	**27 J**	**43 J**	**170 J**
di-n-octyl phthalate	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510 J
benzo (b) fluoranthene	NG	<510	<420	<400 J	<410	**78 J**	<410	<410	**55 J**	**440 J**
benzo (k) fluoranthene	NG	<510	<420	<400 J	<410	**45 J**	<410	<410	**26 J**	<510 J
benzo (a) pyrene	1,300	<510	<420	<400 J	<410	<460	<410	<410	<410	<510 J
indeno (1,2,3-cd) pyrene	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510 J
dibenzo (a,h) anthracene	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510 J
benzo (g,h,i) perylene	NG	<510	<420	<400 J	<410	<460	<410	<410	<410	<510 J
Tenatively Identified Compounds		4	6	9	7	8	17	19	9	16

NOTES:
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NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

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TABLE G-3
SUMMARY OF TCL PESTICIDE and PCB DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/Kg)	CB-01 4/25/94	CB-03 4/27/94	CB-04 4/27/94	CB-05 4/26/94	CB-06 4/26/94	CB-07 4/26/94	DUPE-01 CB-07 4/26/94	CB-08 4/26/94	CB-09 4/26/94	CB-11 4/26/94	CB-13 4/26/94	CB-15 4/27/94	CB-16 4/26/94	CB-18 4/27/94	OUT-01A 5/2/94	OUT-01B 5/2/94	OUT-01C 5/2/94	OUT-02A 4/29/94	OUT-02B 4/29/94	OUT-02C 4/29/94	OUT-02D 4/29/94	OUT-03A 4/29/94
alpha-BHC	NG	<9.8	<6.6 J	<7.0 J	<9.6 J	<10 J	<10 J	<10 J	<6.8 J	<11	<11	<9.5	<6.8 J	<6.6 J	<7.4 J	<7.7 J	**0.51 J**	**0.22 J**	**0.19 JP**	<6.9 J	<1.5 J	<1.5 J	<7.0
beta-BHC	NG	<9.8	<6.6 J	<7.0 J	<9.6	<10	<10	<10	<6.8 J	<11	<11	<9.5	<6.8 J	<6.6 J	<7.4 J	<7.7	<7.3	<7.9	**0.39 JP**	<6.9	**0.16 JP**	<1.5	<7.0
delta-BHC	NG	<9.8	<6.6	<7.0	<9.6	<10	<10	<10	<6.8	<11	<11	<9.5	<6.8	<6.6	<7.4	**0.33 JP**	**0.64 JP**	<7.9 J	**0.26 JP**	<6.9	**0.08 JP**	<1.5	**0.28 JP**
gamma-BHC (lindane)	NG	<9.8	<6.6	<7.0	<9.6 J	<10 J	<10 J	<10 J	<6.8	<11	<11	<9.5	<6.8	<6.6	<7.4	<7.7 J	<7.3 J	<7.9 J	<3.1	<6.9	<1.5 J	<1.5	<7.0 J
heptachlor	0.8	<9.8	<6.6 J	<7.0 J	<9.6 J	<10 J	<10 J	<10 J	<6.8 J	<11	<11	<9.5	<6.8 J	<6.6 J	<7.4 J	<7.7 J	<7.3 J	<7.9 J	<3.1 J	<6.9 J	<1.5 J	<1.5 J	**2.3 JP**
aldrin	100	<9.8	<6.6	**1.0 JP**	**0.33 JP**	<10	<10	<10	<6.8	<11	<11	<9.5	<6.8	<6.6	**1.5 JP**	**0.27 JP**	**0.63 JP**	**0.45 JP**	**1.6 J**	<6.9	<1.5 J	<1.5	**1.8 JP**
heptachlor epoxide	0.8	<9.8	<6.6	<7.0	<9.6	<10	<10	<10	<6.8	<11	<11	<9.5	<6.8	<6.6	<7.4	<7.7 J	<7.3 J	<7.9 J	<3.1	<6.9	<1.5 J	<1.5	**0.54 JP**
endosulfan I	30	<9.8	<6.6 J	<7.0 J	**0.46 JP**	<10 J	<10 J	<10 J	<6.8 J	<11	<11	<9.5	<6.8 J	<6.6 J	<7.4 J	**0.42 JP**	<7.3 J	**0.50 JP**	<3.1	<6.9	<1.5 J	<1.5	<7.0 J
dieldrin	100	<20	<13 J	<14 J	**0.71 J**	<20 J	<20 J	<21 J	<13 J	**27**	**33**	<19	<13 J	<13 J	**1.6 J**	<15	<14	<15	**37**	**4.8 J**	**0.11 J**	**0.08 J**	**22 JP**
4,4' - DDE	NG	**2.6 J**	<13	<14	**1.0 JP**	<20	<20	<21	**2.4 J**	**9.4 J**	**78**	**2.3 JP**	**2.0 JP**	<13	**2.2 JP**	**7.3 J**	**52**	**11 J**	**20**	**75**	**3.8 J**	**2.5 J**	**4.2 JP**
endrin	800	**0.29 JP**	<13 J	<14 J	<19 J	<20 J	<20 J	<21 J	<13 J	<22	<23	<19	<13 J	<13 J	<14 J	<15	<14	**0.59 JP**	<6.0 J	<13 J	<2.9 J	<2.8 J	**1.4 JP**
endosulfan II	30	**0.69 JP**	<13	**2.0 JP**	**0.86 J**	<20	<20	<21	<13	<22	<23	**2.2 JP**	**1.4 JP**	<13	**2.5 JP**	**1.1 JP**	<14	<15	<6.0	<13	**0.10 JP**	<2.8	**2.0 JP**
4,4' - DDD	NG	<20	<13 J	<14 J	<19 J	<20 J	<20 J	<21 J	<13 J	**1.9 JP**	**4.3 J**	<19	<13 J	<13 J	<14 J	**3.9 JP**	**31**	**6.8 JP**	**2.7 JP**	**7.9 JP**	**0.88 JP**	**0.55 JP**	**2.1 JP**
endosulfan sulfate	NG	<20	<13	<14	**0.62 JP**	<20	<20	<21	<13	<22	**1.5 JP**	<19	<13	<13	<14	**1.8 JP**	**1.5 J**	**1.9 JP**	<6.0 J	**0.88 JP**	**0.12 JP**	**0.30 JP**	**0.81 JP**
4,4' - DDT	NG	**3.3 JP**	<13 J	<14 J	**1.8 J**	<20 J	<20 J	<21 J	<13 J	**10 J**	**27 JP**	**5.9 J**	**7.3 J**	<13 J	<14 J	**5.0 JP**	**17 J**	**5.9 JP**	**20 J**	**97 J**	**6.0 J**	**4.2 J**	**9.6 JP**
methoxychlor	600	<98 J	<66 J	<70 J	<96	<100 J	<100 J	<100 J	<68 J	<110	<110 J	<95	<68 J	<66 J	<74 J	<77 J	<73 J	<79	<31 J	<69 J	**0.30 JP**	<15 J	<70 J
endrin ketone	NG	<20	<13	<14	<19	<20	<20	<21	<13	<22	<23	<19	<13	<13	<14	<15	<14	<15	<6.0	<13	<2.9 J	<2.8	<14
endrin aldehyde	NG	<20	<13 J	<14 J	<19 J	<20	<20	<21	<13 J	<22	**2.2 JP**	<19	**3.9 JP**	<13 J	<14 J	<15 J	<14 J	<15 J	<6.0	<13	<2.9 J	<2.8	<14 J
alpha - chlordane	1.0	**2.5 JP**	**1.5 JP**	<7.0	<9.6	<10	<10	<10	<6.8	**23**	**20**	<9.5	<6.8	<6.6	<7.4	<7.7 J	<7.3 J	<7.9 J	**4.9**	**3.2 J**	<13.5 J	<1.5	**23 J**
gamma - chlordane	1.0	<9.8	<6.6	<7.0	<9.6	<10	<10	<10	<6.8	**20**	**13**	<9.5	<6.8	<6.6	<7.4	<7.7	<7.3	<7.9	**4.5**	**3.1 J**	<1.5 J	<1.5	**22**
toxaphene	10	<980 J	<660	<700 J	<960	<1000	<1000	<1000	<680 J	<1100 J	<1100	<950	<680 J	<660 J	<740	<770	<730	<790	<310	<690	<150 J	<150	<700
aroclor - 1016	0.8	<200 J	<130	<140 J	<190	<200	<200	<210	<130 J	<220 J	<230	<190	<130 J	<130 J	<140	<150	<140	<150	<60	<130	<29	<28	<140
aroclor - 1221	0.8	<390 J	<260	<280 J	<380	<400	<410	<410	<270 J	<440 J	<460	<380	<270 J	<260 J	<290	<300	<290	<310	<120	<270	<60	<57	<280
aroclor - 1232	0.8	<200 J	<130	<140 J	<190	<200	<200	<210	<130 J	<220 J	<230	<190	<130 J	<130 J	<140	<150	<140	<150	<60	<130	<29	<28	<140
aroclor - 1242	0.8	<200 J	<130	<140 J	<190	<200	<200	<210	<130 J	<220 J	<230	<190	<130 J	<130 J	<140	<150	<140	<150	<60	<130	<29	<28	<140
aroclor - 1248	0.8	<200 J	<130	<140 J	<190	<200	<200	<210	<130 J	<220 J	<230	<190	<130 J	<130 J	<140	<150	<140	<150	<60	<130	<29	<28	<140
aroclor - 1254	0.8	**110 JP**	**66 JP**	<140 J	<190	<200	<200	<210	**150 J**	<220 J	<230	<190	**180 J**	<130 J	110 JP	**67 JP**	<140	<150	**24 JP**	<130	<29	<28	**350 JP**
aroclor - 1260	0.8	<200 J	<130	<140 J	<190	<200	<200	<210	<130 J	<220 J	<230	<190	<130 J	<130 J	<140	<150	<140	<150	<60	<130	<29	<28	<140

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.
P - The percent difference between concentration values calculated on both columns was greater than 25% D.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-3 (cont.)
SUMMARY OF TCL PESTICIDE and PCB DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/Kg)	OUT-03B 4/29/94	OUT-03C 4/29/94	OUT-04 5/2/94	OUT-05 4/29/94	OUT-06 4/29/94	OUT-07 4/29/94	DUPE-04 OUT-07 4/29/94	OUT-08 4/29/94	OUT-09 4/29/94
alpha-BHC	NG	<17	<7.2 J	<6.8 J	<7.0	<7.8 J	<6.9 J	<6.9 J	<8.3	<8.7
beta-BHC	NG	<17	<7.2	<6.8	**1.5 JP**	<7.8	<6.9	<6.9	<8.3	<8.7
delta-BHC	NG	**1.6 JP**	<7.2 J	<6.8	**0.18 JP**	<7.8	**0.43 JP**	<6.9	<8.3 J	<8.7 J
gamma-BHC (lindane)	NG	<17 J	<7.2 J	<6.8 J	<7.0 J	<7.8	<6.9	<6.9	<8.3 J	<8.7 J
heptachlor	0.8	<17 J	**0.58 JP**	<6.8 J	<7.0 J	<7.8 J	<6.9 J	<6.9 J	<8.3 J	<8.7 J
aldrin	100	<17 J	**0.81 JP**	**0.72 JP**	**0.88 JP**	<7.8	**0.45 JP**	**0.71 JP**	<8.3 J	**0.44 JP**
heptachlor epoxide	0.8	<17 J	<7.2 J	<6.8 J	<7.0 J	<7.8	<6.9	<6.9	<8.3 J	<8.7 J
endosulfan I	30	<17 J	**1.7 JP**	<6.8 J	<7.0 J	**0.78 JP**	**0.65 JP**	**0.80 J**	<8.3 J	<8.7 J
dieldrin	100	<17	**12 J**	<13	<14	**0.58 JP**	<13	<13	**3.4 JP**	**18**
4,4' - DDE	NG	**5.2 JP**	**3.0 J**	**3.3 JP**	**2.0 JP**	**1.6 JP**	<13	<13	**1.4 JP**	**34**
endrin	800	<17	<14	<13	<14	<15 J	<13 J	<13 J	**0.53 JP**	<17
endosulfan II	30	<34	**2.6 JP**	**1.6 JP**	**1.8 JP**	<15	**1.5 JP**	**1.1 JP**	**1.2 JP**	<17
4,4' - DDD	NG	**5.5 JP**	<14	<13	<14	**1.4 JP**	<13	<13	**0.49 JP**	**3.3 JP**
endosulfan sulfate	NG	<34 J	**1.7 JP**	**1.2 JP**	**1.0 JP**	**0.89 JP**	**0.87 JP**	<13 J	**1.5 JP**	**1.1 JP**
4,4' - DDT	NG	**27 JP**	**4.5 JP**	**2.1 JP**	**3.6 J**	<15 J	<13 J	<13 J	**2.1 JP**	**14 J**
methoxychlor	600	<170 J	<72 J	<68 J	<70 J	<78 J	<69 J	<69 J	**2.5 JP**	<87 J
endrin ketone	NG	<34	**1.8 JP**	<13	<14	<15	<13	<13	<16	<17
endrin aldehyde	NG	**7.8 JP**	<7.2	<13 J	<14 J	<15	<13	<13	<16 J	<17 J
alpha - chlordane	1.0	**61 J**	<7.2 J	**1.3 JP**	**1.2 JP**	<7.8	<6.9	<6.9	<8.3 J	**8.7 J**
gamma - chlordane	1.0	**54**	**7.4**	<6.8	<7.0	**0.34 JP**	<6.9	<6.9	**1.2 JP**	**8.2 J**
toxaphene	10	<1700	<720	<680	<700	<780	<690	<690	<830	<870
aroclor - 1016	0.8	<340	<140 J	<130	<140	<150 J	<130	<130 J	<160	<170
aroclor - 1221	0.8	<690	<280 J	<270	<280	<310 J	<270	<270 J	<330	<340
aroclor - 1232	0.8	<340	<140 J	<130	<140	<150 J	<130	<130 J	<160	<170
aroclor - 1242	0.8	<340	<140 J	<130	<140	<150 J	<130	<130 J	<160	<170
aroclor - 1248	0.8	<340	<140 J	<130	<140	<150 J	<130	<130 J	<160	<170
aroclor - 1254	0.8	**2900**	**170 JP**	**100 J**	**63 J**	<150 J	<130	<130 J	**65 J**	<170
aroclor - 1260	0.8	<340	<140 J	<130	<140	<150 J	<130	<130 J	<160	<170

