Standard Motor

Site # HW2 41016

DRAFT

Standard Motor Products
Remedial Investigation/Feasibility Study
Work Plan

May 23, 2000

Prepared for:
Standard Motor Products, Inc.
37-18 Northern Boulevard
Long Island City, NY 11101

Prepared by:
the group
IT Corporation
2200 Cottontail Lane
Somerset, NJ 08873

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ENVIRONMENTAL REMEDIATION

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List of Acronyms

ARAR	Applicable and Relevant and Appropriate Requirements
BTEX	Benzene, Toluene, Ethylbenzene, and Xylene
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CLP	Contract Laboratory Program
DCA	Dichloroethane
DCE	Dichloroethene
DQO	Data Quality Objective
FID	Flame Ionization Detector
FOL	Field Operations Leader
FSP	Field Sampling Plan
GRO	Gasoline-Range Organics
HASP	Health and Safety Plan
IT	IT Corporation
LUST	Leaking Underground Storage Tank
MTA	Metropolitan Transit Authority
MtBE	Methyl Tertiary-Butyl Ether
NCP	National Contingency Plan
NPL	National Priorities List
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OU	Operable Unit
OVA	Organic Vapor Analyzer
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
PCE	Tetrachloroethene
PID	Photoionization Detector
POC	Principal Organic Compound
PRAP	Proposed Remedial Action Plan
QAPP	Quality Assurance Project Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision

List of Acronyms (continued)

SAP	Sampling and Analysis Plan
SMP	Standard Motor Products
SVOC	Semi-volatile Organic Compound
TAL	Target Analyte List
TAGM	Technical and Administrative Guidance Memorandums
TCA	Trichloroethane
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Procedure
TOGS	Technical and Operational Guidance Series
TPH	Total Petroleum Hydrocarbon
TSD	Treatment, Storage, and Disposal
USEPA	Unites States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound

1.0

1.0 Introduction

IT Corporation (IT) is submitting this Work Plan in accordance with the March 30, 1998 Order on Consent between the New York State Department of Environmental Conservation (NYSDEC) and Standard Motor Products, Inc. (SMP). This Order on Consent stipulates requirements for the development and implementation of a Remedial Investigation/Feasibility Study (RI/FS) for the SMP site. This Work Plan presents IT's technical scope of work for the performance of an RI/FS for the SMP site, as well as a detailed schedule for the performance of the work. A preliminary scoping meeting between IT and NYSDEC personnel was held on July 2, 1998 to further define the scope of work for the RI/FS. Modifications to this scope of work were performed based upon subsequent conversations, meetings, and written comments by NYSDEC dated March 27, 2000.

This RI/FS Work Plan has been developed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, the National Contingency Plan (NCP) of March 8, 1990, the United States Environmental Protection Agency (USEPA) guidance document dated October 1988, and appropriate entitled *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* USEPA and New York State technical and administrative guidance documents.

The following are the documents specifically applicable to prepare an RI/FS, and will be considered in preparation of this Work Plan:

- *Guidance on Remedial Investigations Under CERCLA* (USEPA, 1985a);
- *Guidance on Feasibility Studies Under CERCLA* (USEPA, 1985b);
- *Final Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (USEPA, 1988a);
- *Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities* (USEPA, 1987a);
- *Interim Guidance of Superfund Selection of Remedy* (USEPA, 1986);
- *Superfund Exposure Assessment Manual* (USEPA, 1988b);
- *Interim Final Risk Assessment Guidance for Superfund Vol. I Human Health Evaluation Manual PART A* (USEPA, 1989b);

- *Interim Final Risk Assessment Guidance for Superfund Environmental Evaluation Manual* (USEPA, 1989c);
- *A Compendium of Superfund Field Operations Methods* (USEPA, December, 1987b);
- *CERCLA Quality Assurance Manual* (USEPA, Region II, 1987c);
- *Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans* (USEPA, 1983).

This Work Plan represents one of the four project planning documents developed for the SMP RI/FS. The other three project planning documents associated with SMP are the Sampling and Analysis Plan (SAP), the Health and Safety Plan (HASP), and the Citizens Participation Plan. The SAP contains a Field Sampling Plan (FSP) as well as a Quality Assurance Project Plan (QAPP).

This Work Plan contains seven sections, including this Introduction as Section 1.0. Section 2.0 describes the site location, site description and history and summary of previous investigations. Section 3.0 presents existing environmental conditions. Section 4.0 presents the Work Plan rationale for the RI sampling activities and the technical approach to preparing and executing the Work Plan. Section 5.0 presents the task plan for this RI/FS, which has been divided into ten major tasks. Section 6.0 of the Work Plan presents the project management approach, key positions, and the schedule of this project. Section 7.0 lists the references cited in the Work Plan.

2.0

2.0 Site Location, Site Description and History, and Summary of Previous Investigations

The following sections describe the site location, site description and history and a summary of previous investigations.

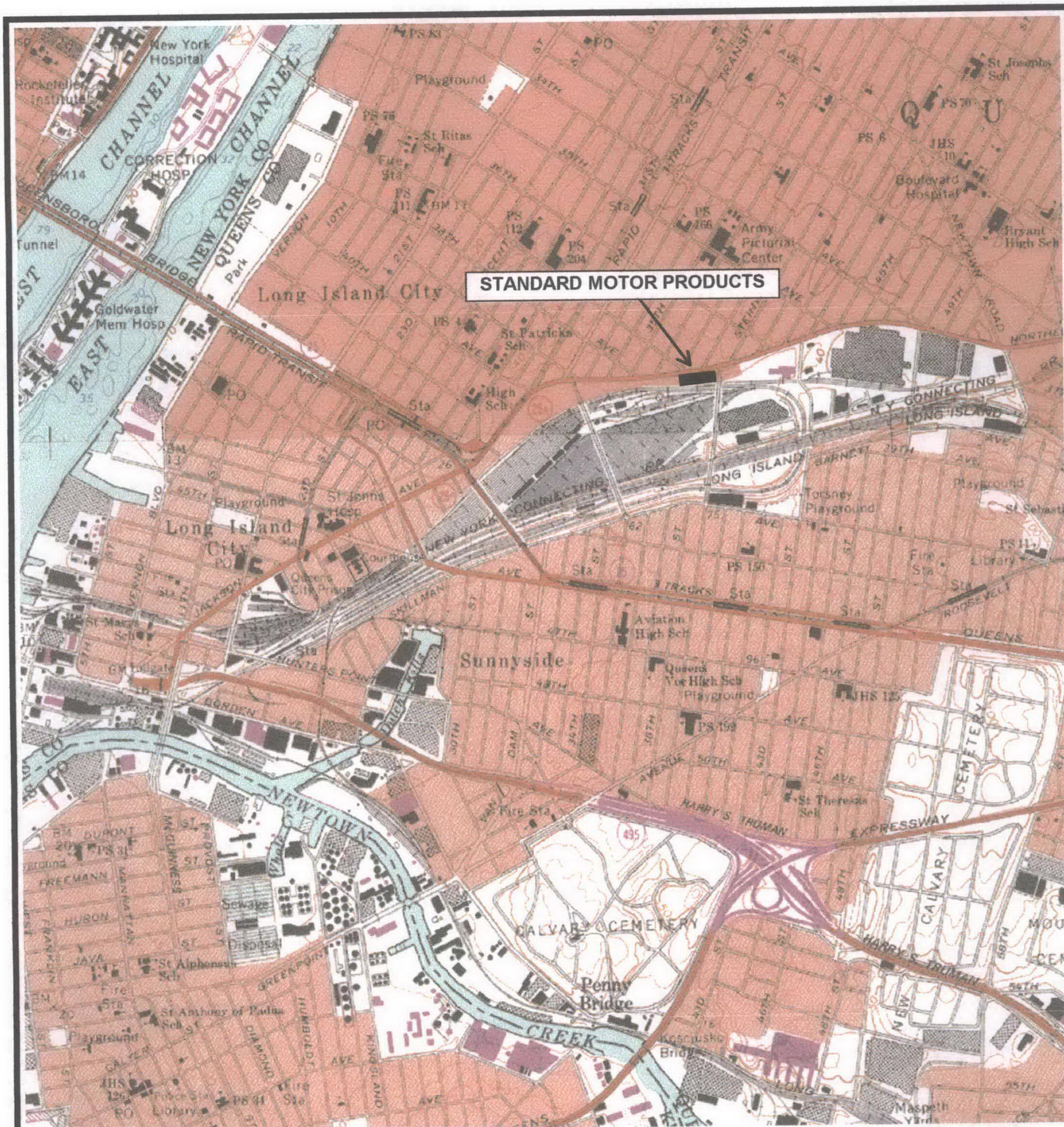
2.1 Site Location

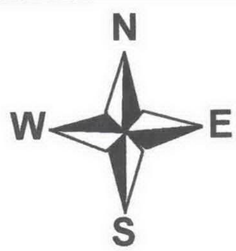
The SMP site is located at 37-18 Northern Boulevard in Long Island City, New York (Figure 2-1 and Figure 2-2). The site is owned and operated by SMP and is located in an urban and industrial area. The property is approximately rectangular in shape and occupies more than 1 acre of land. The site property contains a large, six-story, industrial building with approximately 42,000 square feet per floor that occupies most of the site. SMP is the only occupant of the building. This SMP's Long Island City facility manufactures car parts and is SMP's corporate headquarters.

Bordering the site are Northern Boulevard to the north; Sunnyside Freight Railroad Yard to the south; 39th Street, an automobile dealership and a Merit gasoline filling station to the east; and commercial and industrial properties to the west. Various industrial, commercial, and residential properties are located across Northern Boulevard from the SMP site. A narrow strip of land on the south side of the property contains a loading dock and a dirt access path for vehicles (Figure 2-3). This strip of land is owned by the Metropolitan Transit Authority (MTA) and is part of a long-term lease to SMP. Contamination had been identified in the soil adjacent to the loading dock. This area is mostly dirt and gravel covered with some concrete remaining from a nearby road-paving project. Access to this area is limited to doors at the rear of the SMP building, a locked access gate at the adjacent automobile dealership, a railroad spur from 42nd Place to the east, and to railroad personnel by way of the Sunnyside Yard to the south. A highly industrialized area with a wide variety of activities ranging from small-scale assembly to large-scale manufacturing is located within the general vicinity of the SMP site.

2.2 Site Description and History

The site was historically involved in industrial and manufacturing activities since 1919 (EnviroAudit, 1996). SMP has occupied the on-site building since the mid-1900s. S. Karpen & Brothers occupied the building prior to that time.





