ERM-Northeast

# REMEDIAL INVESTIGATION REPORT
# FORMER RED DEVIL FACILITY
# MOUNT VERNON, NEW YORK

MAY, 1992

PREPARED FOR:

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## APPENDICES

## EXECUTIVE SUMMARY

The Insilco Corporation (Insilco) of Midland, Texas formerly owned the Red Devil Paint facility located at 30 Northwest Street, Mount Vernon, Westchester County, New York (the "Site"). The Site is located in an industrial area that dates back at least 75 years. A bakery originally existed on the premises. During the late 1940's and early 1950's, the Red Devil Paint Company (also known as the Technical Color and Chemical Company) began to occupy the Site. Insilco purchased Red Devil in 1971. Several facility expansions were built over the years in response to increasing paint production. Because of the size and relative complexity of the Site, the property has been divided into four areas of interest designated as A, B, C, and D.

Insilco sold its Red Devil Paint Division and manufacturing operations were terminated in 1990. At this time, Insilco initiated final closure of operations and implemented a Site assessment and management program to mitigate against property damage. This program included the permanent closure of all underground and vaulted storage tanks remaining at the property and a preliminary investigation of the soil and ground water quality. This initial investigation indicated that several tank systems had failed. In an effort to define environmental impacts related to tank system releases at the Site, a Remedial Investigation has been performed.

Soil quality has been characterized in each of the four areas of the Site. This has been done through a variety of techniques including soil gas sampling (using a real-time field instrument (PID) for analysis), laboratory analysis of soil samples and PID screening of split-spoon soil cores. This work has characterized the nature of soil contamination at the Site. The bulk of the detected target compounds were aromatic hydrocarbons (xylenes, toluene and ethylbenzene). The bulk of the contaminant chemistry however, consisted of Tentatively Identified Compounds, primarily petroleum hydrocarbons, unknowns and aldol condensates. Subordinate amounts of chlorinated solvents and naphthalene were also found.

Progress on delineation has been made, additional work will achieve full delineation of impacted soils at the Site. Minor additional work will complete the delineation in Area A. No additional soil investigation is required in Area B since no tank system releases were identified in this area. Additional work is planned in Areas C and D to complete the delineation process.

A number of monitoring wells have been installed at the Site. The data developed from these wells has been supplemented by ground water quality derived through the use of a hydropunch tool. The results of this investigation has revealed a free product body that underlies a portion of the Site and is composed of an amber colored paint product or paint intermediary that looks much like varnish in appearance. Additional work will be necessary to delineate the extent of free product.

When the magnitude of free product contamination is considered, the associated dissolved plume at the Site is surprisingly dilute. Sampling results suggest that the solubility of the free product must be very low. The constituents contained in the dissolved plume consist primarily of petroleum hydrocarbons (aromatics, tentatively identified hydrocarbons and a minor amount of polyaromatics) along with a trace of chlorinated solvents. It should also be noted that the results of ground water samples collected on the upgradient side of the Site indicates that some contamination may be entering the property from off-site. In order to complete the delineation of dissolved ground water impacts, additional investigation will be required.

A detailed work plan describing a Supplemental Remedial Investigation is being submitted under separate cover. The purpose of the Supplemental RI is to complete the characterization of the site and fill all data gaps identified by previous work.

# 1.0 INTRODUCTION

The Insilco Corporation (Insilco) of Midland, Texas formerly owned the Red Devil Paint facility located at 30 Northwest Street, Mount Vernon, Westchester County, New York (the "Site"). In December, 1990 Insilco retained ERM-Northeast (ERM) to supervise the removal and abandonment of the tanks at the Site. This work included the opening, purging and cleaning of tanks with a preliminary investigation of soil and ground water quality. During this work, a potential discharge was identified and a spill report was made to the New York State Department of Environmental Conservation (NYSDEC) who assigned the case to the Region III Oil Spill Group. Later, the Site was re-assigned to the Division of Hazardous Waste Remediation. In an effort to define the environmental impacts related to the tank system releases at the Site, a Remedial Investigation has been performed and is described in this report.

## 1.1 Purpose of Remedial Investigation

The purpose of the Remedial Investigation (RI) was to make a determination of the vertical and horizontal extent of soil contamination resulting from historical paint manufacturing operations at the Site. The second objective was to characterize the ground water system at the Site including flow directions and ground water quality.

This RI report will include a description of methods and results of all field activities conducted to date at the Site including the following:

- Underground storage tank system (UST) removal and site closure activities;
- Results of endpoint sampling conducted as part of the UST removals;

- Soil and ground water investigations conducted pursuant to the tank closures.

This report also provides a summary of the Site history, local geology and hydrogeology. The data presented in this report, along with additional data to be developed as part of a proposed Supplemental RI, will form the basis for a Risk Assessment, Feasibility Study and the development of any necessary and appropriate Interim Remedial Measures (IRMs).

## 1.2 Site Background

### 1.2.1 Site Description

The former Red Devil Paint facility is located in the City of Mount Vernon, Westchester County, New York. The location of the plant site is shown on the Site Vicinity Map presented as Figure 1-1. This figure was taken from the United States Geological Survey (USGS) Mount Vernon, New York quadrangle, and shows the plant site at 40° 54' 54" north latitude and 73° 51' 35" west longitude.

The property is approximately 50,500 square feet (sq/ft) in area, 73 percent (37,035 sq/ft) of which is occupied by the former multi-floored paint manufacturing facility. A site plan of the facility, showing the property boundaries and the locations of the former storage tanks, is provided as Figure 1-2. Because of the size and relative complexity of the Site, the property has been divided into four areas of interest designated as A, B, C, and D as shown on Figure 1-2.

Present land use in the vicinity of the Site (as shown on Figure 1-3) is urban, with mixed residential and industrial/commercial development. The Site is directly bordered on the northwest by railroad tracks, on the northeast by Oak Street, on the


Source: U.S.G.S. Quadrangle Map, Mt. Vernon, NY
Scale: 1" = 2000'

TITLE

**GENERAL VICINITY MAP**
**INSILCO-RED DEVIL FACILITY**
**MT. VERNON, NY**

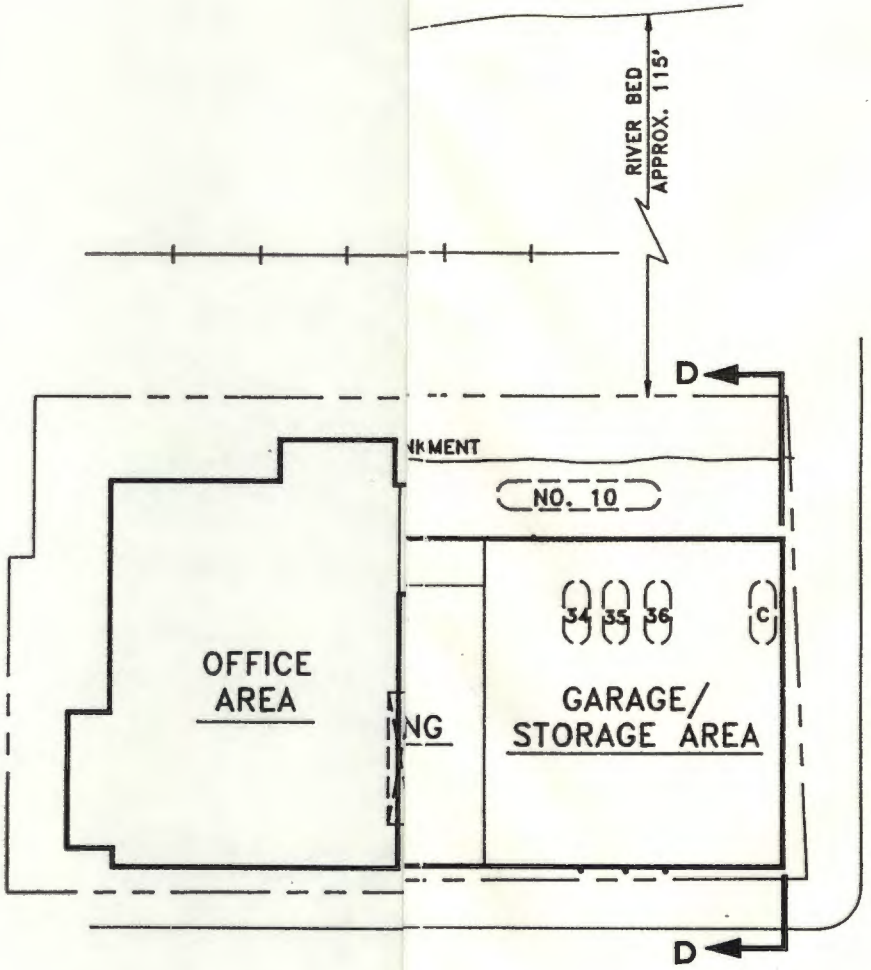
PREPARED FOR

INSILCO

ERM-Northeast
Environmental Resources Management

| SCALE | FIGURE |
|---|---|
| Noted | 1-1 |
| DATE | |
| 7/1991 | |

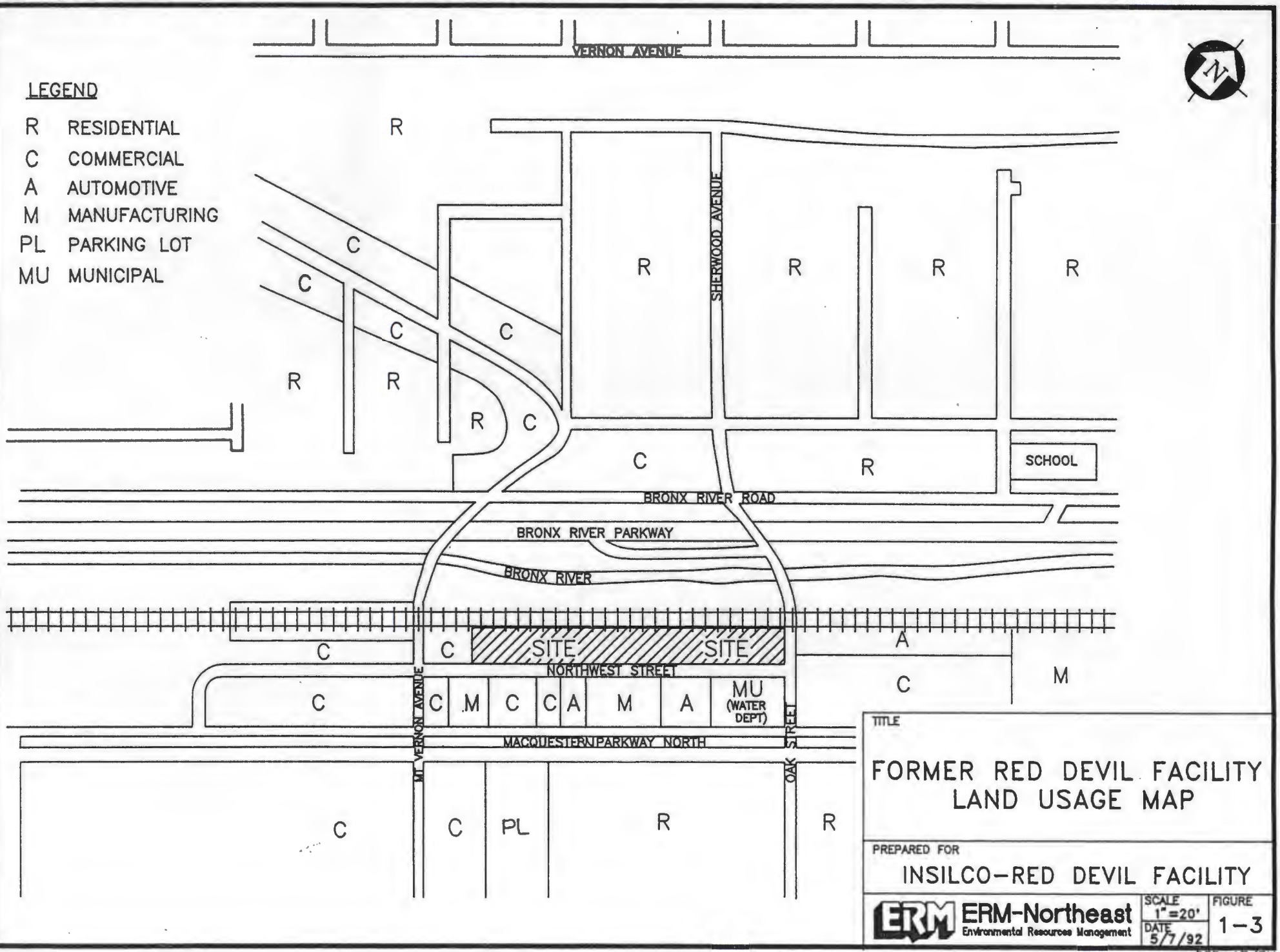
146621




**LEGEND**

- VAULTED UNDERGROUND STORAGE TANK
- UNDERGROUND STORAGE TANK
- PREVIOUSLY REMOVED TANK
- VENT

| | | | |
|---|---|---|---|
| SITE MAP WITH TANK LOCATIONS | | | 1-2 |
| HAYNES | JUNE 2, 1992 | | |
| =40' | REDDEVIL | | |


LEGEND
R RESIDENTIAL
C COMMERCIAL
A AUTOMOTIVE
M MANUFACTURING
PL PARKING LOT
MU MUNICIPAL
VERNON AVENUE
SHERWOOD AVENUE
SCHOOL
BRONX RIVER ROAD
BRONX RIVER PARKWAY
BRONX RIVER
SITE
SITE
NORTHWEST STREET
MU (WATER DEPT)
MACQUESTERN PARKWAY NORTH
MT VERNON AVENUE
OAK STREET
TITLE
FORMER RED DEVIL FACILITY
LAND USAGE MAP
PREPARED FOR
INSILCO-RED DEVIL FACILITY
ERM-Northeast
Environmental Resources Management
SCALE 1"=20'
DATE 5/7/92
FIGURE 1-3
RED-17/EM

southeast by Northwest Street and on the southwest by a small furniture outlet store, a grocery market and taxi dispatching office. The Bronx River is located approximately 115 feet northwest of the Site, immediately beyond the railroad embankment.

### 1.2.2 Site History

A review of available records indicates that construction of the building was completed in phases responding to increasing production and the addition of new product lines. The core of the building consisting of what is now Area C and Area D is believed to have been built shortly after the turn of the century. A separate building used to manufacture paint remover was built in 1956. The storage/machine shop area (Area B) was constructed during 1963. In 1966, an addition to the production area (Area C) containing the packaging and mixing kettle rooms was completed. The final change to the building, as it now stands, was the 1987 construction of an office structure in Area A. At this time, the paint remover building was razed to its foundation which remains in the courtyard of Area A.

The Insilco Corporation acquired Red Devil in 1971. In 1989, Insilco sold their Red Devil Paint Division to Thompson and Formby, but continued to operate the facility under a supply agreement until mid-1990. After operations ceased in 1990, Thompson and Formby removed most the operating equipment and all remaining stock and transported these materials to other facilities. In 1991 Insilco entered into an agreement to sell the building and the buyer (Metro Self-Storage Bronx, Inc.) is currently converting the facility into self-storage units.

The Site is located in an industrial area that dates back at least 75 years. The earliest records from the Building's Department indicate that Egler and Sons Baking

Company constructed a baking factory on the Site in 1908. Throughout the years 1911 to 1940, additional structures (e.g., sheds, a mill, garages) were added to the main building. During this time, the Site continued to be used for food manufacturing. Companies occupying the Site included: the Shults Bread Company, Continental Baking Corporation, and the Bakery Services Corporation.

During the late 1940's and early 1950's, the Red Devil Company (also known as the Technical Color and Chemical Company) began to occupy the Site. Throughout the years, various building additions were constructed as discussed above.

The former Red Devil facility is located in an area zoned for industrial use. Facilities presently and formerly located in the area of the Site include: machine shops, laundry cleaners, metal stamping factory, tinsmith, printing factory, brewery, lettershop, jewelry manufacturing plant, pharmaceutical company, chemical manufacturing company, brass instruments manufacturing facility, dental laboratory, car wash, service stations, and auto body repair shops.

## 1.3 Report Organization

The remainder of this report is organized as follows:

2.0 SUMMARY OF SITE CLOSURE ACTIVITIES - This section presents the details of the closure program for all underground storage tank systems at the Site.

3.0 PHYSICAL CHARACTERISTICS - This section describes the Site's environmental setting including geology, surface water, topography, hydrogeology and soils.

4.0 SAMPLING PROCEDURES - This section describes how the field program was conducted, including sampling techniques, well installation procedures and decontamination methods.

5.0 FIELD INVESTIGATION AND RESULTS - This section summarizes the findings based on results of soil and ground water samples collected as part of this investigation.

6.0 DISCUSSION OF RESULTS - This section interprets the results of the investigation and summarizes the overall qualitative findings.

7.0 INVESTIGATION SUMMARY - This section provides a brief summary of the investigation and its results.

## 2.0 SUMMARY OF SITE CLOSURE ACTIVITIES

After the final cessation of manufacturing operations was completed, Insilco conducted a site assessment program to mitigate against property damage. This program included the permanent closure of underground storage tanks and vaulted above-grade storage tanks remaining at the property. In December 1990, ERM-Northeast (ERM) was contracted by Insilco to supervise the removal and abandonment of the tanks at the Site. This scope of work was later expanded to include the investigation of tanks reported as previously abandoned. The known details of all underground tanks are listed on Table 2-1.

The vaulted, above-grade tanks were all found to be in excellent condition. The vaults were clean and showed no signs historical leakage. For these reasons, along with the fact that the vaults provided secondary containment, no environmental investigation was warranted relative to the vaulted tanks. A list of all chemicals reported to be used at the Site, including those materials stored in the vaulted tanks is provided in Table 2-2.

A description of the closure activities conducted in each of the four areas of the Site is provided below. After closure activities were completed, all underground and vaulted tanks, and associated piping, were cleaned, cut up and transported from the Site. This material was sent for disposal to a scrap metal dealer, J. Bass & Son of Mt. Vernon, New York. Enclosed in Appendix A are the Bills of Lading associated with this work.

### 2.1 Area A

Area A is comprised of the office, loading bay and courtyard areas as shown in Figure 1-2. There were originally eleven underground storage tanks in this area: five were reportedly removed and six were reported as abandoned in place. The soils around the five removed tanks were investigated by test borings and test trenching and were found to be

Table 2-1

## Underground Tank Specifications
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Tank | Area | Construction | Reported Capacity (gal) | Reported Contents |
|---|---|---|---|---|
| 1A | A | Steel | 1,500 | Alcohol |
| 2A | A | Steel | 1,500 | Excess Storage |
| 3A | A | Steel | 1,500 | Mineral Spirits |
| 4A | A | Steel | 1,500 | Methanol |
| 5A | A | Steel | 1,500 | Methylene Chloride / Isopropanol |
| 6A | A | Steel | 1,500 | Methylene Chloride / Isopropanol |
| E | B | Steel | 3,500 | Mineral Spirits |
| F | B | Steel | 4,000 | Acetone |
| G | B | Steel | 3,000 | "Medium Oil" Alkyd |
| H | B | Steel | 10,000 | #6 Fuel Oil |
| D | C | Steel | 7,500 | Polyurethane Varnish |
| 10 | D | Fiberglass | 10,000 | Waste Acetone / Toluene |
| 34 | D | Steel | 4,000 | Polyurethane Varnish |
| 35 | D | Steel | 4,000 | Mineral Spirits |
| 36 | D | Steel | 4,000 | Mineral Spirits |
| C | D | Steel | 1,500 | Waste Oil |

TABLE: 2-2
LIST OF RAW MATERIALS
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| AREA A | AREA B | AREA C | AREA D |
|---|---|---|---|
| SUBSTANCE | SUBSTANCE | SUBSTANCE | SUBSTANCE |
| Acetone | Acetone | Aluminum Liquid | Acetone |
| Alcohol | #6 Fuel Oil | Filtered Alkyd | Linseed Oil |
| Methanol | Hydrocarbon Resin | Medium Oil | Medium Oil |
| Methylene Chloride | Linseed Oil | Methyl Carbitol | Mineral Spirits |
| Mineral Spirits | Long Oil | Mineral Spirits | Polyurethane Varnish |
| Toluene | Medium Oil Alkyd | Long Oil | Toluene |
| | Medium Oil | Polyurethane Varnish | Zinc Pigment |
| | Methanol | Propyl Glycol | |

NOTES:

Alkyd-By product of a reaction between ethylene glycol or glycerol and an acid in the presence of a drying oil such as linseed. The solutions are used as vehicles in paints and enamels.

Resin-Vegetable derived:amorphous mixture of carboxylic acids, essential oils and terpenes occuring as sap on the bark of many varieties of trees and shrubs.

Long Oil-A varnish with a high oil to resin ratio.

Medium Oil-A varnish with a medium oil to resin ratio.

clean (a detailed description and the results of this work is presented in Section 3.1.1). The six abandoned tanks were all 1,500 gallons in size and were designated as Tanks 1A, 2A, 3A, 4A, 5A, and 6A. Tank contents are listed in Table 2-1. After investigation, it was revealed that the closure of these tanks had been inadequate.