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.
P - The percent difference between concentration values calculated on both columns was greater than 25% D.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-4
SUMMARY OF TAL INORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION / DATE / ANALYTE	GUIDANCE (ug/Kg)	CB-01 4/25/94	CB-03 4/27/94	CB-04 4/27/94	CB-05 4/26/94	CB-06 4/26/94	CB-07 4/26/94	DUPE-01 CB-07 4/26/94	CB-08 4/26/94	CB-09 4/26/94	CB-11 4/26/94	CB-13 4/26/94	CB-15 4/27/94	CB-16 4/26/94	CB-18 4/27/94	OUT-01A 5/2/94	OUT-01B 5/2/94	OUT-01C 5/2/94	OUT-02A 4/29/94	OUT-02B 4/29/94	OUT-02C 4/29/94
aluminum	NG	**3880 EJ**	**2140 EJ**	**2500 EJ**	**2110 JE**	**2680 JE**	**2050 JE**	**3390 JE**	**4680 JE**	**12000 JE**	**5770 JE**	**2040 JE**	**1780 JE**	**4520 JE**	**1570 JE**	**8490**	**13700**	**11000**	**7700**	**4090**	**6690**
antimony	2,000	<13.1 JN	<12.9 JN	<13.7 JN	**25.5 JN**	<13.4 JN	<13.5 JN	<13.9 JN	<13.4 JN	<14.6 JN	<15.2 JN	<12.6 JN	<13.4 JN	<12.9 JN	<14.4 JN	<15	<14.2	<15.4	<15.2	<13.5	<14.8
arsenic	6,000	**2.1 B**	**2.6**	**3.8**	**2.6**	**2.1 B**	**1.8 B**	**2.4 B**	**14.4**	**3.4**	**3.0**	**1.8 B**	**2.3 B**	**2.1 B**	**2.9**	**21.1 JN**	**7.4 JN**	**6.5 JN**	**4.0 S**	**2.3 B**	**3.4**
barium	NG	**34.1 B**	<1.2	**14.7 B**	<1.1	**7.4 B**	**2.1 B**	**6.4 B**	**7.0 B**	**42.3 B**	**39.2 B**	**1.6 B**	**4.9 B**	**19.4 B**	<1.3	**27.3 B**	**47.7 B**	**49.7 B**	**33.9 B**	**19.8 B**	**19.1 B**
beryllium	NG	**0.39 B**	<0.21	**0.34 B**	**0.26 B**	**0.33 B**	**0.34 B**	**0.35 B**	**0.40 B**	**0.58 B**	**0.38 B**	**0.38 B**	**0.33 B**	**0.39 B**	**0.29 B**	**0.63 B**	**0.80 B**	**0.86 B**	**0.40 B**	<0.22	<0.24
cadmium	600	**7.8**	**0.86 B**	**0.67 B**	<0.55	<0.58	**1.4**	**1.3**	**1.5**	<0.63	<0.66	<0.55	**0.65 B**	**0.71 B**	**1.3**	**1.7 J**	<0.62 J	**1.8 J**	**3.2 JN**	**1.7 JN**	<0.64 N
calcium	NG	**129000 EJ**	**222000 EJ**	**133000 EJ**	**187000 JE**	**126000 JE**	**212000 JE**	**162000 JE**	**152000 JE**	**16400 JE**	**16800 JE**	**150000 JE**	**119000 JE**	**108000 JE**	**121000 JE**	**93700**	**22500**	**63000**	**2080**	**6070**	**1490**
chromium	26,000	**15.1 NJ**	**5.3 JN**	**28.1 NJ**	**22.8 JN**	**16.1 JN**	**24.5 JN**	**11.5 JN**	**24.0 JN**	**10.5 JN**	**12.7 JN**	**2.7 JN**	**19.4 JN**	**13.8 JN**	**16.1 JN**	**16.4**	**9.4**	**16.8**	**7.6**	**4**	**4.6**
cobalt	NG	**4.2 B**	<4.0	**4.6 B**	**4.8 B**	<4.1	**4.4 B**	<4.2	**4.7 B**	<4.5	<4.7	<3.9	<4.1	<4.0	<4.4	**6.6 B**	**6.2 B**	**6.7 B**	<4.7	<4.1	**5.4 B**
copper	16,000	**43.1 R**	**220 J**	**38.1 R**	**145 R**	**23.7 R**	**1330 J**	R	**57.8 R**	**45.3 R**	**30.0 R**	**21.5 R**	**197 J**	**35.6 R**	**58.7 R**	**88.1**	**31.2**	**66.6**	**108**	**25.6**	**17.1**
iron	2,000,000	**10600 EJ**	**7830 EJ**	**8460 EJ**	**10800 JE**	**7380 JE**	**17000 JE**	**13000 EJ**	**15000 JE**	**6190 JE**	**6500 JE**	**6200 JE**	**7430 JE**	**10400 JE**	**6300 JE**	**19700**	**12400**	**17000**	**10200**	**7360**	**9670**
lead	31,000	**79.0 NJ**	**40.1 NJ**	**182 NJ**	**58.2 JN**	**47.8 JN**	**457 JN**	**80.8 JN**	**85.9 JN**	**97.2 JN**	**90.6 JN**	**14.6 JN**	**96.6 JN**	**49.6 JN**	**90.6 JN**	**146 JN**	<13.9 JN	<44.1 JNW	**20.1 JW**	**19.4 WJ**	**8.2 WJ**
magnesium	NG	**5910 EJ**	**19700 EJ**	**9740 EJ**	**17200 JE**	**10800 JE**	**18900 JE**	**14100 JE**	**12600 JE**	**10400 JE**	**4790 JE**	**13200 JE**	**10100 JE**	**10600 JE**	**11600 JE**	**12900**	**3110**	**7470**	**1660**	**2960**	**1360**
manganese	460,000	**333 EJ**	**313 EJ**	**398 EJ**	**768 JE**	**479 JE**	**284 JE**	**724 JE**	**571 JE**	**309 JE**	**584 JE**	**497 JE**	**340 JE**	**737 JE**	**376 JE**	**630**	**185**	**674**	**133**	**244**	**111**
mercury	150	<0.12 JN	<0.12 JN	<0.12 JN	<0.11 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.13 JN	<0.14 JN	<0.11 JN	<0.12 JN	<0.12 JN	<0.13 JN	<0.14 JN	<0.13 JN	<0.14 JN	<0.14 JN	<0.12 JN	<0.13 JN
nickel	16,000	**16.5**	**13.1**	**10.7**	**12.3**	**11.1**	**115**	**15**	**18.9**	**14.2**	**6.2 B**	**7.9 B**	**9.3 B**	**11.4**	**9.5 B**	**17.9 J**	**13.5 J**	**19.1 J**	**9.5 B**	**5.7 B**	**7.6 B**
potassium	NG	<562	<556	<590	<549	<576	<583	<598	<576	<629	<655	<543	<576	<556	<621	<646	**875 B**	**1340 B**	<655	<583	<637
selenium	NG	<0.54 JN	<0.53 JNW	<0.57 JN	<0.53 JN	<0.55 JN	>0.56 JNW	<0.58 JNW	<2.8 JNW	<0.61 JN	<0.63 JN	<0.52 JNW	<0.55 JNW	<0.53 JNW	<0.60 JN	<0.62 JW	<0.59	<0.64	<0.63 JW	<0.56 JW	<0.61 JW
silver	1,000	<1.8 R	<1.8 R	<1.9 NR	<1.8 NR	<1.9 NR	<1.9 NR	<1.9 NR	<1.9 NR	**67.6 JN**	<2.1 NR	<1.8 NR	<1.9 NR	<1.8 NR	<2.0 NR	<2.1 JN	<2.0 JN	<2.1 JN	<2.1 NJ	<1.9 NJ	<2.1 NJ
sodium	NG	**144 B**	**233 B**	**155 B**	<106	<112	<113	<116	<112	<122	<127	**177 B**	<112	<108	<120	<125 R	<119 R	**153 BJ**	<127	**182 B**	<123
thallium	NG	<1.4	<1.4	<1.5	<1.4	<1.4	<1.5	<1.5	<1.4	<1.6	<1.6	<1.4	<1.4	<1.4	<1.6	<0.54 N	<0.54 N	<1.7 N	<1.6	<1.5	<1.6 WJ
vanadium	NG	**8.6 B**	**6.1 B**	**12.7**	**10.1 B**	**10.6 B**	**13.2**	**14.2**	**22.7**	**9.1 B**	**8.9 B**	**7.5 B**	**10.1 B**	**15**	**10.6 B**	**13.0 B**	**15.5**	**21**	**8.2 B**	**6.0 B**	**8.2 B**
zinc	120,000	**2150 ENJ**	**98.2 ENJ**	**82.9 ENJ**	**64.8 REN**	**53.0 ENR**	**198 JNE**	**115 JEN**	**263 JEN**	**142 JEN**	**83.0 JNE**	**92.9 JEN**	**483 JEN**	**127 JEN**	**246 JEN**	**395**	**58.8**	**364**	**162**	**77.2**	**45.1**
cyanide	NG	<1.2 R	<1.2 R	<1.2 R	<1.1 R	<1.2 R	<1.2 R	<1.1 R	<1.2 R	<1.3 R	<1.4 R	<1.1 R	<1.2 R	<1.2 R	<1.3 R	<1.4 J	<1.4 J	<1.4 J	<1.4	<1.2	<1.3

NOTES:

- concentrations reported as micrograms per kilogram (ug/Kg).

B - Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.

E - Indicates a value estimated or not reported due to the presence of interference.

N - Indicates spike sample recovery is not within control limits.

W - Post digestion spike for furnace AA analysis is outside of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993

R - Data rejected by data validator.

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-4 (cont.)
SUMMARY OF TAL INORGANIC DATA - SEDIMENT
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE ANALYTE	GUIDANCE (ug/Kg)	OUT-02D 4/29/94	OUT-03A 4/29/94	OUT-03B 4/29/94	OUT-03C 4/29/94	OUT-04 5/2/94	OUT-05 4/29/94	OUT-06 4/29/94	OUT-07 4/29/94	DUPE-04 OUT-07 4/29/94	OUT-08 4/29/94	OUT-09 4/29/94
aluminum	NG	**7150**	**4250**	**8370**	**3390**	**5770**	**3420**	**2840**	**1400**	**1570**	**4470**	**9220**
antimony	2,000	<14.2	<13.7	<17.1	<14.1	<13.4	<13.7	<15.2	<13.5	<13.5	<16.3	<17.1
arsenic	6,000	**3.2**	**4.8 JN**	**5.5 JN**	**2.3 BJN**	<1.3 NR	**2.2 BJN**	**1.1 B**	<5.5	<5.5	**6.0 JN**	**11.9 JN**
barium	NG	**24.5 B**	**64.4**	**36.3 B**	**12.4 B**	**3.3 B**	<1.2	**3.8 B**	<1.2	<1.2	**31.1 B**	**52.6 B**
beryllium	NG	**0.37 B**	**0.38 B**	**0.48 B**	**0.49 B**	**0.56 B**	**0.38 B**	**0.30 B**	<0.22	<0.22	**0.46 B**	**0.72 B**
cadmium	600	**0.73 BJN**	**1.7 J**	**2.5 J**	**1.8 J**	<0.58	**2.1 J**	<0.66 N	<0.59 N	<0.59 N	**0.79 BJ**	**1.5 BJ**
calcium	NG	**5610**	**118000**	**9020**	**84200**	**142000**	**136000**	**52400**	**171000**	**192000**	**110000**	**31400**
chromium	26,000	**6.9**	**9.4**	**27.4**	**20.6**	**10.4**	**10.7**	**17.0**	**4.5**	**0.94 B**	**11.7**	**19.5**
cobalt	NG	**5.5 B**	**4.5 B**	**6.5 B**	<4.3	<4.1	<4.2	<4.7	<4.1	<4.1	<5.0	**8.1 B**
copper	16,000	**42.5**	**67.7**	**111**	**73.1**	**22.6**	**25.0**	**21.0**	**8.2**	**8.5**	**32.3**	**27.8**
iron	2,000,000	**11200**	**17700**	**13700**	**10700**	**11500**	**10600**	**5870**	**5500**	**5880**	**18500**	**16400**
lead	31,000	**14.1 WJ**	**54.0 JN**	**60.9 JN**	**72.8 JN**	<51.8 JN	**35.3 JN**	**88.8**	**26.9**	**7.9 WJ**	**102 JN**	**85.8 JN**
magnesium	NG	**2020**	**8360**	**3540**	**7460**	**12000**	**10000**	**6700**	**14700**	**16700**	**44200**	**6590**
manganese	460,000	**142**	**525**	**361**	**472**	**273**	**407**	**117**	**211**	**247**	**916**	**625**
mercury	150	<0.13 JN	<0.12 JN	<0.15 JN	<0.13 JN	<0.12 JN	<0.12 JN	<0.14 JN	<0.12 JN	<0.12 JN	<0.15 JN	<0.15 JN
nickel	16,000	**9.9 B**	**14.6 J**	**16.4 J**	**14.6 J**	**8.6 B**	**10.4 J**	**6.6 B**	**5.9 B**	**5.0 B**	**9.1 BJ**	**14.1**
potassium	NG	<613	<590	**846 B**	<605	**603 B**	**625 B**	<655	<583	<583	<703	**1120 B**
selenium	NG	<0.59 JW	<0.57 JW	<0.71 JN	<0.58 JW	<0.55 JW	<0.57 JW	<0.63	<0.56 JW	<0.56 JW	<0.68 JW	<0.71
silver	1,000	<2.0 NJ	<1.9 JN	<2.4 JN	<1.9 JN	<1.9 JN	<1.9 JN	<2.1 JN	<1.9 JN	<1.9 NJ	<2.3 JN	<2.4 JN
sodium	NG	<119	<114 R	<142 R	<117 R	<112 R	<114 R	**363 B**	**191 B**	**162 B**	<136 R	**995 BJ**
thallium	NG	<1.5 WJ	<0.52 N	<0.65 JNW	<0.53 N	<0.51 N	<0.52 JNW	<1.6	<1.5	<1.5	<0.62 N	<0.65 N
vanadium	NG	**9.2 B**	**6.6 B**	**15.0 B**	**10.7 B**	**13.5**	**10.9 B**	**12.5 B**	**4.0 B**	**4.6 B**	**10.3 B**	**18.3**
zinc	120,000	**120**	**120**	**153**	**112**	**70.3**	**315**	**83.5**	**41.6**	**36.3**	**85.3**	**675**
cyanide	NG	<1.3	<1.2 J	<1.5 J	<1.3 J	<1.2 J	<1.2 J	<1.4 J	<1.2	<1.2	<1.5 J	**3.7**

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

B - Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E - Indicates a value estimated or not reported due to the presence of interference.
N - Indicates spike sample recovery is not within control limits.
W - Post digestion spike for furnace AA analysis is outside of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.
J - Value is estimated since it falls below the detection limit.
GUIDANCE - Technical Guidance for Screening Contaminated Sediments, NYSDEC, 22 November 1993
R - Data rejected by data validator.
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-6
SUMMARY OF TCL VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED COMPOUND	GUIDANCE (ug/Kg)	B-101 3-5 4/26/94	B-101 5-7 4/26/94	B-102 3-5 4/26/94	B-102 5-7 4/26/94	B-103 3-5 5/2/94	B-103 7-9 5/2/94	B-108 3-5 4/29/94	B-108 7-9 4/29/94	B-109 3-5 5/2/94	B-109 9-11 5/2/94	B-110 3-5 4/28/94	B-110 7-9 4/28/94	DUPE-02 B-110 7-9 4/28/94	B-111 8-10 4/25/94	B-112 3-5 4/27/94	B-112 9-11 4/27/94	B-113 8-10 4/25/94	B-114 5-7 5/4/94	B-114 7-9 5/4/94
chloromethane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
bromomethane	NG	<12 J	<12 J	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14 J	<12	<12
vinyl chloride	200	<12 J	<12 J	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14 J	<12	<12
chloroethane	1,900	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
methylene chloride	100	<12	<12	<13	<13	<12	<12	<16	<61	<12 J	<12	<11 J	<13	<12	<15	**6 J**	**7 J**	<14	<14	<13
acetone	200	<12	<12	<13	<13	<12	<65	**42**	<61	<12 J	<12	<11 J	<13	<12	**68**	<11	<11	**120**	<12	**65**
carbon disulfide	2,700	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,1-dichloroethene	400	<12	<12	<13	<13	**7 J**	**36**	<12	**40 J**	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,1-dichloroethane	200	<12	<12	<13	<13	**190**	**340 EJ**	**2 J**	**660**	<12 J	<12	<11 J	<13	**4 J**	<15	<11	<11	<14	<12	<12
1,2-dichloroethene	300	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	**8 J**
chloroform	300	<12	<12	<13	<13	<12	<12	**0.8 J**	<61	<12 J	<12	<11 J	**1 J**	<12	<15	<11	<11	<14	<12	<12
1,2-dichloroethane	100	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
2-butanone	300	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,1,1-trichloroethane	800	<12	<12	<13	<13	**48**	**530 EJ**	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
carbon tetrachloride	600	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
bromodichloromethane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,2-dichloropropane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
cis-1,3-dichloropropene	300	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
trichloroethene	700	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
dibromochloromethane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,1,2-trichloroethane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
benzene	60	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	**31**	<12	<12
trans-1,3-dichloropropene	300	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
bromoform	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
4-methyl-2-pentanone	1,000	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
2-hexanone	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
tetrachloroethene	1,400	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
1,1,2,2-tetrachloroethane	600	<12	<12	<13	<13	<12	<12	<12 J	<61 J	<12 J	<12	<11 J	<13 J	<12 J	<15	<11	<11	<14	<12	<12
toluene	1,500	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	**6 J**	<12	<12
chlorobenzene	1,700	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
ethylbenzene	5,500	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	**42**	<12	<12
styrene	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12
xylenes (total)	1,200	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	**41**	<12	<12
trichlorofluoromethane	NG	<12	<12	<13	<13	<12	<12	<12	<61	<12 J	<12	<11 J	<13	<12	<15	<11	<11	<14	<12	<12

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-6 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING / DEPTH (ft) / DATE COLLECTED / COMPOUND	GUIDANCE (ug/Kg)	B-115 2-3 4/28/94	B-115 5-6 4/28/94	B-116 4-6 4/27/94	B-116 8-10 4/27/94	B-117 2-4 4/27/94	B-117 6-8 4/27/94	B-118 3-5 4/27/94	B-118 7-9 4/27/94	B-119 3-5 4/27/94	B-119 7-9 4/27/94	B-120 2-4 4/26/94	B-121 0-3 4/25/94	B-124 3-5 4/25/94	B-124 7-9 4/25/94	B-125 3-5 4/26/94	B-125 7-9 4/26/94	B-129 3-5 5/5/94	DUPE-06 B-129 3-5 5/5/94	B-129 9-11 5/5/94
chloromethane	NG	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
bromomethane	NG	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12 J	<12 J	<12 J	<11 J	<11 J	<11	<11	<12
vinyl chloride	200	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12 J	<12 J	<12 J	<11 J	<11 J	<11	<11	<12
chloroethane	1,900	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
methylene chloride	100	<13	<12	<11	<12	<10	<11	**10 J**	**5 J**	**4 J**	**4 J**	<13	<12	<12	<12	<11	<11	<11	<22	**14**
acetone	200	**90**	<12	<11	<12	<10	<11	<15	<12	**15**	<12	<13	<12	<12	<12	<11	<11	<11	<11	**15**
carbon disulfide	2,700	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,1-dichloroethene	400	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,1-dichloroethane	200	<13	**6 J**	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,2-dichloroethene	300	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
chloroform	300	**3 J**	**2 J**	**2 J**	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,2-dichloroethane	100	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
2-butanone	300	<13	<12	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,1,1-trichloroethane	800	<13	**2 J**	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
carbon tetrachloride	600	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
bromodichloromethane	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,2-dichloropropane	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
cis-1,3-dichloropropene	300	<13	<12 J	<11	<12 J	<10 J	<11 J	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
trichloroethene	700	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
dibromochloromethane	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,1,2-trichloroethane	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
benzene	60	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
trans-1,3-dichloropropene	300	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
bromoform	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
4-methyl-2-pentanone	1,000	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
2-hexanone	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
tetrachloroethene	1,400	<13	<12 J	<11	<12	<10	<11	**3 J**	<12	**3 J**	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
1,1,2,2-tetrachloroethane	600	<13 J	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
toluene	1,500	**7 J**	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
chlorobenzene	1,700	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
ethylbenzene	5,500	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
styrene	NG	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
xylenes (total)	1,200	<13	<12 J	<11	<12	<10	<11	<15	<12	<13	<12	<13	<12	<12	<12	<11	<11	<11	<11	<12
trichlorofluoromethane	NG	<13	<12 J	<11	<12	<10	**17**	<15	<12	**1 J**	**12 J**	<13	<12	<12	<12	<11	<11	<11	<11	<12

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-6 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING / DEPTH (ft) / DATE COLLECTED	GUIDANCE (ug/Kg)	B-130 3-5 5/4/94	DUPE-05 B-130 3-5 5/4/94	B-130 9-11 5/4/94	B-131 3-5 5/4/94	B-131 7-9 5/4/94	B-132 3-5 5/5/94	B-132 5-7 5/5/94	B-133 1-3 5/10/94	B-133 5-7 5/9/94	DUPE-09 B-133 5-7 5/9/94	B-134 1-3 5/10/94	B-134 7-9 5/9/94	B-135 1-3 5/10/94	B-135 7-9 5/9/94	B-136 1-3 5/10/94	B-136 7-9 5/10/94	MW-26D 3-5 5/3/94	MW-26D 11-13 5/3/94
COMPOUND																			
chloromethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
bromomethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
vinyl chloride	200	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
chloroethane	1,900	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
methylene chloride	100	<13	<12	<13	<16	<12	<12	<23	<13	<13	<12	<12	<12	<12	<12	<12	<13	<12	<13
acetone	200	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	**53**	**41**
carbon disulfide	2,700	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,1-dichloroethene	400	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,1-dichloroethane	200	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,2-dichloroethene	300	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
chloroform	300	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	**1 J**	**3 J**
1,2-dichloroethane	100	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
2-butanone	300	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,1,1-trichloroethane	800	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	**9 J**	<13
carbon tetrachloride	600	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13 J
bromodichloromethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,2-dichloropropane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
cis-1,3-dichloropropene	300	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
trichloroethene	700	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
dibromochloromethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,1,2-trichloroethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
benzene	60	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	**2 J**	<12	<12	<12	<12	<13	<12	<13
trans-1,3-dichloropropene	300	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
bromoform	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
4-methyl-2-pentanone	1,000	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
2-hexanone	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
tetrachloroethene	1,400	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
1,1,2,2-tetrachloroethane	600	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
toluene	1,500	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
chlorobenzene	1,700	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
ethylbenzene	5,500	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	**93**
styrene	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13
xylenes (total)	1,200	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	**390**
trichlorofluoromethane	NG	<12	<12	<13	<12	<12	<12	<12	<10	<12	<12	<12	<12	<12	<12	<12	<13	<12	<13