SOURCE:
CENTRAL PARK AND BROOKLYN, NEW YORK
QUADRANGLES, 7.5 MINUTE SERIES

FIGURE 2-1
SITE LOCATION MAP

STANDARD MOTOR PRODUCTS, INC.
37-18 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK

IT CORPORATION
A Member of The IT Group

Prepared by: JLF	Date: 5/12/00
Approved by:	Scale: 1"=2,000'
Project Mgr:	Revision No.: 0
File name: locationfigure.xls	Project No.: 775699

SOURCE: GES SITE INVESTIGATION REPORT, MERIT GAS STATION–1990

REV. NO.	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY	APPVD BY
PROJECT MANAGER:	M. WATT	DRAWN BY:	J.R.D.	DATE: 5/21/00		

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 2–2
ADJACENT PROPERTY OWNERS

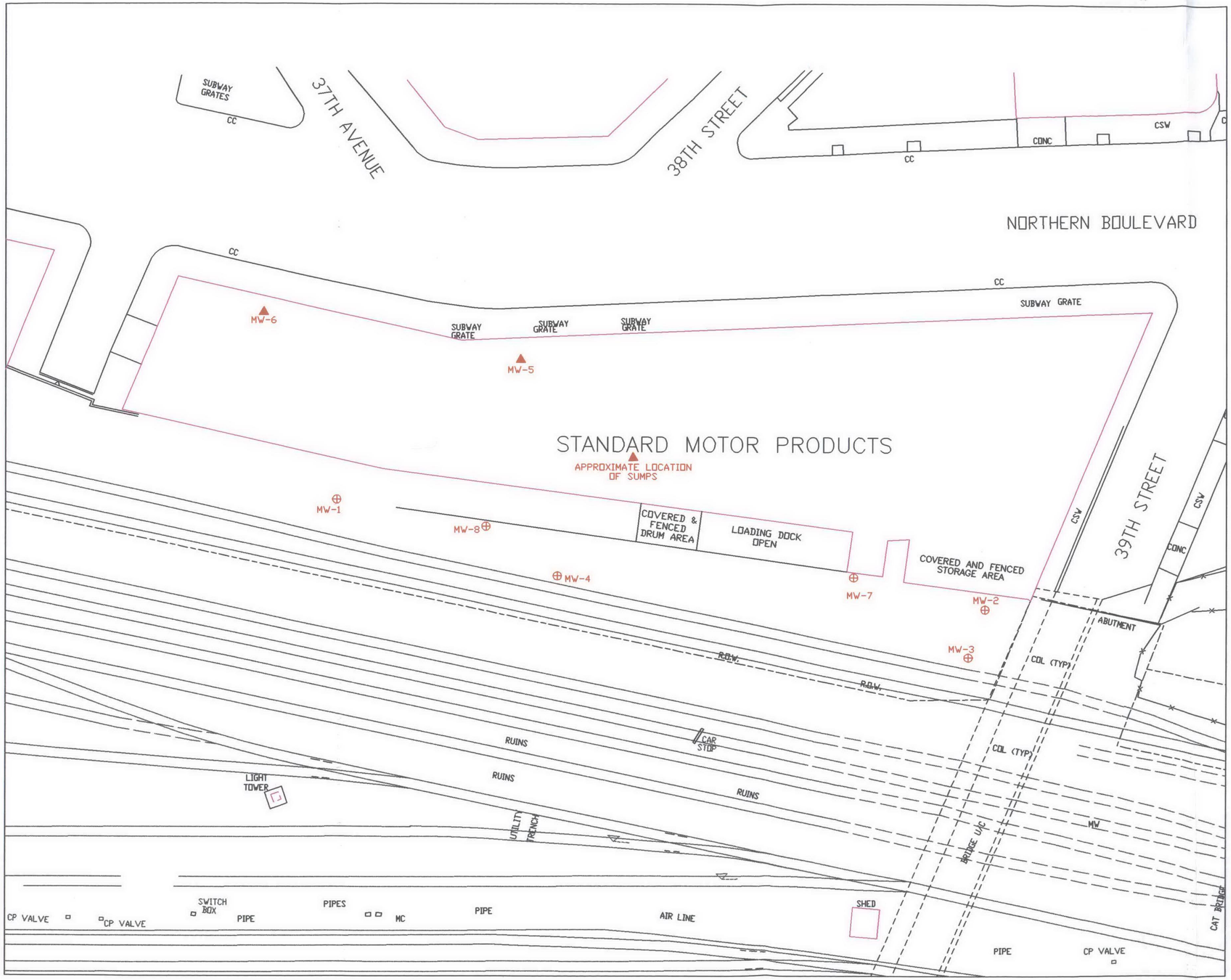
REMEDIAL INVESTIGATION/
FEASIBILITY STUDY WORKPLAN

Prepared For:

STANDARD MOTOR PRODUCTS

PROJECT NO.	FILE NO.	CHK'D: / ENG. / APPVD.	DRAWING NUMBER	REV. NO.
775699	B4		775699–B4	

775699–B1.dwg 05/22/00 3:26pm J.R.D.



LEGEND:

MW-7 ⊕ PREVIOUS MONITORING WELLS THAT CAN NOT BE LOCATED

MW-5 ▲ EXISTING WELL/SUMP

25 0 25 50

SCALE OF FEET

REV. NO.	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY	APPVD BY
0	-/--/--	DEVELOPED DRAWING	-.-.-.			

PROJECT MANAGER: M. WATT | DRAWN BY: J.R.D. | DATE: 5/11/00

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 2-3
SITE PLAN

REMEDIAL INVESTIGATION/
FEASIBILITY STUDY WORKPLAN

Prepared For:

STANDARD MOTOR PRODUCTS

PROJECT NO.	FILE NO.	CHK'D: / ENG. / APPVD.	DRAWING NUMBER	REV. NO.
775699	B3		775699-B3	

775699-B3.dwg 05/22/00 2:03pm J.R.D.

SMP maintained a small plating line for chrome plating of small machine parts from approximately 1975 to 1984. The wastes generated from the chrome plating process were temporarily stored on-site prior to off-site disposal. SMP was previously engaged in painting automobile parts prior to distribution. Until 1984, solvent-based paints were used, after which aqueous-based paints were used until all painting operations were gradually eliminated between 1990 and 1991. Several other processes that SMP performed in the past also generated hazardous wastes. These include die-casting that was stopped in the 1970s, rubber production that was eliminated around 1985, and degreasing, using chlorinated solvents, that was eliminated in 1990.

Currently, SMP's main activity is the production of automobile parts and components. The manufacturing operations include metal fabrication and machining, plastic injection molding, and assembly. SMP also operates a small photography laboratory for production of newsletters, brochures, etc. The only hazardous or toxic materials involved in plant operations are lubricating oils for machinery, caustics for degreasing, phenolics used in molding processes, epoxies for coil production, and water-based inks involved in their small scale printing. All wastes are temporarily stored on-site in secure containers prior to off-site disposal at a licensed treatment, storage, and disposal (TSD) facility.

2.3 Summary of Previous Investigations

Several studies have been conducted at the SMP site or at adjacent sites (i.e., Amtrak Sunnyside Yard and the Merit "Northern" Station). These previous investigations are summarized in the following sections.

2.3.1 Summit Environmental Evaluations, Inc.

Following the observation of an oily sheen in a puddled area in the southeast side of the property off the loading dock, a preliminary investigation was initiated by Summit Environmental Evaluations, Inc. in September 1990. An area of approximately 2,700 square feet (30 feet by 90 feet) was excavated to a depth of 1 to 2 feet. The excavated soils (approximately 150 cubic yards) were either stockpiled or placed in roll-off containers that were located along the loading dock (Figure 2-4). Analysis of soil samples, collected on October 11, 1990, indicated that this area contained elevated levels of petroleum hydrocarbons and volatile organic compounds (VOCs), particularly 1,1,1-trichloroethane (TCA).

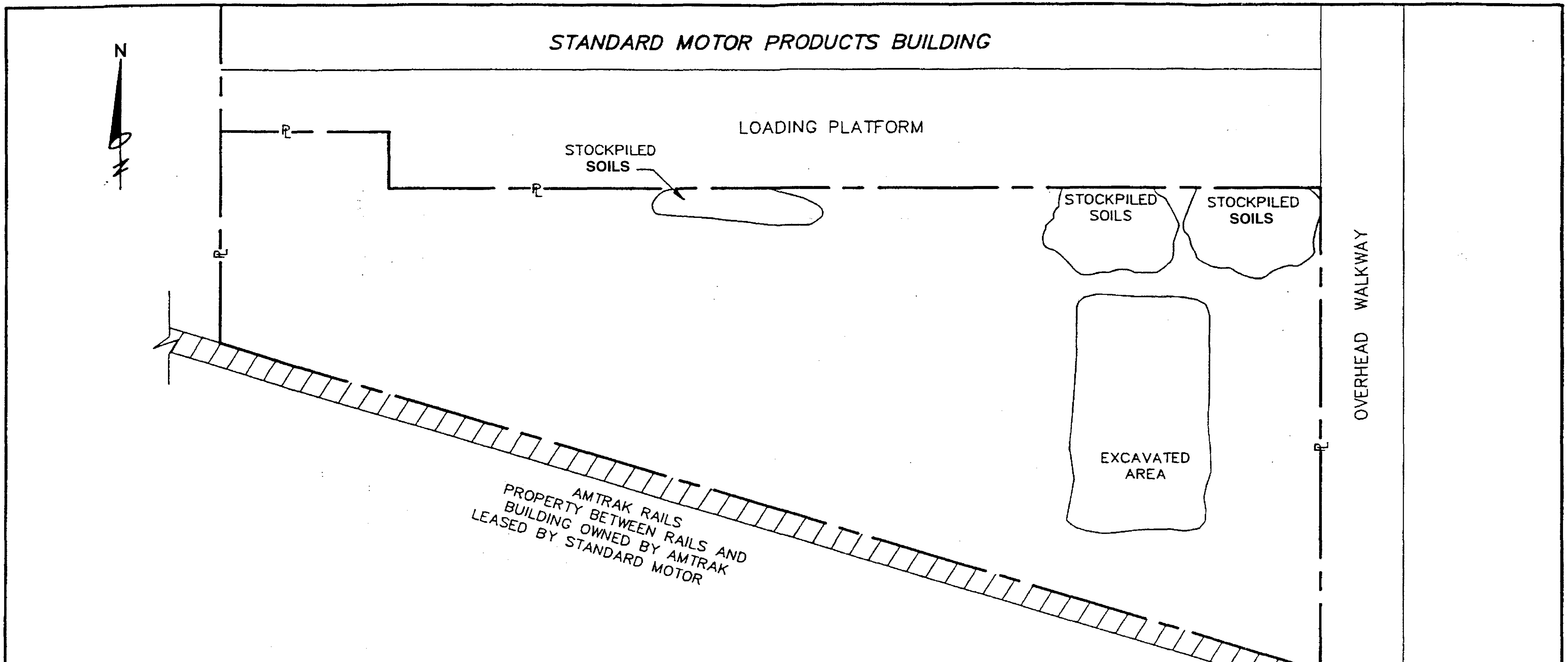


Figure 2-4

APPROXIMATE LOCATION OF PREVIOUSLY EXCAVATED AND STOCKPILED SOILS

STANDARD MOTOR PRODUCTS, INC.

Based on the elevated levels of VOCs, Summit Environmental recommended remediation of the soils via high temperature incineration at a TSD facility (Summit Environmental Evaluations, 1990).

2.3.2 Public Service Testing Laboratories, Inc.

Subsequent to the Summit Environmental investigation, SMP contracted Public Service Testing Laboratories, Inc. to conduct additional analyses on the soil. Analyses were conducted for toxicity characteristic leaching procedure (TCLP) metals, VOCs, and semi-volatile organic compounds. The results of these additional analyses indicated non-detectable levels of VOCs. However, levels of lead detected from TCLP analyses yielded results above the hazardous toxicity thresholds in three of the five samples. Public Service Testing Laboratories, Inc. recommended disposal of the soils as a hazardous waste.

2.3.3 H2M Soil Investigation

In early 1991, H2M conducted an assessment of the soil quality in the area off the loading dock. This assessment included a soil gas survey and analysis of additional soil samples. The results of this assessment are documented in the "*Soil Investigation Report*" prepared by H2M Group in 1991. The soil gas survey included 50 test points covering an area of approximately 10,000 square feet (see Appendix A). A photo-ionization detector (PID) was used to detect VOCs. The highest concentrations were found immediately adjacent to the loading dock. In addition, an oily sheen was noted in the flooded excavation on the west side of the study area during the soil gas survey. Eleven soil samples were collected based on the results of the soil gas survey and on visual inspections. Six samples were collected from the stockpiled soils and five (two on-site and three off-site background) samples were collected from undisturbed soils. Soil samples were collected at a depth of 18 inches below grade. These samples were analyzed for total petroleum hydrocarbons (TPH), VOCs, lead, and TCLP lead. Elevated levels of TPH and VOCs were found in the stockpiled soils and in the undisturbed soils off the loading dock in the eastern portion of the site. Though TPH and VOCs were also detected in background samples, the concentrations were up to three orders of magnitude less than in the stockpiled soils and near the eastern portion of the loading dock. Based on the results, H2M reported that the soils could be classified as an environmental media contaminated with a listed hazardous waste and not a hazardous waste itself. However, H2M recommended further delineation of the impacted area (since non-excavated soils had also been found) and remediation via soil vapor extraction either in-situ or in soil venting piles (H2M Group, 1991).