Soil was removed to expose Tanks 1A through 6A and revealed soils impacted by released tank materials. A discharge report was made at this time to the New York State Department of Environmental Conservation (NYSDEC) chemical spill hot-line (Spill # 91-01562). After the cover soils were removed and the tanks were opened, a mixture of solvent, water and sand was found in each tank. Samples of the materials in the tanks were collected and analyzed. The results revealed the presence of solvents (acetone, methylene chloride, 2-butanone, toluene and 4-methyl-2-pentanone) at levels up to approximately one percent. Liquids from the tanks were pumped to vaulted Tank 1 (located in Area B) and the solids were placed in a covered roll-off container. Analytical results of the tank liquid characterization samples from Area A are presented in Appendix B.

Tank 3A (used to store mineral spirits) was found to be in poor condition. Tanks 1A, 2A, 4A, 5A and 6A appeared to be relatively intact, however, soils around each were found to be impacted. Following removal of the tanks, excavation of soils continued down to a depth of 6 feet where a concrete anchor slab for the tank system was encountered. Approximately 150 cubic yards of impacted soils were removed. After characterization, the soils were removed from the Site and disposed of according to NYSDEC approved protocol as a Class "U" waste at CWM Chemical Services, Inc. located in Model City, New York. Attached as Appendix C are copies of the Uniform Hazardous Waste Manifests.

## 2.2 Area B

As shown on Figure 1-2, the storage area, boiler room and vaulted Tanks 1 through 9 are the above grade structures that make up Area B. Work began on Tanks 3 through 8, with the opening of the tanks, removal of the fluids and cleaning of the interiors. Tank 9 was left intact as a secondary fuel oil storage backup for the buildings heating system. Because Tanks 1 and 2 were used for temporary liquid storage as part of the closure activities, they were not immediately opened and cleaned. However, after these fluids were disposed, Tanks 1 and 2 were also cut-up and removed from the Site.

In addition to the vaulted tanks, underground Tanks E, F, G and H were also located in Area B. These tanks were found to still contain liquids. After the tanks were opened, the interiors were cleaned and the liquids from Tanks E, F and G temporarily stored in vaulted Tank 2. A bulk sample was collected and sent to Envirotest Laboratories for waste characterization. This sample indicated that these tanks contained primarily methylene chloride and other chlorinated solvents, acetone and other ketones and various aromatic hydrocarbons. Tank H contained Number 6 heating oil. Laboratory data sheets are provided in Appendix B. Visual inspection of the tank system indicated that both the tanks and piping were in excellent condition. Sampling of surrounding soils (see Section 5.1.2 for details) further substantiated the integrity of this tank system. It was therefore concluded that the soils surrounding the underground tank systems in Area B were not impacted.

Tanks E, F, G, and H were abandoned in place by filling them with an EPA-approved, inert, amino-based foam. This action was deemed appropriate because: (1) the tanks are located either under or near load bearing walls and could not be removed without impacting the structural integrity of the building; and (2) only trace levels of contaminants were detected in the tested soils.

## 2.3 Area C

Area C is composed of three rooms as shown in Figure 1-2: (1) the production area; (2) the packaging area; and (3) the paint remover and filling room. Several vaulted tanks were present in the production room; one underground tank (Tank D) was located in the packaging room. The residual materials in the tanks were removed and drummed for disposal. The tanks were then opened and cleaned. Vaulted tanks 13, 15, 16, and 19 were cut up and removed from the Site.

Soil conditions surrounding Tank D were investigated by a program of sampling which is described in Section 3.1.3. Tank D was also abandoned in-place using the amino-based foam. This action was deemed appropriate because: (1) Tank D is located under a load bearing foundation and cannot be removed without impacting the integrity of the building; and (2) only trace levels of contaminants were detected in the tested soils.

## 2.4 Area D

The packing room, garage/storage area and the alley between the building and railroad embankment comprise Area D. In Figure 1-2, two underground tanks (Tanks A and B) are shown in the alley northwest of the packing room. These tanks were used during heavy rain events to hold excess storm water which could not be adequately accommodated by the existing storm drains. In addition to the storm water tanks, there is another underground storage tank (Tank 10) in the alley and four underground storage tanks (34, 35, 36 and C) beneath the garage/storage area.

Tanks 34, 35, 36 and C were found to contain fluids and sludges; the tank contents were then removed and drummed for disposal. After the sludges were removed and the tanks were cleaned, the system was cut-up with a cold chisel and removed. Upon inspection,

Tanks 35 and 36 (both used to store mineral spirits) were found to contain holes up to 0.25 inches in diameter. In addition the associated piping was observed to be compromised. Tanks 34 and C appeared to be relatively intact, however, soils around both were found to be impacted.

Soil conditions around the Area D tanks were investigated by soil gas survey and a program of soil sampling (the results of this work are described in Section 3.1.4). As mentioned above, soils around Tanks 34, 35, 36 and C were impacted by leakage, however the soils at Tank 10 were found to be primarily clean.

Tank 10 was abandoned in place using the amino-based foam. This action was appropriate because: (1) Tank 10 is located adjacent to a load bearing foundation and cannot be removed without impacting the integrity of the building; (2) Tank 10 is also located adjacent to the Penn Central railroad embankment; and (3) only trace levels of contaminants were detected the tested soils.

Following removal of Tanks 34, 35, 36 and C, excavation of soils continued down to a depth of 8 feet where a concrete anchor slab for the tank system was encountered. Approximately 30 cubic yards of impacted soils were removed. After characterization (sample results provided in Appendix B), the soils were removed from the Site and disposed of according to NYSDEC approved protocol as a Class "U" waste at CWM Chemical Services, Inc. located in Model City, New York. Attached as Appendix C are copies of the Uniform Hazardous Waste Manifests.

# 3.0 PHYSICAL CHARACTERISTICS

## 3.1 Geology

The Insilco site is located in the City of Mount Vernon, in the southern part of Westchester County, New York State. The Site is less than one mile north of the Bronx and the border of Westchester County with New York City. This location falls within the Lower Hudson River Valley of the New England physiographic province.

Topography in the area consists of northeast trending ridges, separated by rivers that flow southward in narrow valleys. The Site itself is located alongside the Bronx River, which is approximately 115 feet northwest of the Site. The average topographic elevation at the Site is approximately 95 feet above Mean Sea Level (MSL). The Site slopes northwest toward Oak Street.

Regional geology in this part of southern Westchester County consists of Precambrian metamorphic bedrock, the Manhattan schist, overlain by a generally thin layer of unstratified glacial deposits. Overburden typically consists of an unsorted mixture of clay, boulders, and sand deposited as ground moraine. This glacial layer is generally a low permeability material, and a poor source of water. In stream valleys, such as that of the Bronx River, the overburden can be much thicker, and consist of stratified glacial deposits, recent stream sediments and reworked glacial material. In general, the water yielding capacity of the unconsolidated stream valley deposits is highly variable.

Bedrock is reported in the literature to be the highly-folded, coarsely-crystalline, micaceous Manhattan Schist. Outcrops of the Manhattan Schist are found in road cuts and on ridges throughout the area, although it does not crop out on-site. The Manhattan Schist is relatively impermeable, and does not serve as an important source of water. What little

water it does produce is from fractures which decrease in size and frequency with depth. Well records show an average yield of 40 gpm (gallons per minute) from wells which average 320 feet in depth in the schist.

On-site geology is known from the various borings installed as part of this Remedial Investigation. Borings installed for environmental characterization of the Site were typically 15 to 35 feet in depth. One 50-foot boring was installed to investigate the deeper geologic conditions. Geologic logs of all these borings are provided in Appendix D. It has been found that the subsurface is capped with 5 to 10 feet of fill material. The fill is predominantly sand, plus a mixture of coal dust, bricks, concrete rubble and boulders. The natural sediments beneath the fill are a mixture of glacial material plus recent alluvial sediments. The general character of the unconsolidated material is predominantly silty, with lesser amounts of fine to medium sand and trace amounts of gravel. The combination of these sediment types was variable across the Site. Stratification of this material was poorly developed or absent. Depth to ground water on-site ranged from 15 feet (Area D) to 25 feet (Area A). Bedrock was not encountered in any boring.

## 3.2 Soils

Soils in the Site vicinity are mapped by the United States Soil Conservation Service as part of the Hollis soil series. Hollis soils are shallow, poorly-drained soils formed in glacial deposits that were derived from granite, gneiss and schist. These soils are moderately erodible, and have a relatively slow water infiltration and transmission rate, and a high runoff potential.

## 3.3 Surface Water

The former Red Devil Site is located along the eastern banks of the Bronx River. There are no surface water bodies on the Site itself. Local drainage is northwest towards the Bronx River. The Site itself is drained to a storm sewer system. The Bronx River flows southward, and discharges into the Long Island Sound, near the head of the East River.

## 3.4 Hydrogeology

The main source of ground water in Westchester County is precipitation. Precipitation averages 48 inches per year. Runoff averages 22 inches per year, and occurs mostly in late winter through the early spring months.

There are no major aquifers in southern Westchester County. Both the Manhattan Schist and the glacial sediments are capable of yielding small quantities of water to wells, but are not used any longer. Any remaining old wells have long been abandoned due to urbanization. All potable water in the area is supplied by the New York City public water system which is derived principally from surface water sources.

The direction of ground water flow is discussed in detail in Section 5.2.1. In summary, it was determined that ground water flow is westward, at an oblique angle with downstream direction of the Bronx River. A water table contour map is provided as Figure 5-8.

# 4.0 SAMPLING PROCEDURES

## 4.1 Introduction

The purpose of investigative activities at the Former Red Devil Site was to characterize the geology and hydrogeology as well as the subsurface soil and ground water quality at the Site. The program was designed to comply with relevant and applicable NYSDEC protocols. This section of the RI report provides a detailed description of the field activities that took place between May, 1991 and May, 1992. The objectives of each task are outlined and a description of the sampling procedures and Quality Assurance/Quality Control (QA/QC) methodologies is also provided. The field activities at the Site included the following tasks: soil sampling; soil gas survey; monitoring well installation; and ground water sampling and analysis.

## 4.2 Soil Sampling

### 4.2.1 Rationale

In order to develop an understanding of the Site geology and investigate potential releases from failed underground storage tanks and piping systems, a program of soil borings and soil sampling was employed at the Former Red Devil Site. The laboratory analytical data was collected from the borings to:

- characterize the extent of contaminated soils (where necessary) near the underground storage tanks present throughout the Site;

- establish an understanding of subsurface geologic conditions and stratigraphy as well as assess the presence of potential contaminant migration pathways; and

- establish appropriate screen intervals for ground water monitoring wells at various locations across the Site.

4.2.2 Procedures

Continuous split-barrel samples were collected in all borings during this investigation using either a tripod apparatus, a portable skid mounted drill-rig or a truck mounted drill-rig. All drilling was performed by Aquifer Drilling and Testing (ADT) of Long Island City, New York under the supervision of an ERM hydrogeologist. Depth to ground water at the Site ranges from approximately 15 feet below grade in the Area, D to 25 feet below grade in Area A. All test borings were drilled to the water table using hollow-stem augers.

Prior to each boring, all drilling equipment was cleaned with a high pressure steam cleaner. Split-barrel samplers were decontaminated prior to and after each use with a soap and water wash, using either Alconox or Liquinox, and a tap water rinse. The resultant waste fluids were collected and drummed for disposal. All washwater, drilling fluids, drill cuttings and wastewater were handled in accordance with the New York State Department of Environmental Conservation (NYSDEC) Division of Water Technical and Operational Guidance Series (1.6.1). All drilling equipment was properly decontaminated between test boring locations and all split-barrel samplers between sampling intervals to minimize the potential for cross-contamination.

A photo-ionization detector (PID) was used to monitor any gases emitted from the borehole and from each split-barrel sampler as soon as the sampler was opened. The PID (Photovac Microtip) was calibrated daily using isobutylene gas. An 11.6 EV lamp was utilized. All soil samples were logged by an ERM hydrogeologist. Sample collection procedures and protocols were conducted in compliance with standard NYSDEC and EPA methodologies. Split-barrel samplers were driven in accordance with ASTM Standards for Penetration Test and Split-Barrel Sampling of Soils (ASTM D1586-67, Reapproved 1974). Penetration resistance, recovery and sample description for each split-barrel sample were logged in bound field books and on soil boring logs.

Immediately after collection, an aliquot from each sample was placed in a mason jar covered with aluminum foil. After a time period of 15 minutes, the foil was pierced and the headspace air was analyzed using a calibrated Microtip PID. Based on these headspace measurements, a worst-case sample from each boring was placed in the appropriate laboratory-supplied containers and sent to a New York State certified laboratory for analysis.

### 4.2.3 Analytical Parameters

In general, the contaminants of concern at the former Red Devil facility are volatile organic compounds. This is demonstrated by the list of underground tanks contents presented in Table 1-1. However, in certain areas, additional analyses were warranted based on the materials that were stored at those locations. A summary of the soil analytical program is provided as Table 4-1.

TABLE: 4-1
SOIL ANALYTICAL PROGRAM
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

STAGE ONE NON-AQUEOUS SOIL ANALYTICAL PARAMETERS

| SAMPLE | SAMPLE TYPE | SAMPLE LOCATION | SITE AREA | CLP TCL VOLATILES | CLP TCL SEMI VOLATILES | CLP TAL ZINC | TPH |
|---|---|---|---|---|---|---|---|
| B-1 | NON-AQUEOUS SOIL | PACKING | C | X | X | X | X |
| B-2 | NON-AQUEOUS SOIL | ALLEY WAY | D | X | X | X | X |
| B-3 | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | X | X | X |
| B-4 | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | X | X | X |
| B-5 | NON-AQUEOUS SOIL | STORAGE | B | X | X | X | X |
| B-6 | NON-AQUEOUS SOIL | STORAGE | B | | X | | X |

STAGE TWO NON-AQUEOUS SOIL ANALYTICAL PARAMETERS

| SAMPLE | SAMPLE TYPE | SAMPLE LOCATION | SITE AREA | CLP TCL VOLATILES | CLP TCL SEMI VOLATILES | CLP TAL METALS | CLP PESTICIDES/PCBs |
|---|---|---|---|---|---|---|---|
| B-1A | NON-AQUEOUS SOIL | COURTYARD | A | X | X | X | |
| B-2A | NON-AQUEOUS SOIL | COURTYARD | A | X | X | X | |
| B-3A | NON-AQUEOUS SOIL | COURTYARD | A | X | X | X | |
| B-4A | NON-AQUEOUS SOIL | COURTYARD | A | X | | | |
| B-5A | NON-AQUEOUS SOIL | COURTYARD | A | X | | | |
| B-6A | NON-AQUEOUS SOIL | COURTYARD | A | X | | | |
| B-7A | NON-AQUEOUS SOIL | COURTYARD | A | X | | | |
| B-8A | NON-AQUEOUS SOIL | COURTYARD | A | X | | | |
| B-1D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | X | X | |
| B-2D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | X | X | |
| B-3D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | X | X | X |
| B-4D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-5D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-6D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-7D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-8D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-9D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |
| B-10D | NON-AQUEOUS SOIL | GARAGE/STORAGE | D | X | | | |

## 4.3 Soil Gas Sampling

### 4.3.1 Rationale

Soil gas sampling was used to varying degrees in each area of the Site as a tool to qualitatively characterize the degree of subsurface contamination. This data was then used to better define subsequent detailed soil sampling.

### 4.3.2 Procedures

Borings were advanced through the asphalt, concrete or wood floors in areas where soil gas measurements were to be taken. Dedicated soil probes consisting of a slotted shield point, teflon tubing, gravel pack and a grout seal were constructed to a depth of approximately three feet below grade. After construction, the probes were allowed to equilibrate with the surrounding soils. Ambient air was then purged from each probe and soil gas samples were run through a calibrated PID and the total vapor measurements were recorded.

## 4.4 Monitoring Well Installation

### 4.4.1 Rationale

Monitoring wells were installed to evaluate the ground water quality and to determine the thickness and areal extent of a floating non-aqueous liquid (hereinafter referred to as free product) that was found in certain areas of the Site. At this time, the objective of installing the ground water monitoring network was to allow ground water samples to be collected for laboratory analyses as well as to collect water level and free product thickness measurements.

It should be noted that drilling access at this Site is severely limited by a number of factors including the following:

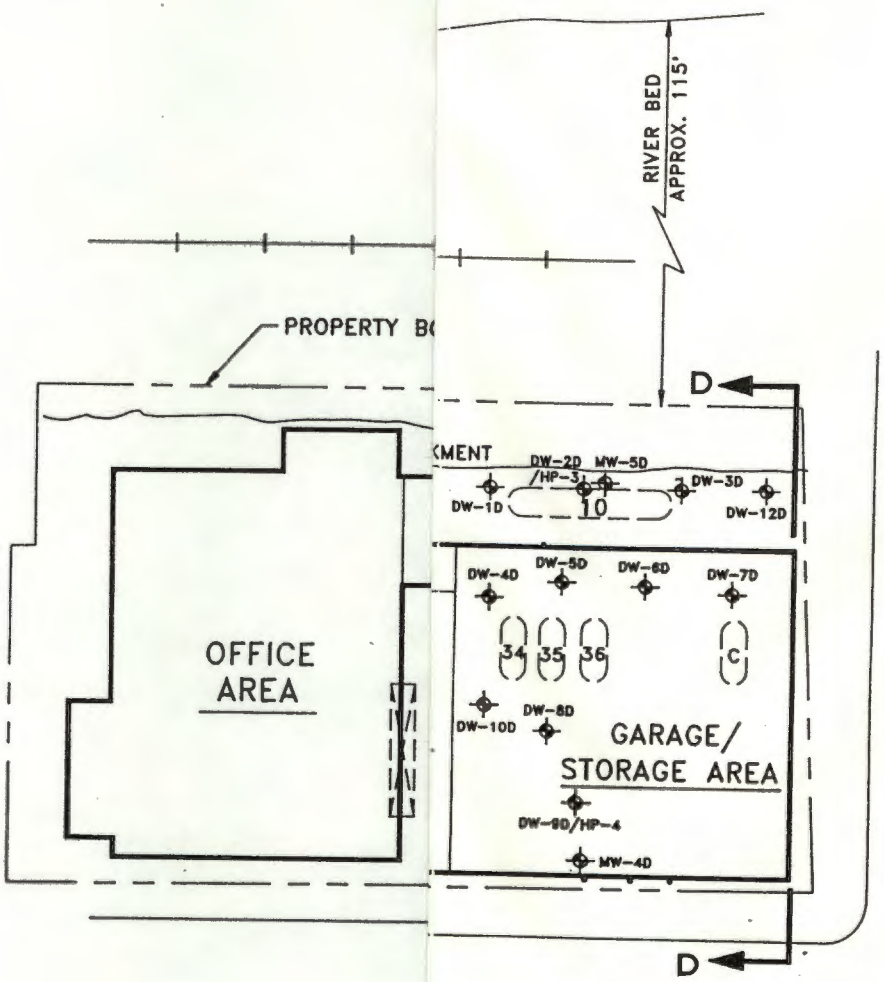
- The presence of the railroad embankment causes extremely cramped working conditions in the downgradient area behind the building. In some parts of this area, drilling is not possible at all and in other parts drilling can be performed only by using light-duty portable equipment.

- Because of the lack of working space behind the building, much of the drilling work was done indoors. In some parts of the building, low ceiling conditions either restricts or prevents drilling activities.

- The Site is underlain by fill material containing boulders and concrete rubble. Difficult drilling conditions are associated with these materials and often they could not be penetrated by the light-duty drilling equipment.

4.4.2 Procedures

The Site monitoring wells were installed in a phased effort. Initial well locations were based on local topography and the location of nearby surface water bodies which indicated that the direction of ground water flow would be north-northwest towards the Bronx River. The initial round of monitoring wells were installed on both the upgradient and downgradient portions of the property. When free product was discovered, eleven wells were added in Area D for product delineation. Three additional product delineation wells were installed in Area C and one in Area A. A total of 20 wells currently exist at the Site as shown on Figure 4-1.




LEGEND

TED STORAGE TANK

RGROUND STORAGE TANK

OUSLY REMOVED TANK

TORING WELL

OPUNCH LOCATION

| NO. | DATE | APPD. | REVISION |
|---|---|---|---|
| | | | |

# GROUND WATER DATA COLLECTION POINTS

DRAWING NO. 4-1

| | | | |
|---|---|---|---|
| E. MIKUCKI | DATE MAY 28, 1992 | CLIENT APPROVAL | REV. NO. |
| 1"=40' | JOB NO. 488.003.1 | DRAWN FOR RED-7 DATE | SHEET OF |

Two prefixes have been used in the well identification nomenclature: DW refers to a well that contains free product and/or is used primarily for product delineation; MW refers to a well that does not contain product and is therefore suitable for use as a ground water sampling point. The suffix A, B, C, or D is used to denote the area of the Site where the well is located.

All monitoring wells were installed by Aquifer Drilling and Testing (ADT) using hollow stem auger drilling methods. All wells were installed under the supervision of an ERM hydrogeologist. Prior to the installation of each well, all drilling equipment was cleaned as described in Section 2.2.2. Wells were generally constructed of flush-joint, Schedule 40 PVC (the exception is well DW-2C, which was constructed of stainless steel). Well screens were ten to fifteen feet in length and utilized manufactured 20-slot pipe. Well screens were generally installed straddling the water table (the exception is well MW-5A which was screened from five to fifteen feet below the water table).

Gravel pack was installed in the annular space to extend two to four feet above the screen. A one to two-foot bentonite pellet layer was installed above the gravel, and the remaining annular space was tremie grouted to the surface with a bentonite/cement slurry. Each PVC riser pipe was completed with a locking flush-mounted road box. Well logs are supplied in Appendix D.