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.
E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-7
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED COMPOUND	GUIDANCE (ug/Kg)	B-101 3-5 4/26/94	B-101 5-7 4/26/94	B-102 3-5 4/26/94	B-102 5-7 4/26/94	B-103 3-5 5/2/94	B-103 7-9 5/2/94	B-104 5-7 5/6/94	DUPE-08 B-104 5-7 5/6/94	B-104 7-9 5/6/94	B-105 5-7 5/6/94
phenol	30 or MDL	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
bis (-2-chloroethyl) ether	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2-chlorophenol	800	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
1,3-dichlorobenzene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
1,4-dichlorobenzene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
1,2-dichlorobenzene	NG	<410	<440	<410	<420	<410 J	<450 J	<400 J	<400 J	<390 J	<370 J
2-methylphenol	100 or MDL	<410	<440	<410	<420	<410 J	<450 J	<400	<400	<390 J	<370
2,2-oxybis (1-chloropropane)	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
4-methylphenol	900	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
N-nitroso-di-n-propylamine	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
hexachloroethane	NG	<410	<440	<410	<420	<410 J	<450 J	<400 J	<400 J	<390 J	<370 J
nitrobenzene	200 or MDL	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
isophrone	4,400	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
2-nitrophenol	330 or MDL	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
2,4-dimethylphenol	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
bis (-2-chloroethoxy) methane	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
2,4-dichlorophenol	400	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
1,2,4-trichlorobenzene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
naphthalene	13,000	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
4-chloroaniline	220 or MDL	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
hexachlorobutadiene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
4-chloro-3-methylphenol	240 or MDL	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
2-methylnaphthalene	36,400	<410	<440	<410	<420	<410	<450	<400	<400	<390	<370
hexachlorocyclopentadiene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2,4,6-trichlorophenol	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2,4,5-trichlorophenol	100	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
2-chloronaphthalene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2-nitroaniline	430 or MDL	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
dimethyl phthalate	2,000	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
acenaphthylene	41,000	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2,6-dinitrotoluene	1,000	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
3-nitroaniline	500 or MDL	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
acenaphthene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2,4-dinitrophenol	200 or MDL	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
4-nitrophenol	100 or MDL	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
dibenzofuran	6,200	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
2,4-dinitrotoluene	NG	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
diethylphthalate	7,100	<410	<440	<410	<420	<410	<450	<400	<400	<390 J	<370
4-chlorophenyl-phenylether	NG	<410	<440	<410	<420	<410 J	<450 J	<400 J	<400 J	<390 J	<370 J
fluorene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390 J	<370
4-nitroaniline	NG	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990	<980 J	<940
4,6-dinitro-2-methylphenol	NG	<1000	<1100	<1000	<1100	<1000	<1100	<1000	<990 J	<980	<940
n-nitrosodiphenylamine	NG	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
4-bromophenyl-phenylether	NG	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
hexachlorobenzene	410	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
pentachlorophenol	1,000 or MDL	<1000	<1100	<1000	<1100	<1000 J	<1100 J	<1000 J	<990 J	<980	<940 J
phenanthrene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
anthracene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
carbazole	NG	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
di-n-butylphthalate	NG	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
fluoranthene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
pyrene	50,000*	<410	<440	<410	<420	<410 J	<450 J	<400	<400 J	<390	<370
butylbenzylphthalate	50,000*	<410	<440	<410	<420	<410	<450 J	<400	<400 J	<390	<370
3,3-dichlorobenzidine	N/A	<410	<440	<410	<420	<410	<450 J	<400	<400 J	<390	<370
benzo (a) anthracene	224 or MDL	<410	<440	<410	<420	<410	<450 J	<400	<400 J	<390	<370
chrysene	400	<410	<440	<410	<420	<410	<450 J	<400	<400 J	<390	<370
bis (2-ethylhexyl) phthalate	50,000*	<410	<440	<410	<420	<410	<450 J	**30 J**	<400 J	<390	<370
di-n-octyl phthalate	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
benzo (b) fluoranthene	1,100	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
benzo (k) fluoranthene	1,100	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
benzo (a) pyrene	61 or MDL	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
indeno (1,2,3-cd) pyrene	3,200	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
dibenzo (a,h) anthracene	14 or MDL	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
benzo (g,h,i) perylene	50,000*	<410	<440	<410	<420	<410	<450	<400	<400 J	<390	<370
Tenatively Identified Compounds		6	2	5	9	2	3	19	10	3	6

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.

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NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-7 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING / DEPTH (ft) / DATE COLLECTED / COMPOUND	GUIDANCE (ug/Kg)	B-105 7-9 5/6/94	B-108 3-5 4/29/94	B-108 7-9 4/29/94	B-109 3-5 5/2/94	B-109 9-11 5/2/94	B-110 3-5 4/28/94	B-110 7-9 4/28/94	DUPE-02 B-110 7-9 4/28/94	B-111 8-10 4/25/94	B-112 3-5 4/27/94
phenol	30 or MDL	<400	<390 J	**840 J**	<410	<400	<370	<410	<400	<460	<380
bis (-2-chloroethyl) ether	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2-chlorophenol	800	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
1,3-dichlorobenzene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
1,4-dichlorobenzene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
1,2-dichlorobenzene	NG	<400 J	<390 J	<410 J	<410 J	<400 J	<370 J	<410 J	<400 J	<460	<380
2-methylphenol	100 or MDL	<400	<390	<410	<410 J	<400 J	<370	<410	<400	<460	<380
2,2-oxybis (1-chloropropane)	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-methylphenol	900	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
N-nitroso-di-n-propylamine	NG	<400	<390 J	<410 J	<410	<400	<370	<410	<400	<460	<380
hexachloroethane	NG	<400 J	<390	<410	<410 J	<400 J	<370	<410	<400	<460	<380
nitrobenzene	200 or MDL	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
isophrone	4,400	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2-nitrophenol	330 or MDL	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4-dimethylphenol	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
bis (-2-chloroethoxy) methane	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4-dichlorophenol	400	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
1,2,4-trichlorobenzene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
naphthalene	13,000	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-chloroaniline	220 or MDL	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
hexachlorobutadiene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-chloro-3-methylphenol	240 or MDL	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2-methylnaphthalene	36,400	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
hexachlorocyclopentadiene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4,6-trichlorophenol	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4,5-trichlorophenol	100	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200 J	<960
2-chloronaphthalene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2-nitroaniline	430 or MDL	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
dimethyl phthalate	2,000	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
acenaphthylene	41,000	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,6-dinitrotoluene	1,000	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
3-nitroaniline	500 or MDL	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
acenaphthene	50,000*	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4-dinitrophenol	200 or MDL	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
4-nitrophenol	100 or MDL	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
dibenzofuran	6,200	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
2,4-dinitrotoluene	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
diethylphthalate	7,100	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-chlorophenyl-phenylether	NG	<400 J	<390 J	<410 J	<410 J	<400 J	<370 J	<410 J	<400 J	<460	<380 J
fluorene	50,000*	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-nitroaniline	NG	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
4,6-dinitro-2-methylphenol	NG	<990	<970	<1000	<1000	<990	<940	<1000	<990	<1200	<960
n-nitrosodiphenylamine	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
4-bromophenyl-phenylether	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380 J
hexachlorobenzene	410	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
pentachlorophenol	1,000 or MDL	<990 J	<970	<1000	<1000 J	<990 J	<940	<1000	<990	<1200	<960
phenanthrene	50,000*	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
anthracene	50,000*	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
carbazole	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
di-n-butylphthalate	NG	<400	<390	<410	<410	<400	<370	<410	<400	<460	<380
fluoranthene	50,000*	<400	<390	<410	<410	<400	**20 J**	<410	<400	<460	<380
pyrene	50,000*	<400	<390	<410	<410 J	<400 J	**20 J**	<410	<400 J	<460	<380
butylbenzylphthalate	50,000*	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
3,3-dichlorobenzidine	N/A	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
benzo (a) anthracene	224 or MDL	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
chrysene	400	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
bis (2-ethylhexyl) phthalate	50,000*	<400	**47 J**	**37 J**	<410	<400	<370	<410	<400 J	<700	<380
di-n-octyl phthalate	50,000*	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
benzo (b) fluoranthene	1,100	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
benzo (k) fluoranthene	1,100	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
benzo (a) pyrene	61 or MDL	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
indeno (1,2,3-cd) pyrene	3,200	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
dibenzo (a,h) anthracene	14 or MDL	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380 J
benzo (g,h,i) perylene	50,000*	<400	<390	<410	<410	<400	<370	<410	<400 J	<460	<380
Tenatively Identified Compounds		2	9	18	6	3	12	11	8	13	6

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-7 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED COMPOUND	GUIDANCE (ug/Kg)	B-112 9-11 4/27/94	B-113 8-10 4/25/94	B-115 2-3 4/28/94	B-115 5-6 4/28/94	B-120 2-4 4/26/94	B-121 0-3 4/25/94	B-122 0-1 10/28/93	B-123 0-1 10/28/94	B-124 3-5 4/25/94	B-124 7-9 4/25/94
phenol	30 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
bis (-2-chloroethyl) ether	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2-chlorophenol	800	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
1,3-dichlorobenzene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
1,4-dichlorobenzene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
1,2-dichlorobenzene	NG	<400 J	<440	<420 J	<400 J	<410	<400	<370	<360	<370	<370
2-methylphenol	100 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,2-oxybis (1-chloropropane)	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
4-methylphenol	900	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
N-nitroso-di-n-propylamine	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
hexachloroethane	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
nitrobenzene	200 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
isophrone	4,400	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2-nitrophenol	330 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,4-dimethylphenol	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
bis (-2-chloroethoxy) methane	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,4-dichlorophenol	400	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
1,2,4-trichlorobenzene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
naphthalene	13,000	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
4-chloroaniline	220 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
hexachlorobutadiene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
4-chloro-3-methylphenol	240 or MDL	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2-methylnaphthalene	36,400	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
hexachlorocyclopentadiene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,4,6-trichlorophenol	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,4,5-trichlorophenol	100	<990	<1100 J	<1100	<1000	<1000	<1000 J	<930	<910	<930	<940 J
2-chloronaphthalene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2-nitroaniline	430 or MDL	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
dimethyl phthalate	2,000	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
acenaphthylene	41,000	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,6-dinitrotoluene	1,000	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
3-nitroaniline	500 or MDL	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
acenaphthene	50,000*	<400	<440	<420	<400	**49 J**	<400	<370	<360	<370	<370
2,4-dinitrophenol	200 or MDL	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
4-nitrophenol	100 or MDL	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
dibenzofuran	6,200	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
2,4-dinitrotoluene	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
diethylphthalate	7,100	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
4-chlorophenyl-phenylether	NG	<400	<440	<420 J	<400 J	<410	<400	<370	<360	<370	<370
fluorene	50,000*	<400	<440	<420	<400	**31 J**	<400	<370	<360	<370	<370
4-nitroaniline	NG	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
4,6-dinitro-2-methylphenol	NG	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
n-nitrosodiphenylamine	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
4-bromophenyl-phenylether	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
hexachlorobenzene	410	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
pentachlorophenol	1,000 or MDL	<990	<1100	<1100	<1000	<1000	<1000	<930	<910	<930	<940
phenanthrene	50,000*	<400	<440	<420	<400	**570**	<400	<370	<360	<370	<370
anthracene	50,000*	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
carbazole	NG	<400	<440	<420	<400	**95 J**	<400	<370	<360	<370	<370
di-n-butylphthalate	NG	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
fluoranthene	50,000*	<400	<440	<420	<400	**730**	**96 J**	<370	<360	<370	<370
pyrene	50,000*	<400	<440	<420	<400	**570**	**72 J**	<370	<360	**24 J**	<370
butylbenzylphthalate	50,000*	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
3,3-dichlorobenzidine	N/A	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
benzo (a) anthracene	224 or MDL	<400	<440	<420	<400	**320 J**	<400	<370	<360	<370	<370
chrysene	400	<400	<440	<420	<400	**320 J**	**41 J**	<370	<360	<370	<370
bis (2-ethylhexyl) phthalate	50,000*	<400	<440	<420	<400	<410	<400	<370	**110 J**	<370	<370
di-n-octyl phthalate	50,000*	<400	<440	<420	<400	<410	<400	<370	<360	<370	<370
benzo (b) fluoranthene	1,100	<400	<440	<420	<400	**260 J**	**42 J**	<370	<360	<370	<370
benzo (k) fluoranthene	1,100	<400	<440	<420	<400	**370 J**	**41 J**	<370	<360	<370	<370
benzo (a) pyrene	61 or MDL	<400	<440	<420	<400	**300 J**	<400	<370	<360	<370	<370
indeno (1,2,3-cd) pyrene	3,200	<400 J	<440	<420	<400	**170 J**	<400	<370	<360	<370	<370
dibenzo (a,h) anthracene	14 or MDL	<400 J	<440	<420	<400	**78 J**	<400	<370	<360	<370	<370
benzo (g,h,i) perylene	50,000*	<400 J	<440	<420	<400	**190 J**	**65 J**	<370	<360	<370	<370
Tenatively Identified Compounds		6	9	12	8	3	9	1	2	10	7

NOTES:

- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-7 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED COMPOUND	GUIDANCE (ug/Kg)	B-125 3-5 4/26/94	B-125 7-9 4/26/94	B-133 1-3 5/10/94	B-133 5-7 5/9/94	DUPE-09 B-133 5-7 5/9/94	B-134 1-3 5/10/94	B-134 7-9 5/9/94	B-135 1-3 5/10/94	B-135 7-9 5/9/94	B-136 1-3 5/10/94
phenol	30 or MDL	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
bis (-2-chloroethyl) ether	NG	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
2-chlorophenol	800	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
1,3-dichlorobenzene	NG	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
1,4-dichlorobenzene	NG	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
1,2-dichlorobenzene	NG	<400	<390	<370 J	<380 J	<380 J	<380 J	<400 J	<360 J	<370 J	<390 J
2-methylphenol	100 or MDL	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
2,2-oxybis (1-chloropropane)	NG	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
4-methylphenol	900	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
N-nitroso-di-n-propylamine	NG	<400	<390	<370	<380	<380 J	<380	<400 J	<360	<370	<390
hexachloroethane	NG	<400	<390	<370 J	<380 J	<380 J	<380 J	<400 J	<360 J	<370 J	<390 J
nitrobenzene	200 or MDL	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
isophrone	4,400	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
2-nitrophenol	330 or MDL	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
2,4-dimethylphenol	NG	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
bis (-2-chloroethoxy) methane	NG	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
2,4-dichlorophenol	400	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
1,2,4-trichlorobenzene	NG	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
naphthalene	13,000	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
4-chloroaniline	220 or MDL	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
hexachlorobutadiene	NG	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
4-chloro-3-methylphenol	240 or MDL	<400	<390	<370	<380	<380 J	<380	<400	<360	<370 J	<390
2-methylnaphthalene	36,400	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370 J	<390
hexachlorocyclopentadiene	NG	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2,4,6-trichlorophenol	NG	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2,4,5-trichlorophenol	100	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
2-chloronaphthalene	NG	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2-nitroaniline	430 or MDL	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
dimethyl phthalate	2,000	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
acenaphthylene	41,000	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2,6-dinitrotoluene	1,000	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
3-nitroaniline	500 or MDL	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
acenaphthene	50,000*	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2,4-dinitrophenol	200 or MDL	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
4-nitrophenol	100 or MDL	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
dibenzofuran	6,200	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
2,4-dinitrotoluene	NG	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
diethylphthalate	7,100	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
4-chlorophenyl-phenylether	NG	<400	<390	<370 J	<380 J	<380 J	<380 J	<400 J	<360 J	<370 J	<390 J
fluorene	50,000*	<400	<390	<370 J	<380 J	<380 J	<380	<400	<360	<370	<390 J
4-nitroaniline	NG	<990	<970	<940 J	<950 J	<960 J	<950	<1000	<910	<970	<970 J
4,6-dinitro-2-methylphenol	NG	<990	<970	<940 J	<950	<960	<950	<1000	<910	<970	<970 J
n-nitrosodiphenylamine	NG	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
4-bromophenyl-phenylether	NG	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
hexachlorobenzene	410	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
pentachlorophenol	1,000 or MDL	<990	<970	<940 J	<950	<960 J	<950	<1000 J	<910 J	<970 J	<970 J
phenanthrene	50,000*	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
anthracene	50,000*	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
carbazole	NG	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
di-n-butylphthalate	NG	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
fluoranthene	50,000*	<400	<390	<370 J	<380	<380	<380 J	<400	<360	<370	<390 J
pyrene	50,000*	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
butylbenzylphthalate	50,000*	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
3,3-dichlorobenzidine	N/A	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
benzo (a) anthracene	224 or MDL	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
chrysene	400	<400	<390	<370 J	<380	<380	<380	<400	<360	<370	<390 J
bis (2-ethylhexyl) phthalate	50,000*	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
di-n-octyl phthalate	50,000*	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
benzo (b) fluoranthene	1,100	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
benzo (k) fluoranthene	1,100	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
benzo (a) pyrene	61 or MDL	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
indeno (1,2,3-cd) pyrene	3,200	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
dibenzo (a,h) anthracene	14 or MDL	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
benzo (g,h,i) perylene	50,000*	<400	<390	<370	<380	<380	<380	<400	<360	<370	<390 J
Tenatively Identified Compounds		8	2	8	0	4	10	7	5	3	2

NOTES:

- concentrations reported as micrograms per kilogram (ug/Kg).