2.3.4 H2M Remedial Investigations

Later in 1991, H2M began a Remedial Investigation in order to determine the nature, type, and physical state of soil and/or groundwater contamination associated with the operation of SMP's facility. Groundwater and soil samples were collected through the installation of six monitoring wells and thirteen soil borings in the eastern half of the site. The results of this investigation are documented in the "*Remedial Investigation Report*" prepared by H2M Group in 1992

All forty soil samples collected, with depths ranging from 5 to 40 feet, were analyzed for VOCs. In addition, select samples were analyzed for TPH and TCLP metals. Total VOC concentrations were as high as 35 mg/kg (see Appendix B); the most prevalent compounds detected in the shallow soil samples (above 7 feet) were chlorinated solvents such as TCA, tetrachloroethylene (PCE), methylene chloride, and trichloroethylene (TCE). Results indicated that soil contamination existed along the loading dock from the suspected source area near the southeast corner westward for about 200 feet and southward for 15 to 20 feet. Though most chlorinated solvent contamination was found at shallow depth, elevated levels of benzene, ethylbenzene, toluene and xylene (BTEX) were detected at depths greater than 10 feet (beneath the water table) which could have originated from the upgradient Merit "Northern" Gas Station site.

Of the six monitoring wells installed, four were along the loading dock and two were indoors in the northwest portion of the SMP building (see Appendix B). Groundwater level measurements determined a northerly direction of groundwater flow that was contradictory to the general regional groundwater flow direction that is south to southwest, according to a 1981 USGS regional map. The differences in groundwater flow direction are presumably due to a sump pump that operates continually in the SMP basement to prevent flooding, as well as potential dewatering operations in the local subway system and other nearby buildings (H2M Group, 1992).

Subsequent to the H2M RI, the remedial investigation of the adjacent Amtrak Sunnyside Yard documents groundwater flow from the east to the west. These differences in groundwater flow direction require further evaluation within the current SMP RI/FS.

All groundwater samples were analyzed for VOCs, TPH, and metals. Several metals and VOCs were found to exceed the NYSDEC groundwater standards. VOCs ranged from non-detect to 2,600 µg/l for xylene. Xylene is a BTEX constituent which could have originated from the upgradient Merit "Northern" Gas Station site. Chlorinated solvents were also detected to a lesser extent. Metals detected in groundwater samples included iron, manganese, sodium, lead, chromium, copper, and zinc (H2M Group, 1992).

The 1992 RI report determined that unacceptable risks were unlikely from exposure to contaminated soils and that there is no exposure to groundwater. Therefore, No Action with site controls (e.g., paving and additional fencing) and continued groundwater monitoring was recommended in lieu of remediation.

2.3.5 EnviroAudit

In 1995, EnviroAudit conducted an investigation of surface and subsurface soils, as well as groundwater conditions within the surficial aquifer. This investigation included the drilling of fifteen soil borings with two borings completed as groundwater monitoring wells, collection and analysis of forty-four soil samples, and collection and analysis of three groundwater samples and two sump samples. The results of this investigation were documented in "*A Phase II EnviroAudit Subsurface Investigation and Summary Report of an Industrial Property Located at 37-18 Northern Boulevard in Lond Island City, New York*", prepared by EnviroAudit Ltd., in 1996.

Elevated levels of VOC contamination were found in an area of the loading dock, in site soils and groundwater (see Appendix C). The primary compounds detected in excess of clean-up guidelines were TCA, 1,1-dichloroethane (DCA), and trichloroethene (TCE). Lead was only detected at low levels using the TCLP analysis (EnviroAudit Ltd., 1996).

2.3.6 Amtrak Sunnyside Yard Remedial Investigations

The Amtrak Sunnyside Yard is a train makeup and maintenance facility that is located south and west of the SMP site. It is listed as a Class II Site in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites (Site Number 241006), and has been the subject of a Remedial Investigation since 1989. Due to its close proximity to the SMP site the previous investigations regarding the groundwater in the vicinity of SMP, and potentially downgradient of SMP are of relevance.

The Amtrak Sunnyside Yard was subdivided into six operable units in order to address remedial efforts and accommodate construction schedules at the Yard. Operable Unit (OU) 6 was designated as the groundwater OU and included the saturated soil beneath the Yard. A Phase I Remedial Investigation (Roux Associates, Inc., 1992) was conducted in 1990 and 1991. The results of the Phase I RI shallow groundwater monitoring indicated the following:

- No VOCs or semi-volatile organic compounds (SVOCs) were detected above standards;
- Only a limited number of SVOCs, predominantly polycyclic aromatic hydrocarbons (PAH), were detected;
- Polychlorinated biphenyls (PCB) were detected in only one monitoring well, which also contained separate-phase petroleum; and
- Iron, lead, manganese, and sodium were detected above the NYSDEC standards in most samples, which is typical for background conditions in industrialized urban environments with historic saltwater intrusion.

Subsequent investigations of the groundwater were conducted to further delineate the extent of contaminants, determine if migration of contaminants in groundwater is occurring either on site or off site; and develop additional information regarding groundwater flow characteristics. These were reported in the OU 6 RI Report (Roux Associates, Inc., 1999) and are summarized here.

Several VOCs, including BTEX, chlorinated solvents, styrene, carbon disulfide, and 4-methyl-2-pentanone, were detected in groundwater. Chlorinated solvents were detected in monitoring wells adjacent to the SMP site and west (i.e., downgradient) of the SMP site. The concentrations of 1,2-DCE, TCE, and PCE are presented in Appendix D for these wells and generally show a decrease in concentrations over the sample collection period. Though groundwater flow is toward the west from the SMP site, the water table is nearly flat in the vicinity of SMP, and data collected during the OU 6 RI indicate that their may be radial flow of contaminants in this area, thus indicating that the detected VOCs in these wells on the Amtrak Sunnyside Yard may be due to groundwater contamination at SMP.

Several SVOCs were also detected in the Amtrak Sunnyside Yard groundwater samples. Due to the proximity of the wells containing SVOCs to the separate-phase petroleum plume at the Yard, these detections are likely due to that plume. Several metals were also found at concentrations above local background concentrations.

2.3.7 Merit "Northern" Station

The Merit "Northern" Station is an active retail gasoline station with a one-story building, car wash, and kiosk. It is located east of the SMP property and was the subject of a recent environmental investigation (GES, 1998). In 1995, 45 underground storage tanks (UST) were decommissioned and removed and two others were decommissioned by abandonment in place. As part of the site investigation, a subsurface investigation was performed to define the vertical and horizontal extent of the hydrocarbon impact detected during the post-excavation sampling. Four monitoring wells were drilled on the Merit site in 1996 to assess groundwater quality. Soil samples were analyzed for BTEX, methyl tertiary butyl ether (MtBE), and gasoline-range organics (GRO). Groundwater samples were analyzed for BTEX, MtBE, and TPH. The highest concentrations of contaminants in groundwater were detected in the northeast section of the Merit site near the former location of the larger USTs. The lowest concentrations were detected in the southeast section of the site, and concentrations were intermediate in the northwest and southwest sections of the site. Concentrations of BTEX ranged from below detection in the southwest section of the site to a maximum of 1,110 µg/l benzene, 11,600 µg/l toluene, 4,250 µg/l ethylbenzene, and 20,500 µg/l xylene. MtBE concentrations in groundwater ranged from 11.4 µg/l to 8,770 µg/l. TPH concentrations in groundwater ranged from below detection to 8,400 µg/l. Concentrations of BTEX in groundwater at the Merit Site were greater than concentrations detected on the SMP site. Selected figures and tables from the Site Investigation Report (GES, 1998) are presented in Appendix E.

3.0

3.0 Existing Environmental Conditions

In this section, a summary of the existing environmental conditions which include site geology and hydrogeology, local climate, population and environmental resources, and the distribution and concentrations of contaminants is presented.

3.1 Site Geology

The site and regional geology were characterized based on previously published reports and observations made during various investigations at the site. Though Queens County soil mapping is limited, the geologic formations underlying the region are reported to be composed of a series of unconsolidated clay, sand, and gravel deposits of late Cretaceous and Pleistocene age. Crystalline bedrock of Precambrian age underlies these unconsolidated deposits and outcrops in northwestern Queens County near the East River.

The Upper Pleistocene deposit is the major unconsolidated deposit underlying Long Island City; this deposit unconformably overlies the Gardiners Clay and is found at the surface in nearly all of Queens County. The deposits, which are of glacial origin and include terminal moraine deposits, ground moraine deposits, and glacial outwash, are generally an unsorted and unstratified mixture of clay, sand, gravel, and boulders. Depth to bedrock ranges from zero feet in small areas of outcrop in northwestern Queens to as much as 300 feet in buried valleys. In the vicinity of SMP the deposits are estimated to be at least 60 feet thick with extensive clay layers present.

In the central to southeast portions of Queens County, the Upper Pleistocene deposits unconformably overlie the Gardiners Clay which consists primarily of greenish-gray clay and silts with interbedded sand. The Gardiners Clay is present beneath the site and it is of limited thickness. In the central portion of Queens County, the Gardiners Clay unconformably overlies the Precambrian bedrock. The remainder of the county (generally along or near the shorelines) is covered by estuary and salt marsh deposits (Soren, 1971). Many of these areas have been extended by artificial fill.

Observations made during investigation of the site found fill including sand, silt, conerete fragments, and wood railroad ties to two feet below grade. Below this, sands and gravel were observed to thirty feet below grade and are reported to be consistent with the published information on subsurface geology in the area.

3.2 Hydrogeology

Hydrogeology of the site has been characterized based on previously published reports and observations made during various investigations at the site. The hydrogeologic units correspond to the previously discussed geologic units. The major aquifer beneath Long Island City is the Upper Glacial Aquifer (Upper Pleistocene Deposits) which includes all of the saturated glacial drift. The sand and gravel beds are the most permeable with an estimated horizontal hydraulic conductivity of 270 ft/day (Franke and Cohen, 1972); other deposits contain less well-sorted clay and silt deposits that have much lower conductivities.

Groundwater within the Upper Glacial Aquifer may be locally confined in areas of the clay and silt deposits, but is generally unconfined; localized clay lenses result in areas of perched groundwater.

The depth to groundwater in the vicinity of the subject property is approximately 5 to 10 feet below grade. Regional horizontal groundwater flow was determined during a previous investigation to be to the south-southwest based on a 1981 USGS regional map. However, the local investigation of the adjacent Amtrak Sunnyside Yard documents groundwater flow from the east to the west. The groundwater eventually discharges either to the East River or to one of its tributaries. Vertical groundwater movement is restricted by the underlying Gardiners Clay where present or by the Precambrian bedrock that is considered to be the bottom hydrologic boundary of the groundwater flow system.

Potable wells are not confirmed to exist in or near the site nor are they expected to be developed in the future due to the extensive industrial nature of the area. Water supply wells may be found at locations well east of the site.

An on-site basement sump pump is operated continuously in the SMP building and may impact the groundwater hydraulics on-site; however, confirmation of this hypothesis is required. Previous investigations speculated that groundwater flow direction in the immediate site area is generally to the north toward the basement sump pump. However, a more recent investigation performed at the Amtrak Sunnyside Yard determined that groundwater flow in the vicinity of SMP is generally to the west. Additional investigations are required to verify groundwater flow direction.