Those wells designated for ground water quality sampling were developed either by air lift or submersible pump to ensure the removal of any drilling fines and to restore the hydraulic properties of the surrounding water bearing material. Each well was developed to a turbidity of 50 Nephelometric Turbidity Units (NTUs). A portable NTU meter was brought to the Site to make this determination. Following

development, the wells were allowed to equilibrate for a minimum of one week before ground water samples were collected.

## 4.5 Ground Water Sampling and Analysis

### 4.5.1 Rationale

Ground water samples were collected at the former Red Devil Facility and were analyzed to determine if historical activities at the Site have impacted the ground water quality. The results of these analyses, in combination with head distribution data and ground water flow directions (see Section 2.6) were used to delineate the nature and extent of any impacts to ground water.

### 4.5.2 Procedures

#### 4.5.2.1 Ground Water Sampling Using the Hydropunch

During the closure activities conducted in Area A and Area D, certain areas were encountered where soil appeared to be severely impacted. At these locations, the hydropunch tool was used as an initial screening of ground water quality.

Using a drill rig, augers were advanced down to the water table. The center bit and drill rods were removed and the hydropunch was inserted through the augers and pushed a minimum of five feet into the underlying aquifer. The tool was opened and ambient ground water allowed to enter. The tool was then extracted from the borehole and the sample transferred to laboratory sample containers. A total of five hydropunch samples (HP-1 through HP-3 together with HP-5 and HP-6, with one being a duplicate) were collected in this fashion. A representative sample could not

be collected from the HP-4 location. Volatile organic compound (VOC) samples were transferred to the lab bottles first, followed by base/neutral/acid extractables (semi-volatiles) and then metals samples. The VOC and semi-volatile samples were poured directly into laboratory prepared/supplied bottles. The metals samples were poured from bailers into a properly decontaminated Geotech barrel filter. The sample was then forced under pressure through a 0.45 micron filter directly into the lab bottles. All bottles were properly labeled and placed in chilled coolers while on-site.

4.5.2.2 Ground Water Sampling Using Monitoring Wells

There are three monitoring wells at the Site without free product that were sampled as part of this investigation. All ground water sampling was conducted in accordance with the EPA Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA and the NYSDEC ASP protocol. During all ground water sampling activities, field and laboratory QA/QC samples were collected in strict accordance with EPA and NYSDEC requirements.

On April 16, 1992, approximately two weeks after the installation of the last ground water monitoring well, wells MW-1, MW-4 and MW-5 were sampled. The purpose of the two-week waiting period was to allow hydrogeologic and geochemical conditions to stabilize after the disturbance by drilling procedures. Prior to initiating any sampling activities, a complete round of water level and product thickness measurements, to the nearest one-hundredth of a foot, were collected from all ground water monitoring wells at the Site. Well casing volumes were then calculated for each well, and three well casing volumes were evacuated using dedicated PVC bailers. All well purge water was drummed for proper disposal. Each well was then allowed to recover and samples were collected with dedicated, properly

decontaminated stainless-steel bottom-loading bailers. Each bailer was suspended by dedicated, new lengths of polypropylene cord and dedicated leader wire constructed of teflon-coated, stainless-steel leader wire. Volatile organic compound (VOC) samples were collected first, followed by base/neutral/acid extractables (semi-volatiles) and metal samples.

Prior to sampling, each bailer was decontaminated, using the process outlined below:

1. tap water and a non-phosphate detergent wash
2. tap water rinse
3. distilled/deionized water rinse
4. 10% nitric acid rinse
5. distilled/deionized water rinse
6. pesticide-grade methanol rinse
7. total air dry
8. distilled/deionized water rinse

All pumping equipment used at the Site was decontaminated before being placed in a well by flushing a tap water/non-phosphate detergent wash through the pump housing. This was followed by a potable water flush until the rinse water ran clear.

The VOC and semi-volatile samples were poured from the bailers directly into laboratory prepared/supplied bottles. All metal samples were filtered in the field as described above. All bottles were properly labeled and placed in chilled coolers while on-site. For the purposes of quality assurance and quality control, one field blank and one trip blank accompanied the ground water samples; blanks were

analyzed for the same parameters as the well samples. The field blank was prepared using laboratory-supplied deionized water. This water was poured through the decontaminated stainless steel bailer and was transferred to laboratory containers. The trip blank was prepared by the laboratory and accompanied the analytical glassware throughout the entire sampling event. Each sample was properly identified, packaged in coolers with ice packs, logged and shipped to the laboratory under full chain-of-custody procedures.

4.5.3 Laboratory Analysis

The initial hydropunch samples were analyzed by Envirotest Laboratories, Inc. of Newburgh, New York which is a New York State Department of Health and NYSDEC-ASP approved laboratory. All sample analysis and reporting was performed in accordance with EPA CLP quality assurance/quality control (QA/QC) protocol.

The ground water samples collected from the monitoring wells were analyzed by Adirondack Environmental Services, Inc. of Albany, New York. Adirondack is a New York State Department of Health and NYSDEC-ASP approved laboratory. This second round of data was reported according to NYSDEC-ASP protocol.

The parameters selected for ground water analyses are summarized as follows: hydropunch samples HP-1 through HP-3 and HP-5 were analyzed for the presence of TCL volatiles, TCL semi-volatiles and TPH. Hydropunch sample HP-6 was sampled for TCL volatiles only. A representative sample could not be collected from the proposed HP-4 location. Samples collected from monitoring wells MW-1, MW-4 and MW-5 were analyzed for TCL volatiles, TCL semi-volatiles and TAL metals.

## 4.6 Monitoring Well Elevations, Water Level and Product Thickness Measurements

### 4.6.1 Purpose

In order to develop an understanding of the Site-specific ground water flow regime, monitoring well elevations were surveyed, depth to water and product thickness measurements were taken. Data collected from each of these activities was then evaluated to determine ground water flow directions, and check for the occurrence and distribution of free product at the Site.

### 4.6.2 Procedures

Once the monitoring wells had been installed, the elevation of the top of the protective steel roadway box and the inner casing was surveyed to the nearest 0.01 foot. All monitoring wells were surveyed by Aristotle Bournazos, P.C. of Mt. Vernon, New York. Mr. Bournazos is a New York State Licensed, OSHA-certified surveyor. Following the development of the monitoring wells, one round of water and product level measurements was obtained with an electronic interface probe accurate to 0.01 foot. All measuring equipment was decontaminated between wells using an Alconox and water solution and tap water rinse. Measurements were taken from the top of each well casing and recorded in a bound field book. Using the well casing elevation data compiled by the surveyor, water and product level measurements were converted into elevation data from which a ground water contour map and product thickness map were constructed.

## 4.7 QA/QC and Data Validation

### 4.7.1 Purpose

The overall objective of collecting QA/QC sample together with performing a detailed analytical data review and validation is to determine what degree of confidence can be placed in the analytical results. The lab results have to be proven valid in order to justify using them to guide future investigation, develop risk assessments or plan remedial work at the Site.

### 4.7.2 Procedures

In accordance with required EPA and NYSDEC field sampling protocol, field and laboratory QA/QC samples were collected during all ground water and soil sampling activities at the Red Devil Site. Laboratory QA/QC samples consisted of a blind duplicate, a matrix spike and matrix spike duplicate (MS/MSD) and were collected at a frequency of one per twenty samples. Field QA/QC consisted of trip blanks and field equipment blanks which were generally submitted at a frequency of one per sampling event.

The analytical results of the laboratory and field QA/QC samples were used during the data validation process to evaluate any potential cross contamination of samples in the field or laboratory and to evaluate the quality of the data collected in the field. All ground water and soil analytical results reported by the laboratory included a CLP Quality Assurance and Generalized Reporting data package format with the following deliverables: cover page, field and internal chain-of-custody forms, traffic report form, laboratory chronicle, analysis results, raw analysis data (instrument printouts), QA/QC summaries, and travel and method blank results.

All data validation was performed by a qualified, experienced environmental chemist. The data validation was conducted in accordance with the NYSDEC ASP requirements. All CLP data packages generated by the laboratories were checked and reviewed for sample holding times, trip and field blank contamination levels, method blank contamination levels, surrogate compound recoveries, matrix spike/matrix spike duplicate recoveries, duplicate precision, initial and continuing calibration, internal standard areas, mass tuning, qualitative identification, quantitative results and quantitation limits. This independent data validation review ensures that the analytical data presented are accurate so that appropriate interpretations are made. Based upon the quality assurance review, qualifier codes were placed next to specific sample results on the data summary tables presented in this report. These qualifier codes serve as an indication of the qualitative and quantitative reliability of the data. Qualifier codes found in this report include the following:

U Indicates compound was analyzed for but was not detected.

NA Indicates compound was not analyzed for.

J Indicates an estimated value. Used to indicate tentatively identified compounds and to indicate a compound which meets the identification criteria but whose concentration is less than the sample quantitation limit and greater than zero.

D Indicates compounds identified at secondary dilution factor.

E Indicates compounds whose concentrations exceeded the calibration range.

B (Organics) Indicates that the analyte was found in the associated blank as well as the sample.

B (Inorganics) Indicates value is less than the Contract Required Detection Limit (CRDL) but greater than or equal to the Instrument Detection Limit (IDL).

4.7.3 Results

A quality assurance report for each data package was prepared as part of the data validation process. Each report summarizes the findings and qualifies the data with respect to usability. The reports further indicate the analyses that were performed and the items evaluated during the data validation review. Any problems that were found during the review are expressed in terms of their impact on the data usability. All data validation reports have been included in this document as Appendix E.

# 5.0 FIELD INVESTIGATION AND RESULTS

This project was begun under the jurisdiction of the NYSDEC Oil Spill program. Therefore, laboratory data reports that were completed as part of the Stage One soils investigation, or as part of the early ground water investigation, did not contain the detailed QA/QC backup that is normally required for New York State Superfund projects. Once management of the project was transferred to the inactive hazardous waste program, all subsequent laboratory analyses were reported and validated as per the NYSDEC ASP requirements.

## 5.1 Soils Investigation Program

Soil quality has been characterized in each of the four areas of the Site. This has been done through a variety of techniques including soil gas sampling (using a real-time field instrument (PID) for analysis), laboratory analysis of soil samples and PID screening of split-spoon soil cores. Where appropriate, the PID screening begins below the bottom of tank excavations that were filled with certified clean fill. The details of how these techniques were applied in each area are described below, followed by a presentation of the results. Discussion of these results is provided in Section 6.1.

### 5.1.1 Area A

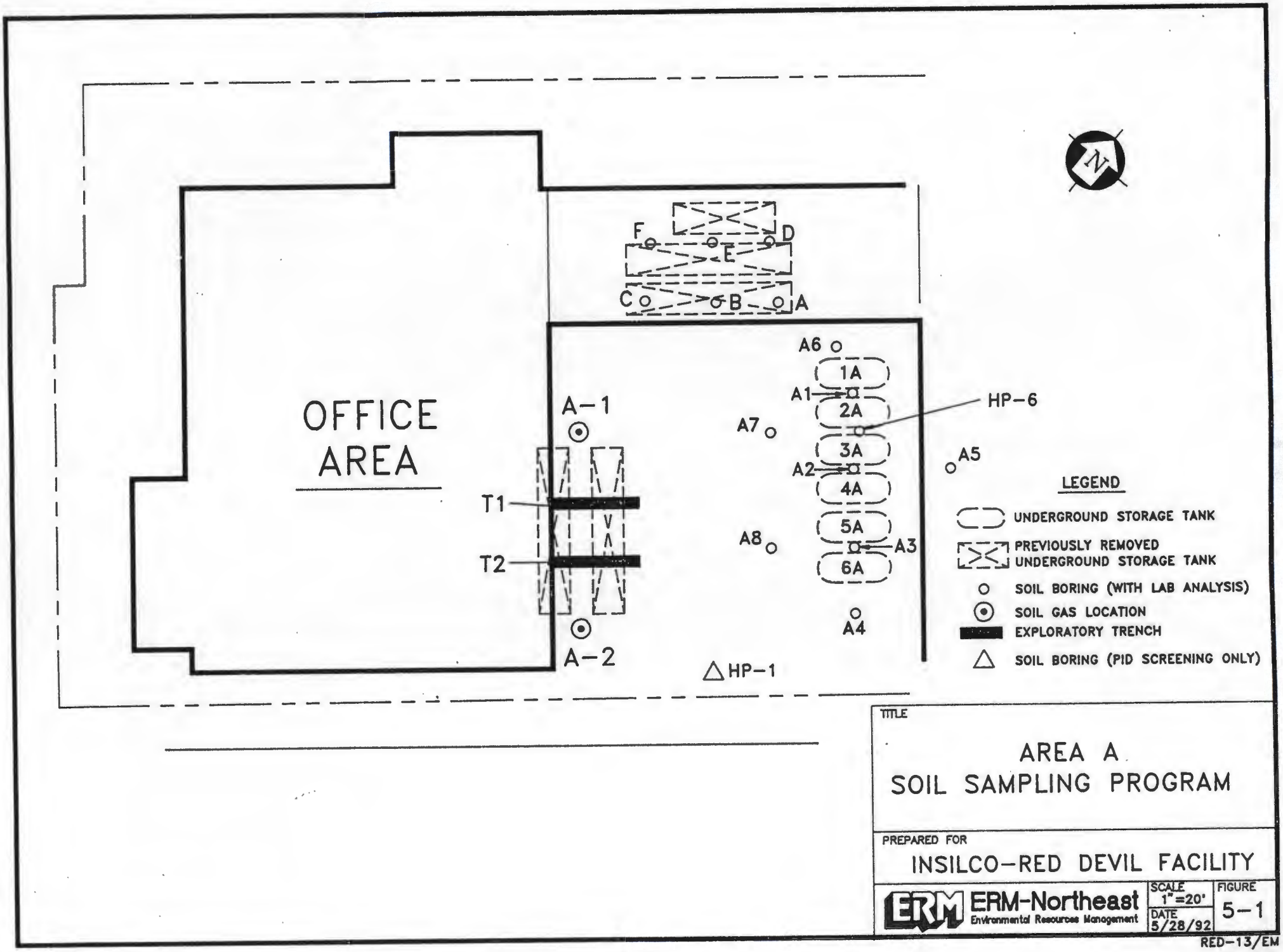
The investigation of soil quality in Area A was conducted in two stages. Work in this area focused on the former underground storage tank locations. The first stage of work was done at the time of the tank closure activities for the purpose of initial soil quality characterization. The objective of the second stage of work was to begin delineating soil impacts identified by the Stage One results. A map of Area

A is presented as Figure 5-1 and shows the location of all soil borings completed to date.

5.1.1.1 Stage One Investigation

An exploratory soil boring (HP-6) was advanced to the water table (23 feet below grade) between Tanks 2A and 3A as shown on Figure 5-1. The purpose of this boring was to make a preliminary determination of the vertical extent of the impacted soil. Continuous split-barrel samples were screened using a Photo Ionization Detector (PID). The worst case sample from boring HP-6 as determined by the PID screening was collected from the 16 to 18 foot interval and analyzed for TCL VOC's.

Test trenching was performed on the southwest side of the Area A courtyard (see Figure 5-1) to verify that the tanks at this location had actually been removed as previously reported. The trenches extended approximately eight feet below grade where refusal was reached at the concrete anchor slab. No tanks were present. The soils removed from the trenches were inspected and screened by PID. Similarly, soil borings were installed as shown on Figure 5-1 to assess another area where tanks were reportedly removed. These borings also reached refusal at eight feet below grade on the concrete anchor slab. No tanks were encountered. Soil cuttings from these borings were also screened by PID and sensory characterized. Two soil gas probes were also installed (see Figure 5-1) to rather assess potential soil impacts related to the previously removed tanks.


OFFICE AREA
F
D
E
C
B
A
A6
1A
A1
2A
HP-6
A7
3A
A5
A2
4A
A-1
T1
5A
A8
A3
T2
6A
A4
A-2
HP-1
LEGEND
UNDERGROUND STORAGE TANK
PREVIOUSLY REMOVED UNDERGROUND STORAGE TANK
SOIL BORING (WITH LAB ANALYSIS)
SOIL GAS LOCATION
EXPLORATORY TRENCH
SOIL BORING (PID SCREENING ONLY)
TITLE
AREA A
SOIL SAMPLING PROGRAM
PREPARED FOR
INSILCO-RED DEVIL FACILITY
ERM-Northeast
Environmental Resources Management
SCALE 1"=20'
DATE 5/28/92
FIGURE 5-1
RED-13/EM

5.1.1.2 Stage Two Investigation

A total of eight soil borings were advanced and sampled in the courtyard area as part of the Stage Two soils investigation at the locations shown on Figure 5-1. Each boring was sampled continuously; these samples were field screened using a calibrated PID. One worst case sample based on the PID results was collected from each boring and sent for laboratory analysis.

Three of the eight borings (A-1, A-2 and A-3) were advanced down to the water table in the center of the former tank excavation and were used to characterize the contaminants present in the impacted soil. At these locations, samples selected for laboratory analysis were tested for Target Analyte List (TAL) metals and Target Compound List (TCL) volatiles and semi-volatiles. The remaining five boring locations (A-4 through A-8) were placed to define boundaries to the impacted area. These samples were analyzed for TCL volatile compounds.

5.1.1.3 Area A Results

Geologic logs for borings HP-1, HP-6 and A-1 through A-8 are presented in Appendix D. The PID screening data from all soil samples and from the Stage One investigation of the previously removed tanks is provided in Table 5-1. The soil gas sampling data is not presented in a table, however the PID reading in the two installed probes ranged from 5.4 to 7.2 ppm. The results of the laboratory samples are summarized on Table 5-2 and Figure 5-2. The laboratory data sheets are provided in Appendix F.

TABLE: 5-1
PID SCREENING RESULTS:AREA A
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

**T-1**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 7 |
| 2 to 4 feet | 10 |
| 4 to 6 feet | 4 |
| 6 to 8 feet | 2 |

**T-2**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 5 |
| 2 to 4 feet | 2.7 |
| 4 to 6 feet | 3 |
| 6 to 8 feet | 0 |

**A**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 1.2 |
| 4 to 6 feet | 1 |
| 6 to 8 feet | 0 |

**B**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 1.5 |
| 4 to 6 feet | 0 |
| 6 to 8 feet | 0 |

**C**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 0 |
| 9 to 11 feet | 1 |
| 11 to 13 feet | 1 |
| 13 to 15 feet | 0 |

**D**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 2 |
| 4 to 6 feet | 1.6 |
| 6 to 8 feet | 2.7 |

**E**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 1.2 |
| 4 to 6 feet | 3 |
| 6 to 8 feet | 2 |

**F**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 1 |
| 9 to 11 feet | 0 |
| 11 to 13 feet | 2.4 |
| 13 to 15 feet | 1 |

**HP-1**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 2.5 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 5 |
| 6 to 8 feet | 2.5 |
| 8 to 10 feet | 4 |
| 10 to 15feet | 0 |
| 15 to 20 feet | 6 |
| 20 to 25 feet | 10 |
| 25 to 30 feet | 10 |

**HP-6**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| 10 to 12 feet | 256 |
| 12 to 14 feet | 1765 |
| 14 to 16 feet | 2356 |
| 16 to 18 feet | 5197 |
| 18 to 20 feet | 4673 |
| 20 to 22 feet | 2677 |
| - | - |

**B-1A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 55.6 |
| 9 to 11 feet | 25.4 |
| 11 to 13 feet | 15 |
| 13 to 15 feet | 31 |
| 15 to 17 feet | 38 |
| 17 to 19 feet | 363 |
| 19 to 21 feet | 565 |
| 21 to 23 feet | 215 |
| 23 to 25 feet | 1217 |

**B-2A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 0 |
| 9 to 11 feet | 0 |
| 11 to 13 feet | 25 |
| 13 to 15 feet | 2 |
| 15 to 17 feet | 10 |
| 17 to 19 feet | >9999 |
| 19 to 21 feet | 2010 |
| 21 to 23 feet | 520 |
| 23 to 25 feet | 620 |

**B-3A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 54.6 |
| 9 to 11 feet | 15.1 |
| 11 to 13 feet | 24.7 |
| 13 to 15 feet | 28.2 |
| 15 to 17 feet | 5.4 |
| 17 to 19 feet | 92.5 |
| 19 to 21 feet | 126.7 |
| 21 to 23 feet | 125 |
| 23 to 25 feet | 160 |

**B-4A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 22 |
| 9 to 11 feet | 2.4 |
| 11 to 13 feet | 6.3 |
| 13 to 15 feet | 18.3 |
| 15 to 17 feet | 21.6 |
| 17 to 19 feet | 28.6 |
| 19 to 21 feet | 31.5 |
| 21 to 23 feet | 17.1 |
| 23 to 25 feet | 17.8 |

**B-5A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 151 |
| 9 to 11 feet | 47.5 |
| 11 to 13 feet | 66.1 |
| 13 to 15 feet | 57.6 |
| 15 to 17 feet | 72.3 |
| 17 to 19 feet | 286 |
| 19 to 21 feet | 46.1 |
| 21 to 23 feet | 219 |
| - | - |

**B-6A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | - |
| 9 to 11 feet | 28 |
| 11 to 13 feet | 46 |
| 13 to 15 feet | 36 |
| 15 to 17 feet | 48 |
| 17 to 19 feet | 48 |
| 19 to 21 feet | 33 |
| 21 to 23 feet | 382 |
| 23 to 25 feet | 325 |

**B-7A**

| DEPTH | PID |
|---|---|
| 7 to 9 feet | 2 |
| 9 to 11 feet | 21.2 |
| 11 to 13 feet | 3.6 |
| 13 to 15 feet | 3 |
| 15 to 17 feet | 20.2 |
| 17 to 19 feet | 42.9 |
| 19 to 21 feet | 0.2 |
| 21 to 23 feet | 375 |
| 23 to 25 feet | 425 |

**B-8A**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| 10 to 12 feet | 0 |
| 12 to 14 feet | 3.9 |
| 14 to 16 feet | 6 |
| 16 to 18 feet | 66.6 |
| 18 to 20 feet | 28 |
| 20 to 22 feet | 73 |
| 22 to 24 feet | 19 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.