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-7 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED COMPOUND	GUIDANCE (ug/Kg)	B-136 7-9 5/10/94	MW-26D 3-5 5/3/94	MW-26D 11-13 5/3/94
phenol	30 or MDL	<410	<390	<410
bis (-2-chloroethyl) ether	NG	<410	<390	<410
2-chlorophenol	800	<410	<390	<410
1,3-dichlorobenzene	NG	<410	<390	<410
1,4-dichlorobenzene	NG	<410	<390	<410
1,2-dichlorobenzene	NG	<410 J	<390 J	<410 J
2-methylphenol	100 or MDL	<410	<390	<410
2,2-oxybis (1-chloropropane)	NG	<410	<390	<410
4-methylphenol	900	<410	<390	<410
N-nitroso-di-n-propylamine	NG	<410	<390	<410
hexachloroethane	NG	<410 J	<390 J	<410 J
nitrobenzene	200 or MDL	<410	<390	<410
isophrone	4,400	<410	<390	<410
2-nitrophenol	330 or MDL	<410	<390	<410
2,4-dimethylphenol	NG	<410	<390	<410
bis (-2-chloroethoxy) methane	NG	<410	<390	<410
2,4-dichlorophenol	400	<410	<390	<410
1,2,4-trichlorobenzene	NG	<410	<390	<410
naphthalene	13,000	<410	<390	<410
4-chloroaniline	220 or MDL	<410	<390	<410
hexachlorobutadiene	NG	<410	<390	<410
4-chloro-3-methylphenol	240 or MDL	<410	<390	<410
2-methylnaphthalene	36,400	<410	<390	<410
hexachlorocyclopentadiene	NG	<410	<390	<410
2,4,6-trichlorophenol	NG	<410	<390	<410
2,4,5-trichlorophenol	100	<1000	<970	<1000
2-chloronaphthalene	NG	<410	<390	<410
2-nitroaniline	430 or MDL	<1000	<970	<1000
dimethyl phthalate	2,000	<410	<390	<410
acenaphthylene	41,000	<410	<390	<410
2,6-dinitrotoluene	1,000	<410	<390	<410
3-nitroaniline	500 or MDL	<1000	<970	<1000
acenaphthene	50,000*	<410	<390	<410
2,4-dinitrophenol	200 or MDL	<1000	<970	<1000
4-nitrophenol	100 or MDL	<1000	<970	<1000
dibenzofuran	6,200	<410	<390	<410
2,4-dinitrotoluene	NG	<410	<390	<410
diethylphthalate	7,100	<410	<390	<410
4-chlorophenyl-phenylether	NG	<410 J	<390 J	<410 J
fluorene	50,000*	<410	<390	<410
4-nitroaniline	NG	<1000	<970	<1000
4,6-dinitro-2-methylphenol	NG	<1000	<970 J	<1000 J
n-nitrosodiphenylamine	NG	<410	<390 J	<410 J
4-bromophenyl-phenylether	NG	<410	<390 J	<410 J
hexachlorobenzene	410	<410	<390 J	<410 J
pentachlorophenol	1,000 or MDL	<1000	<970 J	<1000 J
phenanthrene	50,000*	<410	<390 J	<410 J
anthracene	50,000*	<410	<390 J	<410 J
carbazole	NG	<410	<390 J	<410 J
di-n-butylphthalate	NG	<410	<390 J	<410 J
fluoranthene	50,000*	<410	<390 J	<410 J
pyrene	50,000*	<410 J	<390	<410
butylbenzylphthalate	50,000*	<410	<390	<410
3,3-dichlorobenzidine	N/A	<410	<390	<410
benzo (a) anthracene	224 or MDL	<410	<390	<410
chrysene	400	<410	<390	<410
bis (2-ethylhexyl) phthalate	50,000*	<410	**160 J**	**48 J**
di-n-octyl phthalate	50,000*	<410	<390	<410
benzo (b) fluoranthene	1,100	<410	<390	<410
benzo (k) fluoranthene	1,100	<410	<390	<410
benzo (a) pyrene	61 or MDL	<410	<390	<410
indeno (1,2,3-cd) pyrene	3,200	<410	<390	<410
dibenzo (a,h) anthracene	14 or MDL	<410	<390	<410
benzo (g,h,i) perylene	50,000*	<410	<390	<410
Tenatively Identified Compounds		3	13	13

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-8
SUMMARY OF TCL PESTICIDE and PCB DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING		B-101	B-101	B-102	B-102	B-103	B-103	B-108	B-108	B-109	B-109	B-110	B-110	DUPE-02 B-110	B-111	B-112	B-112	B-113	B-115	B-115	B-120
DEPTH (ft)	GUIDANCE	3-5	5-7	3-5	5-7	3-5	7-9	3-5	7-9	3-5	9-11	3-5	7-9	7-9	8-10	3-5	9-11	8-10	2-3	5-6	2-4
DATE COLLECTED	(ug/Kg)	4/26/94	4/26/94	4/26/94	4/26/94	5/2/94	5/2/94	4/29/94	4/29/94	5/2/94	5/2/94	4/28/94	4/28/94	4/28/94	4/25/94	4/27/94	4/27/94	4/25/94	4/28/94	4/28/94	4/26/94
COMPOUND																					
alpha-BHC	110	<2.1	<2.1	**0.24 J**	**0.11 JP**	<1.4 J	<7.0 J	<6.6 J	<1.4 J	<1.3 J	<1.3 J	<6.4 J	<6.9 J	<1.3 J	<12 J	<6.5 J	<1.3 J	<22 J	<1.4 J	<1.4 J	<2.1 J
beta-BHC	200	<2.1	<2.1	<2.1 J	<2.1 J	<1.4	<7.0	<6.6	<1.4	<1.3 J	<1.3	<6.4	<6.9	<1.3 J	<12 J	<6.5 J	<1.3 J	<22 J	<1.4	<1.4	<2.1 J
delta-BHC	300	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	**0.23 JP**	**0.13 JP**	<1.3 J	<1.3 J	<6.4	**0.57 JP**	**0.18 J**	<12 J	<6.5	<1.3	<22 J	<1.4	<1.4	<2.1 J
gamma-BHC (lindane)	60	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	<6.6	<1.4	<1.3 J	<1.3 J	<6.4 J	<6.9 J	<1.3	<12 J	<6.5	<1.3	<22 J	<1.4 J	<1.4 J	<2.1 J
heptachlor	100	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	<6.6	<1.4 J	<1.3 J	<1.3 J	<6.4 J	<6.9 J	<1.3 J	<12 J	<6.5 J	<1.3 J	<22 J	<1.4 J	<1.4 J	<2.1 J
aldrin	41	<2.1	<2.1	**0.14 J**	<2.1 J	<1.4 J	<7.0 J	<6.6	<1.4	<1.3 J	<1.3 J	<6.4	<6.9	<1.3	<12 J	<6.5	<1.3	<22 J	<1.4	<1.4	<2.1 J
heptachlor epoxide	20	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	<6.6	<1.4	<1.3 J	<1.3 J	<6.4	<6.9	<1.3	<12 J	<6.5	<1.3	<22 J	<1.4	<1.4	<2.1 J
endosulfan I	900	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	<6.6	<1.4	<1.3 J	<1.3 J	<6.4 J	<6.9 J	<1.3 J	<12 J	<6.5 J	<1.3 J	<22 J	<1.4 J	<1.4 J	<2.1 J
dieldrin	44	<4.1	<4.1	<4.1 J	<4.2 J	<2.7	<14	<13	<2.7	**0.053 JP**	<2.6	<12 J	<13 J	**0.094 JP**	<23 J	<13 J	<2.6 J	<44 J	**0.12 JP**	<2.7 J	<4.1 J
4,4' - DDE	2,100	<4.1	<4.1	**0.76 J**	**1.5 J**	<2.7 J	**12 DJ**	**170**	<2.7	**8.0 J**	<2.6	**7.8 J**	**140 JP**	**21 J**	**81 J**	**18**	<2.6	**200**	**2.1 J**	<2.7	**0.41 J**
endrin	100	<4.1	<4.1	<4.1 J	<4.2 J	<2.7	<14	<13 J	<2.7 J	<2.6 J	<2.6	<12 J	<13 J	<2.6 J	<23 J	<13 J	<2.6 J	<44 J	<2.8 J	<2.7 J	<4.1 J
endosulfan II	900	<4.1	<4.1	<4.1 J	<4.2 J	<13	<14	<13	<2.7	<2.6 J	<2.6	<12	<13	<2.6	<23 J	<13	<2.6	<44 J	<2.8	<2.7	<4.1 J
4,4' - DDD	2,900	<4.1	<4.1	<4.1 J	**0.25 JP**	<2.7	**16 D**	**210**	<2.7	**4.5 J**	<2.6	**7.9 J**	**120 J**	<17 J	**130 J**	<13 J	<2.6 J	**290**	**0.38 JP**	<2.7 J	<4.1 J
endosulfan sulfate	1,000	<4.1	<4.1	**0.31 JP**	**0.43 J**	<2.7 J	<14 J	<13 J	<2.7 J	<2.6 J	<2.6 J	<12 J	<13 J	<2.6	<23 J	<13	<2.6	<44 J	<2.8 J	<2.7 J	<4.1 J
4,4' - DDT	2,100	<4.1 J	<4.1 J	**0.62 JP**	<4.2 J	<2.7 J	<14 J	**11 J**	**0.066 JP**	**0.57 JP**	<2.6	<12 J	**30 J**	**2.8 JP**	**24 J**	<13 J	<2.6 J	**94 J**	**1.1 JP**	<2.7 J	**0.36 JP**
methoxychlor	***	<21 J	<21 J	<21 J	<21 J	<14 J	<70 J	<66 J	<14 J	<13 J	<13 J	<64 J	<69 J	<13 J	<120 J	<65 J	<13 J	<220 J	<14 J	<14 J	<21 J
endrin ketone	N/A	<4.1	<4.1	<4.1 J	<4.2 J	<2.7	<14	<13	<2.7	<2.6 J	<2.6	<12 J	<13 J	<2.6 J	<23 J	<13	<2.6	<44 J	<2.8 J	<2.7 J	<4.1 J
endrin aldehyde	NG	<4.1	<4.1	<4.1 J	<4.2 J	<2.7 J	<14 J	<13	<2.7	<2.6 J	<2.6 J	<12	<13	<2.6 J	<23 J	<13 J	<2.6 J	<44 J	<2.8	<2.7	<4.1 J
alpha - chlordane	540	<2.1	<2.1	<2.1 J	<2.1 J	<1.4 J	<7.0 J	**0.31 JP**	<1.4	<1.3 J	<1.3 J	<6.4	<6.9	**0.083 JP**	<12 J	<6.5	<1.3	<22 J	<1.4	<1.4	<2.1 J
gamma - chlordane	540	<2.1	<2.1	<2.1 J	<2.1 J	<1.4	<7.0	<6.6	<1.4	<1.3 J	<1.3	<6.4	<6.9	<1.3 J	<12 J	<6.5	<1.3	<22 J	**0.10 JP**	<1.4	<2.1 J
toxaphene	NG	<210	<210	<210	<210	<140	<700	<660	<140	<130 J	<130	<640	<690	<130 J	<1200	<650	<130	<2200	<140	<140	<210
aroclor - 1016	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	<28	<27	<41
aroclor - 1221	*	<82	<82	<82	<84	<54	<280	<260	<54	<52	<53	<250	<270	<53	<460	<260	<53	<880	<57	<54	<82
aroclor - 1232	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	<28	<27	<41
aroclor - 1242	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	<28	<27	<41
aroclor - 1248	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	<28	<27	<41
aroclor - 1254	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	**10 J**	<27	<41
aroclor - 1260	*	<41	<41	<41	<42	<27	<140	<130	<27	<26	<26	<120	<130	<26	<230	<130	<26	<440	<28	<27	<41

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
NA - Compound not analyzed for in this sample.
D - Reported concentration value reflects dilution.
P - The percent difference between concentration values calculated on both columns was greater than 25% D.
* - 1.0 ppm surface; 10 ppm subsurface.
*** - As per TAGM 4046, total pesticides <10 ppm.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-8 (cont.)
SUMMARY OF TCL PESTICIDE and PCB DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING		B-121	B-122	B-123	B-124	B-124	B-125	B-125	B-133	B-133	DUPE-09 B-133	B-134	B-134	B-135	B-135	B-136	B-136	MW-26D	MW-26D
DEPTH (ft)	GUIDANCE	0-3	0-1	0-1	3-5	7-9	3-5	7-9	1-3	5-7	5-7	1-3	7-9	1-3	7-9	1-3	7-9	3-5	11-13
DATE COLLECTED	(ug/Kg)	4/25/94	10/28/93	10/28/94	4/25/94	4/25/94	4/26/94	4/26/94	5/10/94	5/9/94	5/9/94	5/10/94	5/9/94	5/9/94	5/9/94	5/10/94	5/10/94	5/3/94	5/3/94
COMPOUND																			
alpha-BHC	110	<10	NA	NA	**0.045 J**	**0.042 J**	**0.13 J**	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
beta-BHC	200	<10	NA	NA	**0.34 JP**	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	**0.28 JP**	<6.6 J	<1.4 J	<6.6	<1.4
delta-BHC	300	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
gamma-BHC (lindane)	60	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
heptachlor	100	<10	NA	NA	<1.9	<1.9	**0.10 JP**	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
aldrin	41	<10	NA	NA	<1.9	<1.9	**0.16 J**	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
heptachlor epoxide	20	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
endosulfan I	900	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
dieldrin	44	<20	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11 J	<2.5 J	<2.5 J	<2.5 J	<2.7 J	<2.5 J	<2.4 J	<13 J	<2.7 J	<13	<2.7
4,4' - DDE	2,100	**11 JP**	NA	NA	**0.095 J**	<3.7	**0.17 JP**	<3.9	<11 J	<2.5 J	<2.5 J	**0.26 J**	<2.7 J	**0.64 J**	<2.4 J	<13 J	<2.7 J	**4.1 J**	<2.7
endrin	100	<20	NA	NA	**0.074 J**	**0.072 JP**	**0.074 JP**	<3.9	<11 J	<2.5 J	<2.5 J	<2.5 J	<2.7 J	<2.5 J	<2.4 J	<13 J	<2.7 J	<13	<2.7
endosulfan II	900	<20	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11	<2.5 J	<2.5	<2.5	<2.7 J	<2.5	<2.4	<13	<2.7	<13	<2.7
4,4' - DDD	2,900	**12 JP**	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11	<2.5 J	<2.5	<2.5	<2.7 J	<2.5	<2.4	<13	<2.7	**4.9 J**	**0.096 JP**
endosulfan sulfate	1,000	<20	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11	<2.5 J	<2.5 J	<2.5	<2.7 J	<2.5	<2.4	<13	<2.7	<13 J	<2.7 J
4,4' - DDT	2,100	**3.0 JP**	NA	NA	<3.7 J	<3.7 J	<3.5 J	<3.9	<11 J	<2.5 J	<2.5 J	<2.5 J	<2.7 J	<2.5 J	<2.4 J	<13 J	<2.7 J	<13 J	<2.7 J
methoxychlor	***	<100	NA	NA	<19 J	<19 J	<18 J	<19	<59 J	<13 J	<13 J	<13 J	<14 J	<13 J	<13 J	<66 J	<14 J	<66 J	<14 J
endrin ketone	N/A	<20	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11 J	<2.5 J	<2.5	<2.5	<2.7 J	<2.5	<2.4	<13	<2.7	<13	<2.7
endrin aldehyde	NG	<20	NA	NA	<3.7	<3.7	<3.5 J	<3.9	<11 J	<2.5 J	<2.5 J	<2.5 J	<2.7 J	<2.5 J	<2.4 J	<13 J	<2.7 J	<13 J	<2.7 J
alpha - chlordane	540	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9 J	<1.3 J	<1.3 J	<1.3 J	<1.4 J	<1.3 J	<1.3 J	<6.6 J	<1.4 J	<6.6 J	<1.4 J
gamma - chlordane	540	<10	NA	NA	<1.9	<1.9	<1.8 J	<1.9	<5.9	<1.3 J	<1.3	<1.3 J	<1.4 J	<1.3	<1.3	<6.6	<1.4	<6.6	<1.4
toxaphene	NG	<1000	NA	NA	<190	<190	<180	<190	<590	<130	<130	<130	<140	<130	<130	<660	<140	<660	<140
aroclor - 1016	*	<200	<560	<540	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27
aroclor - 1221	*	<400	<560 J	<540 J	<74	<75	<71	<78	<230	<51	<51	<51	<54	<51	<50	<260	<54	<260	<54
aroclor - 1232	*	<200	<560 J	<540 J	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27
aroclor - 1242	*	<200	<560	<540	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27
aroclor - 1248	*	<200	<560	<540	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27
aroclor - 1254	*	<200	<560	<540	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27
aroclor - 1260	*	<200	<560	<540	<37	<37	<35	<39	<110	<25	<25	<25	<27	<25	<24	<130	<27	<130	<27