3.3 Climate

Climate in the area of the site is temperate, with cold winters and warm summers. The average yearly temperature, based on historical weather data (1961 through 1990), is 54.7°F (12°C) (Washington Post, 2000). The lowest average yearly temperature generally occurs during the month of January at 25°F (-3°C); the highest average temperature generally occurs during the month of July at 85°F (29°C). Analysis of historical precipitation data averages (Washington Post, 2000) in the area of SMP indicates that the highest precipitation amounts generally occur in May and July (averages of 4.20 and 4.21 inches per month, respectively). The driest months tend to be February and October with average monthly precipitation amounts of 3.16 and 3.10 inches of precipitation, respectively.

3.4 Population and Environmental Resources

The Site is located in a heavily industrialized area of Long Island City, Queens County, New York. Queens County has a total population of 1,951,598 people residing in approximately 752,690 housing units (http://govinfo.kerr.orst.edu).

A highly industrialized area with a wide variety of activities ranging from small-scale assembly to large-scale manufacturing is located within the general vicinity of the SMP site. The Amtrak Sunnyside Yard, a NYSDEC inactive hazardous waste site (Site number 241006), is located south and southwest of the SMP building. The Merit "Northern" Gas Station is located to the east and hydraulically upgradient of the SMP site. Groundwater and soil contamination has been documented at these sites.

Previously, over 90 underground storage tanks identified on the New York State Leaking Underground Storage Tank (LUST) list were reported within a one-mile radius of the SMP site, indicating a significant number of USTs which may impact soil and groundwater quality in the area.

3.5 Distribution and Concentrations of Contaminants

Contaminants were detected during various soil and groundwater investigations at the site. The distribution of contaminants at the site was determined based on the results of several investigations.

3.5.1 Soil

Analysis of soil samples collected during a 1990 Summit Environmental investigation revealed the presence of elevated levels of petroleum hydrocarbons and VOCs primarily TCA. An area of approximately 2,700 square feet was excavated to a depth of 18 inches and roughly 150 cubic yards of soil were stockpiled on site.

In an attempt to validate soil contamination results obtained during the Summit Environmental investigation, five additional samples were analyzed by Public Service Testing Laboratories, Inc. for TCLP (extractable) metals and VOCs. No extractable VOCs were detected, but Public Service Testing reported levels of lead resulting from a TCLP analysis that exceeded hazard toxicity thresholds in three of the five samples analyzed.

A 1991 H2M preliminary soil investigation determined that soils in the area off the rear-loading platform were impacted with elevated levels of petroleum hydrocarbons and VOCs (see Appendix A). The preliminary soil investigation included a soil gas survey and the collection of 11 soil samples approximately 18 inches below grade. For the soil gas survey, over 50 points were surveyed throughout the site. PID readings of VOC concentrations ranged from 4.0 ppm to over 20 ppm. The highest readings were obtained along the loading dock and near an area of ponded waters exhibiting an oily sheen. The results of the soil sampling indicated that contaminated soil extended past the previously excavated area. H2M also concluded that, although the initial concern at the site was petroleum hydrocarbon contamination, the analytical data clearly indicate that VOCs are the more serious contaminant of concern. VOCs in soils were detected at concentrations as high as 894.2 mg/kg; total petroleum hydrocarbon (TPH) was detected at concentrations as high as 5,300 mg/kg; and lead was detected at concentrations as high as 647.5 mg/kg. Also, lead was detected in a TCLP analysis as high as 0.27 mg/l.

The RI, conducted by H2M and described in an August 1992 report, was performed to determine the nature, type, extent, and physical state of the soil and groundwater contamination associated with the operations at SMP (see Appendix B). The RI tasks included performance of soil borings and collection of soil quality data, installation of groundwater wells, and collection of groundwater quality data.

The soil boring program was initiated in October 1991 to determine the areal and vertical extent of soil contamination, to provide a fingerprint of specific contaminants, and to aid in soil classification. A total of 13 soil borings were performed throughout the southeastern portion of the site (see Appendix B). Boring locations were selected to determine the extent of contamination along the loading dock and the distance that contamination extends toward the southern border of the site. Borings were also performed at locations where outdoor monitoring wells were installed to confirm that the source area of contamination is limited to the area adjacent to the loading platform.

Split spoon samples were screened using a flame ionization detector (FID). FID readings of split spoon samples ranged from less than 5 ppm to over 1,000 ppm. The highest readings were generally obtained at depths between 5 and 15 feet below grade. Soil samples were selected for laboratory analysis and analyzed for VOCs, TCLP metals, and TPH. Samples were collected from within an area of approximately 6,000 square feet and at depths ranging from the surface to forty feet below grade. Total VOC concentrations ranged from non-detect to 35 mg/kg (see Appendix B). The most prevalent compounds were TCA (mean concentration of 2.323 mg/kg), total xylenes (mean concentration of 2.253 mg/kg), PCE (mean concentration of 0.456 mg/kg), methylene chloride (mean concentration of 0.422 mg/kg), and TCE (mean concentration of 0.356 mg/kg). The reported mean concentrations were calculated using only detectable concentrations of the contaminant; non-detectable results were not factored into the calculation.

Review of the soil data from this investigation indicates that the primary source of contamination occurs along the loading platform with the center of contamination in the vicinity of soil borings B-4 and B-5. Total VOC concentrations near these borings were greater than 2.5 mg/kg and detected at depths greater than 20 feet below grade. A second possible source of contamination was found to be in the area near boring B-7, which was performed at the base of the stockpiled soils, where the highest single sample concentration of VOCs (35.3 mg/kg total VOCs) was detected. The high concentrations detected at 5-7 feet below grade at B-7 quickly diminished to near 1.0 mg/kg at 10 feet below grade, indicating that B-7 is likely not the primary source area, but a secondary source resulting from soil stockpiling. Results of the soil investigation program indicated that soil contamination along the loading dock extends from the southeast portion of the site (the soil stockpile area) approximately 200 feet to the vicinity of B-12 where all samples indicated non-detectable levels of VOCs. The depth of contamination immediately adjacent to the loading bay ranged from greater than 20 feet deep (in the saturated zone) near B-4 to less than 5 feet below grade near B-12. It was also concluded that contamination from the source area extends in a southerly direction approximately 15 to 20 feet toward B-10 where relatively minor soil contamination (total VOCs about 1 mg/kg) was detected.

A Phase II subsurface investigation was conducted at the site in 1995 by EnviroAudit Ltd.; the investigation was voluntarily initiated by SMP (see Appendix C). The objective of the investigation was to study the site surface and subsurface soils, as well as groundwater conditions within the surficial aquifer. Fifteen soil borings were drilled, with two borings completed as monitoring wells. A total of 44 soil samples were performed and three groundwater samples were collected. Water was sampled from two existing dewatering sumps. Soil samples were collected from locations MW-7 and MW-8, as well as AB-1 through AB-13. Samples were collected from 0-2 feet below grade for site fill and surface soil screening. Samples were also collected at depths 5-7 and 10-12 feet below grade to consider the groundwater interface and saturated zone conditions.

Soil samples were analyzed for a total of 36 VOCs, TPH, and specific metals. Several soil samples were analyzed for identification of types of petroleum products. Total VOCs from laboratory analysis ranged from non-detect to over 8,000 mg/kg at various locations and depths. All surface samples contained measurable VOCs ranging from 0.488 mg/kg to 8,150 mg/kg. Total VOCs in the 5-7 foot samples ranged from non-detect to 23 mg/kg. Total VOCs in the 10-12 foot samples ranged from non-detect to 35.5 mg/kg. The highest concentrations were detected immediately adjacent to the loading dock in the central portion of the site. Concentrations of total VOCs dropped markedly with distance from this area. The most prevalent compounds detected included TCA, TCE, and DCA.

The highest total VOC concentration at 8,150 mg/kg was found at 0-2 feet at sample AB-2. The compounds with the highest concentrations detected in this location were TCA (7,000 mg/kg), DCA (640 mg/kg), and TCE (510 mg/kg). No recovery occurred at 5-7 feet due to debris in the sampling device. At the 10-12 feet interval, 9.44 mg/kg of total VOCs were detected, including TCA (7 mg/kg), DCA (0.910 mg/kg) and xylenes (0.810 mg/kg).

The adjacent location had the second highest concentration of total VOCs at the 0-2 feet sampling interval, 2,540 mg/kg. Again the most prevalent compound was TCA (1,600 mg/kg); also present were TCE (820 mg/kg), DCA (41 mg/kg), DCE and PCE (both at 34 mg/kg), and an assortment of other compounds at below 5 mg/kg. Concentrations of total VOCs in the samples collected at the 5-7 and 10-12 feet intervals were 10 mg/kg and 1.2 mg/kg, respectively.

The highest concentrations of compounds detected appear to be spatially arranged in descending order of magnitude around an assumed spill area just off the loading dock in the vicinity of borings AB-1 and AB-2.

TPH was detected in samples ranging from 7 mg/kg to 94,000 mg/kg; spatial arrangement closely resembled that of the total VOC contamination. The highest concentrations were detected along the loading dock in the central portion of the site.

TCLP metal analysis indicated detections in soils ranging from non-detect to 0.624 mg/l.

3.5.2 Groundwater

During the hydrogeologic investigation conducted by H2M, two rounds of groundwater samples were collected (see Appendix B). The first round of samples, collected in October 1991, were taken from monitoring wells MW-1 through MW-4. Samples from wells MW-1 through MW-6 were collected during the second round of sampling in February 1992. The samples were analyzed for Target Compound List (TCL) purgeable organics, Target Analyte List TAL metals, cyanide, and TPH.

The analytical results from the two rounds of sampling were compared to the New York State Water Quality Regulations for Class GA groundwater; 10 out of the 24 inorganics exceeded these standards. The most significant deviations from the standards were for iron, manganese, and sodium. Iron exceeded the standard (300 μg/l) in all wells during both sampling events; concentrations ranged from 12,800 μg/l in MW-6 to 330,000 μg/l in MW-1, with a mean concentration of 103,000 μg/l. Manganese exceeded its standard of 300 μg/l in all wells during each sampling event; concentrations ranged from 607 μg/l in MW-6 to 9,260 μg/l in MW-4 with a mean concentration of 5,106 μg/l. Sodium concentrations exceeded the standard (20,000 μg/l) in all wells except MW-3; concentrations ranged from 16,900 μg/l in MW-3 to 102,000 μg/l in MW-4 with a mean concentration of 52,510 μg/l.

Other inorganics exceeding the standards included lead which exceeded its standard of 25 μg/l in all of the wells during the first round, and in 4 of 6 wells sampled during the second round; chromium, copper, and zinc exceeded their quality standards in six, five, and four wells respectively. Lead concentrations ranged from 11.3 μg/l in MW-6 to 848 μg/l in MW-1, with a mean concentration of 219 μg/l. The chromium standard (50 μg/l) was exceeded with concentrations ranging from 53 µg/l (MW-3) to 740 µg/l (MW-1). The copper standard (200 µg/l) was exceeded with concentrations ranging from 203 µg/l in MW-3 to 1,870 µg/l in MW-1. Zinc, with a standard of 300 µg/l, was present in concentrations ranging from 427 µg/l (MW-1) to 5,420 µg/l (MW-5).

Arsenic, barium, and cadmium exceeded their standards only sporadically during the first round, and no exceedances occurred during the second round. A cadmium concentration above the standard of 10 µg/l was detected in MW-1 (11.9 µg/l). Exceedances for arsenic and barium were minor in nature.

Of the 34 compounds analyzed for in the VOC analysis, 10 were detected above the New York State standard of 5 µg/l for principal organic compounds (POCs). The VOCs detected included DCE, DCA, DCE (total), TCA, TCE, benzene, PCE, toluene, ethylbenzene, and total xylenes; VOC concentrations above standards ranged from 6 µg/l to 2,600 µg/l. At least one VOC was detected in each well during both sampling events. The VOCs with the highest concentrations were TCA (mean concentration of 74 µg/l), benzene (mean concentration of 34 µg/l), toluene (mean concentration of 73 µg/l), ethylbenzene (mean concentration of 147 µg/l), and total xylenes (mean concentration of 684 µg/l).