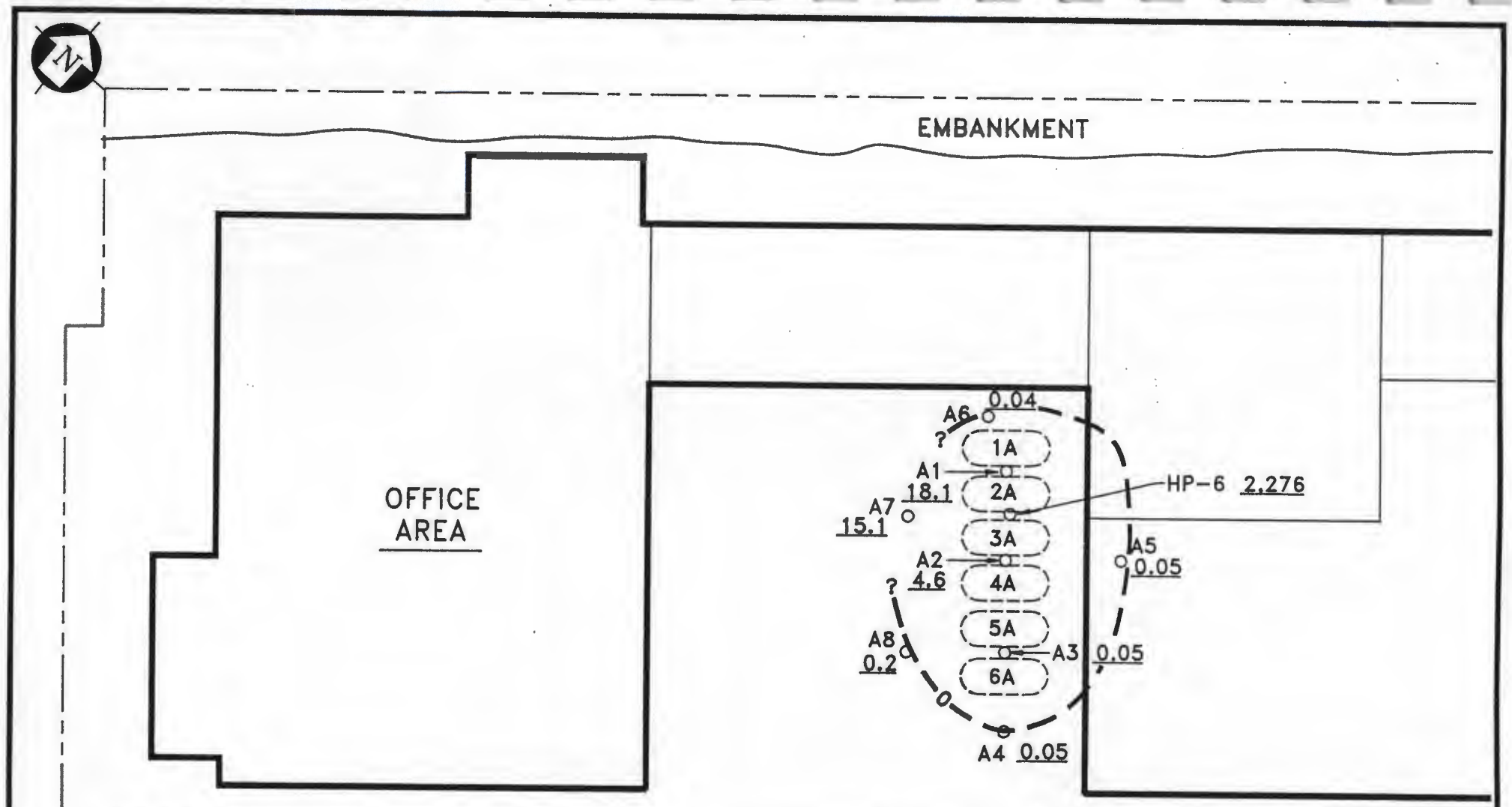
TABLE: 5-2
LABORATORY ANALYTICAL RESULTS: AREA A SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | HP-6 | B-1A | B-1AR | B-2A | B-3A | B-4A | B-5A | B-6A | B-7A | B-8A | TB-1 | TB | FB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 5/20/91 | 1/20/92 | 2/7/92 | 1/20/92 | 1/20/92 | 1/20/92 | 2/11/92 | 2/19/92 | 1/20/92 | 2/7/92 | 1/20/92 | 2/7/92 | 2/7/92 |
| Depth Collected | 16-18 feet | 23-25 feet | 23-25 feet | 17-19 feet | 24-26 feet | 19-21 feet | 17-19 feet | 21-23 feet | 20-22 feet | 20-22 feet | | | |
| DETECTED TARGET COMPOUND LIST VOLATILE ORGANIC COMPOUNDS (in mg/Kg) | | | | | | | | | | | | | |
| Acetone | 2.9 | 0.18 B | 0.086 | 1.3J | 0.018 B | 0.02 B | 0.033 | U | U | 0.19 | 0.013 | U | 0.065 |
| Benzene | 0.73 J | 0.003 J | U | U | U | U | U | U | U | U | U | U | U |
| Carbon Disulfide | U | U | U | U | U | U | U | 0.018 | U | U | U | U | U |
| Chloroethane | U | U | U | U | U | U | U | U | U | 0.005 B | U | U | U |
| 1,1-Dichloroethane | U | U | U | U | U | U | U | U | U | U | U | U | U |
| 1,1-Dichloroethene | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Ethylbenzene | 12 | 0.071 | U | U | U | U | U | U | U | U | U | U | U |
| 4-Methyl-2-Pentanone | U | 0.019 J | U | U | 0.023 | 0.018 | U | U | U | U | U | U | U |
| Methylene Chloride | U | 0.67 B | 0.007 B | 0.51 BJ | 0.005 BJ | 0.007 BJ | 0.012 B | 0.01 B | 0.43 BJ | 0.005 B | 0.013 B | 0.012 BJ | 0.004 BJ |
| Tetrachloroethene | U | 0.009 J | U | U | U | U | 0.005 J | U | U | U | U | U | U |
| Trichloroethene | U | U | U | U | U | U | 0.003 J | U | U | U | U | U | U |
| 1,1,1-Trichloroethane | 0.28 J | U | U | U | U | U | U | U | U | U | U | U | U |
| Toluene | 2200 D | 17 E | 0.007 | 2.8 | U | U | U | 0.007 | 15 | U | U | U | U |
| Xylenes (total) | 60 JD | 0.22 | U | U | U | U | U | U | U | U | U | U | U |
| TOTAL VOLATILES | 2275.91 | 18.172 | 0.1 | 4.61 | 0.046 | 0.045 | 0.05 | 0.035 | 15.43 | 0.024 | 0.026 B | 0.012 B | 0.069 |
| TICs | 314.57 J | 1.44 J | 0.183 J | U | 0.01 J | 0.01 J | U | 0.049 | U | U | U | 0.008 | U |
| DETECTED TARGET COMPOUND LIST SEMI-VOLATILE COMPOUNDS (in mg/Kg) | | | | | | | | | | | | | |
| Benzo(b)flourantene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Benzo(a)pyrene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Bis(2-ethylhexyl)phthalate | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Chrysene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Di-n-butyl phthalate | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Naphthalene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Phenanthrene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| Pyrene | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| TOTAL B/Ns | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | U |
| B/N TICs | NA | 2.3 BJ | NA | 2.0 BJ | 2.0 BJ | NA | NA | NA | NA | NA | NA | NA | U |
| TOTAL PETROLEUM HYDROCARBONS (in mg/Kg) | | | | | | | | | | | | | |
| Total | 92 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE: 5-2 (cont.)
LABORATORY ANALYTICAL RESULTS: AREA A SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | HP-6 | B-1A | B-1AR | B-2A | B-3A | B-4A | B-5A | B-6A | B-7A | B-8A | TB-1 | TB | FB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 5/20/91 | 1/20/92 | 2/7/92 | 1/20/92 | 1/20/92 | 1/20/92 | 2/11/92 | 2/19/92 | 1/20/92 | 2/7/92 | 1/20/92 | 2/7/92 | 2/7/92 |
| Depth Collected | 16-18 feet | 23-25 feet | 23-25 feet | 17-19 feet | 24-26 feet | 19-21 feet | 17-19 feet | 21-23 feet | 20-22 feet | 20-22 feet | | | |
| DETECTED TARGET ANALYTE LIST METALS (in mg/Kg) | | | | | | | | | | | | | |
| Aluminum | NA | 5240 | NA | 6900 | 4230 | NA | NA | NA | NA | NA | NA | NA | NA |
| Antimony | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Arsenic | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Barium | NA | 50.5 | NA | 74 | 39.6 B | NA | NA | NA | NA | NA | NA | NA | NA |
| Beryllium | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Cadmium | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Calcium | NA | 1780 | NA | 1860 | 1450 | NA | NA | NA | NA | NA | NA | NA | NA |
| Chromium | NA | 13.7 | NA | 18.8 | 12.3 | NA | NA | NA | NA | NA | NA | NA | NA |
| Cobalt | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Copper | NA | 11.6 | NA | 14.8 | 9.1 | NA | NA | NA | NA | NA | NA | NA | NA |
| Iron | NA | 12200 | NA | 17200 | 11300 | NA | NA | NA | NA | NA | NA | NA | NA |
| Lead | NA | 2.5 N | NA | 4.0 N | 4.4 +SN | NA | NA | NA | NA | NA | NA | NA | NA |
| Magnesium | NA | 3540 | NA | 3780 | 1890 | NA | NA | NA | NA | NA | NA | NA | NA |
| Manganese | NA | 192 | NA | 351 | 149 | NA | NA | NA | NA | NA | NA | NA | NA |
| Mercury | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Nickel | NA | 13.3 | NA | 16.7 | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Potassium | NA | 1320 | NA | 1910 | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Selenium | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Silver | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Sodium | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Thallium | NA | U | NA | U | U | NA | NA | NA | NA | NA | NA | NA | NA |
| Vanadium | NA | 18 | NA | 25 | 14.5 | NA | NA | NA | NA | NA | NA | NA | NA |
| Zinc | NA | 46.1 | NA | 60.7 | 50.7 | NA | NA | NA | NA | NA | NA | NA | NA |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits (85-115%), while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.




LEGEND

- ○ SOIL BORING LOCATION
- FORMER UNDERGROUND STORAGE TANK
- 15.1 TOTAL VOC CONCENTRATION IN Mg/Kg

TITLE

# AREA A
# TOTAL VOLATILE ORGANIC CONCENTRATIONS IN SOIL

PREPARED FOR

INSILCO–RED DEVIL FACILITY

ERM ERM-Northeast Environmental Resources Management

SCALE 1"=20'

DATE 5/7/92

FIGURE 5-2

RED-1/EM

### 5.1.2 Area B

A preliminary investigation (Stage One) of soil quality was conducted at the former underground storage tank locations in Area B. The results of this work did not indicate that soils were significantly impacted, therefore no Stage Two work was required.

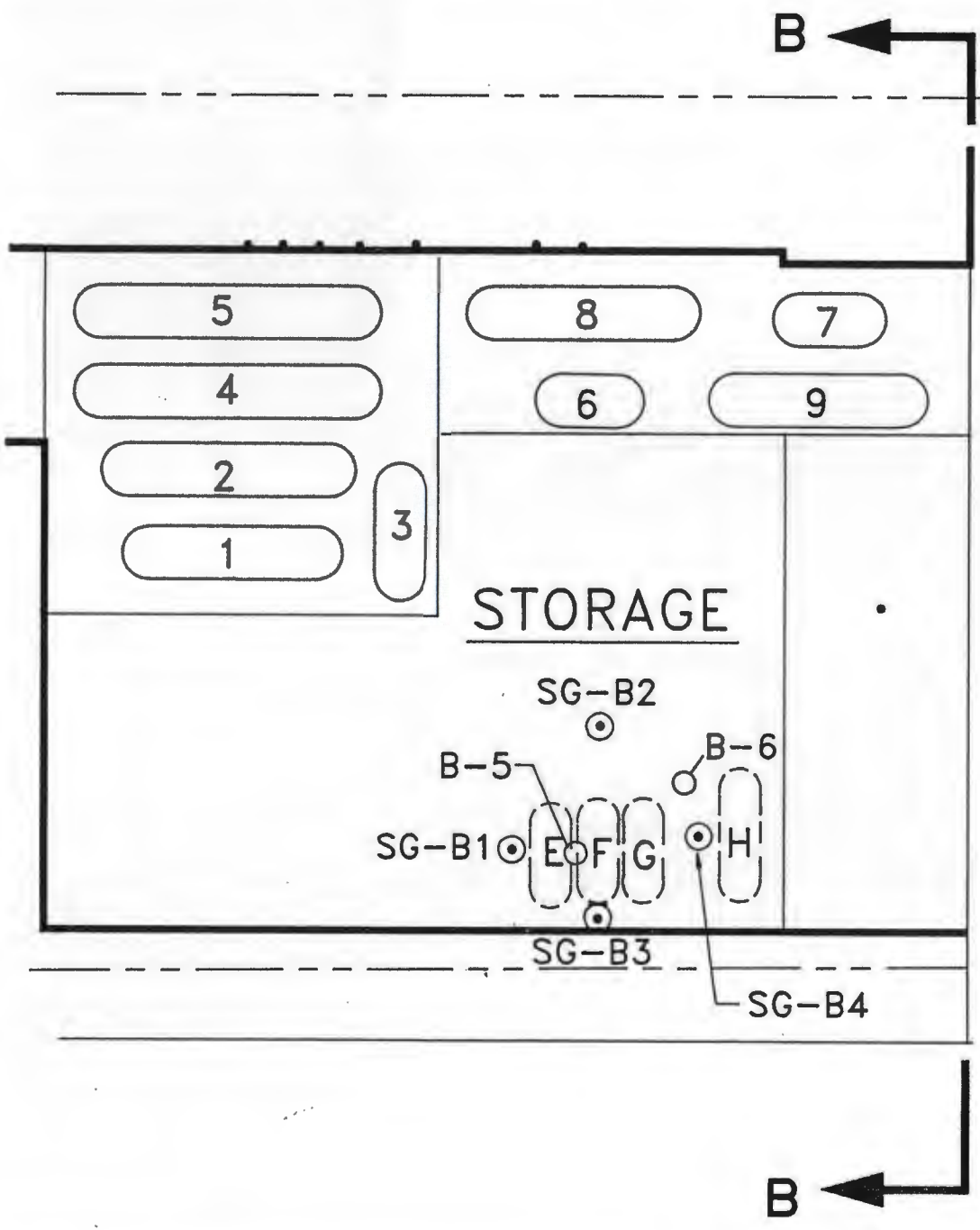
#### 5.1.2.1 Stage One Investigation

Two borings were installed to the water table and soil gas sampling was performed at the locations shown in Figure 5-3. Both soil borings (B-5 and B-6) were sampled continuously; each sample was field screened using a PID. One worst case sample was chosen from each boring and sent for laboratory analysis.

The worst case sample from B-5 was collected at the inverts of Tanks E and F (6 to 8 feet below grade) and was analyzed for zinc, TCL VOCs, TCL semi-volatiles and Total Petroleum Hydrocarbons (TPH). Soil samples collected from B-6 did not register a detection on the PID that could be distinguished from background (0 to 10 ppm). Since a worst case sample could not be identified, soils from the Number 6 fuel oil Tank H invert (16 to 18 feet below grade) were analyzed for TPH and TCL semi-volatiles.

#### 5.1.2.2 Area B Results

The results of the soil gas sampling were generally below 10 ppm, as measured by the PID (isobutylene calibration). A complete listing of these results is provided in Table 5-3. Results of PID screening of soil samples collected from borings B-5 and B-6 are summarized in Table 5-4. The results of the laboratory analyses are




LEGEND

- VAULTED STORAGE TANK
- UNDERGROUND STORAGE TANK
- VENT
- SOIL BORING LOCATION
- SOIL GAS LOCATION

TITLE

# AREA B
# SOIL SAMPLING PROGRAM

PREPARED FOR

INSILCO-RED DEVIL FACILITY

ERM-Northeast
Environmental Resources Management

SCALE 1" = 20'

DATE 5/7/92

FIGURE 5-3

RED-14/EM

TABLE: 5-3
SOIL GAS SAMPLING RESULTS: AREA B
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| STORAGE AREA | |
|---|---|
| **PROBE** | **PID** |
| SG-B1 | 10 |
| SG-B2 | 2.5 |
| SG-B3 | 1 |
| SG-B4 | 3 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.

TABLE: 5-4
PID SCREENING RESULTS:AREA B
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| B-5 | |
|---|---|
| DEPTH | PID |
| 6 to 8 feet | 275 |
| 8 to 10 feet | 1408 |
| 10 to 12 feet | 100 |
| 12 to 14 feet | 54 |
| 14 to 16 feet | 25 |
| 16 to 18 feet | 0 |
| 18 to 20 feet | 0 |

| B-6 | |
|---|---|
| DEPTH | PID |
| - | - |
| - | - |
| 10 to 12 feet | 0 |
| 12 to 14 feet | 2.3 |
| 14 to 16 feet | 1.7 |
| 16 to 18 feet | 5 |
| 18 to 20 feet | 0 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.

summarized in Table 5-5; laboratory data sheets are provided in Appendix F. Geologic logs for borings B-5 and B-6 are provided in Appendix D.

### 5.1.3 Area C

One stage of soils investigation has been conducted thus far in Area C. The results of this work indicate the need for further definition of soil quality in this area. This additional work has not yet been undertaken and will be included as part of the Phase II RI Work Plan.

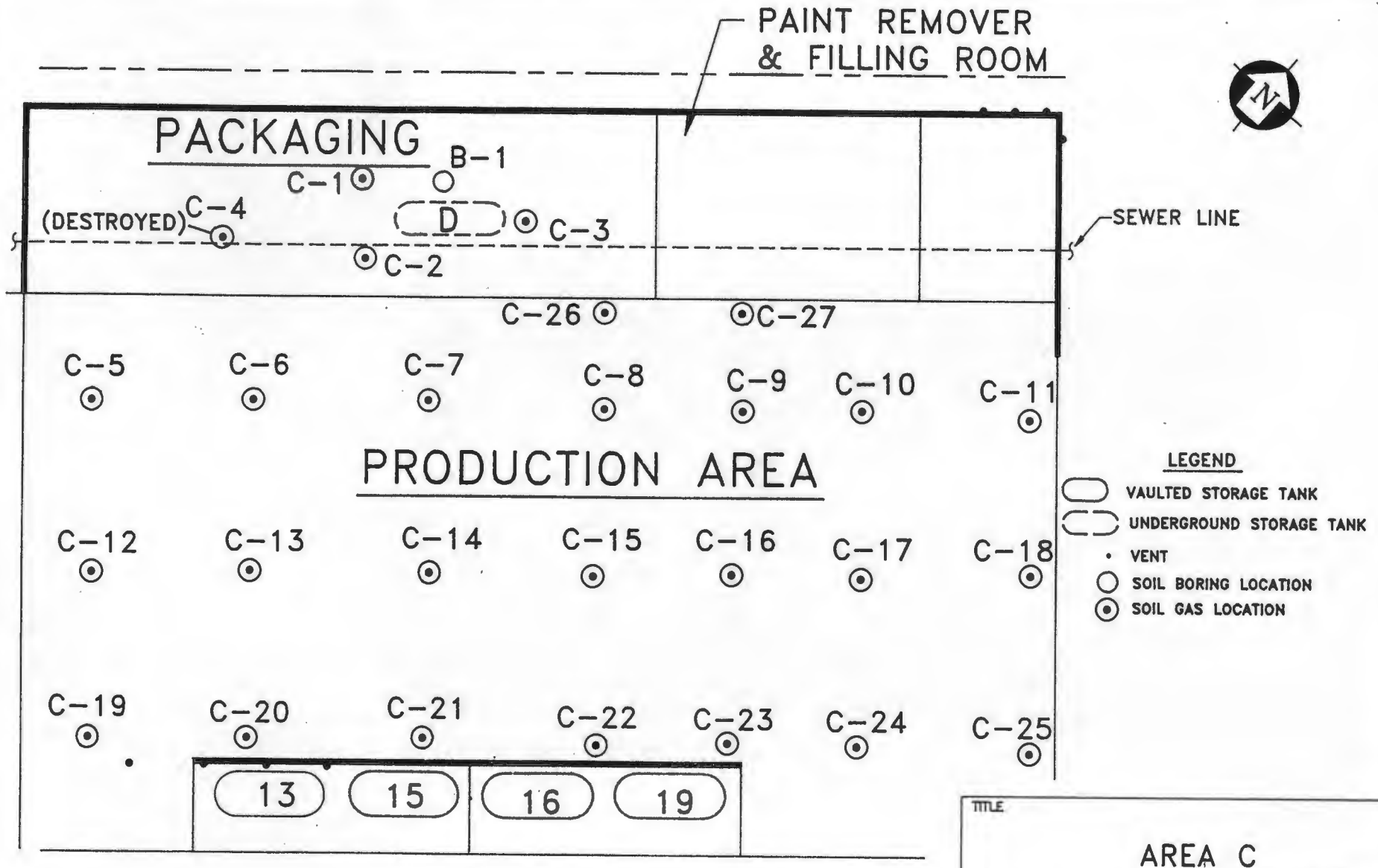
#### 5.1.3.1 Stage One Investigation

A soil boring (B-1) was advanced to the water table within the backfill material surrounding Tank D as indicated on Figure 5-4. Continuous split spoon samples were collected and field screened using a PID. Based on the PID readings, a worst case sample was selected and sent for TAL metals, TCL VOCs, TCL semi-volatiles, and TPH analysis.