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
NA - Compound not analyzed for in this sample.
D - Reported concentration value reflects dilution.
P - The percent difference between concentration values calculated on both columns was greater than 25% D.
* - 1.0 ppm surface; 10 ppm subsurface.
*** - As per TAGM 4046, total pesticides <10 ppm.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-9
SUMMARY OF TAL INORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING	GUIDANCE	B-103	B-103	B-104	DUPE-08 B-104	B-104	B-105	B-105	B-106	B-106	B-107	B-107	B-108	B-108	B-109	B-109	B-110	B-110	DUPE-02 B-110	B-112	B-112
DEPTH (ft)	(mg/Kg)	3-5	7-9	5-7	5-7	7-9	5-7	7-9	2-3	5-6	2-3	5-6	3-5	7-9	3-5	9-11	3-5	7-9	7-9	3-5	9-11
DATE COLLECTED		5/2/94	5/2/94	5/6/94	5/6/94	5/6/94	5/6/94	5/6/94					4/29/94	4/29/94	5/2/94	5/2/94	4/28/94	4/28/94	4/28/94	4/27/94	4/27/94
ANALYTE																					
aluminum	SB	**9690**	**7170**	NA	NA	NA	NA	NA	**8140**	**6900**	**4940**	**6490**	**9980**	**3110**	**7270**	**7910**	**3610**	**9610**	**10600**	**7110 EJ**	**3740 EJ**
antimony	SB	<13.5	<13.7	NA	NA	NA	NA	NA	<3.8 NR	<3.8 NR	<3.8 NR	<3.9 NR	<12.9	<13.5	<12.9	<13.2	<12.5	<13.5	<13.2	<12.8 JN	<13.2 JN
arsenic	7.5 or SB	**3.7 JN**	**5.3 JN**	NA	NA	NA	NA	NA	**4.3 BJN**	**1.2 JNS**	**2.3 BJN**	**3.5 JN**	**2.5**	**1.6 B**	**4.0 JN**	**4.9 JN**	<0.43 WJ	**2.7**	**2.4 S**	**2.3**	**2.8**
barium	300 or SB	**24.5 B**	**32.3 B**	NA	NA	NA	NA	NA	**32.8**	**23.5**	**40.3**	**24.9**	**39.7 B**	**11.6 B**	**29.0 B**	**29.8 B**	**3.4 B**	**52.0**	**77.4**	**21.6 B**	**15.2 B**
beryllium	0.16 or SB	**0.57 B**	**0.57 B**	NA	NA	NA	NA	NA	**0.45 B**	**0.27 B**	**0.28 B**	**0.43 B**	**0.51 B**	**0.27 B**	**0.54 B**	**0.74 B**	<0.20	**0.53 B**	**0.69 B**	**0.45 B**	**0.33 B**
cadmium	1 or SB	<0.59	<0.59	NA	NA	NA	NA	NA	<0.30 N	<0.30 N	<0.30 N	<0.31 N	<0.56 N	<0.59 N	<0.56	<0.57	**0.64 JNB**	<0.59 N	<0.57 N	<0.55	<0.57
calcium	SB	**1590**	**27500**	NA	NA	NA	NA	NA	**1180**	**1170**	**21500**	**1590**	**9020**	**25900**	**24900**	**43500**	**114000**	**14200**	**2420**	**37800 EJ**	**83300 EJ**
chromium	10 or SB	**7.3**	**5.5**	NA	NA	NA	NA	NA	**9.2**	**6.9 R**	**7.4**	**7.5**	**6.6**	**2.4 B**	**6.9**	**9.4**	**3.1**	**9.2**	**8.1**	**8.0 NJ**	**4.2 NJ**
cobalt	30 or SB	**6.3 B**	**5.9 B**	NA	NA	NA	NA	NA	**7.3**	**6.9**	**6**	**6.5**	**7.9 B**	<4.1	**6.2 B**	**6.4 B**	**5.4 B**	**9.3 B**	**10.4 B**	**7.0 B**	**4.5 B**
copper	25 or SB	**21.3**	**28.1**	NA	NA	NA	NA	NA	**11.5**	**6.8**	**16.8**	**13**	**17.2**	**9.4**	**20.7**	**17.0**	**10.1**	**36.5**	**5.8 B**	**21.6 R**	**31.7 R**
iron	2,000 or SB	**11600**	**10800**	NA	NA	NA	NA	NA	**12600**	**10400**	**12100**	**11700**	**14500**	**7770**	**12900**	**16000**	**7970**	**14200**	**21600**	**12900 EJ**	**7660 EJ**
lead	SB	<2.2 JNW	<7.5 JN	**3.6**	**3.1**	**3.0**	**7.0**	**4.7**	**2.3 JN**	**1.3 JN**	**1.9 JN**	**1.9 JN**	**8.0 S**	**6.0 WJ**	<9.1 JN	<14.4 JN	**4.2 S**	**11.2 WJ**	**13.5 WJ**	**24.3 NJ**	**5.0 NJ**
magnesium	SB	**2110**	**6440**	NA	NA	NA	NA	NA	**2140**	**1970**	**4580**	**1940**	**4740**	**7960**	**9870**	**14500**	**6510**	**3290**	**2290**	**8710 EJ**	**20300 EJ**
manganese	SB	**197**	**513**	NA	NA	NA	NA	NA	**373**	**293**	**550**	**567**	**459**	**445**	**407**	**468**	**262**	**618**	**447**	**365 EJ**	**446 EJ**
mercury	0.1	<0.12 JN	<0.12 JN	NA	NA	NA	NA	NA	<0.11 JN	<0.11 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.12 JN	<0.11 JN	<0.12 JN	<0.12 JN	<0.11 JN	<0.12 JN
nickel	13 or SB	**9.2 JB**	**11.2 J**	NA	NA	NA	NA	NA	**12.4 R**	**11.6 R**	**15.5**	**10.9**	**13.8**	**8.4 B**	**13.0 J**	**14.2 J**	**9.4**	**12.3**	**13.9**	**13.8**	**8.9 B**
potassium	SB	<583	<590	NA	NA	NA	NA	NA	**703**	**554 B**	**442 B**	**600**	<556	<583	**754 B**	**1570**	**540 B**	<583	<569	<549	**572 B**
selenium	2 or SB	<0.56	<0.57	NA	NA	NA	NA	NA	**0.26 B**	<0.26	<0.27	<0.27	<0.53 WJ	<0.56 WJ	<0.53 W	<0.55	<0.52 WJ	**0.63 JWB**	<0.55 W	<0.53 JN	<0.55 JNW
silver	SB	<1.9 JN	<1.9 JN	NA	NA	NA	NA	NA	<0.56 JN	<0.56 JN	<0.57 JN	<0.58 JN	<1.8 JN	<1.9 JN	<1.8 JN	<1.8 JN	<1.7 NJ	<1.9 JN	<1.8 NJ	<1.8 NR	<1.8 R
sodium	SB	<113 R	<114 R	NA	NA	NA	NA	NA	**140 B**	**130 B**	**217 B**	**167 B**	**251 B**	**165 B**	<108 R	<110 R	**249 B**	**287 B**	<110	<106	<110
thallium	SB	**1.5 JNWB**	<0.52 N	NA	NA	NA	NA	NA	<0.68 NR	<0.68 NR	<0.70 NR	<0.71 NR	<1.4	<1.5	<0.49 N	<0.50 N	<1.3	<1.5	<1.4	<1.4	<1.4
vanadium	150 or SB	**10.9 B**	**8.2 B**	NA	NA	NA	NA	NA	**7.9**	**6.5**	**4.2 B**	**6.7**	**9.7 B**	**4.4 B**	**7.8 B**	**14.0**	**8.4 B**	**11.9 B**	**18.4**	**16.5**	**6.1 B**
zinc	20 or SB	**25.4**	**24.6**	NA	NA	NA	NA	NA	**24.3**	**17.2**	**20.3**	**26**	**36.1**	**22.3**	**26.7**	**30.2**	**23.1**	**34.9**	**27.9**	**36.0 ENR**	**21.0 ENR**
cyanide	NG	<1.2 J	<1.2 J	NA	NA	NA	NA	NA	NA	NA	NA	NA	<1.2	<1.2	<1.2 J	<1.2 J	<1.1	<1.2	<1.2	<1.1 R	<1.2 R

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).

B - Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E - Indicates a value estimated or not reported due to the presence of interference.
N - Indicates spike sample recovery is not within control limits.
W - Post digestion spike for furnace AA analysis is outside of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.
J - Value is estimated since it falls below the detection limit.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NA - Sample not analyzed for this analyte.
R - Data rejected by data validator.
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-9 (cont.)
SUMMARY OF TAL INORGANIC DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

BORING DEPTH (ft) DATE COLLECTED	GUIDANCE (mg/Kg)	B-115 2-3 4/28/94	B-115 5-6 4/28/94	B-120 2-4 4/26/94	B-122 0-1 10/28/93	B-123 0-1 10/28/94	MW-26D 3-5 5/3/94	MW-26D 11-13 5/3/94
ANALYTE								
aluminum	SB	**4530**	**3260**	**8120 EJ**	**2840**	**3100**	**6990**	**3040**
antimony	SB	<14.1	<13.4	<13.7 JN	<3.7 NR	<3.6 NR	<12.9	<13.5
arsenic	7.5 or SB	**1.8 B**	**1.1 B**	**1.8 B**	<1.1 JNS	<0.21 JN	**4.1 JN**	**25.0 NWJ**
barium	300 or SB	**25.1 B**	**9.3 B**	**25.5 B**	**22.1 B**	**22.4**	**21.5 B**	**7.9 B**
beryllium	0.16 or SB	**0.37 B**	<0.22	**0.41 B**	**0.18 B**	**0.20 B**	**0.54 B**	**0.57 B**
cadmium	1 or SB	<0.61 N	<0.58 N	<0.59	<0.29 N	<0.28 N	<0.56	<0.59
calcium	SB	**2450**	**44200**	**16000 EJ**	**50400**	**69100**	**20800**	**45700**
chromium	10 or SB	**6.8**	**2.5**	**4.6 NJ**	**4.1**	**4.7**	**5.3**	**3.0**
cobalt	30 or SB	**5.7 B**	<4.1	**6.0 B**	**4.2 B**	**5.3 B**	**6.1 B**	<4.1
copper	25 or SB	**5.8 B**	**9.3**	**23.8 R**	**18.0**	**23.3**	**15.0**	**6.9**
iron	2,000 or SB	**10100**	**7510**	**11200 EJ**	**7080**	**8210**	**12200**	**9180**
lead	SB	**11.6 S**	**3.6 WJ**	**5.4 NJ**	**1.6 JN**	**1.6 JN**	<0.77 JN	<4.0 JNS
magnesium	SB	**1340**	**13600**	**3540 EJ**	**13200**	**15300**	**8660**	**14000**
manganese	SB	**177**	**301**	**324 EJ**	**287**	**349**	**395**	**298**
mercury	0.1	<0.13 JN	<0.12 JN	<0.12 JN	<0.11 JN	<0.11 JN	<0.12 JN	<0.12 JN
nickel	13 or SB	**8.1 B**	**7.6 B**	**11.3**	**8.1**	**9.2**	**14.1 J**	**8.6 BJ**
potassium	SB	<605	<576	<590	**489 B**	**395 B**	**1050 B**	<583
selenium	2 or SB	<0.58 JW	<0.55 JW	**0.57 NWBJ**	<1.3 JW	<1.2 JW	<0.53	<0.56
silver	SB	<1.9 JN	<1.9 JN	<1.9 R	<0.54 JN	<0.53 JN	<1.8 JN	<1.9 JN
sodium	SB	**216 B**	**180 B**	<114	**188 B**	**191 B**	<108 R	<113 R
thallium	SB	<1.5	<1.4	<1.5	<0.67 NR	<0.65 NR	<0.49 N	<0.51 N
vanadium	150 or SB	**9.7 B**	**3.8 B**	**7.7 B**	**2.1 B**	**2.1 B**	**8.9 B**	**6.0 B**
zinc	20 or SB	**24.2**	**27.4**	**23.4 ENR**	**17.7**	**17.5**	**26.1**	**20.8**
cyanide	NG	<1.3	<1.2	NA	NA	NA	<1.2 J	<1.2 J

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
B - Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.
E - Indicates a value estimated or not reported due to the presence of interference.
N - Indicates spike sample recovery is not within control limits.
W - Post digestion spike for furnace AA analysis is outside of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.
J - Value is estimated since it falls below the detection limit.
GUIDANCE - Division of Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels, HWR-94-4046, 24 January 1994
NA - Sample not analyzed for this analyte.
R - Data rejected by data validator.
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-10
SUMMARY OF TPH DATA - SOILS
MMC - FARRELL ROAD PLANT RI/FS

SAMPLE ID DEPTH (ft) DATE COLLECTED COMPOUND	B126 (3-5) 3-5 4/28/94	B127 (2-4) 2-4 4/28/94	DUPE-03 B127 (2-4) 4/28/94 2-4	B128 (1-3) 1-3 4/28/94
TPH	2040	220	989	30

NOTES:
- concentrations reported in miligrams per kilogram (mg/Kg).

TABLE G-11
SUMMARY OF TCL VOLATILE ORGANIC DATA - SURFACE WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	SW-01 11/4/93	SW-02 11/4/93	SW-03 11/4/93
chloromethane	<10	<10	<10
bromomethane	<10	<10	<10
vinyl chloride	<10	<10	<10
chloroethane	<10	<10	<10
methylene chloride	<10	<10	<10
acetone	<10	<10	<10
carbon disulfide	<10	**6 J**	**2 J**
1,1-dichloroethene	<10	<10	<10
1,1-dichloroethane	<10	<10	<10
1,2-dichloroethene	<10	<10	<10
chloroform	<10	<10	<10
1,2-dichloroethane	<10	<10	<10
2-butanone	<10	**7 J**	<10
1,1,1-trichloroethane	<10	<10	<10
carbon tetrachloride	<10	<10	<10
bromodichloromethane	<10	<10	<10
1,2-dichloropropane	<10	<10	<10
cis-1,3-dichloropropene	<10	<10	<10
trichloroethene	<10	<10	<10
dibromochloromethane	<10	<10	<10
1,1,2-trichloroethane	<10	<10	<10
benzene	<10	<10	<10
trans-1,3-dichloropropene	<10	<10	<10
bromoform	<10 J	<10	<10 J
4-methyl-2-pentanone	<10	<10	<10
2-hexanone	<10	<10	<10
tetrachloroethene	<10	<10	<10
1,1,2,2-tetrachloroethane	<10	<10	<10
toluene	<10	<10	<10
chlorobenzene	<10	<10	<10
ethylbenzene	<10	<10	<10
styrene	<10	<10	<10
xylenes (total)	<10	<10 J	<10
trichlorofluoromethane	R	<10	<10
methyl tert-butyl ether	**310 JN**	<10	<10

NOTES:
- concentrations reported as micrograms per kilogram (ug/Kg).
J - Value is estimated since it falls below the detection limit.
N - Presumptive evidence of a compound.
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-12
SUMMARY OF INORGANIC DATA - SURFACE WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE ANALYTE	SW-01 11/4/93	SW-02 11/4/93	SW-03 11/4/93
calcium	**74100 JE**	**182000 JE**	**146000 JE**
magnesium	**10700**	**68000**	**38300**
hardness	**229000 J**	**734000 J**	**522000 J**

NOTES:

- concentrations reported as micrograms per kilogram (ug/Kg).

E - Indicates a value estimated or not reported due to the presence of interference.

J - Value is estimated since it falls below the detection limit.

TABLE G-13
SUMMARY OF TCL VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	MW-01 5/16/94	MW-02 5/20/94	MW-03S 5/18/94	MW-03D 5/18/94	MW-04 5/16/94	MW-05 5/16/94	MW-06 5/17/94	MW-07 5/17/94	MW-08 5/17/94	MW-09 5/17/94	MW-10 5/20/94	MW-11 5/20/94	MW-12 5/20/94
benzene	0.7	<0.5	<1.0	<0.5	**0.12 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.2 B**	<0.5	**56 B**
bromobenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
bromochloromethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
bromodichloromethane	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
bromoform	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
bromomethane	5	<0.5	<1.0 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5 J	<0.5 J	<1.0 J
n-butlybenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
sec-butlybenzene	5	<0.5	**2.9 B**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.5 B**	<0.5	<1.0
tert-butlybenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.54 B**	<1.0
carbon tetrachloride	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
chlorobenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
chloroethane	5	<0.5 J	<1.0 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<1.0 J
chloroform	7	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**0.14 BJ**	<1.0
chloromethane	NG	<0.5 J	<1.0	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5	<0.5	<1.0
2-chlorotoluene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
4-chlorotoluene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
dibromochloromethane	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,2-dibromo-3chloropropane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,2-dibromoethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
dibromoethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,2-dichlorobenzene	4.7	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,3-dichlorobenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,4-dichlorobenzene	4.7	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
dichlorodifluoromethane	5	<0.5 J	<1.0	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1-dichloroethane	5	<0.5	**0.25 J**	**0.2 J**	**0.18 J**	<0.5	<0.5	**0.12 J**	<0.5	**65**	**1**	**0.50**	**1.2**	<1.0
1,2-dichloroethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1-dichloroethene	5	<0.5	**1.3**	<0.5	**1.1**	0.83	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**8.6**	<1.0
cis-1,2-dichloroethene	5	<0.5	<1.0	<0.5	**87**	<0.5	<0.5	<0.5	<0.5	**7**	**0.08 J**	<0.5	<0.5	<1.0
trans-1,2-dichloroethene	5	<0.5	<1.0	**13**	**3.2**	<0.5	<0.5	<0.5	<0.5	**0.25 J**	<0.5	<0.5	<0.5	<1.0
1,2-dichloroethene	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-dichloropropane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,3-dichloropropane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
2,2-dichloropropane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1-dichloropropene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
cis-1,3-dichloropropene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
trans-1,3-dichloropropene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
ethylbenzene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**7.2**	<0.5	<1.0
hexachlorobutadiene	0.5	<0.5 J	<1.0	<0.5	<0.5	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
isopropylbenzene	5	<0.5	**4.0 B**	<0.5	**0.02 J**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**3.7 B**	<0.5	<1.0
4-isopropyltoluene	5	<0.5	**10**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**1.8**	**6.8**	**10**
methylene chloride	5	<0.5 J	**2.2 BJ**	<0.5	<0.5 J	<0.5	<0.5	<0.5	<0.5 J	<0.5 J	<0.5 J	<0.5	<0.5	<2.6 J
naphthalene	10	<0.5 J	**140 B**	<0.5	<0.5	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	**73 B**	**31 B**	**160 B**
n-propylbenzene	5	<0.5	**6.0 B**	<0.5	<0.5	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	**2.1**	<0.5	<1.0
styrene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1,1,2-tetrachloroethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1,2,2-tetrachloroethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
tetrachloroethene	5	<0.5 J	<1.0 J	<0.5	<0.5	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<1.0 J
toluene	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<7.7
1,2,3-trichlorobenzene	5	<0.5 J	<1.0 J	<0.5	<0.5	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5 J	<0.5 J	<1.0 J
1,2,4-trichlorobenzene	5	<0.5 J	<1.0	<0.5	<0.5	<0.5 J	<0.5 J	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,1,1-trichloroethane	5	<0.5	**13**	<0.5	**0.99**	<0.5	<0.5	**1**	<0.5	**22**	**1.2**	**6.4**	**62**	<1.0
1,1,2-trichloroethane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
trichloroethene	5	<0.5	**4.9**	**39**	**160**	<0.5	<0.5	<0.5	<0.5	**5.4**	**0.65**	**3.6**	**0.79**	<1.0
trichlorofluoromethane	5	<0.5 J	**130 J**	<0.5 J	**10 J**	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	**130**	**59 J**	<1.0 J
1,2,3-trichloropropane	5	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
1,2,4-trimethylbenzene	5	<0.5	**82 B**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**25**	**25 B**	**190 B**
1,3,5-trimethylbenzene	5	<0.5	**33**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**4.6**	**20**	**69**
vinyl chloride	2	<0.5 J	<1.0 J	**4.7 J**	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<1.0 J
o-xylenes	NG	<0.5	**43 B**	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**22 B**	**6.1 B**	**110 B**
m & p-xylenes	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	**2.6 B**	<0.5 J	**140 B**
xylenes (total)	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethyl ether	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
acetone	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
carbon disulfide	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
2-butanone	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
4-methyl-2-pentanone	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
2-hexanone	50	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
butane, 2-methyl	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0
methyl tert butyl ether	NG	<0.5	<1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1.0

NOTES:

- concentrations reported as micrograms per liter (ug/L).

B - Compound also detected in reagent blank.

J - Value is estimated since it falls below the detection limit.

E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.

N - Presumptive evidence of a compound.

NA - Compound not analyzed for in this sample.

GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-13 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	MW-13 5/16/94	MW-14 5/16/94	MW-15 5/16/94	MW-16 5/17/94	MW-17 5/18/94	MW-18 5/18/94	MW-19 5/16/94	MW-20 5/17/94	MW-21 5/19/94	MW-22 5/19/94	MW-23 5/19/94	MW-24 5/17/94	MW-25 5/19/94
benzene	0.7	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	**2200 B**	**35 B**	**1800 B**	<0.5	**16000 B**
bromobenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
bromochloromethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
bromodichloromethane	50	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
bromoform	50	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
bromomethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10 J	<0.5	<100
n-butlybenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	**20 B**	<10	<0.5	<100
sec-butlybenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	**4.2 BJ**	<10	<0.5	<100
tert-butlybenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
carbon tetrachloride	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
chlorobenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
chloroethane	5	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<10	<0.5 J	<0.5 J	<0.5 J	<40 J	<10 J	<10 J	<0.5 J	<100 J
chloroform	7	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	40	<10	<10	<0.5	<100
chloromethane	NG	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<10 J	<0.5 J	<0.5 J	<0.5 J	<40 J	<10 J	<10	<0.5 J	<100 J
2-chlorotoluene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
4-chlorotoluene	5	<0.5	<0.5	<0.5	<0.5	<10 J	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
dibromochloromethane	50	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5 J	<0.5	<40	<10	<10	<0.5	<100
1,2-dibromo-3chloropropane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40 J	<10 J	<10	<0.5	<100 J
1,2-dibromoethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
dibromoethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,2-dichlorobenzene	4.7	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,3-dichlorobenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,4-dichlorobenzene	4.7	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
dichlorodifluoromethane	5	<0.5 J	<0.5 J	<0.5 J	<0.5	<10 J	<0.5	<0.5	<0.5	<40 J	<10 J	<10	<0.5	<100 J
1,1-dichloroethane	5	<0.5	<0.5	**0.22 J**	<0.5	**1.0 J**	**0.28 J**	**3.2**	<0.5	<40	<10	<10	**5**	<100
1,2-dichloroethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,1-dichloroethene	5	<0.5	<0.5	<0.5	<0.5	**3.7 J**	**0.22 J**	**0.68**	<0.5	<40	<10	<10	**0.63**	<100
cis-1,2-dichloroethene	5	<0.5	<0.5	<0.5	**5.6**	**120**	**2.4**	<0.5	<0.5	<40	<10	<10	<0.5	<100
trans-1,2-dichloroethene	5	<0.5	<0.5	<0.5	**0.28 J**	**4.9 J**	**0.14 J**	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,2-dichloroethene	5	NA	NA	NA	NA	NA	<0.5	NA	NA	NA	NA	NA	NA	NA
1,2-dichloropropane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,3-dichloropropane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
2,2-dichloropropane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,1-dichloropropene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
cis-1,3-dichloropropene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
trans-1,3-dichloropropene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
ethylbenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	**510**	**420**	<10	<0.5	**660**
hexachlorobutadiene	0.5	<0.5 J	<0.5 J	<0.5 J	<0.5	<10	<0.5	<0.5 J	<0.5	<40	<10	<10	<0.5	<100
isopropylbenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	**42 B**	<10	<0.5	**32 BJ**
4-isopropyltoluene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	**12**	**8.8 J**	<0.5	**7.4 J**
methylene chloride	5	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<48 J	<0.5 J	<0.5 J	<0.5 J	<160 J	<37 J	<10 J	<0.5 J	<440 J
naphthalene	10	<0.5 J	<0.5 J	<0.5 J	<0.5	<10	<0.5	<0.5 J	<0.5	<98 J	<140	<120	<0.5	<580 J
n-propylbenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	**85**	<10	<0.5	**37 J**
styrene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,1,1,2-tetrachloroethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
1,1,2,2-tetrachloroethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
tetrachloroethene	5	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<10	<0.5 J	<0.5 J	<0.5 J	<40 J	<10 J	<10 J	<0.5 J	<100 J
toluene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	**6500 B**	**1200 B**	**1400 B**	<0.5	**12000**
1,2,3-trichlorobenzene	5	<0.5 J	<0.5 J	<0.5 J	<0.5	<10	<0.5	<0.5 J	<0.5	<40 J	<10 J	<10 J	<0.5	<100 J
1,2,4-trichlorobenzene	5	<0.5 J	<0.5 J	<0.5 J	<0.5	<10	<0.5	<0.5 J	<0.5	<40 J	<10 J	<10	<0.5	<100 J
1,1,1-trichloroethane	5	<0.5	<0.5	<0.5	<0.5	**6.4 J**	**0.81**	<0.5	**0.54**	<40	<10	<10	<0.5	<100
1,1,2-trichloroethane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
trichloroethene	5	<0.5	<0.5	**1.5**	**4.2**	**650**	**9.6**	**33**	<0.5	<40	<10	<10	<0.5	<100
trichlorofluoromethane	5	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<10 J	<0.5 J	<0.5	<0.5 J	<40 J	<10	<10 J	<0.5 J	<100 J
1,2,3-trichloropropane	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40 J	<10 J	<10	<0.5	<100 J
1,2,4-trimethylbenzene	5	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<230	**980 B**	**450 B**	<0.5	<660
1,3,5-trimethylbenzene	5	<0.5	<0.5	<0.5	<0.5	**0.61 J**	<0.5	<0.5	<0.5	<69	**270 B**	**160**	<0.5	<170
vinyl chloride	2	<0.5 J	<0.5 J	<0.5 J	<0.5 J	<10 J	<0.5 J	<0.5 J	<0.5 J	<40 J	<10 J	<10 J	<0.5 J	<100 J
o-xylenes	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<620	**1200 B**	**360 B**	<0.5	<1400
m & p-xylenes	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<620	**1500 B**	**530 B**	<0.5	<1400
xylenes (total)	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ethyl ether	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
acetone	50	<0.5	<0.5	<0.5	<0.5	**350 J**	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
carbon disulfide	NG	**6 J**	<0.5	<0.5	**2 J**	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
2-butanone	50	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
4-methyl-2-pentanone	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
2-hexanone	50	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
butane, 2-methyl	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100
methyl tert butyl ether	NG	<0.5	<0.5	<0.5	<0.5	<10	<0.5	<0.5	<0.5	<40	<10	<10	<0.5	<100

NOTES:

- concentrations reported as micrograms per liter (ug/L).

B - Compound also detected in reagent blank.
J - Value is estimated since it falls below the detection limit.
E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
N - Presumptive evidence of a compound.
NA - Compound not analyzed for in this sample.
GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-13 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	DUPE-11 MW-25 5/19/94	MW-26S 5/18/94	DUPE-10 MW-26S 5/18/94	MW-26D 5/18/94	BR-01 6/23/94	BR-02 6/23/94	BR-03 6/23/94	P-9 11/2/93	P-10S 11/2/93	P-10D 11/2/94	P-11S 11/2/94	P-11D 11/2/94	P-12 11/2/94
benzene	0.7	**14000 B**	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	**310 J**	<100	<10	<10	<10 J
bromobenzene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
bromochloromethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
bromodichloromethane	50	<100	<2.5	<2.5	<1.0	**0.65**	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
bromoform	50	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10 J	<100	<100 J	<10 J	<10 J	<10 J
bromomethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
n-butlybenzene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
sec-butlybenzene	5	<100	**0.15 J**	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
tert-butlybenzene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
carbon tetrachloride	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
chlorobenzene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
chloroethane	5	<100 J	<2.5 J	<2.5 J	<1.0 J	<0.5 J	<0.5 J	<0.5 J	<10	<100	<100	<10	<10	<10 J
chloroform	7	<100	<2.5	<2.5	<1.0	**1.5 BJ**	**7.3 BJ**	**1.8 BJ**	<10	<100	<100	<10	<10	<10 J
chloromethane	NG	<100 J	<2.5 J	<2.5 J	<1.0 J	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
2-chlorotoluene	5	<100	<2.5	<2.5	<1.0	<0.5	**0.05 J**	<0.5	NA	NA	NA	NA	NA	NA
4-chlorotoluene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
dibromochloromethane	50	<100	<2.5	<2.5	<1.0	**0.29 J**	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
1,2-dibromo-3chloropropane	5	<100 J	<2.5	<2.5	<1.0	<0.5 J	<0.5 J	<0.5 J	NA	NA	NA	NA	NA	NA
1,2-dibromoethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
dibromoethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,2-dichlorobenzene	4.7	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,3-dichlorobenzene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,4-dichlorobenzene	4.7	<100	<2.5	<2.5	<1.0	<0.5	**0.06 J**	<0.5	NA	NA	NA	NA	NA	NA
dichlorodifluoromethane	5	<100 J	<2.5 J	<2.5 J	<1.0 J	<0.5 J	<0.5 J	<0.5 J	NA	NA	NA	NA	NA	NA
1,1-dichloroethane	5	<100	**58**	**57**	**23**	<0.5	<0.5	<0.5	<10	<100	**3 J**	<10	<10	<10 J
1,2-dichloroethane	5	<100	<2.5	<2.5	**2**	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
1,1-dichloroethene	5	<100	**24**	**24**	**50 J**	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
cis-1,2-dichloroethene	5	<100	<2.5	**0.72 J**	**130**	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
trans-1,2-dichloroethene	5	<100	<2.5	<2.5	**0.66 J**	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,2-dichloroethene	5	NA	NA	NA	NA	NA	NA	NA	<10	<100	<100	<10	<10	<10 J
1,2-dichloropropane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
1,3-dichloropropane	5	<100	<2.5	<2.5	<1.0	<0.5 J	<0.5 J	<0.5 J	NA	NA	NA	NA	NA	NA
2,2-dichloropropane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,1-dichloropropene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
cis-1,3-dichloropropene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
trans-1,3-dichloropropene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
ethylbenzene	5	**500**	**68**	**68**	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
hexachlorobutadiene	0.5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
isopropylbenzene	5	**21 BJ**	**2.1 J**	**2.2 J**	<1.0	<0.5	**0.05 J**	**0.18 J**	NA	NA	NA	NA	NA	NA
4-isopropyltoluene	5	<100	**1.7 J**	**1.7 J**	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
methylene chloride	5	<420 J	<9.5 J	<2.5	<3.0 J	<0.5 J	<0.5 J	<0.5	<10	<100	<100	<10	<10	<10 J
naphthalene	10	<140 J	<2.5	<2.5	<1.0 J	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
n-propylbenzene	5	<100	**0.76 J**	**0.80 J**	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
styrene	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
1,1,1,2-tetrachloroethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,1,2,2-tetrachloroethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
tetrachloroethene	5	<100 J	<2.5 J	<2.5 J	<1.0 J	<0.5 J	<0.5 J	<0.5 J	<10	<100	<100	<10	<10	<10 J
toluene	5	**11000 B**	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	**21 J**	<100	<10	<10	<10 J
1,2,3-trichlorobenzene	5	<100 J	<2.5	<2.5	<1.0 J	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,2,4-trichlorobenzene	5	<100 J	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
1,1,1-trichloroethane	5	<100	**18**	**19**	**10**	<0.5	<0.5	<0.5	<10	**180 J**	**5 J**	<10	<10	<10 J
1,1,2-trichloroethane	5	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
trichloroethene	5	<100	<2.5 J	<2.5	**96 BJ**	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
trichlorofluoromethane	5	<100 J	<2.5 J	<2.5 J	**1.5 J**	<0.5 J	<0.5 J	<0.5 J	<10	<100	<100	<10	<10	<10 J
1,2,3-trichloropropane	5	<100 J	<2.5	<2.5	<1.0	<0.5 J	<0.5 J	<0.5 J	NA	NA	NA	NA	NA	NA
1,2,4-trimethylbenzene	5	<490	**24**	**24**	<1.0	<0.5	<0.5	**0.88 BJ**	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	5	**130 B**	**9**	**9.6**	<1.0	<0.5	<0.5	**0.57 BJ**	NA	NA	NA	NA	NA	NA
vinyl chloride	2	<100 J	<2.5 J	<2.5 J	<1.0 J	<0.5 J	<0.5 J	<0.5 J	<10	<100	<100	<10	<10	<10 J
o-xylenes	NG	**1200 B**	**4.6 B**	**4.6 B**	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
m & p-xylenes	NG	**1100 B**	**180 B**	**180 B**	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
xylenes (total)	5	NA	NA	NA	NA	NA	NA	NA	<10	<100	<100	<10	<10	<10 J
ethyl ether	NG	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	NA	NA	NA	NA	NA	NA
acetone	50	**4000 J**	**125 J**	**110 J**	<1.0	<0.5	<0.5	<20 J	<10	**2300 JE**	<100	<10	<10	<10 J
carbon disulfide	NG	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	**9 J**	<100	<100	<10	<10	<10 J
2-butanone	50	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
4-methyl-2-pentanone	NG	<100	<2.5	<2.5	<1.0	<0.5	**5 J**	<0.5	<10	<100	<100	<10	<10	<10 J
2-hexanone	50	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	<100	<10	<10	<10 J
butane, 2-methyl	NG	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	**330 JN**	<100	<10	<10	<10 J
methyl tert butyl ether	NG	<100	<2.5	<2.5	<1.0	<0.5	<0.5	<0.5	<10	<100	**50 JN**	<10	<10	<10 J

NOTES:

- concentrations reported as micrograms per liter (ug/L).

B - Compound also detected in reagent blank.
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E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
N - Presumptive evidence of a compound.
NA - Compound not analyzed for in this sample.
GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-13 (cont.)
SUMMARY OF TCL VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION / DATE / COMPOUND	GUIDANCE (ug/L)	P-13 11/2/94	P-17S 11/9/94	P-17D 11/9/94	P-18S 11/9/94	DUP-2 P-18S 11/9/94	P-18D 11/9/94	P-19S 11/9/94	P-19D 11/9/94
benzene	0.7	<10	<10	<10	<10	<10	<10	<10	<10
bromobenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
bromochloromethane	5	NA	NA	NA	NA	NA	NA	NA	NA
bromodichloromethane	50	<10	<10	<10	<10	<10	<10	<10	<10
bromoform	50	<10	<10	<10	<10	<10 J	<10	<10	<10
bromomethane	5	<10	<10	<10	<10	<10	<10	<10	<10
n-butlybenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
sec-butlybenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
tert-butlybenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
carbon tetrachloride	5	<10	<10	<10	<10	<10	<10	<10	<10
chlorobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10
chloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10
chloroform	7	<10	<10	<10	<10	<10	<10	<10	<10
chloromethane	NG	<10	<10	<10	<10	<10	<10	<10	<10
2-chlorotoluene	5	NA	NA	NA	NA	NA	NA	NA	NA
4-chlorotoluene	5	NA	NA	NA	NA	NA	NA	NA	NA
dibromochloromethane	50	<10	<10	<10	<10	<10	<10	<10	<10
1,2-dibromo-3chloropropane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,2-dibromoethane	5	NA	NA	NA	NA	NA	NA	NA	NA
dibromoethane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,2-dichlorobenzene	4.7	NA	NA	NA	NA	NA	NA	NA	NA
1,3-dichlorobenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
1,4-dichlorobenzene	4.7	NA	NA	NA	NA	NA	NA	NA	NA
dichlorodifluoromethane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,1-dichloroethane	5	<10	<10	<10	<10	<10	**9 J**	**3 J**	**3 J**
1,2-dichloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10
1,1-dichloroethene	5	<10	<10	<10	<10	<10	<10	<10	**9 J**
cis-1,2-dichloroethene	5	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-dichloroethene	5	NA	NA	NA	NA	NA	NA	NA	NA
1,2-dichloroethene	5	<10	<10	<10	<10	<10	**140**	**9 J**	**15**
1,2-dichloropropane	5	<10	<10	<10	<10	<10	<10	<10	<10
1,3-dichloropropane	5	NA	NA	NA	NA	NA	NA	NA	NA
2,2-dichloropropane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,1-dichloropropene	5	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-dichloropropene	5	<10	<10	<10	<10	<10	<10	<10	<10
trans-1,3-dichloropropene	5	<10	<10	<10	<10	<10	<10	<10	<10
ethylbenzene	5	<10	<10	<10	<10	<10	<10	<10	<10
hexachlorobutadiene	0.5	NA	NA	NA	NA	NA	NA	NA	NA
isopropylbenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
4-isopropyltoluene	5	NA	NA	NA	NA	NA	NA	NA	NA
methylene chloride	5	<10	<10	<10	<10	<10	<10	<10	<10
naphthalene	10	NA	NA	NA	NA	NA	NA	NA	NA
n-propylbenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
styrene	5	<10	<10	<10	<10	<10	<10	<10	<10
1,1,1,2-tetrachloroethane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2,2-tetrachloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10
tetrachloroethene	5	<10	<10	<10	<10	<10	<10	<10	<10
toluene	5	<10	<10	<10	<10	<10	<10	<10	<10
1,2,3-trichlorobenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-trichlorobenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-trichloroethane	5	<10	<10	<10	<10	<10	<10	<10	**14**
1,1,2-trichloroethane	5	<10	<10	<10	<10	<10	<10	<10	<10
trichloroethene	5	<10	<10	<10	<10	<10	<10	**11**	**140**
trichlorofluoromethane	5	<10	<10	<10	<10	<10	<10	<10	**25 JN**
1,2,3-trichloropropane	5	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-trimethylbenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
1,3,5-trimethylbenzene	5	NA	NA	NA	NA	NA	NA	NA	NA
vinyl chloride	2	<10	<10	<10	<10	<10	<10	<10	<10
o-xylenes	NG	NA	NA	NA	NA	NA	NA	NA	NA
m & p-xylenes	NG	NA	NA	NA	NA	NA	NA	NA	NA
xylenes (total)	5	<10 J	<10 J	<10 J	<10 J	<10	<10 J	<10 J	<10 J
ethyl ether	NG	NA	NA	NA	NA	NA	NA	NA	NA
acetone	50	<10	<10	<10	**34 J**	**21 J**	<10	<10	**30**
carbon disulfide	NG	**2 J**	<10	<10	<10	<10	<10	<10	<10
2-butanone	50	<10	<10	<10	<10	<10	<10	<10	<10
4-methyl-2-pentanone	NG	<10	<10	<10	<10	<10	<10	<10	<10
2-hexanone	50	<10	<10	<10	<10	<10	<10	<10	<10
butane, 2-methyl	NG	<10	<10	<10	<10	<10	<10	<10	<10
methyl tert butyl ether	NG	<10	<10	<10	<10	<10	<10	<10	<10