The H2M RI report concluded that based on groundwater investigations, groundwater contaminant migrations are likely limited to the on-site area, due to the nature and magnitude of the dewatering activities on-site.

The Phase II subsurface investigation by EnviroAudit Ltd. included the collection of five groundwater samples from three monitoring wells and two dewatering sump samples (see Appendix C). Groundwater samples were analyzed for 36 VOCs, TPH, and specific metals, as well as hardness.

Detectable levels of solvent contamination were found in groundwater from all three of the monitoring wells sampled. Groundwater from MW-7 had the highest total VOC concentration of over 14,000 µg/l. This well was placed in the area of the highest concentrations of total VOCs in soils. The most prevalent compounds detected were DCA (6,800 µg/l), TCA (4,700 µg/l), cis-1,2-DCE (1,200 µg/l), TCE (810 µg/l), MtBE (380 µg/l), and total xylenes (350 µg/l). Samples from MW-6 (H2M installed well), inside the site building, contained detectable levels of PCE at

65 µg/l, TCE at 11 µg/l, and MtBE at 9 µg/l. The sample from MW-8 contained MtBE at 53 µg/l.

The shallow sump sample collected from within the building contained VOC concentrations ranging from 3 to 37 µg/l for a total VOC concentration of 143 µg/l. The deep sump sample collected from within the building contained non-detectable levels of VOCs.

3.5.3 Air

Ambient air monitoring was performed throughout the H2M RI using a PID and FID to obtain a preliminary representation of ambient air quality in the vicinity of the SMP contamination area. Readings ranged from 0 ppm (calibration gas equivalence units) to 10 ppm, which is typical of ambient air readings in industrialized, urban areas; therefore, no respiratory protection was recommended for site workers.

4.0

4.0 Work Plan Rationale

4.1 Technical Approach

The technical approach developed to address project-specific concerns focuses on two areas: 1) a phased approach to the field investigation, and 2) a goal-oriented approach to scoping the RI/FS project. The field investigation activities will be conducted in a two-phased approach to collect data of the appropriate quality to achieve contaminant delineation in a cost-effective manner. Scoping activities will concentrate on the ultimate goals of the project in order to develop an efficient work plan.

4.1.1 Field Investigation Strategy-Phased Approach

The field investigation for the SMP RI/FS will be conducted in a phased approach. The first phase of the investigation will involve the collection of soil samples using hand augers and via geoprobe drilling to delineate the nature and extent of soil contamination. Groundwater samples will also be collected during the geoprobe drilling. The second phase of the investigation will use the results of the geoprobe groundwater samples to determine the locations for placement of groundwater monitoring wells and the screened interval depths, if necessary.

The major objectives of the Phase I field investigation are the following:

- Determine the nature and extent of surface soil contamination in the vicinity of the loading dock on the south side of the SMP facility;
- Determine the nature and extent of subsurface soil contamination in the vicinity of the loading dock on the south side of the SMP facility;
- Determine if soil contamination may extend from the vicinity of the loading dock under the loading dock and SMP facility; and
- Determine if groundwater contamination exists in the vicinity of the loading dock and beneath the SMP facility.

The major objectives of the Phase II field investigation are the following:

- Install monitoring wells at locations and with screened intervals as determined via the results of the Phase I field investigations;
- Determine groundwater flow direction and characteristics;

- Further delineate groundwater contamination emanating from the soils in the vicinity of the loading dock on the south side of the SMP facility;
- Gather sufficient data to perform a qualitative human health exposure assessment; and
- Gather data to adequately evaluate remedial alternatives.

4.1.2 Goal-Oriented Scoping

The primary goal of the RI/FS is to protect human health. This goal is accomplished by performing a site-specific qualitative human health exposure assessment, which will be based on the determination of significant impacts from past contaminant releases. The exposure assessment will determine if potentially unacceptable exposure may be present at the site. If no significant potential for exposure exists, a "No Action" scenario may be appropriate for SMP. If a significant potential for exposure exists, a focused feasibility study will be performed to assess appropriate remedial alternatives.

Both the qualitative exposure assessment and focused feasibility study require a nature and extent delineation of site-specific contaminants. The human health exposure assessment specifically requires investigation of potential exposure pathways, and appropriate data quality objectives (DQO). The feasibility study requires data collection adequate to define potential treatment/disposal volumes and contaminant transport parameters, appropriate geotechnical parameters, and treatability of waste streams. Data necessary to support these assessments will be collected during the field investigation. Risk assessment and feasibility study task managers will be intimately involved in scoping of the project plans to ensure project goals are met in the most efficient manner.

4.2 Data Quality Objectives

Data Quality Objectives (DQOs) are statements specifying the quality of data needed to support decisions relative to various stages of remedial actions. They are based on the concept that different data uses require different levels of data quality with respect to the precision, accuracy, and completeness of the data. DQOs must be in place to ensure that RI/FS results are of high quality, are scientifically and legally defensible, and have requisite levels of precision and accuracy to support any decisions made as a result of the findings of the investigation. As defined in the document "Data Quality Objectiveness for Remedial Response Activities (USEPA, 1987a), five analytical support levels exist to identify the data quality generated during investigations. The five levels are:

- Screening (Level 1): This provides the lowest data quality, but the most rapid results. It is often used for health and safety monitoring at the site, preliminary comparison to applicable and relevant and appropriate requirements (ARAR), initial site characterization to locate areas for subsequent and more accurate analyses, and for engineering screening of alternatives (bench-scale tests). These types of data include those generated on site through the use of PID, pH, conductivity and other real time monitoring equipment at the site.
- Field Analyses (Level 2): This provides rapid results and better quality than in Level 1. Analyses include mobile lab-generated data.
- Engineering (Level 3): This provides an intermediate level of data quality and is used for site characterization engineering analyses. It may include mobile lab-generated data and some analytical lab methods (e.g., laboratory data with quick turnaround used for screening, but without full quality control documentation).
- Conformational (Level 4): This provides the highest level of data quality and is used for purposes of risk assessment, engineering design, and cost analyses. These analyses require full USEPA's Contract Laboratory Program (CLP) analytical procedures.
- Non-Standard (Level 5): This refers to analyses by non-standard protocols, for example, when exacting detection limits, or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to Level 4 data.

Level 1 data includes field Organic Vapor Analyzer (OVA) or Photoionizer Detector (PID) readings gathered from boreholes and during other routine field activities. Field measurements of parameters such as pH, temperature, or specific conductivity are also examples of Level 1 data. These types of data may be used to demonstrate the adequacy of well development/purging procedures or in the case of PID or OVA readings, to help protect the health and safety of workers. On-site screening of soil samples will yield semi-quantitative results of DQO Level 1 quality. Analytical Level 2 includes quick turnaround analyses required for post-excavation and other remedial activities, and gas chromatograph analyses. Analytical Levels 3, 4 and 5 are required to perform risk assessments, feasibility studies and engineering designs.

Field sampling and laboratory analytical activities will be performed in accordance with the requirements of the QAPP. The data quality levels that will be used for the RI/FS are addressed in detail in the QAPP. Groundwater samples will be field measured for parameters such as pH, temperature, and conductivity to provide real-time data. These field measurements are proposed to be Level 1. Geotechnical testing of soil samples will be used for characterization purposes, and, therefore, are proposed to be Level 3. Analytical data generated from sample analysis for TCL and TAL parameters will be Level 4. These data can be used to verify confirmed areas of concern, support the qualitative risk assessments, and evaluate alternatives. The quality of the analytical data and associated detection limits specified for this Phase I investigation satisfy the overall DQOs required for use in the qualitative risk assessment and focused feasibility studies.

5.0

5.0 Task Plan for the RI/FS

The tasks for this RI/FS correspond to the tasks presented in the *"Final Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA"* (OSWER Directive 9335.3-01, USEPA, April 1989). The order in which these tasks are presented is the order in which the tasks will be performed. Some tasks, such as community relations, will be implemented throughout the RI/FS.

5.1 Task 1 - Project Planning

The project-planning task involves several subtasks that will be performed in order to develop the plans and corresponding schedule necessary to execute the RI/FS. These include several subtasks that have already been completed:

- Performing a detailed analysis of existing data;
- Conducting an initial site visit; and
- Participating in a scoping meeting with NYSDEC.

Additionally, the project planning also includes the preparation of a Work Plan (i.e., this document), Sampling and Analysis Plan (SAP), and Health and Safety Plan (HSP). The Work Plan documents the scoping process and presents the anticipated future tasks. The SAP contains two parts: 1) the Field Sampling Plan (FSP) that provides guidance for all field activities to be performed; and 2) a Quality Assurance Project Plan (QAPP) that describes the policy, organization, functional activities, and quality assurance and quality control protocols necessary to achieve DQOs dictated by the intended use of data.

5.2 Task 2 - Community Relations

The Citizen Participation Plan details the program of citizen participation activities that will be conducted during the SMP investigation. Specific requirements for citizen participation include the following:

- Preparation of SMP's Citizen Participation Record;
- Preparation of a contact list which includes residents adjacent to the site, government officials, media, environmental, civic and business groups and other groups or individuals affected by or interested in the SMP site or its RI/FS;
- Establishment of a document repository for the SMP site;

- Preparation and mailing of Fact Sheets which will accomplish the following: 1) at the start of the RI, announces the availability of the final draft RI/FS Work Plan and provides a brief analysis of the proposed investigation, 2) at the completion of the Feasibility Study and completion of the Proposed Remedial Action Plan (PRAP), outlines the PRAP and announces a 30-day comment period and public meetings; and 3) when the Record of Decision (ROD) is signed, describes the selected remedy and any significant changes from the proposed remedy and summarizes and responds to significant public comments.

5.3 Task 3 - Field Investigation

The field investigation for the SMP RI/FS will be conducted in two phases. The first phase of the investigation will involve the collection of soil samples using hand augers and Geoprobe drilling to delineate the nature and extent of soil contamination. Groundwater samples will be collected during the Geoprobe sampling. The second phase of the investigation will use the results of the Geoprobe groundwater samples to determine the locations for placement of groundwater monitoring wells and the screened interval depths.

The major objectives of the Phase I field investigation are the following:

- Determine the nature and extent of surface soil contamination in the vicinity of the loading dock on the south side of the SMP facility;
- Determine the nature and extent of subsurface soil contamination in the vicinity of the loading dock on the south side of the SMP facility;
- Determine if soil contamination may extend from the vicinity of the loading dock under the loading dock and SMP facility; and
- Determine if groundwater contamination exists in the vicinity of the loading dock and beneath the SMP facility.

The major objectives of the Phase II field investigation are the following:

- Install monitoring wells at locations and with screened intervals as determined through the results of the Phase I field investigations;
- Determine groundwater flow direction and characteristics;

- Further delineate groundwater contamination emanating from the soils in the vicinity of the loading dock on the south side of the SMP facility;
- Gather enough data to perform a qualitative human health exposure assessment; and
- Gather data to adequately evaluate remedial alternatives.

The field investigation will consist of the following subtasks:

- Subcontracting
- Mobilization and Demobilization
- Site Survey and Topographic Mapping
- Geoprobe/Hand Auger Investigation-Phase I Investigation
- Installation of Monitoring Wells-Phase II Investigation
- Monitoring Well Sampling-Phase II Investigation
- Slug Testing-Phase II Investigation
- Management of Wastes Generated During Field Investigation

5.3.1 Subcontracting

This subtask may include the awarding of subcontracts to perform certain field activities. The following subcontracts may be required:

- A surveying subcontract for surveying all sample locations and major site features;
- A subcontract for Geoprobe drilling, auger boring, and soil sampling, monitoring well installation and development;
- A supply of drums for the containerization of soil boring cuttings;
- Removal of drums containing contaminated soil boring cuttings;
- A subcontract for analytical laboratory services; and
- A subcontract for the development of Data Usability Summary Reports.