Soil gas samples were also collected from four soil gas probes advanced around Tank D. A detailed soil gas sampling program was conducted to survey soil conditions in the production room of Area C in an attempt to locate possible unknown tanks and identify any localized points of discharge.

#### 5.1.3.3 Area C Results

The PID screening results from boring B-1 are provided in Table 5-6. The worst case sample was identified to be 9 to 10 feet below grade; the results of the




TITLE

AREA C
SOIL SAMPLING PROGRAM

PREPARED FOR

INSILCO-RED DEVIL FACILITY

ERM ERM-Northeast
Environmental Resources Management

SCALE 1" = 20'

DATE 5/7/92

FIGURE 5-4

RED-16/EM

TABLE: 5-5
LABORATORY ANALYTICAL RESULTS: AREA B SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | B-5 | B-6 |
|---|---|---|
| Date Collected | 5/2/91 | 5/21/91 |
| Depth Collected | 6-8 feet | 16-18 feet |

DETECTED TARGET COMPOUND LIST
VOLATILE ORGANIC COMPOUNDS (in mg/Kg)

| | | |
|---|---|---|
| Acetone | U | NA |
| Benzene | U | NA |
| Carbon Disulfide | U | NA |
| Chloroethane | U | NA |
| 1,1-Dichloroethane | U | NA |
| 1,1-Dichloroethene | U | NA |
| Ethylbenzene | U | NA |
| 4-Methyl-2-Pentanone | U | NA |
| Methylene Chloride | 0.076 | NA |
| Tetrachloroethene | U | NA |
| 1,1,1-Trichloroethane | U | NA |
| Toluene | U | NA |
| Xylenes (total) | U | NA |
| TOTAL VOLATILES | 0.076 | NA |
| TICs | 0.116 | NA |

DETECTED TARGET COMPOUND LIST
SEMI-VOLATILE COMPOUNDS (in mg/Kg)

| | | |
|---|---|---|
| Benzo(b)flouranthene | 0.06 J | U |
| Benzo(a)pyrene | 0.05 J | U |
| Bis(2-ethylhexyl)phthalate | 0.03 J | U |
| Chrysene | 0.05 J | U |
| Di-n-butyl phthalate | 0.25 JB | U |
| Naphthalene | U | U |
| Phenanthrene | U | U |
| Pyrene | 0.06 J | U |
| TOTAL B/Ns | 0.5 J | U |
| TICs | U | 1.1 J |

| Boring No. | B-5 | B-6 |
|---|---|---|
| Date Collected | 5/2/91 | 5/21/91 |
| Depth Collected | 6-8 feet | 16-18 feet |

TOTAL PETROLEUM
HYDROCARBONS (in mg/Kg)

| | | |
|---|---|---|
| Total | 15 | 92 |

DETECTED TARGET
ANALYTE LIST METALS (in mg/Kg)

| | | |
|---|---|---|
| Aluminum | NA | NA |
| Antimony | NA | NA |
| Arsenic | NA | NA |
| Barium | NA | NA |
| Beryllium | NA | NA |
| Cadmium | NA | NA |
| Calcium | NA | NA |
| Chromium | NA | NA |
| Cobalt | NA | NA |
| Copper | NA | NA |
| Iron | NA | NA |
| Lead | NA | NA |
| Magnesium | NA | NA |
| Manganese | NA | NA |
| Mercury | NA | NA |
| Nickel | NA | NA |
| Potassium | NA | NA |
| Selenium | NA | NA |
| Silver | NA | NA |
| Sodium | NA | NA |
| Thallium | NA | NA |
| Vanadium | NA | NA |
| Zinc | 80 | NA |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits, while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.

TABLE: 5-6
PID SCREENING RESULTS:AREA C
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| B-1 | |
|---|---|
| **DEPTH** | **PID** |
| 0 to 2 feet | 0 |
| 2 to 4 feet | 3.6 |
| 4 to 6 feet | 10.4 |
| 6 to 8 feet | 5.2 |
| 8 to 10 feet | 3.6 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.

laboratory analysis of this sample is summarized in Table 5-7. Laboratory data sheets are provided in Appendix F.

Soil gas sampling results from probes C-1 through C-4, as well as the survey sampling results from the production room are provided in Table 5-8. A contour map of the soil gas results is given as Figure 5-5.

The geologic log for boring B-1 is presented in Appendix D.

### 5.1.4 Area D

The investigation of soil quality in Area D was conducted in two stages. This work was targeted at the former underground storage tank locations. The initial stage of work was done at the time of the tank closure activities for the purpose of initial soil quality characterization. The objective of the second stage of work was to begin delineating soil impacts identified by the Stage One results.

#### 5.1.4.1 Stage One Investigation

Sampling locations related to the Stage One investigation are shown on Figure 5-6a. Two soil borings (B-3 and B-4) were advanced to the water table at the locations shown on this figure. A third boring (B-2) was terminated at a depth of 10 feet upon refusal. Continuous split spoon samples were collected and field screened using a PID. One worst case sample was chosen from each boring and sent for laboratory analysis. Each sample was analyzed for TAL metals, TCL VOCs, TCL semi-volatiles and TPH. Soil gas samples were also collected from probes located as indicated in Figure 5-6a.

TABLE: 5-7
LABORATORY ANALYTICAL RESULTS: AREA C SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| | |
|---|---|
| Boring No. | B-1 |
| Date Collected | 5/2/91 |
| Depth Collected | 8-10 feet |

DETECTED TARGET COMPOUND LIST
VOLATILE ORGANIC COMPOUNDS (in mg/Kg)

| | |
|---|---|
| Acetone | U |
| Benzene | U |
| Carbon Disulfide | U |
| Chloroethane | U |
| 1,1-Dichloroethane | 0.014 |
| 1,1-Dichloroethene | U |
| Ethylbenzene | U |
| 4-Methyl-2-Pentanone | U |
| Methylene Chloride | U |
| Tetrachloroethene | 0.067 |
| 1,1,1-Trichloroethane | 0.036 |
| Toluene | U |
| Xylenes (total) | U |
| TOTAL VOLATILES | 0.117 |
| TICs | 0.159 J |

DETECTED TARGET COMPOUND LIST
SEMI-VOLATILE COMPOUNDS (in mg/Kg)

| | |
|---|---|
| Anthracene | 0.073 J |
| Benzo(b)flourantene | 0.35 |
| Benzo(a)pyrene | 0.18 J |
| Bis(2-ethylhexyl)phthalate | U |
| Chrysene | U |
| Di-n-butyl phthalate | 1.6 B |
| Fluorantene | 0.44 |
| Naphthalene | U |
| Phenanthrene | 0.27 J |
| Pyrene | 0.3 J |
| TOTAL B/Ns | 02.643 J |
| TICs | U |

TOTAL PETROLEUM
HYDROCARBONS (in mg/Kg)

| | |
|---|---|
| Total | 40 |

DETECTED TARGET ANALYTE
LIST METALS (in mg/Kg)

| | |
|---|---|
| Aluminum | NA |
| Antimony | NA |
| Arsenic | NA |
| Barium | NA |
| Beryllium | NA |
| Cadmium | NA |
| Calcium | NA |
| Chromium | NA |
| Cobalt | NA |
| Copper | NA |
| Iron | NA |
| Lead | NA |
| Magnesium | NA |
| Manganese | NA |
| Mercury | NA |
| Nickel | NA |
| Potassium | NA |
| Selenium | NA |
| Silver | NA |
| Sodium | NA |
| Thallium | NA |
| Vanadium | NA |
| Zinc | 45 |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits, while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.

TABLE: 5-8
SOIL GAS SAMPLING RESULTS: AREA C
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

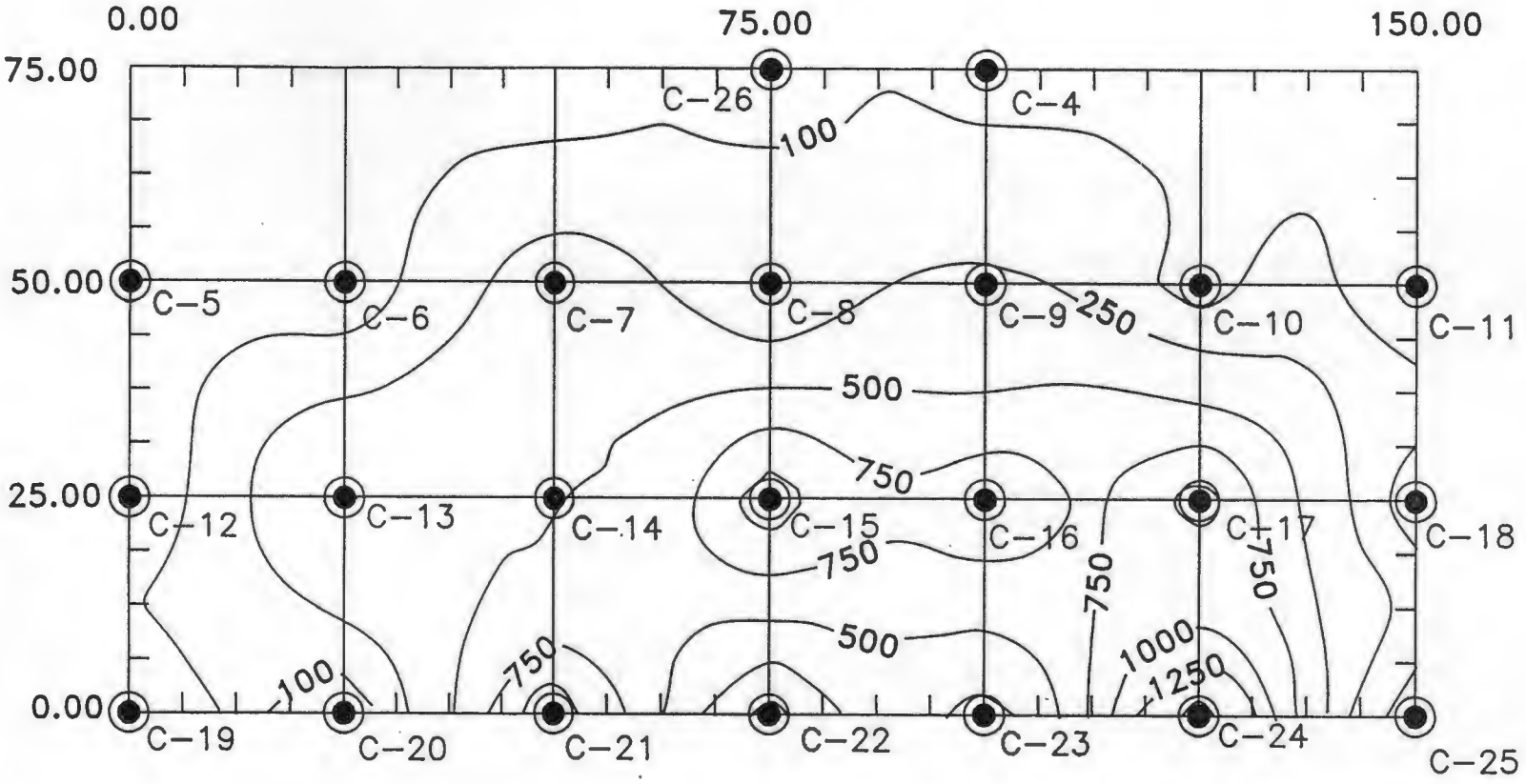
PACKING AREA

| PROBE | PID |
|---|---|
| 1 | 526 |
| 2 | 123 |
| 3 | 575 |

PRODUCTION AREA

| PROBE | PID |
|---|---|
| 4 | 51.9 |
| 5 | 19.2 |
| 6 | 28.7 |
| 7 | 328 |
| 8 | 45.4 |
| 9 | 217 |
| 10 | 37 |
| 11 | 0 |
| 12 | 16.7 |
| 13 | 517 |
| 14 | 493 |
| 15 | 1142 |
| 16 | 897 |
| 17 | 1015 |
| 18 | 15.7 |
| 19 | 27.2 |
| 20 | 19.7 |
| 21 | 1013 |
| 22 | 27.9 |
| 23 | 153 |
| 24 | 1621 |
| 25 | 0 |
| 26 | 13.7 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.




LEGEND

C-20 ◉ SOIL GAS PROBE

—500— SOIL GAS CONCENTRATION (ppm)

SCALED IN FEET

TITLE

**RESULTS OF AREA C SOIL GAS SURVEY**

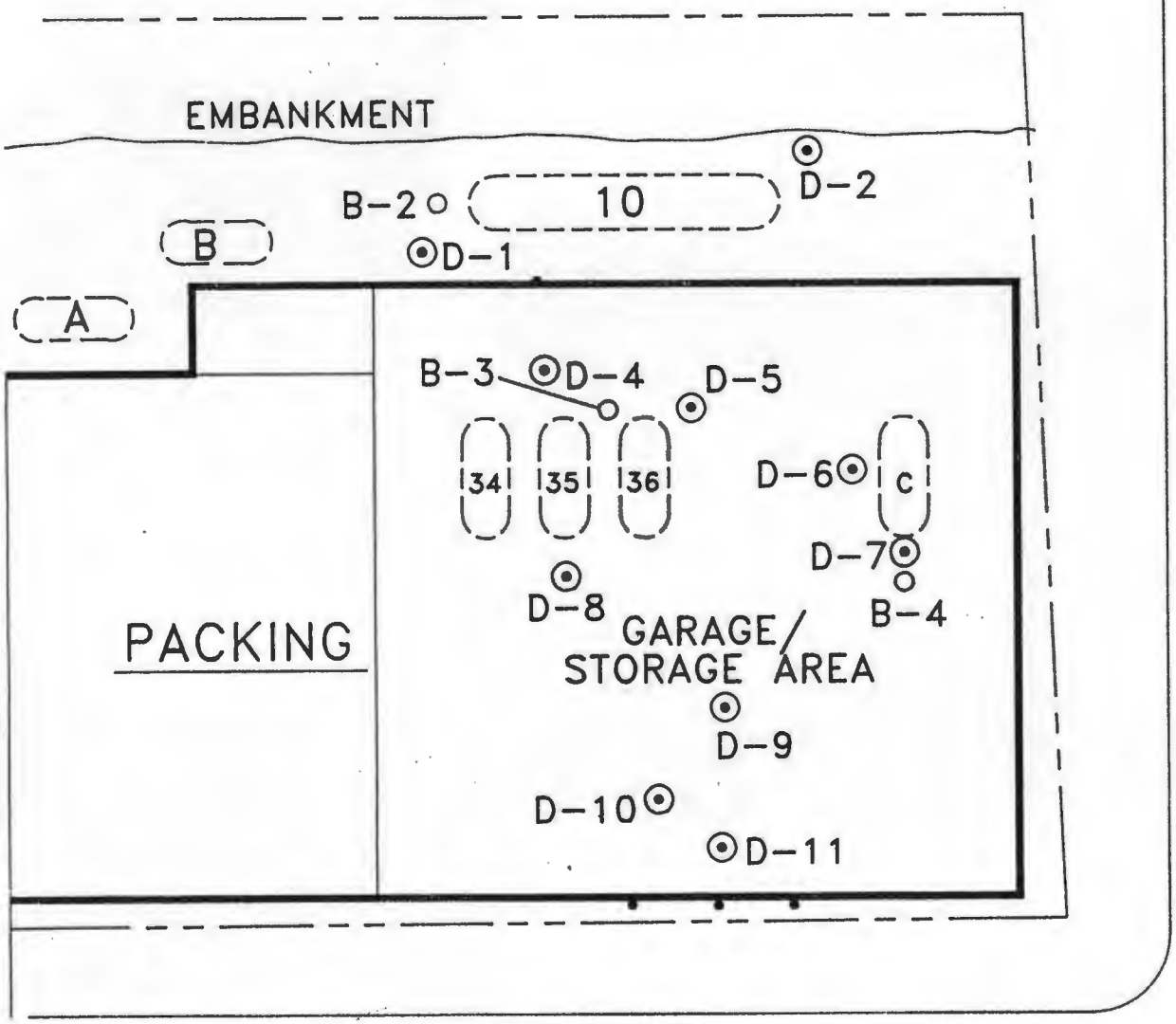
PREPARED FOR

INSILCO-RED DEVIL FACILITY

ERM ERM-Northeast Environmental Resources Management

DATE

FIGURE 5-5




OAK STREET

N

LEGEND

- VAULTED STORAGE TANK
- UNDERGROUND STORAGE TANK
- VENT
- SOIL BORING LOCATION
- SOIL GAS LOCATION

TITLE

# AREA D
# STAGE ONE
# SOIL SAMPLE PROGRAM

PREPARED FOR

INSILCO-RED DEVIL FACILITY

ERM ERM-Northeast
Environmental Resources Management

SCALE 1"=20'

DATE 6/2/92

FIGURE 5-6a

RED-12/EM

5.1.4.2 Stage Two Investigation

Sampling locations related to the Stage Two investigation are shown on Figure 5-6b. A total of ten additional soil borings were advanced and sampled in Area D at the locations shown on this figure. Three of the ten borings designated as B-1D, B-2D and B-3D were advanced in the center of the former tank excavation down to the water table and were used to characterize the contaminants present in the impacted soil. The remaining seven were placed to delineate the impacted soils and define clean boundary conditions. Continuous split-spoon samples were collected and field screened for the presence of contaminants. One worst case sample based on sensory and PID readings was collected from each boring and sent for laboratory analysis. Soils collected from borings B-1D, B-2D and B-3D were analyzed for TCL volatiles, TCL semi-volatiles and TAL metals. Because Tank C was reported to store waste oil, sample B-3D was also analyzed for PCB's. The delineation samples collected from borings B-4D through B-10D were analyzed for the presence of TCL volatile compounds. Five additional soil borings corresponding to monitoring well locations are also shown on Figure 5-6b. No soil samples were collected for laboratory analysis at these locations, but PID screening was performed.

5.1.4.3 Area D Results

The results of the PID screening of soil samples in Area D are provided in Table 5-9. The soil gas sampling results are given in Table 5-10. A summary of the laboratory analysis for the Area D soil samples is provided in Table 5-11 and Figure 5-7. The laboratory data sheets are provided in Appendix F. Geologic logs for the Area D test borings are provided in Appendix D.