NOTES:
- concentrations reported as micrograms per liter (ug/L).
B - Compound also detected in reagent blank.
J - Value is estimated since it falls below the detection limit.
E - Value reported exceeds the linear range of the instrument curve and should be considered estimated.
N - Presumptive evidence of a compound.
NA - Compound not analyzed for in this sample.
GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-14
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	MW-01 5/16/94	MW-02 5/20/94	MW-03S 5/18/94	MW-03D 5/18/94	MW-04 5/16/94	MW-05 5/16/94	MW-06 5/17/94	MW-07 5/17/94	MW-08 5/17/94	MW-09 5/17/94	MW-10 5/20/94	MW-11 5/20/94	MW-12 5/20/94
phenol	1	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
bis (-2-chloroethyl) ether	1	<10 J	<500	<10	<10	<10 J	<10 J	<10	<10	<10 J	<10 J	<10	<20	<200
2-chlorophenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
1,3-dichlorobenzene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
1,4-dichlorobenzene	4.7	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
1,2-dichlorobenzene	4.7	<10 J	<500 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<20 J	<200 J
2-methylphenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
2,2-oxybis (1-chloropropane)	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
4-methylphenol	NG	<10 J	<500	<10	<10	<10 J	<10 J	<10	<10	<10 J	<10 J	<10 J	<20	<200 R
N-nitroso-di-n-propylamine	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
hexachloroethane	5	<10	<500 J	<10 J	<10 J	<10	<10	<10 J	<10 J	<10	<10	<10	<20 J	<200 J
nitrobenzene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
isophrone	50	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
2-nitrophenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
2,4-dimethylphenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
bis (-2-chloroethoxy) methane	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
2,4-dichlorophenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
1,2,4-trichlorobenzene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
naphthalene	10	<10	**240 J**	<10	<10	<10	<10	<10	<10	<10	<10	**62**	**26**	**270**
4-chloroaniline	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
hexachlorobutadiene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
4-chloro-3-methylphenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
2-methylnaphthalene	NG	<10	**870**	<10 J	<10 J	<10	<10	<10 J	<10	<10	<10	**66**	**87**	**420**
hexachlorocyclopentadiene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
2,4,6-trichlorophenol	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200 R
2,4,5-trichlorophenol	NG	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<200 R
2-chloronaphthalene	10	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
2-nitroaniline	5	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<500
dimethyl phthalate	50	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
acenaphthylene	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
2,6-dinitrotoluene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
3-nitroaniline	NG	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<500
acenaphthene	20	<10 J	<500	<10	<10	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	**3 J**	<20	**16 J**
2,4-dinitrophenol	NG	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<500
4-nitrophenol	NG	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<200 R
dibenzofuran	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	**3 J**	**3 J**	**10 J**
2,4-dinitrotoluene	5	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
diethylphthalate	50	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
4-chlorophenyl-phenylether	NG	<10 J	<500	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<20 J	<200 J
fluorene	50	<10	**56 J**	<10 J	<10 J	<10	<10	<10 J	<10	<10	<10	**1 J**	**4 J**	**12 J**
4-nitroaniline	5	<25	<1300	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50	<500
4,6-dinitro-2-methylphenol	NG	<25	<1300 J	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50 J	<200 R
n-nitrosodiphenylamine	50	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
4-bromophenyl-phenylether	NG	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
hexachlorobenzene	0.35	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
pentachlorophenol	1	<25	<1300 J	<25	<25	<25	<25	<25	<25	<25	<25	<25	<50 J	<200 R
phenanthrene	50	<10	**150 J**	<10	<10	<10	<10	<10	<10	<10	<10	**3 J**	**2 J**	**34 J**
anthracene	50	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
carbazole	NG	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
di-n-butylphthalate	NG	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
fluoranthene	50	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
pyrene	50	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
butylbenzylphthalate	50	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
3,3-dichlorobenzidine	5	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
benzo (a) anthracene	0.002	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
chrysene	NG	<10	<500 J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20 J	<200 J
bis (2-ethylhexyl) phthalate	50	<10	<500	<10	<10	**3 J**	<10	<10	<10	**0.9 J**	**1 J**	<10	<20	<200
di-n-octyl phthalate	50	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
benzo (b) fluoranthene	0.002	<10	<500	<10 J	<10 J	<10	<10	<10 J	<10	<10	<10	<10	<20	<200
benzo (k) fluoranthene	0.002	<10	<500	<10	<10	<10	<10	<10	<10 J	<10	<10	<10	<20	<200
benzo (a) pyrene	ND	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
indeno (1,2,3-cd) pyrene	0.002	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
dibenzo (a,h) anthracene	NG	<10	<500	<10	<10	<10	<10	<10	<10	<10	<10	<10	<20	<200
benzo (g,h,i) perylene	NG	<10	<500	<10	<10	<10	<10	<10	<10 J	<10	<10	<10	<20	<200
Tenatively Identified Compounds		7	20	4	7	1	2	1	0	1	1	16	20	19

NOTES:

- concentrations reported as micrograms per liter (ug/L).

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)

R - Data rejected by data validator.

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-14 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION	GUIDANCE	MW-13	MW-14	MW-15	MW-16	MW-17	MW-18	MW-19	MW-20	MW-21	MW-22	MW-23	MW-24	MW-25
DATE	(ug/L)	5/16/94	5/16/94	5/16/94	5/17/94	5/18/94	5/18/94	5/16/94	5/17/94	5/19/94	5/19/94	5/19/94	5/17/94	5/19/94
COMPOUND														
phenol	1	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
bis (-2-chloroethyl) ether	1	<10 J	<10 J	<10 J	<10 J	<10	<10	<10 J	<10 J	<10	<10	<10	<10	<10
2-chlorophenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,3-dichlorobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,4-dichlorobenzene	4.7	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,2-dichlorobenzene	4.7	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J
2-methylphenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**9 J**	<10	<10
2,2-oxybis (1-chloropropane)	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methylphenol	NG	<10 J	<10 J	<10 J	<10 J	<10	<10	<10	<10	<10	<10	**8 J**	<10	<10
N-nitroso-di-n-propylamine	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
hexachloroethane	5	<10	<10	<10	<10	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J
nitrobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
isophrone	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-nitrophenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-dimethylphenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
bis (-2-chloroethoxy) methane	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-dichlorophenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1,2,4-trichlorobenzene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
naphthalene	10	<10	<10	<10	<10	<10	<10	<10	<10	**41**	**62**	**33**	<10	**36**
4-chloroaniline	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
hexachlorobutadiene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chloro-3-methylphenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-methylnaphthalene	NG	<10	<10	<10	<10	<10 J	<10 J	<10 J	<10 J	**7 J**	**24 J**	**18 J**	<10 J	**6 J**
hexachlorocyclopentadiene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,6-trichlorophenol	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,5-trichlorophenol	NG	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
2-chloronaphthalene	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-nitroaniline	5	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
dimethyl phthalate	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
acenaphthylene	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,6-dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3-nitroaniline	NG	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
acenaphthene	20	<10 J	<10 J	<10 J	<10 J	<10	<10	<10	<10 J	<10 J	<10 J	<10	<10 J	<10 J
2,4-dinitrophenol	NG	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
4-nitrophenol	NG	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
dibenzofuran	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-dinitrotoluene	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
diethylphthalate	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chlorophenyl-phenylether	NG	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J
fluorene	50	<10	<10	<10	<10	<10 J	<10 J	<10 J	<10	<10	<10	<10	<10 J	<10
4-nitroaniline	5	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
4,6-dinitro-2-methylphenol	NG	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
n-nitrosodiphenylamine	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-bromophenyl-phenylether	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
hexachlorobenzene	0.35	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
pentachlorophenol	1	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25	<25
phenanthrene	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
anthracene	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
carbazole	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
di-n-butylphthalate	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
fluoranthene	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
pyrene	50	<10	<10	<10	<10	<10	<10	<10	<10	<10 J	<10 J	<10 J	<10	<10 J
butylbenzylphthalate	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3,3-dichlorobenzidine	5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
benzo (a) anthracene	0.002	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
chrysene	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
bis (2-ethylhexyl) phthalate	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	**10 J**	<10	<10
di-n-octyl phthalate	50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
benzo (b) fluoranthene	0.002	<10	<10	<10	<10	<10 J	<10 J	<10 J	<10 J	<10	<10	<10	<10 J	<10
benzo (k) fluoranthene	0.002	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
benzo (a) pyrene	ND	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
indeno (1,2,3-cd) pyrene	0.002	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
dibenzo (a,h) anthracene	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
benzo (g,h,i) perylene	NG	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Tenatively Identified Compounds		4	4	3	2	0	1	4	1	10	18	14	5	13

NOTES:

- concentrations reported as micrograms per liter (ug/L).

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)

R - Data rejected by data validator.

NG - No Guidance Available

(a) - All results with detectable concentrations appear in bold type

(b) - All results that exceed SCG appear in shaded bold type

TABLE G-14 (cont.)
SUMMARY OF TCL SEMI-VOLATILE ORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	DUPE-11 MW-25 5/19/94	MW-26S 5/18/94	DUPE-10 MW-26S 5/18/94	MW-26D 5/18/94	BR-01 5/20/94	BR-02 5/20/94	BR-03 5/20/94
phenol	1	<10	<20	<20	<10 J	<10	<10	<10
bis (-2-chloroethyl) ether	1	<10	<20	<20	<10	<10	<10	<10
2-chlorophenol	NG	<10	<20	<20	<10 J	<10	<10	<10
1,3-dichlorobenzene	5	<10	<20	<20	<10	<10	<10	<10
1,4-dichlorobenzene	4.7	<10	<20	<20	<10	<10	<10	<10
1,2-dichlorobenzene	4.7	<10 J	<20 J	<20 J	<10 J	<10 J	<10 J	<10 J
2-methylphenol	NG	<10	<20	<20	<10 J	<10	<10	<10
2,2-oxybis (1-chloropropane)	NG	<10	<20	<20	<10	<10	<10	<10
4-methylphenol	NG	<10	**130**	**140**	<10 J	<10	<10	<10
N-nitroso-di-n-propylamine	NG	<10	<20	<20	<10	<10	<10	<10
hexachloroethane	5	<10 J	<20 J	<20 J	<10 J	<10 J	<10 J	<10 J
nitrobenzene	5	<10	<20	<20	<10	<10	<10	<10
isophrone	50	<10	<20	<20	<10	<10	<10	<10
2-nitrophenol	NG	<10	<20	<20	<10 J	<10	<10	<10
2,4-dimethylphenol	NG	<10	<20	<20	<10 J	<10	<10	<10
bis (-2-chloroethoxy) methane	5	<10	<20 J	<20 J	<10	<10 J	<10 J	<10 J
2,4-dichlorophenol	NG	<10	<20	<20	<10 J	<10	<10	<10
1,2,4-trichlorobenzene	5	<10	<20	<20	<10	<10	<10	<10
naphthalene	10	**30**	<20	<20	<10	<10	<10	<10
4-chloroaniline	5	<10	<20	<20	<10	<10	<10	<10
hexachlorobutadiene	5	<10	<20	<20	<10	<10	<10	<10
4-chloro-3-methylphenol	NG	<10	<20	<20	<10 J	<10	<10	<10
2-methylnaphthalene	NG	**7 J**	<20 J	<20 J	<10 J	<10 J	<10 J	<10 J
hexachlorocyclopentadiene	5	<10	<20	<20	<10	<10	<10	<10
2,4,6-trichlorophenol	NG	<10	<20	<20	<10 J	<10	<10	<10
2,4,5-trichlorophenol	NG	<25	<50	<50	<25 J	<25	<25	<25
2-chloronaphthalene	10	<10	<20	<20	<10	<10	<10	<10
2-nitroaniline	5	<25	<50	<50	<25	<25	<25	<25
dimethyl phthalate	50	<10	<20	<20	<10	<10	<10	<10
acenaphthylene	NG	<10	<20	<20	<10	<10	<10	<10
2,6-dinitrotoluene	5	<10	<20	<20	<10	<10	<10	<10
3-nitroaniline	NG	<25	<50	<50	<25	<25	<25	<25
acenaphthene	20	<10 J	<20	<20	<10 J	<10	<10	<10
2,4-dinitrophenol	NG	<25	<50	<50	<25	<25	<25	<25
4-nitrophenol	NG	<25	<50	<50	<25 J	<25	<25	<25
dibenzofuran	NG	<10	<20	<20	<10	<10	<10	<10
2,4-dinitrotoluene	5	<10	<20	<20	<10	<10	<10	<10
diethylphthalate	50	<10	<20	<20	<10	<10	<10	<10
4-chlorophenyl-phenylether	NG	<10 J	<20 J	<20 J	<10 J	<10 J	<10 J	<10 J
fluorene	50	<10	<20	<20	<10 J	<10	<10	<10
4-nitroaniline	5	<25	<50	<50	<25	<25	<25	<25
4,6-dinitro-2-methylphenol	NG	<25	<50	<50	<25 J	<25	<25	<25
n-nitrosodiphenylamine	50	<10	<20	<20	<10	<10	<10	<10
4-bromophenyl-phenylether	NG	<10	<20	<20	<10	<10	<10	<10
hexachlorobenzene	0.35	<10	<20	<20	<10	<10	<10	<10
pentachlorophenol	1	<25	<50	<50	<25 J	<25	<25	<25
phenanthrene	50	<10	<20	<20	<10	<10	<10	<10
anthracene	50	<10	<20	<20	<10	<10	<10	<10
carbazole	NG	<10	<20	<20	<10	<10	<10	<10
di-n-butylphthalate	NG	<10	<20	<20	<10	<10	<10	**0.7 J**
fluoranthene	50	<10	<20	<20	<10	<10	<10	<10
pyrene	50	<10 J	<20 J	<20 J	<10	<10 J	<10 J	<10
butylbenzylphthalate	50	<10	<20	<20	<10	<10	<10	<10
3,3-dichlorobenzidine	5	<10	<20	<20	<10	<10	<10	<10
benzo (a) anthracene	0.002	<10	<20	<20	<10	<10	<10	<10
chrysene	NG	<10	<20	<20	<10	<10	<10	<10
bis (2-ethylhexyl) phthalate	50	<10	<20	<20	<10	<10	<10	<10
di-n-octyl phthalate	50	<10	<20	<20	<10	<10	<10	<10
benzo (b) fluoranthene	0.002	<10	<20	<20	<10 J	<10	<10	<10
benzo (k) fluoranthene	0.002	<10	<20	<20	<10	<10	<10	<10
benzo (a) pyrene	ND	<10	<20	<20	<10	<10	<10	<10
indeno (1,2,3-cd) pyrene	0.002	<10	<20	<20	<10	<10	<10	<10
dibenzo (a,h) anthracene	NG	<10	<20	<20	<10	<10	<10	<10
benzo (g,h,i) perylene	NG	<10	<20	<20	<10	<10	<10	<10
Tenatively Identified Compounds		15	19	19	1	0	4	11

NOTES:
- concentrations reported as micrograms per liter (ug/L).
J - Value is estimated since it falls below the detection limit.
GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
R - Data rejected by data validator.
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-15
SUMMARY OF TCL PESTICIDE and PCB DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE COMPOUND	GUIDANCE (ug/L)	MW-01 5/16/94	MW-02 5/20/94	MW-03S 5/18/94	MW-03D 5/18/94	MW-04 5/16/94	MW-05 5/16/94	MW-06 5/17/94	MW-07 5/17/94	MW-08 5/17/94	MW-09 5/17/94	MW-10 5/20/94	MW-11 5/20/94
alpha-BHC	NG	<0.05	**0.026 B**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
beta-BHC	NG	<0.05	**0.047 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	**0.004 JP**
delta-BHC	NG	<0.05	**0.031 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	**0.009 J**	**0.008 JP**
gamma-BHC (lindane)	NG	<0.05	<0.05	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
heptachlor	ND	<0.05	**0.031 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	**0.002 J**	<0.05
aldrin	0.001	<0.05	**0.24 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	**0.017 JP**
heptachlor epoxide	ND	<0.05	<0.05	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
endosulfan I	0.009	<0.05	<0.05 J	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
dieldrin	0.001	<0.10	**0.012 JP**	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
4,4' - DDE	ND	<0.10	<0.10 J	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
endrin	ND	<0.10	**0.055 JP**	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
endosulfan II	0.009	<0.10 J	**0.053 JP**	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J
4,4' - DDD	ND	<0.10	**0.022 JP**	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
endosulfan sulfate	NG	<0.10	<0.10	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
4,4' - DDT	ND	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J
methoxychlor	35	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J
endrin ketone	NG	<0.10	<0.10	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
endrin aldehyde	NG	<0.10	<0.10	<0.10	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10	<0.10
alpha - chlordane	0.1	<0.05	**0.036 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
gamma - chlordane	0.1	<0.05	**0.035 JP**	<0.05	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05	<0.05
toxaphene	ND	<5.0	<5.0	<5.0	<5.0	<5.0 J	<5.0 J	<5.0 J	<5.0	<5.0 J	<5.0 J	<5.0	<5.0
aroclor - 1016	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J
aroclor - 1221	*	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0 J	<2.0	<2.0	<2.0	<2.0 J
aroclor - 1232	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J
aroclor - 1242	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J
aroclor - 1248	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J
aroclor - 1254	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J
aroclor - 1260	*	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0 J

LOCATION DATE COMPOUND	MW-12 5/20/94	MW-13 5/16/94	MW-14 5/16/94	MW-15 5/16/94	MW-16 5/17/94	MW-17 5/18/94	MW-18 5/18/94	MW-19 5/16/94	MW-20 5/17/94	MW-21 5/19/94	MW-22 5/19/94	MW-23 5/19/94	MW-24 5/17/94	MW-25 5/19/94
alpha-BHC	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
beta-BHC	**0.016 JP**	<0.05 J	**0.007 JP**	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
delta-BHC	**0.014 JP**	<0.05 J	**0.003 JP**	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	**0.006 JP**	<0.056	<0.06
gamma-BHC (lindane)	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
heptachlor	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	**0.006 J**
aldrin	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
heptachlor epoxide	**0.002 JP**	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
endosulfan I	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
dieldrin	**0.002 JP**	<0.10 J	<0.10 J	<0.10 J	<0.10 J	**0.003 J**	<0.10 J	**0.065 J**	<0.10 J	<0.10	<0.10	<0.10	<0.11	**0.001 JP**
4,4' - DDE	**0.052 JP**	<0.10 J	**0.012 JP**	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
endrin	**0.009 JP**	<0.10 J	**0.01 J**	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
endosulfan II	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.11 J	<0.12 J
4,4' - DDD	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
endosulfan sulfate	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
4,4' - DDT	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.11 J	<0.12 J
methoxychlor	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.56 J	<0.60 J
endrin ketone	<0.10	<0.10 J	**0.012 JP**	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
endrin aldehyde	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10 J	<0.10 J	<0.10 J	<0.10	<0.10	<0.10	<0.11	<0.12
alpha - chlordane	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
gamma - chlordane	**0.002 JP**	<0.05 J	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05 J	<0.05 J	<0.05 J	<0.05	<0.05	<0.05	<0.056	<0.06
toxaphene	<5.0	<5.0 J	<5.0 J	<5.0 J	<5.0 J	<5.0	<5.0 J	<5.0 J	<5.0 J	<5.0	<5.0	<5.0	<5.6	<6.0
aroclor - 1016	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2
aroclor - 1221	<2.0 J	<2.0	<2.0 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0 J	<2.0 J	<2.0 J	<2.0	<2.2	<2.4
aroclor - 1232	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2
aroclor - 1242	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2
aroclor - 1248	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2
aroclor - 1254	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2
aroclor - 1260	<1.0 J	<1.0	<1.0 J	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J	<1.0	<1.1	<1.2