5.3.2 Mobilization and Demobilization

These subtasks will consist of field personnel orientation, equipment mobilization, identification and marking of sample locations, and demobilization. Mobilization and demobilization will take place for both the Phase I and Phase II investigations. Each field team member will attend an orientation meeting to become familiar with the site history, health and safety requirements, and field procedures. Equipment mobilization will entail the ordering, purchasing or subcontracting for all sample equipment needed for the field investigation. Locations for the soil borings, and surface soil samples, as well as access points, will be surveyed and staked at the start of the site operations. Locations for the groundwater monitoring wells will be surveyed and staked during mobilization for Phase II investigations. Equipment will be demobilized at the completion of each phase of field activities as necessary. Equipment demobilization may include, but will not be limited to, sampling equipment, drilling subcontractor equipment, and health and safety decontamination equipment.

5.3.3 Site Survey and Topographic Mapping

A topographic map will be developed by a New York State licensed surveyor and will be used as a base map for the presentation of data during the development of the RI/FS. All soil boring and groundwater monitoring well sample locations will be surveyed by a New York State licensed surveyor. Upon completion of field operations, the surveyor will locate and establish elevations of all the locations sampled during both phases of the RI. This information will be plotted on a base map and also reported in tabular form.

5.3.4 Phase I Investigation: Geoprobe/Hand Auger Investigation

The geoprobe investigation consists of the collection of both soil and groundwater samples at the SMP site. The objective of the geoprobe soil sampling is to determine the nature and extent of contamination in the surface and subsurface soil in the vicinity of the loading dock on the south side of the SMP facility and to determine whether soil contamination may also be present under the loading dock and facility structures. The objective of the geoprobe groundwater sampling is to aid in the determination of the nature and extent of groundwater contamination and to screen the groundwater column at various locations to determine the optimum location for placement of permanent monitoring wells.

A total of 5 surface soil, 25 vertical geoprobe, and 6 angled geoprobe sample locations will be drilled to determine the nature and extent of soil and groundwater contamination. The geoprobe and surface soil sample locations are presented in Figure 5-1.

The 5 surface soil samples locations consist of the following:

- 5 surface soil sample locations with soil samples collected from 0-1ft: approximately 1 samples per location will be collected for a total of 5 soil samples.

The 25 vertical geoprobe sample locations consist of the following:

- 11 shallow geoprobe soil sample locations with samples collected from 0-1ft and 5-7ft: approximately 2 samples per location will be collected for a total of 22 soil samples.
- 5 deep geoprobe soil sample locations with samples collected from 0-1ft, 5-7ft, 10-12ft, 15-17ft, and 20-22ft: approximately 5 samples per location will be collected for a total of 25 soil samples.
- 5 deep geoprobe soil and groundwater sample locations with soil samples collected from 0-1ft, 5-7ft, 10-12ft, 15-17ft, and 20-22ft: approximately 5 samples per location will be collected for a total of 25 soil samples. Groundwater samples will be collected from 10-12ft and 35-37ft: approximately 2 samples per location will be collected for a total of 10 groundwater samples.
- 4 deep geoprobe groundwater samples locations with groundwater samples collected from 10-12ft and 35-37ft: approximately 2 samples per location will be collected for a total of 8 groundwater samples.

The 6 angled geoprobe sample locations consist of the following:

- 6 angled geoprobe soil and groundwater locations with soil samples collected from the effective depths of 5-7ft and 10-12ft: approximately 2 samples per location will be collected for a total of 12 soil samples. Groundwater samples will be collected from 10-12ft: approximately 1 sample per location will be collected for a total of 6 groundwater samples.

In summary, a total of 89 soil samples and 24 groundwater samples will be collected from the SMP site to determine the nature and extent of contamination. The above sampling strategy is divided into geoprobe/hand auger soil sampling and geoprobe groundwater sampling and is presented below.

5.3.4.1 Geoprobe/Hand Auger Soil Sampling

IT's soil sampling strategy focus on concentrating our samples in the two known source areas. The first know source area located in the southeast corner of the SMP site consisted of an oily sheen in a puddled area that was excavated and stockpiled by Summit Environmental in 1990. This area has been sampled by H2M subsequent to the excavation to determine that even though the horizontal depth of the excavation appeared to remove most of the contamination (excavation was less than 2 feet deep), the vertical extent of the excavation did not completely remove all residual contamination. The contamination in this area is shallow.

The second source area is located where the highest contamination levels were detected in the vicinity of MW-07 that was installed as part of the 1995 EnviroAudit investigaiton. This "hot spot" area contained elevated levels of chlorinated solvents and BTEX. The BTEX contamination was generally detected beneath the water table while the chlorinated solvent contamination was detected in both the unsaturated and saturated zone of the soils. Thus, this contamination is located deeper and extends into the water table whereas the first source area located at the previously excavated and stockpiled soil area is surficial in nature.

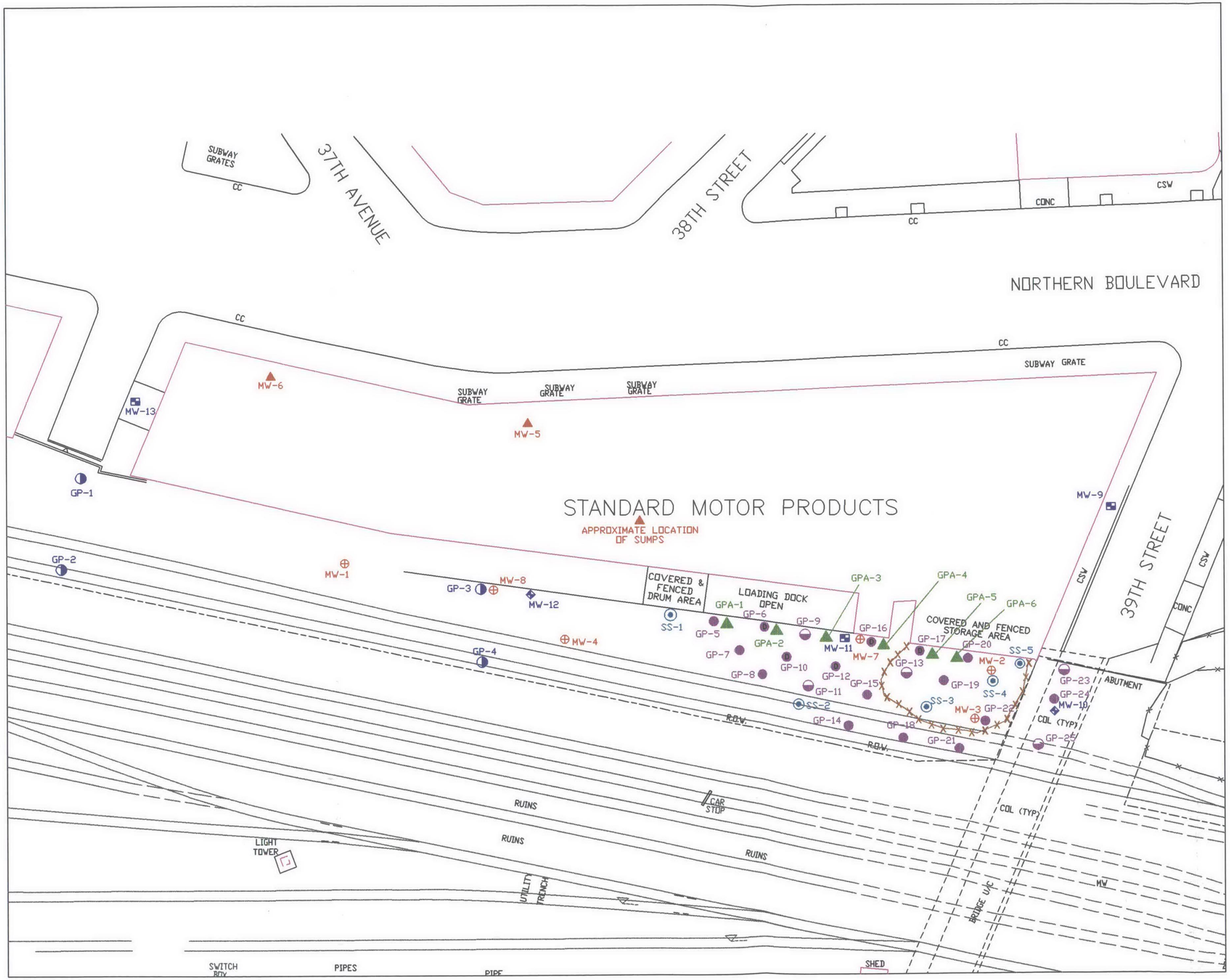
A total of 89 soil samples will be collected from the SMP site in order to determine the nature and extent of soil contamination. These 89 soil samples will be collected from the following locations:

- 5 soil samples from the 5 surface soil sampling locations
- 22 soil samples from the 11 shallow geoprobe locations
- 50 soil samples from the 10 deep geoprobe locations
- 12 soil samples from the 6 angled geoprobe locations.

Table 5-1 presents the soil investigation scoping and rationale for the SMP site.

Surface Soil Sampling:
Five surface soil sample samples in the vicinity of the previously excavated soils and the hot spot area adjacent to the loading dock will be collected from the 0-1 foot depth increment. These samples will be collected using a hand auger. Three surface soil samples (SS-03, SS-04, and SS-05) were located within the area that was previously excavated and stockpiled. This area has proven to have surficial contamination remaining after the excavation. Two surface soil samples will be located at the fringe of the hot spot area adjacent to the loading dock.

Shallow Geoprobe Soil Sampling:
A total of 11 shallow geoprobe soil borings will be drilled and two soil samples per location (0-1 ft and 5-5 ft) will be collected for a total of 22 samples. These shallow geoprobes have been located within both source areas since both the hot spot area and the previously excavated soil area contain surficial contamination. Shallow geoprobes have been utilized to characterize both the center and the fringes of the previously excavated soil area, while the shallow geoprobes have



LEGEND:

- MW-7 ⊕ PREVIOUS MONITORING WELLS THAT CAN NOT BE LOCATED
- MW-5 ▲ EXISTING WELL/SUMP
- MW-11 PROPOSED DEEP/SHALLOW WELL CLUSTER (5-20' & 30-40')
- MW-12 PROPOSED SHALLOW WELL (5-20')
- SS-1 PROPOSED SURFACE SOIL SAMPLE BY HAND AUGER, (0-1'), 5 SAMPLES
- GP-2 PROPOSED SHALLOW GEOPROBE SOIL SAMPLES (0-1' & 5-7'), 11 SAMPLE LOCATIONS
- GP-1 PROPOSED DEEP GEOPROBE SOIL SAMPLES (0-1', 5-7',10-12' & 15-17' & 20-22'), 5 SAMPLE LOCATIONS
- GPA-1 ▲ PROPOSED ANGLED GEOPROBE SOIL AND GROUNDWATER SAMPLES (SOIL: 5-7' & 10-12'), (GROUNDWATER: 5-9') 6 SAMPLE LOCATIONS
- GP-1 PROPOSED DEEP GEOPROBE GROUNDWATER SAMPLE (5-9' & 35-38') 4 SAMPLE LOCATIONS
- GP-11 PROPOSED DEEP GEOPROBE SOIL AND GROUNDWATER SAMPLES (SOIL: 0-1',5-7' & 10-12',15-17' & 20-22'), (GROUNDWATER: 5-9' & 35-38'), 5 SAMPLE LOCATIONS
- x APPROXIMATE VICINITY OF PREVIOUS EXCAVATED & STOCKPILED SOILS

REV. NO.	DATE	DESCRIPTION OF REVISION	REV. BY	ENG	CHKD BY	APPVD BY
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PROJECT MANAGER: M. WATT | DRAWN BY: J.R.D. | DATE: 5/11/00

IT INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE 5-1
PROPOSED SAMPLE LOCATIONS

REMEDIAL INVESTIGATION/
FEASIBILITY STUDY WORKPLAN

Prepared For:
STANDARD MOTOR PRODUCTS

PROJECT NO.	FILE NO.	CHK'D: / ENG. / APPVD.	DRAWING NUMBER	REV. NO.
775699	B1		775699-B1	

775699-B1.dwg 05/22/00 3:26pm J.R.D.