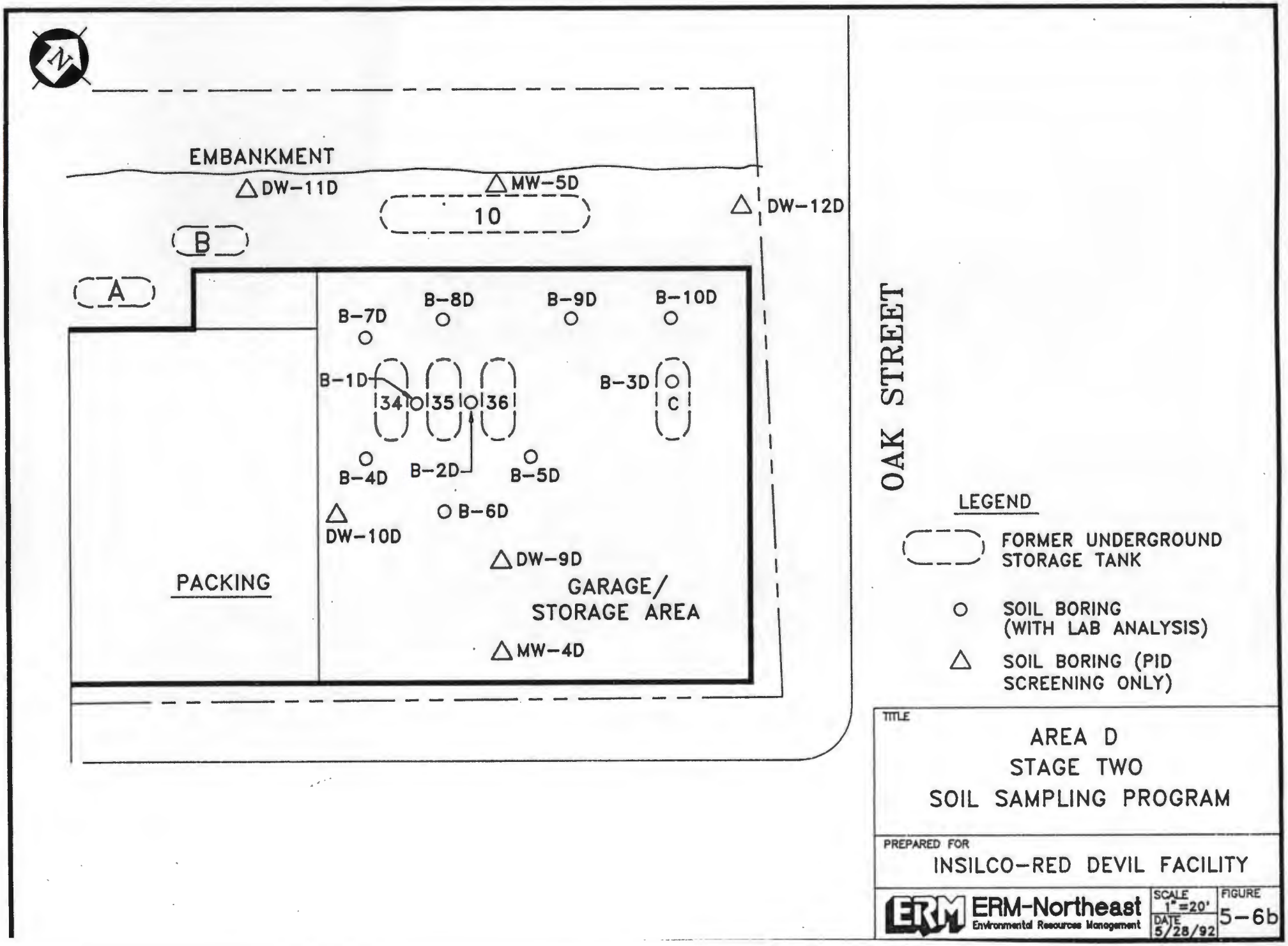

N
EMBANKMENT
DW-11D
MW-5D
10
DW-12D
B
A
B-7D
B-8D
B-9D
B-10D
B-1D
34
35
36
B-3D
C
B-4D
B-2D
B-5D
B-6D
DW-10D
DW-9D
PACKING
GARAGE/
STORAGE AREA
MW-4D
OAK STREET
LEGEND
FORMER UNDERGROUND STORAGE TANK
SOIL BORING (WITH LAB ANALYSIS)
SOIL BORING (PID SCREENING ONLY)
TITLE
AREA D
STAGE TWO
SOIL SAMPLING PROGRAM
PREPARED FOR
INSILCO-RED DEVIL FACILITY
ERM-Northeast
Environmental Resources Management
SCALE 1"=20'
DATE 5/28/92
FIGURE 5-6b

TABLE: 5-9
PID SCREENING RESULTS:AREA D
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

**B-2**

| DEPTH | PID |
|---|---|
| 0 to 1 feet | 0 |
| 1 to 3 feet | 8.6 |
| 3 to 5 feet | 12.8 |
| 5 to 7 feet | 326 |
| 7 to 9 feet | 74.6 |
| 9 to 10 feet | 225 |
| - | - |
| - | - |

**B-3**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 286 |
| 6 to 8 feet | 274 |
| 8 to 10 feet | 996 |
| 10 to 12 feet | 1706 |
| 12 to 14 feet | 2700 |
| 14 to 16 feet | 2470 |

**B-4**

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 35.8 |
| 4 to 6 feet | 0 |
| 6 to 8 feet | 0 |
| 8 to 10 feet | 0 |
| 10 to 12 feet | 20.7 |
| 12 to 14 feet | 735 |
| - | - |

**B-1D**

| DEPTH | PID |
|---|---|
| 5 to 7 feet | 250 |
| 7 to 9 feet | 142 |
| 9 to 11 feet | 250 |
| 11 to 13 feet | 645 |
| 13 to 15 feet | 727 |

**B-2D**

| DEPTH | PID |
|---|---|
| 5 to 7 feet | 195 |
| 7 to 9 feet | 497 |
| 9 to 11 feet | 425 |
| 11 to 13 feet | 775 |
| 13 to 15 feet | 397 |

**B-3D**

| DEPTH | PID |
|---|---|
| 5 to 7 feet | 10.2 |
| 7 to 9 feet | 16.8 |
| 9 to 11 feet | 16.2 |
| 11 to 13 feet | 750 |
| 13 to 15 feet | 340 |

**B-4D**

| DEPTH | PID |
|---|---|
| 5 to 7 feet | 315 |
| 7 to 10 feet | NR |
| 10 to 12 feet | 315 |
| 12 to 14 feet | 618 |
| - | - |

**B-5D**

| DEPTH | PID |
|---|---|
| 5 to 7 feet | NR |
| 7 to 9 feet | 1752 |
| 9 to 11 feet | 1022 |
| 11 to 13 feet | 1297 |
| 13 to 15 feet | 1263 |

**B-6D**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| - | - |
| 5 to 7 feet | 789 |
| 7 to 10 feet | NR |
| 10 to 12 feet | 627 |
| 12 to 14 feet | 1142 |
| 14 to 16 feet | 865 |

**B-7D**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| - | - |
| 5 to 7 feet | 47.3 |
| 7 to 9 feet | 410 |
| 9 to 11 feet | 500 |
| 11 to 13 feet | 266 |
| 13 to 15 feet | 292 |

**B-8D**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| - | - |
| 5 to 7 feet | 234 |
| 7 to 9 feet | 742 |
| 9 to 11 feet | 1150 |
| 11 to 13 feet | 1332 |
| 13 to 15 feet | 1038 |

**B-9D**

| DEPTH | PID |
|---|---|
| - | - |
| - | - |
| - | - |
| 5 to 7 feet | 8 |
| 7 to 9 feet | NR |
| 9 to 11 feet | 700 |
| 11 to 13 feet | 725 |
| 13 to 15 feet | 550 |

**B-10D**

| DEPTH | PID |
|---|---|
| 0 to 1 feet | 0 |
| 1 to 3 feet | 0 |
| 3 to 5 feet | 0 |
| 5 to 7 feet | 3.3 |
| 7 to 9 feet | 8.3 |
| 9 to 11 feet | 200 |
| 11 to 13 feet | 217 |
| 13 to 15 feet | 400 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.
NR No Return

TABLE: 5-9 (cont.)
PID SCREENING RESULTS:AREA D
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

MW-4D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 3.2 |
| 4 to 6 feet | 5.2 |
| 6 to 8 feet | 1.9 |
| 8 to 10 feet | 3.7 |
| 10 to 12 feet | 57 |
| 12 to 14 feet | 127 |
| - | - |

MW-5D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 8.6 |
| 6 to 8 feet | 27 |
| 8 to 10 feet | 25.2 |
| 10 to 12 feet | 185 |
| 12 to 14 feet | 222 |
| - | - |

DW-9D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 0 |
| 6 to 8 feet | 10 |
| 8 to 10 feet | 157 |
| 10 to 12 feet | 457 |
| 12 to 14 feet | 235 |
| - | - |

DW-10D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 5.2 |
| 6 to 8 feet | 7.5 |
| 8 to 10 feet | 235 |
| 10 to 12 feet | 298 |
| 12 to 14 feet | 545 |
| - | - |

DW-11D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 2 |
| 4 to 6 feet | 11.2 |
| 6 to 8 feet | 56 |
| 8 to 10 feet | 200 |
| 10 to 12 feet | 97 |
| 12 to 14 feet | 195 |
| - | - |

DW-12D

| DEPTH | PID |
|---|---|
| 0 to 2 feet | 0 |
| 2 to 4 feet | 0 |
| 4 to 6 feet | 0 |
| 6 to 8 feet | 22.7 |
| 8 to 10 feet | 32 |
| 10 to 12 feet | 146 |
| 12 to 14 feet | 187 |
| - | - |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.
NR No Return

TABLE: 5-10
SOIL GAS SAMPLING RESULTS: AREA D
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| ALLEY AREA | |
|---|---|
| PROBE | PID |
| 1 | 223 |
| 2 | 276 |

| GARAGE AREA | |
|---|---|
| PROBE | PID |
| 3 | 75 |
| 4 | 2193 |
| 5 | 325 |
| 6 | 291 |
| 7 | 676 |
| 8 | 1773 |
| 9 | 10 |
| 10 | 0 |
| 11 | 3 |

Results in parts per million (ppm) as measured by PID calibrated to 100 ppm isobutylene standard.

TABLE: 5-11
LABORATORY ANALYTICAL RESULTS: AREA D SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | B-2 | B-3 | B-4 | B-1D | B-2D | B-2D (DUP) | B-3D | B-4D | B-5D | B-6D | B-7D | B-8D | B-9D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 5/2/91 | 5/2/91 | 5/2/91 | 1/28/92 | 1/28/92 | 1/28/92 | 1/24/92 | 1/30/92 | 1/30/92 | 1/29/92 | 1/28/92 | 1/27/92 | 1/27/92 |
| Depth Collected | 5-7 feet | 12-14 feet | 14-16 feet | 11-13 feet | 11-13 feet | 11-13 feet | 11-13 feet | 12-14 feet | 7-9 feet | 12-14 feet | 9-11 feet | 11-13 feet | 11-13 feet |
| DETECTED TARGET COMPOUND LIST VOLATILE ORGANIC COMPOUNDS (in mg/Kg) | | | | | | | | | | | | | |
| Acetone | U | U | U | 2.8 J | 5.6 B | 4.7 B | 0.037 B | 2.6 | U | 4.4 | 1.9 B | 4.4 B | 38 B |
| Benzene | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Carbon Disulfide | U | U | U | U | U | U | 0.004 J | U | U | U | U | U | U |
| Chloroethane | U | U | U | U | U | U | 0.009 J | U | U | U | U | U | U |
| 1,1-Dichloroethane | U | U | 0.039 | U | U | U | 0.11 | U | U | U | U | U | U |
| 1,1-Dichloroethene | U | U | U | U | U | U | 0.005 J | U | U | U | U | U | U |
| Ethylbenzene | U | U | U | 10 | 13 | 13 | 0.013 | 4.2 | 29 | 11 | 1.6 | 5.7 | 30 JD |
| 4-Methyl-2-Pentanone | U | U | U | U | U | U | U | U | U | U | U | U | 46 |
| Methylene Chloride | U | U | U | 1.9 B | 1.8 B | 1.8 B | 0.008 B | 2.3 B | 18 B | 3.9 B | 2.5 B | 4.8 B | 94 DB |
| Tetrachloroethene | U | U | 0.007 | U | U | U | 0.02 | U | U | U | U | U | U |
| 1,1,1-Trichloroethane | U | U | 0.022 | U | U | U | 0.053 | U | U | U | U | U | U |
| Toluene | U | U | U | 13 | 12 | 11 | U | 3 | U | 12 | 2.7 | 7.6 | U |
| Xylenes (total) | U | 23 | 0.056 | 78 | 100 | 110 | 0.086 | 33 | 150 | 74 | 39 | 110 | 1400 E |
| TOTAL VOLATILES | U | 23 | 0.124 | 105.7 JB | 132.4 B | 140.5 B | 0.345 JB | 45.1 B | 197 B | 94.3 B | 47.7 B | 132.5 B | 1608 JDB |
| TICs | U | 2270 J | 0.76 J | 99 J | 599 J | 5600 J | 0.06 J | 73 J | 2490 J | 400 J | 680 J | 2600 J | 110100 J |
| DETECTED TARGET COMPOUND LIST SEMI-VOLATILE COMPOUNDS (in mg/Kg) | | | | | | | | | | | | | |
| Benzo(b)flourantene | U | U | 0.083 J | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Benzo(a)pyrene | U | U | 0.06 J | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Bis(2-ethylhexyl)phthalate | U | U | U | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Chrysene | U | U | 0.06 J | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Di-n-butyl phthalate | 0.45 B | U | 1.2 B | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Naphthalene | U | U | 0.11 J | 5.2 J | 6.5 J | 6.4 J | U | NA | NA | NA | NA | NA | NA |
| Phenanthrene | U | U | U | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Pyrene | U | U | 0.04 J | U | U | U | U | NA | NA | NA | NA | NA | NA |
| TOTAL B/Ns | 0.45 B | U | 1.553 JB | 5.2 J | 6.5 J | 6.4 J | U | NA | NA | NA | NA | NA | NA |
| TICs | U | U | U | 1600 J | 1960 J | 1700 J | 15.5 J | NA | NA | NA | NA | NA | NA |
| DETECTED PCBs | | | | | | | | | | | | | |
| Total | NA | NA | NA | NA | NA | NA | U | NA | NA | NA | NA | NA | NA |
| TOTAL PETROLEUM HYDROCARBONS (in mg/Kg) | | | | | | | | | | | | | |
| Total | 11 | 25000 | 1400 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |

TABLE: 5-11 (cont.)
LABORATORY ANALYTICAL RESULTS: AREA D SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | B-2 | B-3 | B-4 | B-1D | B-2D | B-2D (DUP) | B-3D | B-4D | B-5D | B-6D | B-7D | B-8D | B-9D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date Collected | 5/2/91 | 5/2/91 | 5/2/91 | 1/28/92 | 1/28/92 | 1/28/92 | 1/24/92 | 1/30/92 | 1/30/92 | 1/29/92 | 1/28/92 | 1/27/92 | 1/27/92 |
| Depth Collected | 5-7 feet | 12-14 feet | 14-16 feet | 11-13 feet | 11-13 feet | 11-13 feet | 11-13 feet | 12-14 feet | 7-9 feet | 12-14 feet | 9-11 feet | 11-13 feet | 11-13 feet |
| DETECTED TARGET ANALYTE LIST METALS (in mg/Kg) | | | | | | | | | | | | | |
| Aluminum | NA | NA | NA | 20000 | 19100 | 19200 | 12100 | NA | NA | NA | NA | NA | NA |
| Antimony | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Arsenic | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Barium | NA | NA | NA | 141 | 114 | 116 | 83 | NA | NA | NA | NA | NA | NA |
| Beryllium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Cadmium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Calcium | NA | NA | NA | 1900 | 1430 | 1560 | 1570 | NA | NA | NA | NA | NA | NA |
| Chromium | NA | NA | NA | 46.9 | 44.3 | 43.7 | 27.2 | NA | NA | NA | NA | NA | NA |
| Cobalt | NA | NA | NA | 18.3 | 17.7 | 16.4 | 12.5 | NA | NA | NA | NA | NA | NA |
| Copper | NA | NA | NA | 10.6 | 11 | 11.1 | 6.2 | NA | NA | NA | NA | NA | NA |
| Iron | NA | NA | NA | 32900 | 32300 | 29800 | 17300 | NA | NA | NA | NA | NA | NA |
| Lead | NA | NA | NA | 9.7 N | 13.5 +SN | 13.9 +SN | 4.8 N | NA | NA | NA | NA | NA | NA |
| Magnesium | NA | NA | NA | 6980 | 6540 | 6550 | 4450 | NA | NA | NA | NA | NA | NA |
| Manganese | NA | NA | NA | 913 | 787 | 695 | 276 | NA | NA | NA | NA | NA | NA |
| Mercury | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Nickel | NA | NA | NA | 27.2 | 26.3 | 26.2 | 16.2 | NA | NA | NA | NA | NA | NA |
| Potassium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Selenium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Silver | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Sodium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Thallium | NA | NA | NA | U | U | U | U | NA | NA | NA | NA | NA | NA |
| Vanadium | NA | NA | NA | 51.9 | 46.9 | 47 | 29 | NA | NA | NA | NA | NA | NA |
| Zinc | 56 | 52 | 40 | 95 | 93.8 | 94.1 | 58.9 | NA | NA | NA | NA | NA | NA |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits (85-115%), while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.

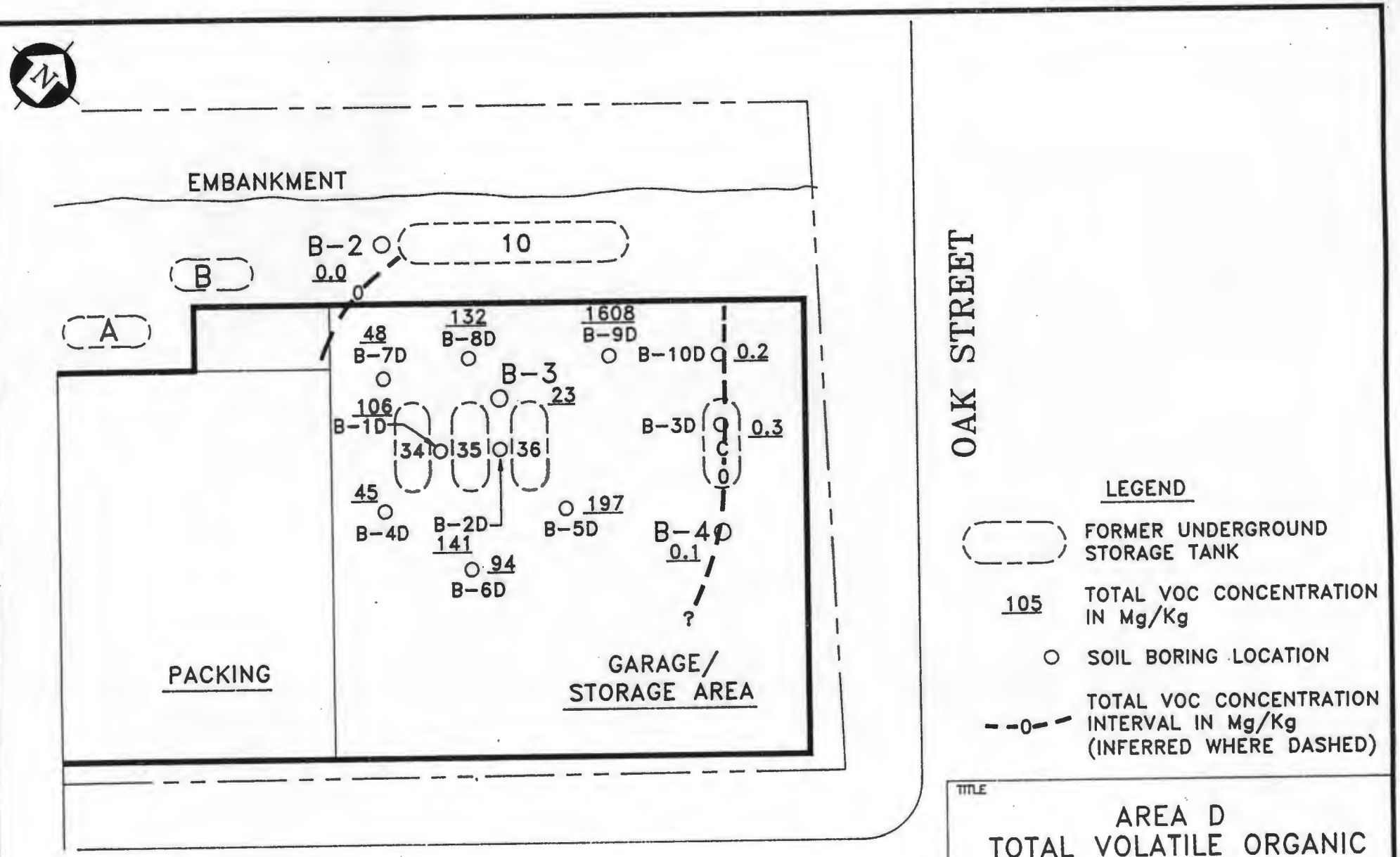
TABLE: 5-11 (cont.)
LABORATORY ANALYTICAL RESULTS: AREA D SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | B-10D | FB-1 | FB-2 | FB-3 | FB | TB-1 | TB-3 |
|---|---|---|---|---|---|---|---|
| Date Collected | 1/24/92 | | | | | | |
| Depth Collected | 9-11 feet | 1/24/92 | 1/27/92 | 1/28/92 | 1/30/92 | 1/24/92 | 1/28/92 |
| DETECTED TARGET COMPOUND LIST VOLATILE ORGANIC COMPOUNDS (in mg/Kg) | | | | | | | |
| Acetone | 0.054 B | U | U | U | 0.84 | 0.011 B | 0.01 B |
| Benzene | U | U | U | U | U | U | U |
| Carbon Disulfide | U | U | U | U | U | U | U |
| Chloroetane | U | U | U | U | U | U | U |
| 1,1-Dichloroethane | 0.031 | U | U | U | U | U | U |
| 1,1-Dichloroethene | U | U | U | U | U | U | U |
| Ethylbenzene | 0.007 | U | U | U | U | U | U |
| 4-Methyl-2-Pentanone | 0.013 | U | 0.035 J | U | U | U | U |
| Methylene Chloride | 0.007 B | 0.008 B | 0.023 JB | 0.004 JB | 0.043 B | 0.011B | 0.01B |
| Tetrachloroethene | 0.007 | U | U | U | U | U | U |
| 1,1,1-Trichloroethane | 0.009 | U | U | U | U | U | U |
| Toluene | 0.005 J | U | 0.37 | U | U | U | U |
| Xylenes (total) | 0.062 | U | U | U | U | U | U |
| TOTAL VOLATILES | 0.182 JB | 0.008 B | 0.428 JB | 0.004 JB | 0.883 B | 0.022 B | 0.02 B |
| TICs | 0.08 J | U | U | U | U | U | U |
| DETECTED TARGET COMPOUND LIST SEMI-VOLATILE COMPOUNDS (in mg/Kg) | | | | | | | |
| Benzo(b)flourantene | NA | NA | NA | U | NA | NA | NA |
| Benzo(a)pyrene | NA | NA | NA | U | NA | NA | NA |
| Bis(2-ethylhexyl)phthalate | NA | NA | NA | 0.012 | NA | NA | NA |
| Chrysene | NA | NA | NA | U | NA | NA | NA |
| Di-n-butyl phthalate | NA | NA | NA | U | NA | NA | NA |
| Naphthalene | NA | NA | NA | U | NA | NA | NA |
| Phenanthrene | NA | NA | NA | U | NA | NA | NA |
| Pyrene | NA | NA | NA | U | NA | NA | NA |
| TOTAL B/Ns | NA | NA | NA | 0.012 | NA | NA | NA |
| TICs | NA | NA | NA | 0.006 J | NA | NA | NA |
| DETECTED PCBs | | | | | | | |
| Total | NA | NA | NA | NA | NA | NA | NA |
| TOTAL PETROLEUM HYDROCARBONS (in mg/Kg) | | | | | | | |
| Total | NA | NA | NA | NA | NA | NA | NA |

TABLE: 5-11 (cont.)
LABORATORY ANALYTICAL RESULTS: AREA D SOIL SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Boring No. | B-10D | FB-1 | FB-2 | FB-3 | FB | TB-1 | TB-3 |
|---|---|---|---|---|---|---|---|
| Date Collected | 1/24/92 | | | | | | |
| Depth Collected | 9-11 feet | 1/24/92 | 1/27/92 | 1/28/92 | 1/30/92 | 1/24/92 | 1/28/92 |
| DETECTED TARGET ANALYTE LIST METALS (in mg/Kg) | | | | | | | |
| Aluminum | NA | 200 | NA | 200 | NA | NA | NA |
| Antimony | NA | 60 N | NA | 60 N | NA | NA | NA |
| Arsenic | NA | 10 | NA | 10 | NA | NA | NA |
| Barium | NA | 25 | NA | 25 | NA | NA | NA |
| Beryllium | NA | 5 | NA | 5 | NA | NA | NA |
| Cadmium | NA | 5 | NA | 5 | NA | NA | NA |
| Calcium | NA | 5000 | NA | 5000 | NA | NA | NA |
| Chromium | NA | 10 | NA | 10 | NA | NA | NA |
| Cobalt | NA | 50 | NA | 50 | NA | NA | NA |
| Copper | NA | 25 | NA | 25 | NA | NA | NA |
| Iron | NA | 3550 | NA | 434 | NA | NA | NA |
| Lead | NA | 5 NW | NA | 5 NW | NA | NA | NA |
| Magnesium | NA | 5000 | NA | 5000 | NA | NA | NA |
| Manganese | NA | 74.8 | NA | 15.1 | NA | NA | NA |
| Mercury | NA | 0.2 | NA | 0.2 | NA | NA | NA |
| Nickel | NA | 40 | NA | 40 | NA | NA | NA |
| Potassium | NA | 5000 | NA | 5000 | NA | NA | NA |
| Selenium | NA | 5 SN | NA | 5 NW | NA | NA | NA |
| Silver | NA | 10 N | NA | 10 N | NA | NA | NA |
| Sodium | NA | 5000 | NA | 5000 | NA | NA | NA |
| Thallium | NA | 10 N | NA | 10 N | NA | NA | NA |
| Vanadium | NA | 50 | NA | 50 | NA | NA | NA |
| Zinc | NA | 14.8 | NA | 10 | NA | NA | NA |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analysed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits (85-115%), while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.