NOTES:

- concentrations reported as micrograms per liter (ug/L).
- * - PCBs < 0.001 ug/L.
- B - Compound also detected in reagent blank.
- J - Value is estimated since it falls below the detection limit.
- P - The percent difference between concentration values calculated on both columns was greater than 25% D.
- GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
- NG - No Guidance Available
- (a) - All results with detectable concentrations appear in bold type
- (b) - All results that exceed SCG appear in shaded bold type

TABLE G-15 (cont.)
SUMMARY OF TCL PESTICIDE and PCB DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION / DATE / COMPOUND	GUIDANCE (ug/L)	DUPE-11 MW-25 5/19/94	MW-26S 5/18/94	DUPE-10 MW-26S 5/18/94	MW-26D 5/18/94	BR-01 5/20/94	BR-02 5/20/94	BR-03 5/20/94
alpha-BHC	NG	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
beta-BHC	NG	<0.05 J	**0.028 JP**	**0.23 JP**	<0.05	<0.05 J	<0.05	<0.05 J
delta-BHC	NG	<0.05 J	**0.008 JP**	**0.01 JP**	**0.005 J**	<0.05 J	<0.05	<0.05 J
gamma-BHC (lindane)	NG	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
heptachlor	ND	<0.05 J	<0.05	<0.05	**0.004 JP**	<0.05 J	<0.05	<0.05 J
aldrin	0.001	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
heptachlor epoxide	ND	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
endosulfan I	0.009	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
dieldrin	0.001	<0.10 J	**0.028 JP**	**0.036 JP**	**0.004 JP**	<0.10 J	<0.10	<0.10 J
4,4' - DDE	ND	<0.10 J	**0.015 JP**	**0.05 JP**	<0.10	<0.10 J	<0.10	**0.003 JP**
endrin	ND	<0.10 J	**0.023 J**	<0.10	<0.10	<0.10 J	<0.10	<0.10 J
endosulfan II	0.009	<0.10 J	**0.031 JP**	**0.04 JP**	<0.10 J	<0.10 J	<0.10 J	<0.10 J
4,4' - DDD	ND	<0.10 J	<0.10	**0.04 JP**	<0.10	<0.10 J	<0.10	<0.10 J
endosulfan sulfate	NG	<0.10 J	<0.10	<0.10	<0.10	<0.10 J	<0.10	<0.10 J
4,4' - DDT	ND	<0.10 J	**0.07 JP**	**0.093 JP**	<0.10 J	<0.10 J	<0.10 J	<0.10 J
methoxychlor	35	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	<0.50 J	**0.013 JP**
endrin ketone	NG	<0.10 J	**0.026 J**	**0.032 J**	<0.10	<0.10 J	<0.10	<0.10 J
endrin aldehyde	NG	<0.10 J	<0.10	<0.10	<0.10	<0.10 J	<0.10	<0.10 J
alpha - chlordane	0.1	<0.05 J	<0.05	<0.05	<0.05	<0.05 J	<0.05	<0.05 J
gamma - chlordane	0.1	<0.05 J	<0.05	**0.003 JP**	<0.05	<0.05 J	<0.05	<0.05 J
toxaphene	ND	<5.0 J	<5.0	<5.0	<5.0	<5.0 J	<5.0	<5.0 J
aroclor - 1016	*	<1.0 J	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J
aroclor - 1221	*	<2.0 J	<2.0	<2.0	<2.0	<2.0 J	<2.0 J	<2.0 J
aroclor - 1232	*	<1.0 J	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J
aroclor - 1242	*	<1.0 J	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J
aroclor - 1248	*	<1.0 J	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J
aroclor - 1254	*	<1.0 J	**1.0 P**	**1.6 P**	<1.0	<1.0 J	<1.0 J	<1.0 J
aroclor - 1260	*	<1.0 J	<1.0	<1.0	<1.0	<1.0 J	<1.0 J	<1.0 J

NOTES:
- concentrations reported as micrograms per liter (ug/L).
* - PCBs < 0.001 ug/L.
B - Compound also detected in reagent blank.
J - Value is estimated since it falls below the detection limit.
P - The percent difference between concentration values calculated on both columns was greater than 25% D.
GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)
NG - No Guidance Available
(a) - All results with detectable concentrations appear in bold type
(b) - All results that exceed SCG appear in shaded bold type

TABLE G-16
SUMMARY OF TAL INORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE ANALYTE	GUIDANCE (ug/L)	MW-01 5/16/94	MW-02 5/20/94	MW-03S 5/18/94	MW-03D 5/18/94	MW-04 5/17/94	MW-05 5/18/94	MW-06 5/17/94	MW-07 5/17/94	MW-08 5/17/94	MW-09 5/17/94	MW-10 5/20/94	MW-11 5/20/94	MW-12 5/20/94	MW-12F (filtered) 5/20/94	MW-13 5/16/94	MW-14 5/16/94	MW-15 5/16/94	MW-16 5/18/94	MW-17 5/18/94	MW-17F (filtered) 5/18/94
aluminum	100	<96.1	**100 B**	<96.1	<96.1	<96.1	**177 B**	<96.1	**341**	**173 B**	**251**	**342**	<96.1	**758**	<96.1	**244**	**426**	**435**	<96.1	**30900**	<96.1
antimony	3	<55.5	**489 J**	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5 J	**449 J**	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5
arsenic	25	<5.6 NW	<4.5 J	**19.6**	<4.5 J	<5.6 NW	<5.6 NW	<5.6 NW	<5.6 N	<5.6 N	<5.6 N	<4.5 J	<4.5 J	<45.0 J	**15.2 J**	<5.6 N	<5.6 NW	<5.6 N	**4.8 BJ**	<22.5	<4.5 J
barium	1,000	**28.3 B**	**87.3 B**	**72.9 B**	**116 B**	**94.7 B**	**178 B**	**188 B**	**299**	**112 B**	**42.8 B**	**37.7 B**	**44.1 B**	**34.3 B**	**93.8 B**	**36.7 B**	**27.1 B**	**86.9 B**	**135 B**	**540 B**	**104 B**
beryllium	3	<0.90	**1.0 B**	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	**1.0 B**	<0.90	<0.90	<0.90	<0.90	**3.5 B**	<0.90
cadmium	10	**117 J**	<2.4	<2.4	<2.4	**81.3 J**	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	**3.1 BJN**	<2.4	<2.4	<2.4	<2.4	<2.4 J	**56.6 JN**
calcium	NG	**45300**	**76000**	**88000**	**140000**	**341000**	**134000**	**167000**	**208000**	**208000**	**78000**	**130000**	**151000**	**119000**	**110000 JE**	**53200**	**142000**	**259000**	**76600**	**1860000**	**170000 JE**
chromium	50	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	**19.4**	<3.8
cobalt	5	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	**18.5 B**	<17.0	<17.0	<17.0	<17.0	**47.7 B**	<17.0
copper	200	**145**	**474**	**70.4 R**	**91.5 R**	**96.5 R**	**126**	**97.9 R**	**71.1 R**	**73.7 R**	**57.6 R**	**144**	**78.8**	**44.3 R**	**122 J**	**46.9 R**	**95.1 R**	**58.4 R**	**85.4 R**	**305**	**166**
iron	300	**318**	**250**	**51100**	**26.9 B**	**238**	**504**	**27.1 B**	**1300**	**416**	**631**	**745**	**210**	**24000**	**5850**	**584**	**1400**	**1460**	**5850**	**102000**	**36.0 B**
lead	25	<0.90	<0.90 JW	<0.90 JW	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90 JW	**1.9 BJW**	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	**21.2**	<0.90
magnesium	35,000	**8840**	**9520**	**9440**	**29600**	**37600**	**43400**	**51000**	**66100**	**24400**	**13300**	**14600**	**23700**	**16400**	**15200 JE**	**7970**	**40900**	**44200**	**27100**	**462000**	**53600 JE**
manganese	300	**9 B**	**327**	**15700**	**12.8 B**	<3.0	**38.5**	<3.0	**118**	**1890**	**384**	**1410**	**937**	**5640**	**5580**	**21.2**	**114**	**121**	**10900**	**9650**	**59**
mercury	2	**0.1 NJ**	<0.04 JN	<0.04 JN	<0.04 JN	<0.04 JN	**0.06 NBJ**	**0.05 NBJ**	<0.04 JN	<0.04 JN	<0.04 JN	<0.04 JN	<0.40 JN	<0.04 JN	<0.04 JN	**0.10 BJN**	**0.04 BJN**	**0.10 BJN**	<0.04 JN	**0.51 JN**	<0.04 JN
nickel	7.1	<16.8	**25.8 B**	<16.8	<16.8	<16.8	<16.8	<16.8	<16.8	<16.8	<16.8	**20.1 B**	**20.5 B**	**67.8**	**33.2 B**	<16.8	<16.8	<16.8	<16.8	**101**	<16.8
potassium	NG	**11100**	**3110 B**	<2390	<2390	**6340**	<2390	<2390	<2390	<2390	<2390	<2390	**2580 B**	<2390	**2700 BJ**	<2390	<2390	<2390	**9810**	**3700 BJ**	**10200 J**
selenium	10	<2.3	<2.3 N	**3.7 NWBJ**	<2.3 NW	<2.3 JW	<2.3 JW	<2.3 JW	<2.3 JW	<2.3	<2.3	<2.3 JNW	<2.3 JNW	<2.3 JN	<2.3 JW	<2.3 JW	<2.3	<2.3 JW	<2.3 N	<2.3 JNW	<2.3
silver	50	**96.2 NJ**	**10.2**	<7.7	<7.7	**68.8 NJ**	**12.4 NJ**	<7.7 JN	<7.7 JN	<7.7 JN	<7.7 JN	<7.7	<7.7	<7.7 J	**31.6 JN**	<7.7 JN	<7.7 JN	<7.7 JN	<7.7	<7.7 J	**135 JN**
sodium	20,000	**78800**	**34000**	**6710**	**34700**	**325000**	**56500**	**113000**	**306000**	**32900**	**30500**	**70800**	**59900**	**95000**	**87400 JE**	**3630 B**	**28700**	**77300**	**15800**	**74300 J**	**90500 JE**
thallium	4	<6.0 JN	<6.0 JW	<30.0	<30.0	**38.0 NWJ**	<6.0 JN	<6.0 JN	<30.0 JNE	<6.0 JN	<6.0 JN	<6.0 JW	<30.0 JW	<30.0 JW	<6.0	<6.0 JN	<6.0 JN	<30.0 JNE	<30.0	<30.0	<6.0
vanadium	14	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	**11.6 B**	<11.0	<11.0	<11.0	<11.0	**57.6**	<11.0
zinc	300	**86.8**	**231**	**17.1 B**	**29.8**	**85.1**	**322**	**29.5**	**52.2**	**16.1 B**	**24.9**	**48.7**	**24.2**	**28.3 J**	**41.6 J**	**68.8**	**115**	**71.6**	**30.6**	**448**	**99.8**
cyanide	100	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J

NOTES:

- concentrations reported as micrograms per liter (ug/L).

B - Indicates a value greater than or equal to the instrument detection limit, but less than the contract required detection limit.

E - Indicates a value estimated or not reported due to the presence of interference.

N - Indicates spike sample recovery is not within control limits.

W - Post digestion spike for furnace AA analysis is outside of control limits (85-115%), while sample absorbence is less than 50% of spike absorbence.

J - Value is estimated since it falls below the detection limit.

GUIDANCE - Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values (22 October 1993)

R - Data rejected by data validator.

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(a) - All results with detectable concentrations appear in bold type

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TABLE G-16 (cont.)
SUMMARY OF TAL INORGANIC DATA - GROUND WATER
MMC - FARRELL ROAD PLANT RI/FS

LOCATION DATE ANALYTE	GUIDANCE (ug/L)	MW-18 5/18/94	MW-18F (filtered) 5/18/94	MW-19 5/17/94	MW-20 5/17/94	MW-21 5/19/94	MW-22 5/19/94	MW-23 5/19/94	MW-24 5/17/94	MW-25 5/19/94	DUPE-11 MW-25 5/19/94	MW-26S 5/18/94	DUPE-10 MW-26S 5/18/94	MW-26D 5/18/94	BR-01 5/20/94	BR-01F (filtered)	BR-02 5/20/94	BR-02F (filtered) 5/20/94	BR-03 5/20/94	BR-03F (filtered) 5/20/94
aluminum	100	**17900**	<96.1	<96.1	**147 B**	**134 B**	**391**	<96.1	**275**	**406**	**431**	**119 B**	**152 B**	**125 B**	**2440**	<96.1	**41900**	<96.1	**13200**	**1020**
antimony	3	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	**173**	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5	<55.5 J	**83.5 J**	<55.5	<55.5	<55.5	<55.5
arsenic	25	**8.0 BJW**	<4.5 JW	<5.6 N	<5.6 N	<4.5 J	<4.5 J	**4.8 BJ**	<5.6 NW	<4.5 J	<4.5 J	**5.7 BJ**	**5.7 BJ**	<5.6 N	<4.5 J	<4.5 JW	**8.6 BJW**	<4.5 JW	<45.0 J	<4.5 J
barium	1,000	**332**	**167 B**	**74.0 B**	**67.4 B**	**21.8 B**	**81.3 B**	**42.0 B**	**55.8 B**	**86.6 B**	**129 B**	**57.5 B**	**95.2 B**	**36.9 B**	**86.4 B**	**211 B**	**360**	**115 B**	**157 B**	**320 B**
beryllium	3	**1.2 B**	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	<0.90	**1.7 B**	<0.90	<0.90	<0.90
cadmium	10	<2.4	<2.4 JN	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4	<2.4 JN	<2.4	<2.4 JN	<2.4	<2.4 JN
calcium	NG	**762000**	**206000 JE**	**94000**	**87500**	**119000**	**231000**	**124000**	**196000**	**238000**	**253000**	**144000**	**145000**	**175000**	**1160000**	**1190000 JE**	**593000 J**	**689000 JE**	**2510000**	**2740000 JE**
chromium	50	**12.9**	<3.8	**271**	**12.9**	<3.8	<3.8	<3.8	<3.8	**5.1 B**	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	**31.6**	<3.8	**28.4**	<3.8
cobalt	5	<17.0	<17..0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0	<17.0
copper	200	**132**	**48.2**	**52.7 R**	**34.4 R**	**30.0 R**	**17.3 BR**	**69.3 R**	**33.2 R**	**47.3 R**	**25.8 R**	**34.6 R**	**37.5 R**	**27.5 R**	**38.0 R**	**237 J**	**20.4 R**	**146 J**	**21.5 R**	**90.5 J**
iron	300	**50700**	<19.4	**44.6 B**	**476**	**770**	**1030**	**2960**	**4490**	**1150**	**1230**	**10200**	**7520**	**420**	**1810**	**245**	**28600**	**31.6 B**	**11200**	**1110**
lead	25	20.4	<0.90	<0.90	<0.90	<0.90	<0.90 JW	**1.4 BJW**	<0.90	<0.90 JW	**1.5 BJW**	<0.90 JW	<0.90 JW	<0.90	<4.5	<0.90 JW	**4.5 BJW**	<0.90 J	**4.1 JW**	**2.1 BJW**
magnesium	35,000	**175000**	**64600 JE**	**14700**	**11900**	**15500**	**22200**	**13300**	**36100**	**26100**	**27400**	**21900**	**22100**	**36200**	**159000 J**	**177000 JE**	**63900**	**51200 JE**	**287000 J**	**340000 JE**
manganese	300	**3170**	**10.9 B**	<3.0	**31.5**	**15000**	**4270**	**2880**	**4020**	**17500**	**18600**	**6990**	**6570**	**1090**	**2910 J**	**3380 J**	**947**	**648**	**2280 J**	**3030 J**
mercury	2	<0.04 JN	<0.04 JN	<0.04 JN	**0.04 BJN**	<0.04 JN	<0.04 JN	<0.04 JN	**0.12 BJN**	<0.04 JN	**0.08 BJN**	**0.07 BJN**	<0.04 JN	<0.04 JN	<0.04 JN	<0.04 JN	<0.04 JN	<0.04 JN	**0.09 BJN**	**0.23 JN**
nickel	7.1	**57.6**	<16.8	<16.8	<16.8	<16.8	**18.6 B**	<16.8	<16.8	<16.8	<16.8	<16.8	<16.8	<16.8	**19.6 B**	<16.8	**37.3 B**	<16.8	**31.9 B**	<16.8
potassium	NG	**3340 B**	<2390	<2390	<2390	<2390	<2390	**2630**	<2390	<2390	<2390	**3190 B**	**2440 B**	<2390	**298000**	**327000 J**	**163000**	**160000 J**	**218000 J**	**255000 J**
selenium	10	<2.3 JNW	<2.3 JW	<2.3	<2.3 JW	<2.3 N	<2.3 N	<2.3 N	<2.3	<2.3 N	<2.3 JNW	<2.3 N	<2.3 N	<2.3 JW	<11.5 JNW	<11.5 JW	<11.5 JNW	<11.5 JW	<11.5 JNE	<11.5 JE
silver	50	<7.7	<7.7 NR	<7.7 JN	<7.7 JN	<7.7	<7.7	<7.7	<7.7 JN	<7.7	<7.7	<7.7	<7.7	<7.7 JN	<7.7	<7.7 NR	<7.7	<7.7 NR	<7.7	<7.7 NR
sodium	20,000	**81100**	**88000 JE**	**2380 B**	**244000**	**9400**	**144000**	**214000**	**42400**	**39000**	**37200**	**89000**	**83700**	**20500**	**987000**	**1050000 JE**	**1540000 J**	**1720000 JE**	**3650000 J**	**4050000 JE**
thallium	4	<30.0	<6.0 JW	<6.0 JN	<6.0 JWN	<6.0	<30.0	<30.0	<6.0 JNW	<30.0	<30.0	<30.0	<30.0	<6.0 JNW	<30.0 JE	<6.0 JW	<30.0 JE	<30.0 JW	<30.0 JE	<6.0 W
vanadium	14	**21.1 B**	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	<11.0	**41.6 B**	<11.0	<11.0	<11.0
zinc	300	**189**	**37.5**	**89.8**	**70.7**	**11.7 B**	**30.3**	**28.6**	**104**	**24.5**	**12.7 B**	**18.8 B**	**17.6 B**	**20.3**	**890**	**712**	**57.3**	**25.4**	**275**	**63.6**
cyanide	100	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J	<10 J

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