TABLE 5-1

SOIL INVESTIGATION SCOPING AND RATIONALE

Draft Work Plan
Remedial Investigation/Feasibility Study
Standard Motor Products

Sample Locations	Matrix	Depth (ft)	No. of Locations	No. of Samples	Sample Location Identification	Rationale
Surface Soil Sample Locations in Previously Excavated Soils Area and at the Fringe of the Hot Spot Area	Surface Soil	0-1	5	5	SS-03, SS-04 and SS-05	To investigate the vicinity of the previously excavated soils area.
					SS-01 and SS-02	To determine the fringe of the contaminated hot spot area.
Shallow Geoprobe Sample Location in Both the Hot Spot along Loading Dock and the Previously Excavated Soils Area	Surface and Subsurface soil (Geoprobe)	0-1 and 5-7	11	22	GP-19, GP-20 and GP-22	To investigate the vicinity of the previously excavated soils area.
					GP-14, GP-15, GP-18 and GP-21	To determine the southern extent of the previously excavated soils area.
					GP-05, GP-07, and GP-08	To determine the western extent of the hot spot soil contamination.
					GP-24	To determine the eastern extent of the previously excavated soils area.
Deep Geoprobe Sample Locations in the Vicinity of the Hot Spot Along the Loading Dock	Surface and Subsurface soil (Geoprobe)	0-1, 5-7, 10-12, 15-17, and 20-22	10	50	GP-09, GP-16,and GP-12	To examine the relationship between the shallow chlorinated solvent and deep BTEX contamination in the vicinity of the hot spot.
					GP-06 and GP-10	To determine the western extent of the deep soil contamination in the vicinity of the hot spot.
					GP-11	To determine the southern extent of the deep soil contamination in the vicinity of the hot spot.
					GP-13 and GP-17	To determine the eastern extent of the deep soil contamination in the vicinity of the hot spot.
					GP-23 and GP-25	To determine the eastern extent of the shallow soil contamination in the vicinity of the previously excavated soils area and the potential for background levels of deep upgradient BTEX soil contamination.
Angled Geoprobe Sample Locations at the Northern Extent of the Hot Spot and the Previously Excavated Soils Area	Subsurface Soil (Geoprobe)	5-7 and 10-12	6	12	GP-A2, GP-A3, and GP-A4	To examine the northern extent of the shallow chlorinated solvent and deep BTEX contamination in the vicinity of the hot spot.
					GP-A5 and GP-A6	To examine the northern extent of the contamination in the vicinity of the previously excavated soils.
					GP-A1	To determine the western fringe of the northern extent of soil contamination in the vicinity of the hot spot.
Total Number of Soil Samples				89		

only been used to characterize the fringes of the hot spot area since the center of the hot spot requires deeper sampling.

Surface soil samples from the 0-1 foot depth increment from the geoprobe soil sampling locations may be collected via either a hand auger or the geoprobe unit depending on site-specific conditions encountered during the field investigation. Subsurface soil samples will be collected using a Geoprobe sampling technique. Eleven (11) vertical shallow subsurface soil borings will be advanced using a Geoprobe drilling rig equipped with a Macro-Core sampler. Figure 5-1 depicts the locations of the borings. The Macro-Core sampler recovers a core of 2-inch diameter by 45 inches in length continuously to a depth of approximately 20 feet. Subsurface soils will be collected from across the water table that is assumed to occur at a depth of approximately 5-7 feet below grade.

Deep Geoprobe Soil Sampling:
A total of 10 deep geoprobe soil borings will be drilled and five soil samples per location (0-1 ft, 5-7 ft, 10-12 ft, 15-17 ft, and 20-22 ft) will be collected for a total of 50 samples. Eight out of ten of these deep geoprobes have been located primarily within the center and around the fringes of the hot spot area located adjacent to the loading dock. The placement of these eight deep borings will characterize the center of the hot spot as well as the southern, eastern and western fringes of the hot spot. Since significantly elevated levels of the BTEX contamination is primarily detected beneath the water table, the source of this contamination is suspect and an off-site upgradient source may be responsible. Thus, both shallow and deep characterization of this area is necessary to examine the relationship between the shallow chlorinate solvents and the deeper BTEX contamination. The last two deep borings are placed under the bridge in the most upgradient on-site location to aid in the determination of background levels of BTEX emanating from upgradient sources.

The Geoprobe drill rig will be equipped with a Large Bore Drive Point Sampler, as necessary, to collect deeper samples. Though depths greater than 20 feet are not expected, if greater depths are required, the Geoprobe drill rig will be equipped with an Large Bore Drive Point Sampler. This tool is used for collecting discharge samples from greater depths, but has a smaller core diameter (1.125 inches) and is only 22 inches in length.

<u>Angled Geoprobe Soil Sampling</u>:

A total of 6 angled geoprobe borings will be drilled and two soil samples per location (5-7 ft and 10-12 ft) will be collected for a total of 12 samples. These angled geoprobes have been located within both source areas since both the hot spot area and the previously excavated soil area contamination may have extended under the loading dock in the northern direction. Along the loading dock, six soil borings will be advanced at approximately a 45 degree angle towards the SMP building to determine whether subsurface soil contamination may be present under the loading dock of SMP building. The Geoprobe sampler will be advanced at a diagonal length of 14-17 feet to collect a subsurface soil sample at an effective depth of 10-12 feet. A sample will also be collected at the effective depth of 5-7 feet. No surface soil samples will be collected due to their location directly adjacent to other vertical Geoprobe locations where surface soil samples are being collected

Proposed locations for soil borings and soil hand auger samples are presented on Figure 5-1. All soil samples will be analyzed for Target Compound List (TCL) VOCs. For evaluation of remedial alternatives, 10 percent of the samples will be analyzed for TCLP organic and metals and 20 percent of the samples will be analyzed for total organic carbon and grain size. In addition, eight surface soil samples (0-1 foot depth) in the area of the excavated soils and stockpiled soils will be analyzed for TCLP lead. A description of soil sampling, drilling, and decontamination procedures using the hand augers and geoprobes will be provided in the Sampling and Analysis Plan (SAP).

5.3.4.2 Geoprobe Groundwater Sampling

A total of 24 geoprobe groundwater samples will be collected from the SMP site in order to aid in the determination of the nature and extent of groundwater contamination and to determine the optimum placement of permanent monitoring wells. These 24 geoprobe groundwater samples will be collected from the following locations:

- 18 groundwater samples from the 9 deep geoprobe locations
- 6 groundwater samples from the 6 angled geoprobe locations.

Table 5-2 presents the groundwater investigation scoping and rationale for the SMP site.

<u>Deep Geoprobe Groundwater Sampling</u>:

A total of 9 deep geoprobe groundwater borings will be drilled and two groundwater samples per location (5-9 ft and 35-38ft) will be collected for a total of 18 samples. Three of these deep geoprobes groundwater locations (GP-09, GP-13, and GP-11) have been located primarily within the center and around the fringes of the hot spot area located adjacent to the loading dock. The placement of these three deep borings will characterize the southern, eastern and western fringes of the hot spot. Since significantly elevated levels of the BTEX contamination is primarily detected beneath the water table, the source of this contamination is suspect and an off-site upgradient source may be responsible. The two deep borings, GP-23 and GP-25, are placed under the bridge in the most upgradient on-site location to aid in the determination of background levels of BTEX emanating from upgradient sources. The last four deep groundwater borings (GP-01, GP-02, GP-03, and GP-04) were located to determine the groundwater quality in the downgradient southwestern direction and to aid in the placement of permanent monitoring wells MW-12 and MW-13.

Angled Geoprobe Groundwater Sampling:
A total of 6 angled geoprobe borings will be drilled and one groundwater sample per location (5-9 ft) will be collected for a total of 6 samples. These angled geoprobes have been located within both source areas since both the hot spot area and the previously excavated soil area contamination may have extended under the loading dock in the northern direction. Along the loading dock, six soil borings will be advanced at approximately a 45 degree angle towards the SMP building to determine whether groundwater contamination may be present under the loading dock of SMP building.

Groundwater samples will be collected and analyzed for TCL VOCs. A discussion of sampling methodologies and techniques will be provided in the SAP.

5.3.5 Phase II Investigation

The Phase II Investigation will consist of the following three tasks:

- Monitoring well installation
- Monitoring well sampling
- Slug Testing

The exact placement and screened intervals of the monitoring wells will be determined based upon the results of the Phase I Investigation consisting of the geoprobe/hand augering activities.

5.3.5.1 Monitoring Well Installation

Based on the results of the soil and groundwater samples from the Phase I field investigations, five additional monitoring well locations will be evaluated. The five proposed monitoring well locations will consist of three cluster well locations consisting of a shallow and deep well and two single well locations consisting of a shallow well. Thus, a total of eight new permanent monitoring wells (5 shallow and 3 deep) will be installed in 5 monitor well locations. These wells, in conjunction with two existing monitoring wells and one sump well, shall determine the horizontal and vertical extent of groundwater contamination in the vicinity of SMP. Two monitoring wells installed during previous investigations inside the SMP building, MW-5 and MW-6, are intact and usable (see Figure 5-1). Additionally, groundwater samples can be obtained from a sump located in the SMP building. A total of 11 wells (eight proposed and 3 existing) will be available at 8 locations for groundwater sampling.

Table 5-2 presents the groundwater investigation scoping and rationale for the SMP site.

Monitor well MW-11 is located in the center of the hot spot located adjacent to the loading dock. Groundwater samples collected from MW-7 contained the highest contaminant levels and since MW-7 was destroyed via heavy construction occuring at the Amtrak Sunnyside Yard, MW-11 serves to replace this well. MW-11 is a cluster well consisting of a shallow and deep well so that the vertical extent of groundwater contamination can be determined in the location of the hot spot.

Monitor well MW-10 is a single shallow well and is located at the farthest upgradient location within the SMP site to determine the immediate upgradient shallow groundwater quality.

Monitoring well MW-09 is the farthest upgradient well and is located directly across the street from the Merit Gas Station, the most probable upgradient source of contamination. MW-09 is a cluster well and consists of a shallow and deep well to determine the vertical extent of potential upgradient contamination.

Monitoring well MW-12, a single shallow well is located immediately downgradient of the hot spot area and MW-11 and will aid in the determination of the extent of the downgradient contamination.

MW-13 is the farthest downgradient well located at the western edge of the SMP site. This well will determine if significant levels of contamination are leaving the SMP site. MW-13 is a cluster well (shallow and deep well) and will aid in the determination of both the horizontal and vertical extent of contamination.