TITLE

# AREA D
# TOTAL VOLATILE ORGANIC CONCENTRATIONS IN SOIL

PREPARED FOR

INSILCO-RED DEVIL FACILITY

ERM ERM-Northeast
Environmental Resources Management

SCALE 1"=20'

DATE 5/28/92

FIGURE 5-7

RED-11/EM

## 5.2 Ground Water Investigation Program

Ground water quality has been characterized at the former Red Devil Site using the following types of data: free product monitoring in wells, laboratory samples collected from wells and laboratory samples collected from the hydropunch tool. The locations of all ground water data collection points were previously presented in Figure 4-1. The construction details of all ground water monitoring wells at the Site are provided in Table 5-12. The application of the various data collection techniques are described below, followed by a presentation of the results. Discussion of these results is provided in Section 6.2.

### 5.2.1 Configuration of the Water Table

Two synoptic sets (3/31/92 and 4/16/92) of depth to water and free product monitoring data were collected at the Site and are summarized in Table 5-13. A water table contour map has been constructed using selected data from this table and is presented as Figure 5-8. Some data was deemed not useable due to the presence of free product which would depress the water level in the well and cause misinterpretation of the flow direction. Therefore, only those wells without free product, or with only a small thickness of product, were used in the production of the water table contour map.

### 5.2.2 Free Product Delineation

The free product monitoring data summarized in Table 5-13 was used to construct the map shown in Figure 5-9. This figure shows the thickness and aerial extent of free phase product at the Site.

TABLE: 5-12
MONITORING WELL CONSTRUCTION DATA
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| WELL NUMBER | DATE OF INSTALLATION | TYPE OF CONSTRUCTION | LENGTH OF SCREEN | TOTAL DEPTH OF WELL | TOP OF RISER ELEVATION |
|---|---|---|---|---|---|
| MW-1A | 1/16/92 | 2 inch PVC | 15 feet | 35 feet | 87.79 |
| MW-4D | 3/25/92 | 2 inch PVC | 10 feet | 21 feet | 78.77 |
| MW-5D | 1/16/92 | 2 inch PVC | 10 feet | 29 feet | 80.09 |
| DW-1A | 3/16/92 | 4 inch Stainless | 15 feet | 35 feet | 88.03 |
| DW-1C | 3/16/92 | 2 inch PVC | 10 feet | 21 feet | 78.18 |
| DW-2C | 3/19/92 | 2 inch PVC | 10 feet | 21 feet | 78.02 |
| DW-3C | 3/20/92 | 2 inch PVC | 10 feet | 21 feet | 78.13 |
| DW-4C | 3/23/92 | 2 inch PVC | 10 feet | 21 feet | 78.17 |
| DW-1D | 1/17/92 | 2 inch PVC | 10 feet | 22 feet | 80.19 |
| DW-2D | 1/16/92 | 2 inch PVC | 10 feet | 21 feet | 79.78 |
| DW-3D | 1/17/92 | 2 inch PVC | 10 feet | 21 feet | 79.06 |
| DW-4D | 1/28/92 | 2 inch PVC | 10 feet | 22 feet | 79.02 |
| DW-5D | 1/17/92 | 2 inch PVC | 10 feet | 21 feet | 78.96 |
| DW-6D | 1/27/92 | 2 inch PVC | 10 feet | 20 feet | 78.90 |
| DW-7D | 1/24/92 | 2 inch PVC | 10 feet | 20 feet | 78.19 |
| DW-8D | 1/30/92 | 2 inch PVC | 10 feet | 22 feet | 79.26 |
| DW-9D | 1/16/92 | 2 inch PVC | 10 feet | 21 feet | 79.27 |
| DW-10D | 3/24/92 | 2 inch PVC | 10 feet | 20 feet | 79.17 |
| DW-11D | 3/20/92 | 2 inch PVC | 10 feet | 21 feet | 78.51 |
| DW-12D | 3/16/92 | 2 inch PVC | 10 feet | 21 feet | 78.45 |

All screens are placed at the bottom of each well.

TABLE: 5-13
GROUND WATER AND PRODUCT LEVEL DATA
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK
31-Mar-92

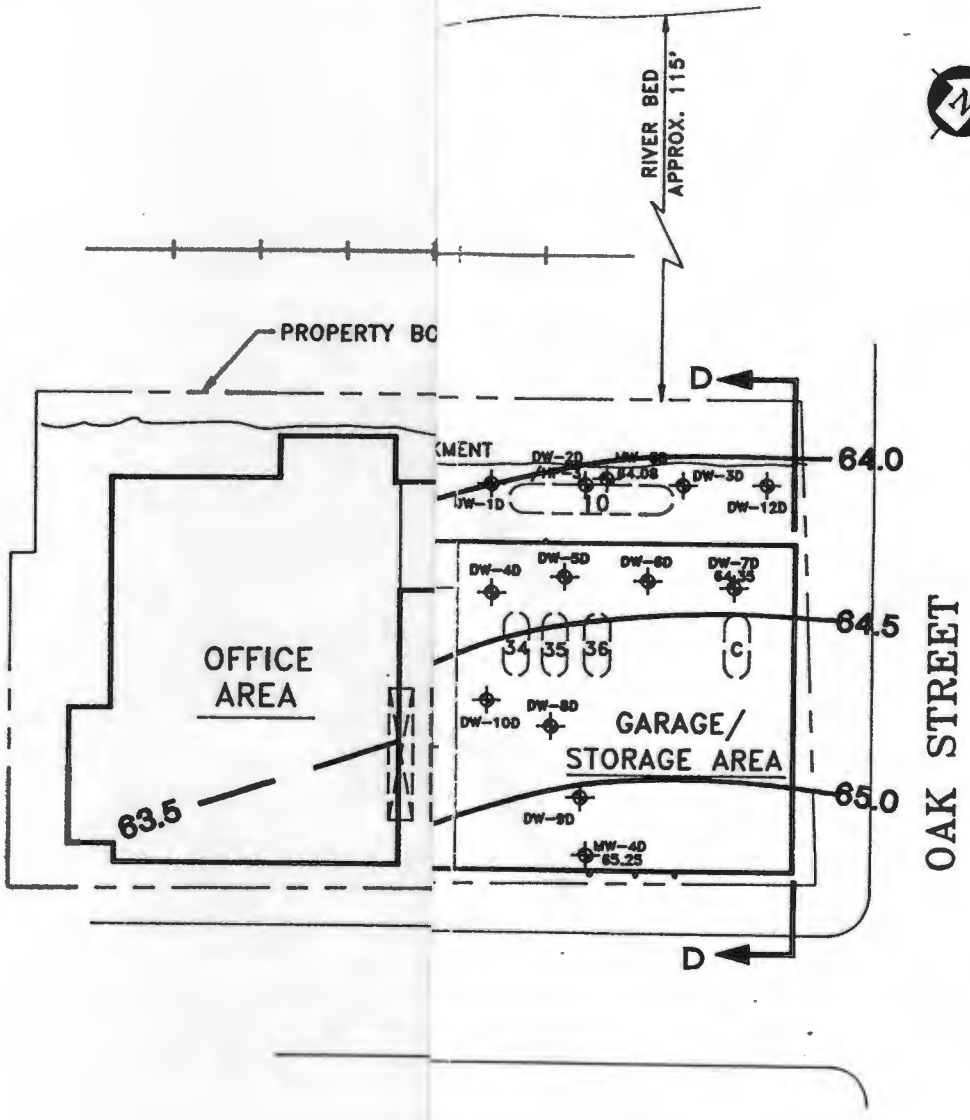
| WELL NUMBER | TOP OF RISER ELEVATION | DTP | DTW | PE | WTE | PTHK |
|---|---|---|---|---|---|---|
| MW-1 | 87.79 | - | 23.83 | - | 63.96 | - |
| MW-4 | 78.77 | - | 13.28 | - | 65.49 | - |
| MW-5 | 80.09 | - | 15.54 | - | 64.55 | - |
| DW-1A | 88.03 | 24.1 | 24.42 | 63.93 | 63.61 | 0.32 |
| DW-1C | 78.18 | 14.24 | 15.49 | 63.94 | 62.69 | 1.25 |
| DW-2C | 78.02 | 14.12 | 15.43 | 63.9 | 62.59 | 1.31 |
| DW-3C | 78.13 | 15.53 | 15.58 | 62.6 | 62.55 | 0.05 |
| DW-4C | 78.17 | 13.9 | 13.92 | 64.27 | 64.25 | 0.02 |
| DW-1D | 80.19 | 15.43 | 17.62 | 64.76 | 62.57 | 2.19 |
| DW-2D | 79.78 | 14.92 | 16.95 | 64.86 | 62.83 | 2.03 |
| DW-3D | 79.06 | 14.25 | 15.91 | 64.81 | 63.15 | 1.66 |
| DW-4D | 79.02 | 14.15 | 16.09 | 64.87 | 62.93 | 1.94 |
| DW-5D | 78.96 | 14.18 | 15.53 | 64.78 | 63.43 | 1.35 |
| DW-6D | 78.90 | 14.05 | 14.92 | 64.85 | 63.98 | 0.87 |
| DW-7D | 78.19 | 13.22 | 13.24 | 64.97 | 64.95 | 0.02 |
| DW-8D | 79.26 | 13.72 | 15.95 | 65.54 | 63.31 | 2.23 |
| DW-9D | 79.27 | 13.83 | 13.84 | 65.44 | 65.43 | 0.01 |
| DW-10D | 79.17 | 13.84 | 17.56 | 65.33 | 61.61 | 3.72 |
| DW-11D | 78.51 | 14.15 | 16.09 | 64.36 | 62.42 | 1.94 |
| DW-12D | 78.45 | 14.64 | 15.55 | 63.81 | 62.9 | 0.91 |

DW = Delineation Well
MW = Ground Water Monitoring Well
DTP = Depth to Product
DTW = Depth to Water
PE = Product Elevation
WTE = Water Table Elevation
PTHK = Product Thickness

TABLE: 5-13 (cont.)
GROUND WATER AND PRODUCT LEVEL DATA
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK
16-Apr-92

| WELL NUMBER | TOP OF RISER ELEVATION | DTP | DTW | PE | WTE | PTHK |
|---|---|---|---|---|---|---|
| MW-1 | 87.79 | - | 24.01 | - | 63.78 | - |
| MW-4 | 78.77 | - | 13.52 | - | 65.25 | - |
| MW-5 | 80.09 | - | 16.01 | - | 64.08 | - |
| DW-1A | 88.03 | 24.34 | 24.62 | 63.69 | 63.41 | 0.28 |
| DW-1C | 78.18 | 14.54 | 15.84 | 63.64 | 62.34 | 1.3 |
| DW-2C | 78.02 | 14.42 | 15.78 | 63.6 | 62.24 | 1.36 |
| DW-3C | 78.13 | 15.84 | 15.94 | 62.29 | 62.19 | 0.1 |
| DW-4C | 78.17 | 14.24 | 14.3 | 63.93 | 63.87 | 0.06 |
| DW-1D | 80.19 | 15.72 | 18.04 | 64.47 | 62.15 | 2.32 |
| DW-2D | 79.78 | 15.21 | 17.36 | 64.57 | 62.42 | 2.15 |
| DW-3D | 79.06 | 14.91 | 16.59 | 64.15 | 62.47 | 1.68 |
| DW-4D | 79.02 | 14.19 | 16.1 | 64.83 | 62.92 | 1.91 |
| DW-5D | 78.96 | 14.32 | 15.85 | 64.64 | 63.11 | 1.53 |
| DW-6D | 78.90 | 14.47 | 15.39 | 64.43 | 63.51 | 0.92 |
| DW-7D | 78.19 | 13.81 | 13.84 | 64.38 | 64.35 | 0.03 |
| DW-8D | 79.26 | 13.99 | 16.46 | 65.27 | 62.8 | 2.47 |
| DW-9D | 79.27 | 14.26 | 14.29 | 65.01 | 64.98 | 0.03 |
| DW-10D | 79.17 | 13.98 | 17.9 | 65.19 | 61.27 | 3.92 |
| DW-11D | 78.51 | 13.73 | 15.66 | 64.78 | 62.85 | 1.93 |
| DW-12D | 78.45 | 14.48 | 15.35 | 63.97 | 63.1 | 0.87 |

DW = Delineation Well
MW = Ground Water Monitoring Well
DTP = Depth to Product
DTW = Depth to Water
PE = Product Elevation
WTE = Water Table Elevation
PTHK = Product Thickness



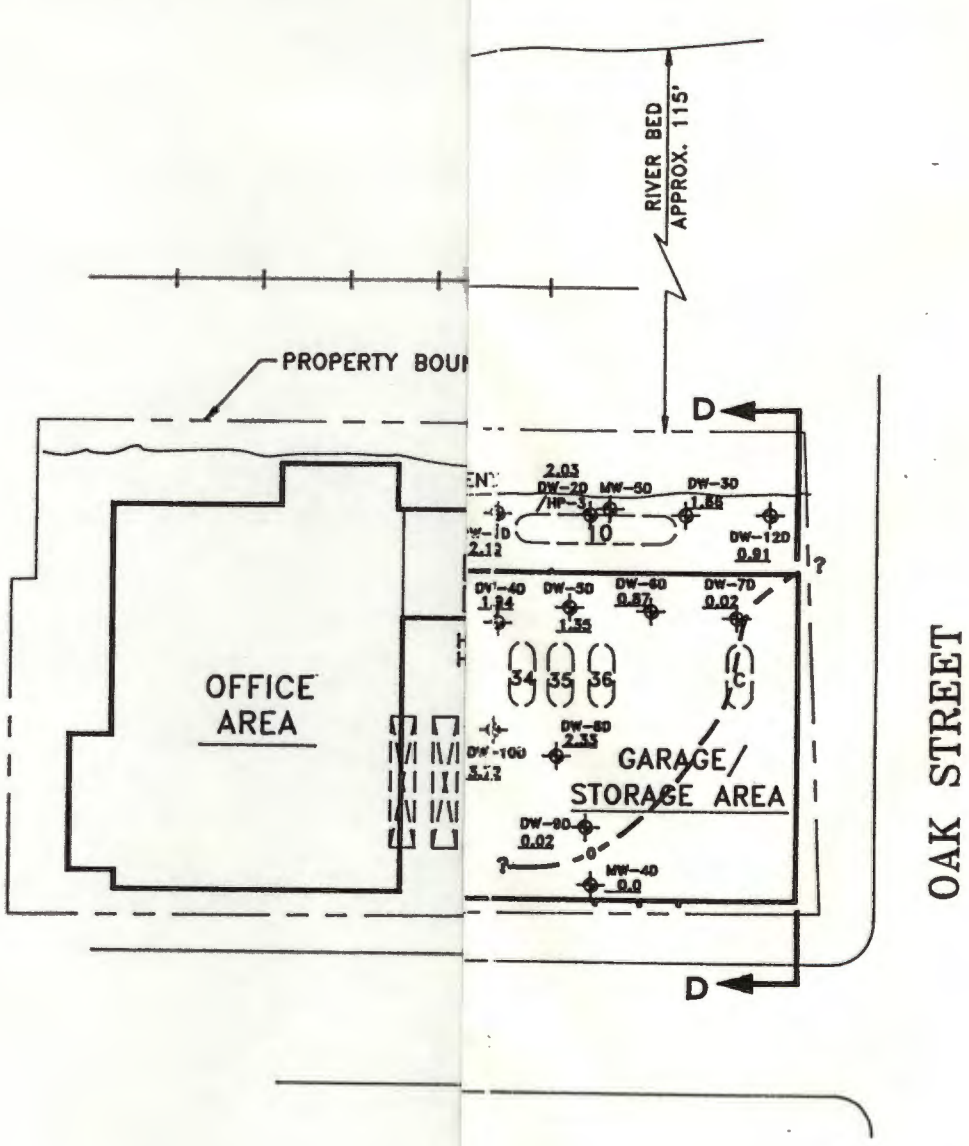

LEGEND

- VAULTED STORAGE TANK
- UNDERGROUND STORAGE TANK
- PREVIOUSLY REMOVED TANK
- MONITORING WELL WITH WATER TABLE ELEVATION
- HYDROPUNCH LOCATION
- CONTOUR INTERVAL 0.5 FEET

| NO. | DATE | APPR. | REVISION |
|---|---|---|---|

# WATER TABLE CONTOUR MAP
## (BASED ON DATA TAKEN 4-16-92)

| | | | |
|---|---|---|---|
| E. MIKUCKI | DATE JUNE 2, 1992 | AGENCY APPROVAL | REVISION NO. 5-8 |
| 1"=40' | DWG. NO. 488.003.1 | APPROVED FOR | DWG. NO. |




LEGEND

- VAULTED STORAGE TANK
- UNDERGROUND STORAGE TANK
- PREVIOUSLY REMOVED TANK
- MONITORING WELL
- HYDROPUNCH LOCATION
- 2.35 MEASURED THICKNESS OF PRODUCT IN FEET
- PRODUCT THICKNESS INTERVAL IN FEET

| NO. | DATE | APPR. | REVISION |
|---|---|---|---|
| | | | |

# LOCATIONS OF PHASE II PRODUCT DELINEATION WELLS

| | | | |
|---|---|---|---|
| E. MKUCKI | DATE: JUNE 2, 1992 | CLIENT APPROVAL | DRAWING NO. 5-9 |
| 1"=40' | JOB NO. 488.003.1 | REVISED PER PLATE2 DATE | SHEET OF |

5.2.3 Ground Water Quality

The parameters selected for ground water analysis during this investigation included target analytes list (TAL) metals, target compound list (TCL) volatile organics and TCL semi-volatile organics. Three samples were collected from three ground water monitoring wells with an additional five samples collected using the hydropunch tool. When duplicate samples and adjacent sampling locations are considered, a total of five separate data points (HP-2/HP-5, HP-6, MW-1A/HP-1, MW-4D and MW-5D/HP-3) exist to characterize ground water quality at the Site.

The results of all ground water samples collected to date at the Site is summarized in Table 5-14. The laboratory data sheets are provided as Appendix G. A plan view of these results is provided as Figure 5-10.

TABLE: 5-14
LABORATORY ANALYTICAL RESULTS: GROUND WATER SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

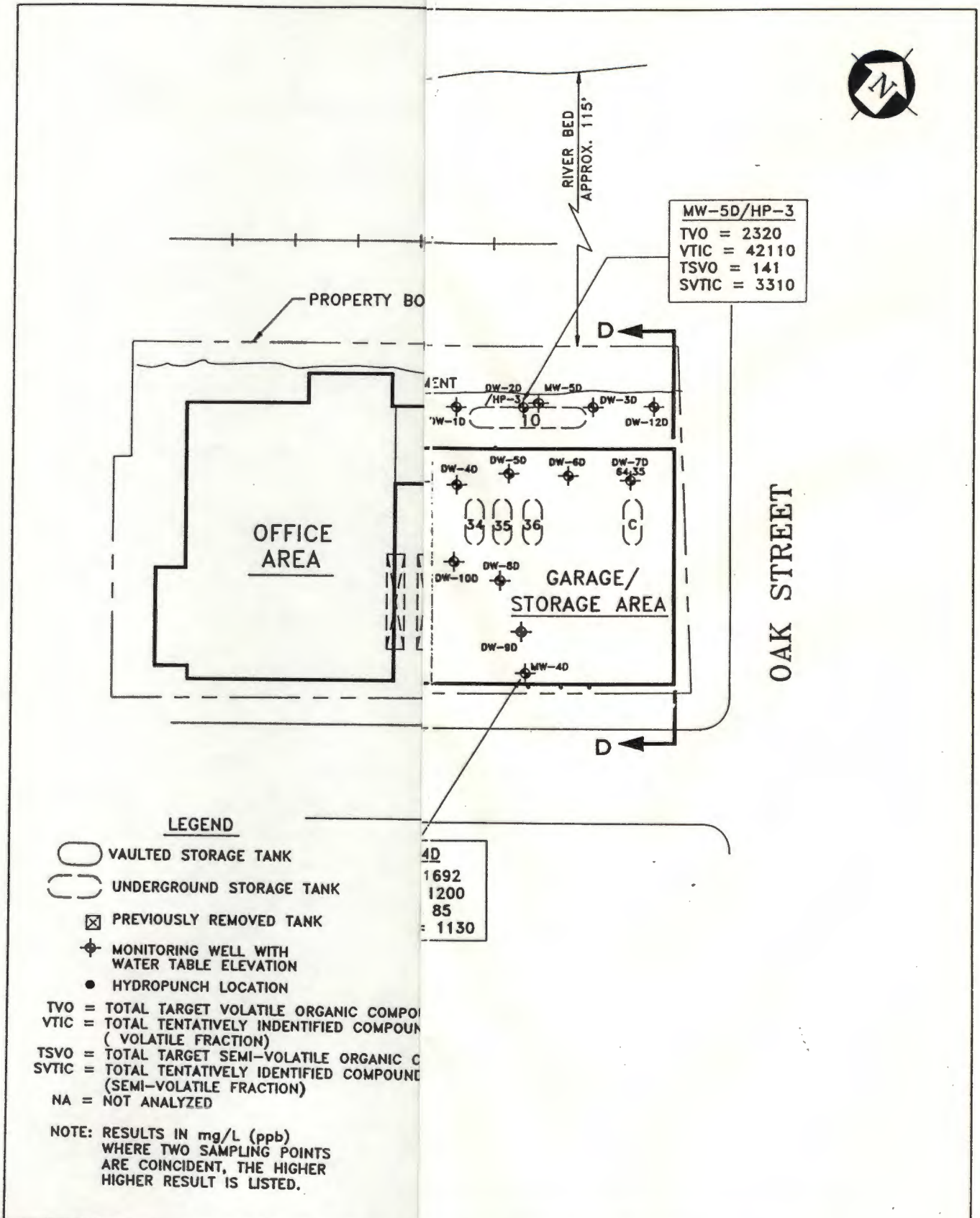
| Well No. / Date Collected | HP-1 5/13/91 | HP-2 5/14/91 | HP-5 (DUP) 5/14/91 | HP-3 5/14/91 | HP-6 5/20/91 | FB 5/14/91 | TB 5/14/91 | MW-1A 4/16/92 | MW-4D 4/16/92 | MW-5D 4/16/92 | MW-5D DUP 4/16/92 | FB 4/16/92 | TB 4/16/92 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| DETECTED TARGET COMPOUND LIST VOLATILE ORGANIC COMPOUNDS (in ug/L) | | | | | | | | | | | | | |
| Acetone | U | 1 J | 1 J | U | U | U | 2 J | U | U | U | 150 | U | U |
| Benzene | U | U | U | U | 2 J | U | U | U | 10 BJ | 18 BJ | 10 BJ | U | U |
| Chloroform | 30 | 14 | 14 | U | 42 | U | U | 17 B | U | U | U | U | U |
| 1,1-Dichloroethane | U | U | U | U | U | U | U | U | U | 74 | 73 | U | U |
| Ethylbenzene | U | U | U | 270 J | U | U | U | U | 160 | 200 | 250 | U | U |
| Methylene Chloride | U | U | U | U | 36 | U | U | U | U | 59 B | 120 B | U | U |
| Tetrachloroethene | U | 2 J | 2 J | U | U | U | U | U | U | U | U | U | U |
| Trichloroethene | U | U | U | U | U | U | U | U | U | 11 J | U | U | U |
| 1,1,1-Trichloroethane | U | 7.8 | 7.3 | U | U | U | U | 2 J | U | 43 | 42 | U | U |
| Toluene | U | U | U | 180 J | 610 D | U | U | 44 B | 22 BJ | 220 B | 200 B | U | U |
| Xylenes (total) | U | U | U | 1870 | U | U | U | U | 1500 | 1400 | 1200 | U | U |
| TOTAL VOLATILES | 30 | 24.8 J | 24.3 J | 2320 J | 690 JD | U | 2 J | 63 BJ | 1692 BJ | 2025 BJ | 2045 BJ | U | U |
| TICs | U | U | U | 42110 J | 19 J | U | U | U | 1200 J | U | U | U | U |
| DETECTED TARGET COMPOUND LIST SEMI-VOLATILE COMPOUNDS (in ug/L) | | | | | | | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 21 | 22 | 28 | 110 | NA | 16 J | NA | U | 3 J | U | U | U | NA |
| Di-n-butylphthalate | U | U | U | 9 J | NA | U | NA | U | U | U | U | U | NA |
| Chrysene | U | U | U | U | NA | U | NA | U | U | U | U | U | NA |
| 4-Methylphenol | U | U | U | U | NA | U | NA | U | U | 24 | 13 | U | NA |
| 2-Methylnaphthalene | U | U | U | U | NA | U | NA | U | 2 J | 2 J | 2 J | U | NA |
| Naphthalene | U | U | U | U | NA | U | NA | U | 80 | 93 | 72 | U | NA |
| Phenol | U | U | U | U | NA | U | NA | U | U | 22 | 13 | U | NA |
| TOTAL B/Ns | 21 | 22 | 28 | 119 J | NA | 16 J | NA | U | 85 J | 141 J | 100 J | U | NA |
| B/N TICs | 548 J | 626 J | 576 J | 3310 J | NA | 185 J | NA | 57 J | 1130 J | 1690 J | 1200 J | U | NA |
| TOTAL PETROLEUM HYDROCARBONS (in mg/L) | | | | | | | | | | | | | |
| Total | 3.4 | 2.6 | 1.8 | 88 | NA | U | NA | NA | NA | NA | NA | NA | NA |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits (85-115%), while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.

TABLE: 5-14 (cont.)
LABORATORY ANALYTICAL RESULTS: GROUND WATER SAMPLES
FORMER RED DEVIL FACILITY
MT. VERNON, NEW YORK

| Well No. / Date Collected | HP-1 5/13/91 | HP-2 5/14/91 | HP-5 (DUP) 5/14/91 | HP-3 5/14/91 | HP-6 5/20/91 | FB 5/14/91 | MW-1A 4/16/92 | MW-4D 4/16/92 | MW-5D 4/16/92 | MW-5D DUP 4/16/92 | FB 4/16/92 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| DETECTED TARGET ANALYTE LIST METALS (in ug/Kg) | | | | | | | | | | | |
| Aluminum | NA | NA | NA | NA | NA | NA | U | U | 222 | U | U |
| Antimony | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Arsenic | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Barium | NA | NA | NA | NA | NA | NA | 118 B | 159 B | 525 | 477 | U |
| Beryllium | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Cadmium | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Calcium | NA | NA | NA | NA | NA | NA | 92200 | 144000 | 187000 | 168000 | U |
| Chromium | NA | NA | NA | NA | NA | NA | 13.3 | U | 10 | U | 11.7 |
| Cobalt | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Copper | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Iron | NA | NA | NA | NA | NA | NA | U | 686 | 42300 | 36900 | U |
| Lead | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Magnesium | NA | NA | NA | NA | NA | NA | 27200 | 48000 | 54600 | 51000 | U |
| Manganese | NA | NA | NA | NA | NA | NA | 1460 | 1710 | 6820 | 6130 | U |
| Mercury | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Nickel | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Potassium | NA | NA | NA | NA | NA | NA | 6050 | 8880 | 11200 | 10600 | U |
| Selenium | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Silver | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Sodium | NA | NA | NA | NA | NA | NA | 101000 | 93900 | 90500 | 85600 | U |
| Thallium | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Vanadium | NA | NA | NA | NA | NA | NA | U | U | U | U | U |
| Zinc | NA | NA | NA | NA | NA | NA | 10.7 B | U | 21.5 | 16.2 B | U |

J indicates an estimated value.
B indicates that the analyte was also found in the laboratory blank.
U indicates that the compound was analyzed for but not detected.
NA idicates that the compound was not analyzed for.
N indicates spiked sample recovery not within control limits
W indicates post digestion spike for Furnace AA analysis is out of control limits (85-115%), while absorbance is less than 50% of spike absorbance.
S indicates the reported value was determined by the method of Standard Additions (MSA).
(+) indicates correlation coefficient for the MSA is less than 0.995.




| NO. | DATE | APPR. | REVISION |
|---|---|---|---|
| | | | |

# SUMMARY OF GROUND WATER SAMPLING RESULTS

| | | | |
|---|---|---|---|
| E. MIKUCKI | DATE MAY 28, 1992 | CLIENT APPROVAL | DRAWING NO. 5-10 |
| 1"=40' | JOB NO. 488.003.1 | DRAWING FILE RED-19 DATE | SHEET OF |

# 6.0 DISCUSSION OF RESULTS

## 6.1 Soils

The soil sampling that has been conducted to date has characterized the nature of soil contamination at the Site. Some progress on delineation has been made, however additional work will be required to achieve full delineation. Additional work will also be necessary to define background soil concentrations, especially with respect to relevant metals. For the purposes of this report, metals concentrations in the Site soils have been generally been compared with background conditions as defined by a NYSDEC document entitled "Biothreat Site Ranking Model User's Manual" (1988). The sections below qualitatively describe the present understanding of soil characterization in each of the four areas of the Site, both in terms of the nature and extent of contamination.

### 6.1.1 Area A

The underground storage tanks that had previously been removed in this area were investigated as described in Section 5.1.1.1 using test borings, test trenching, soil gas sampling and PID screening of soil cuttings/samples. The results of this work show that there has not been significant impairment of soil quality related to these tanks. The available evidence indicates that any impacted soil was excavated and removed with the tanks and the hole was backfilled with clean soil.

The other underground storage tanks in Area A (Tanks 1A through 6A) were known to have contained alcohols, mineral spirits and methylene chloride (see Table 1-1). Volatile organics were therefore the primary contaminant of concern and all samples selected for laboratory analysis were tested for these compounds. Selected samples from within the contaminated area (borings A-1, A-2 and A-3) were also

analyzed for semi-volatiles and metals to fully characterize the chemical composition of the contamination.

The results of the laboratory analysis indicate the area of property damage most highly impacted by releases from the tank system is in the vicinity of Tanks 1A, 2A and 3A. However, the only target compound detected at significant concentration was toluene. No semi-volatile target compounds were detected and all metals were within normal ranges. The bulk of the contaminant chemistry is composed of Tentatively Identified Compounds, primarily petroleum hydrocarbons (boring HP-6), unknowns (A-1) and aldol condensates (A-1 and A-2).

The horizontal extent of contamination, as indicated by the laboratory analyses and as shown in Figure 5-2, shows that the effected area is generally limited to the immediate vicinity of the former tank locations (borings HP-6, A-1 and A-2). The results of the sample from A-7 indicates the need for further delineation in this direction. This is substantiated by the PID screening results (Table 5-1) which show much lower results in all other Area A borings.

The PID screening results also show that the extent of contamination within this area is irregularly distributed. This is also illustrated by the results of laboratory samples from borings A-1 and A-1R. The laboratory reported a matrix problem with the A-1 sample because the initial instrument run indicated the need for dilution but the result of the diluted run was much lower than the initial run. A-1R was re-drilled to obtain a duplicate sample for re-analysis. The result of the duplicate was even less than the diluted A-1 sample.

This phenomena is probably due to a number of reasons including: (1) multiple releases from the tank system; (2) stratification of the fill and/or geologic

deposits causing irregular downward migration; (3) small scale soil heterogeneity and differential contaminant adsorption; and (4) contaminant volatilization from the underlying water table. Of the above, only water table effects can be substantiated by the database. This effect is most clearly discernable in borings A-1, A-6 and A-7. In conclusion, it can be stated that the zone of contaminated soil extends from the base of the tank excavation down to the water table but this zone is not uniformly contaminated.

### 6.1.2 Area B

The underground storage tanks in Area B contained mineral spirits, acetone, "medium oil" and number 6 fuel oil (see Table 1-1). The contaminants of concern were both volatile organics and semi-volatile organics. As shown in Figure 5-3, boring B-5 was installed between Tank E (mineral spirits) and Tank F (acetone); the sample selected for laboratory analysis was tested for VOC's, semi-volatiles and TPH. Boring B-6 was installed between Tank G ("medium oil") and Tank H (#6 fuel oil); the sample selected for laboratory analysis was tested for semi-volatiles and TPH. In addition, the B-5 sample was also analyzed for zinc due to the reported use of zinc based pigments in this area.

The results of the laboratory samples do not indicate the presence of any significant contamination in this area. The B-5 sample contained minor amounts of methylene chloride and polyaromatic compounds. The concentrations of zinc in this sample were within normal ranges. The only detection in the B-6 sample was a single unknown compound.

The lack of significant contamination in Area B is also substantiated by the soil gas sampling results (Table 5-3) which were indistinguishable from background

(0-10 ppm). The PID screening results (Table 5-4) also support this interpretation. The results from boring B-6 are all less than 2.3 ppm. In boring B-5, the results are elevated in the shallow samples, however laboratory analyses indicate that the chemical concentrations in this zone are unremarkable. Deeper in boring B-5, the PID levels decrease to zero.

### 6.1.3 Area C

The only underground storage tank in Area C is Tank D which reportedly contained polyurethane varnish. This was investigated by the installation of boring B-1, in which the sample selected for laboratory analysis was tested for VOC's, semi-volatiles, zinc and TPH.

The results of the laboratory samples do not indicate the presence of any significant contamination related to Tank D. The B-1 sample contained minor amounts of several chlorinated solvents, several tentatively identified hydrocarbons and polyaromatic compounds. The zinc and TPH results were both unremarkable. This is also substantiated by the PID screening results which were indistinguishable from background (0 to 10 ppm).

Soil gas sampling data from the packing and production rooms indicate historical spillage in these areas. Further work will be required to define the extent of impacted soil in these parts of Area C.

### 6.1.4 Area D

The underground storage tanks in Area D contained acetone, toluene, polyurethane varnish, mineral spirits and waste oil. Samples from the initial borings

installed during the Stage One investigation (B-2, B-3, B-4) were analyzed for VOC's, semi-volatiles and TPH. Samples collected as part of the Stage Two investigation used VOC's as an indicator analysis to delineate the contamination identified during Stage One. In addition, selected samples from within the known contaminated area (borings B-1D, B-2D and B-3D) were also analyzed for semi-volatiles and metals to fully characterize the chemical composition of the contamination. Sample B-3D, collected next to the waste oil tank (Tank C) was also analyzed for PCB's.

The results of the laboratory sampling indicates that soils in a large portion of the garage/storage room have been highly impacted by tank system releases. The chemical nature of this impact has been characterized. The bulk of the contaminant chemistry is composed of primarily aromatic hydrocarbons (xylenes, toluene and ethylbenzene), tentatively identified hydrocarbons, acetone and subordinate amounts of chlorinated solvents. The only polyaromatic compound consistently detected at significant concentration was naphthalene. Metals were found to be within normal ranges and no PCB's were detected in sample B-3D.

The horizontal extent of contamination is depicted (to the degree the data will allow) on Figure 5-7. Additional work will be required to complete the delineation in Area D. The need for further delineation is also supported by the results of the soil gas sampling (Table 5-8) and the PID screening (Table 5-9). It should be noted that the PID screening data not only reflects contamination contained in the soil, but also the free product that underlies this entire area.

## 6.2 Ground Water

The free product body that underlies the Site is composed of an amber colored paint product or paint intermediary that looks much like varnish in appearance. When exposed

to air, the product will solidify. In order to delineate the extent of the free product underlying the Site, additional work will be necessary. The data developed to date was previously summarized in Table 5-13 and Figure 5-9.

When the magnitude of free product contamination is considered, the associated dissolved plume at the Site is surprisingly dilute. The results from well MW-5 most clearly illustrate this point. MW-5 is screened five feet below the free product body and, although the ground water at this location is somewhat degraded, the results suggest that the solubility of the free product must be very low. The constituents contained in the dissolved plume consist primarily of petroleum hydrocarbons (aromatics, tentatively identified hydrocarbons and a minor amount of polyaromatics) along with a trace of chlorinated solvents. The detected concentrations at each sampling location exceed the New York State Ambient Ground Water Guidelines which set suggested criteria of no greater than 100 ug/l of total organic chemicals. The inorganic chemicals (metals) identified in the samples collected from wells MW-4D and MW-5D exhibited concentrations above the standards for iron (300 ug/l) and magnesium (35,000 ug/l). Sodium and manganese were found at levels exceeding the guidelines (20,000 ug/l and 300 ug/l respectively) in all of the samples.

The results of ground water samples collected at upgradient locations MW-1A/HP-1 and MW-4D indicates that some contamination may be entering the property from off-site. The other sampling locations are downgradient of the historical operating areas of the Site. The sampling results from these locations indicate that ground water may be picking up dissolved contaminants as it flows beneath the former plant. The downgradient extent of this contamination cannot be determined from the existing database. However, subsurface compaction related to the railroad tracks will likely impede downgradient migration.

It must be understood that access to areas downgradient of the Site for further delineation work is extremely limited. The railroad embankment abuts the rear of the building, while beyond is a 30 foot drop to the Bronx River. In addition, the embankment is built on a core of boulders and rip-rap.

## 7.0 INVESTIGATION SUMMARY

The results of the Remedial Investigation performed at the former Red Devil facility are summarized as follows:

- The Site is located in an industrial area that dates back at least 75 years. A bakery originally existed on the premises. During the late 1940's and early 1950's, the Red Devil Paint Company (also known as the Technical Color and Chemical Company) began to occupy the Site.

- Manufacturing operations at the Site were terminated in 1990. At this time, Insilco initiated final closure of operations and implemented a Site assessment and management program of the purposes of mitigating against property damage. This program included the permanent closure of all underground and vaulted storage tanks remaining at the property and a preliminary investigation of the soil and ground water quality. This initial investigation indicated that several tank systems had failed.

- The subsurface at the Site is capped with 5 to 10 feet of fill material. The fill is predominantly sand, plus a mixture of coal dust, bricks, concrete rubble and boulders. The natural sediments beneath the fill are a mixture of glacial material plus recent alluvial sediments. The general character of the unconsolidated material is predominantly silty, with lesser amounts of fine to medium sand and trace amounts of gravel. Depth to ground water on-site ranged from 15 to 25 feet. Bedrock was not encountered within 50 feet of the ground surface, however the Manhattan Schist does underlie the site.

- The environmental impacts and associated property damage related to the failed tank systems were investigated using the following activities: soil sampling using both laboratory analysis and real-time field instrumentation; soil gas surveys; free product gauging and ground water sampling and analysis.

- The nature of soil impacts at the Site has been characterized. The bulk of the detected target compounds were aromatic hydrocarbons (xylenes, toluene and ethylbenzene). The bulk of the contaminant chemistry however, consisted of Tentatively Identified Compounds, primarily petroleum hydrocarbons, unknowns and aldol condensates. Subordinate amounts of chlorinated solvents and naphthalene were also found.

- Some progress on delineation of the impacted soil has been made, however additional work will be required to achieve full delineation. Minor additional work will complete the delineation in Area A. No additional soil investigation is required in Area B since no tank system releases were identified in this area. Additional work is required in Areas C and D to complete the delineation process.

- The data developed from the ground water investigation has revealed that a free product body underlies a portion of the Site. This product is composed of an amber colored paint product or paint intermediary that looks much like varnish in appearance. Additional work will be necessary to delineate the extent of free product.

- When the magnitude of free product contamination is considered, the associated dissolved plume at the Site is surprisingly dilute. Sampling results suggest that the solubility of the free product must be very low. The constituents contained in the dissolved plume consist primarily of petroleum hydrocarbons (aromatics, tentatively

identified hydrocarbons and a minor amount of polyaromatics) along with a trace of chlorinated solvents. In order to complete the delineation of dissolved ground water impacts, additional investigation will be required.

- The results of ground water samples collected on the upgradient side of the Site indicates that some contamination may be entering the property from off-site.

- A detailed work plan describing a Supplemental Remedial Investigation is being submitted under separate cover. The purpose of the Supplemental RI is to complete the characterization of the site and fill all data gaps identified by previous work.