TABLE 5-2

GROUNDWATER INVESTIGATION SCOPING AND RATIONALE

Draft Work Plan
Remedial Investigation/Feasibility Study
Standard Motor Products

probe/Monitoring Well Sample Locat	Matrix	Depth (ft)	No. of Locations	No. of Samples	Sample Location Identification	Rationale
Deep Geoprobe Sample Locations at the Area South of the SMP Building	Groundwater (Geoprobe)	5-9 and 35-38	9	18	GP-09 and GP-13	To evaluate the shallow and deep groundwater contamination in the hot spot area, the eastern and western fringes of contamination, and to optimize the placement of MW-11.
					GP-11	To determine the southern extent of the hot spot groundwater contamination.
					GP-23 and GP-25	To determine upgradient groundwater quality and to optimize the placement of MW-10.
					GP-03 and GP-04	To evaluate groundwater quality immediately downgradient of the hot spot and to optimize the placement of MW-12.
					GP-01 and GP-02	To evaluate groundwater quality at the most southwestern portion of the site and to optimize the placement of MW-13.
Angled Geoprobe Sample Locations at the Northern Extent of Contaminations in the Vicinity of the Hot Spot and the Previously Excavated Soils Area	Groundwater (Geoprobe)	5-9	6	6	GP-A2, GP-A3, and GP-A4	To examine the northern extent of the shallow chlorinated solvent and deep BTEX contamination in the vicinity of the hot spot.
					GP-A5 and GP-A6	To examine the northern extent of the contamination in the vicinity of the previously excavated soils.
					GP-A1	To determine the western fringe of the northern extent of groundwater contamination in the vicinity of the hot spot.
Monitoring Well Locations throughout the Site	Groundwater	Shallow 5-20, Deep 30-40	8	11	MW-11(shallow and deep)	To evaluate the shallow and deep groundwater contamination in the hot spot area.
					MW-10 (shallow)	To determine the immediately upgradient groundwater quality.
					MW-09 (shallow and deep)	To determine the farther upgradient groundwater quality.
					MW-12 (shallow)	To evaluate the near downgradient groundwater quality.
					MW-13 (shallow and deep)	To determine the northwestern extent of the groundwater contamination.
					MW-5 and MW-6 (existing wells)	To determine the northern extent of the groundwater contamination.
					Sump Sample	To determine the influence the sump has on local groundwater flow.
Total Number of Groundwater Samples				35		

The two existing monitoring wells and sump well located within the building will aid in the determination of the northwestern extent of groundwater contamination and determine the extent of influence the sump well has on the local hydrogeologic regime.

The five proposed shallow wells will be installed utilizing 4 inch PVC casing and screens to a depth of approximately 20 feet. The 15 foot screened interval will extend from 5 to 20 feet. The three proposed deep wells will also be installed utilizing 4-inch PVC casing and screens to a depth of approximately 40 feet. The 10 foot screened interval will extend from 30 to 40 feet.

5.3.5.2 Monitoring Well Sampling

Groundwater samples will be collected from existing and new monitoring wells using conventional well sampling techniques. The rationale for well placement and subsequent groundwater sampling activities performed during the Phase II Investigation is discussed above. A discussion of sampling methodologies and techniques is provided in the Sampling and Analysis Plan. Groundwater samples will be analyzed for TCL VOCs.

5.3.5.3 Slug Testing-Phase II Investigation

Slug testing of newly installed wells will be performed to determine aquifer properties. Slug tests provide useful estimates of aquifer system properties in heterogeneous systems. The slug tests will be performed using both injection and withdrawal volumes. The selected volume will be large enough to ensure that buildup or drawdown can be measured accurately, but small enough not to result in significant changes in aquifer saturated thickness.

To properly plan and design either a groundwater management strategy or a groundwater remedial system, knowledge of aquifer parameters is essential. Slug testing will allow calculation of hydraulic conductivity which, in concert with hydraulic gradient determined by groundwater contour plotting, will allow for determination of groundwater velocity. These parameters are essential for determining the rate of migration and fate of groundwater contaminants.

5.3.6 Management of Wastes Generated during Field Investigation

The activities associated with the collection of environmental samples may involve the generation of potentially contaminated decontamination water, soils (drill cuttings), and groundwater. These investigation wastes will be managed through a process of segregation, characterization, and storage. In general, wastes generated during the field investigation will be segregated according to matrix (e.g. water, soil). The wastes will be characterized into one of the following categories:

- RCRA Hazardous, or
- Non-hazardous

Upon characterization, an assessment of available options, ranging from immediate on-site disposal to off-site disposal, will be made.

5.3.6.1 Decontamination Water

All decontamination of equipment will be performed at a designated decontamination location within the boundaries of the site. This location will be determined prior to the commencement of field activities. The decontamination area will be constructed to provide adequate containment, collection, and storage of all decontamination water. Decontamination water will be segregated and stored on site.

5.3.6.2 Drill Cuttings

Drill cuttings generated during monitoring well installation will be managed in accordance with NYSDEC guidance. During Phase I field investigations, soil borings will consist of Geoprobe penetrations. Consequently, drill cuttings will not be generated from this activity.

5.3.6.3 Well Development/Purge Water

Groundwater generated during the development and purging of monitoring wells will be processed through carbon filters and discharged to the ground surface.

5.3.6.4 Used Personnel Protective Clothing and Equipment

The decontamination area will include suitable receptacles for the containment of all used protective clothing, respirator cartridges (if required), plastic sheeting, etc. Polyethylene bags will be used for this purpose.

5.3.6.5 Waste Minimization Practices

Waste minimization includes those activities that minimize or eliminate the generation of waste. Practical waste minimization practices will be implemented during the course of the field investigation activities to ensure that waste generation is kept to a minimum. The following waste minimization practices have been incorporated into the project plans and/or will be implemented during field activities:

- Use of Geoprobe soil and water sampling techniques to perform subsurface investigations during Phase I, eliminating the generation of drill cuttings for disposal;
- Identification of equipment requiring decontamination;
- Use of reusable items where possible to reduce waste generation;
- Use of material that is easily decontaminated;
- Segregation of clean and contaminated equipment; and
- Identification of procedures for containing residual contaminants (e.g., drill cuttings).

5.4 Task 4 - Sample Analysis and Usability Review

Samples collected during the field investigations will be subjected to a laboratory testing and usability review. A laboratory certified by the New York State Department of Health (NYSDOH) within the Environmental Laboratory Approval Program (ELAP) will conduct the analytical program. All soil samples collected will be analyzed for TCL VOA and 10 percent of soil samples for TCLP and 20 percent of soil samples for TOC analysis. All groundwater samples will be analyzed for TCL VOCs. The analytical methods that will be performed on both groundwater and soil samples are the following:

- USEPA CLP Statement of Work for Organic Analyses OLM03.01, February 1994;
- EPA 418.1 Procedures for Petroleum Hydrocarbons;
- Lloyd Kahn Method for Total Organic Carbon; and
- TCLP Volatiles (1311/CLP OLM03.01, 2/94)

The analytical data reported from the laboratory will be reviewed and evaluated. Twenty percent of the data reported from the laboratory will be reviewed in detail and data usability summary reports for 20 percent of the data will be prepared to determine whether or not the data meet the project specific criteria for data quality and data usability. The data usability summary reports will be conducted in compliance with NYSDEC's *Guidance for the Development of Data Usability Summary Reports* (NYSDEC, 1997).

5.5 Task 5 - Data Evaluation

A preliminary evaluation of the Phase I investigation will be performed as soon as analytical data is received. This evaluation will be expedited in order to meet the projected schedule while still performing a cost-effective phased investigation. The data will be evaluated for critical contaminant levels. This preliminary evaluation supports the Phase II scoping activities such as determination of monitoring well locations and screened depths.

Data collected during both phases of the sampling program will be assembled, reviewed, and evaluated to satisfy the objectives of the investigation. The data collected will be used to identify the extent and nature of contamination, and to determine groundwater flow direction and contaminant migration pathways. Water level elevations measured at the wells will be used to develop equipotential maps of hydraulic head. The results of groundwater and soils analyses will be evaluated and mapped to illustrate the aerial extent of contamination.

Tabular summaries will be prepared to compare and evaluate the results from previous investigations with the current results. The results of the evaluation will be discussed in the RI report.

5.6 Task 6 - Risk Assessment

A qualitative risk assessment will be prepared and assess the potential adverse human health impacts due to exposure to the contaminants of concern in environmental media (i.e., soil and groundwater) associated with SMP in the absence of any actions to control or mitigate these release.

The physical component of the site and the exposure pathways by which site-related constituents may reach human exposure points under the current land-use and future land-use scenarios will be presented. Each exposure pathway will be evaluated for the following four criteria necessary to indicate a complete potential exposure of a population:

- A source and mechanism of release of constituents to the environments;
- An environmental medium;
- A point of potential contact of humans to the contaminated medium; and
- An identified route of exposure.

Conceptual site models will be developed to aid in identifying potentially exposed populations and exposure pathways to environmental media. After complete exposure pathways are identified, the adverse health effects of the constituents of concern via identified complete exposure pathways under the current land-use and future land-use conditions will be discussed and presented in this section.

5.7 Task 7 - Treatability Study (Optional)

Currently, no treatability studies are anticipated for the RI/FS process. However, if at a later date, it is determined that a treatability study is warranted, it will be added either to the RI/FS or to the Remedial Design scope of work.

5.8 Task 8 - Remedial Investigation Report

After completion of the above tasks, a draft RI Report will be prepared and submitted for review. The RI Report will follow current USEPA guidance as contained in USEPA guidance document *Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA* dated October 1988. IT will initiate, develop and complete the RI Report in accordance with the state-approved RI/FS Work Plan.

The RI Report will:

(1) Include all data generated and all other information obtained during the field investigation;
(2) Summarize and compare historical data to new data;
(3) Provide all of the assessments and evaluations set forth in CERCLA, the NCP, and other relevant guidance documents;
(4) Identify any additional data that must be collected.

5.9 Task 9 - Focused Feasibility Study

After analytical data are collected, evaluated and presented in the RI Report, the remedial response objectives and response actions will be developed. Based upon the established remedial response objectives and the results of the exposure assessment, remedial alternatives will be developed and evaluated in accordance to the procedures recommended in *Guidance for Conducting RI/FS under CERCLA*. Due to the limited nature of contamination present at the SMP site, it is envisioned that a streamlined approach can be used in the development of a Focused Feasibility Study.

5.10 Task 10 – Post RI/FS Support

Upon approval if the final RI/FS reports, additional support services will be provided until the time the Record of Decision (ROD) is signed for SMP. These tasks may include any or all of the following efforts:

- Preparation of slides and materials for presentation at the public meeting for the RI/FS;
- Provide technical support to SMP and attend meetings with any Federal, New York State or local organizations regarding the RI/FS for SMP; and
- Preparation of the Responsiveness Summary or review if prepared by others.

6.0

6.0 Project Management Approach

6.1 Organization and Approach

The RI/FS Project Manager has primary responsibility for plan development and implementation of the remedial investigation and feasibility study, including coordination among the RI and FS leaders and support staff, development of bid packages, acquisition of engineering or specialized technical support, and all other aspects of the day-to-day activities associated with the project. The proposed project organization is presented in Figure 6-1. The RI/FS Project Manager identifies staff requirements, directs and monitors site progress, ensures implementation of quality procedures and adherence to applicable codes and regulations, and is responsible for performance within the established budget and schedule.

The RI Task Manager reports to and will work directly with the Project Manager to develop the SAP and is responsible for the implementation of the field investigation, the analysis, interpretation and presentation of data acquired relative to the site, and preparation of the RI report.

The Field Operations Leader (FOL) is responsible for on-site management for the duration of all site operations including the activities conducted, such as sampling, and the work performed by subcontractors such as well drilling and surveying. The FOL will provide consultation and decide on factors relating to sampling activities and changes to the field sampling program.

The FS Task Manager will work closely with the Project Manager and RI Task Manager to ensure that the field investigation generates the proper type and quantity of data for use in the initial screening of remedial technologies/alternatives, detailed evaluation of remedial technologies/alternatives, development of requirements for and evaluation of treatability study/pilot testing, if required, and associated cost analysis. The Focused Feasibility Study Report will be developed by the FS technical group.

The Risk Assessment Task Manager will support the scoping process to ensure the proper number and type of analytical samples are proposed in the field investigation effort. During the development of the RI report, the Risk Assessment Task Manager will work closely with the RI Task Manager to develop the site specific qualitative risk assessment. The Risk Assessment Task

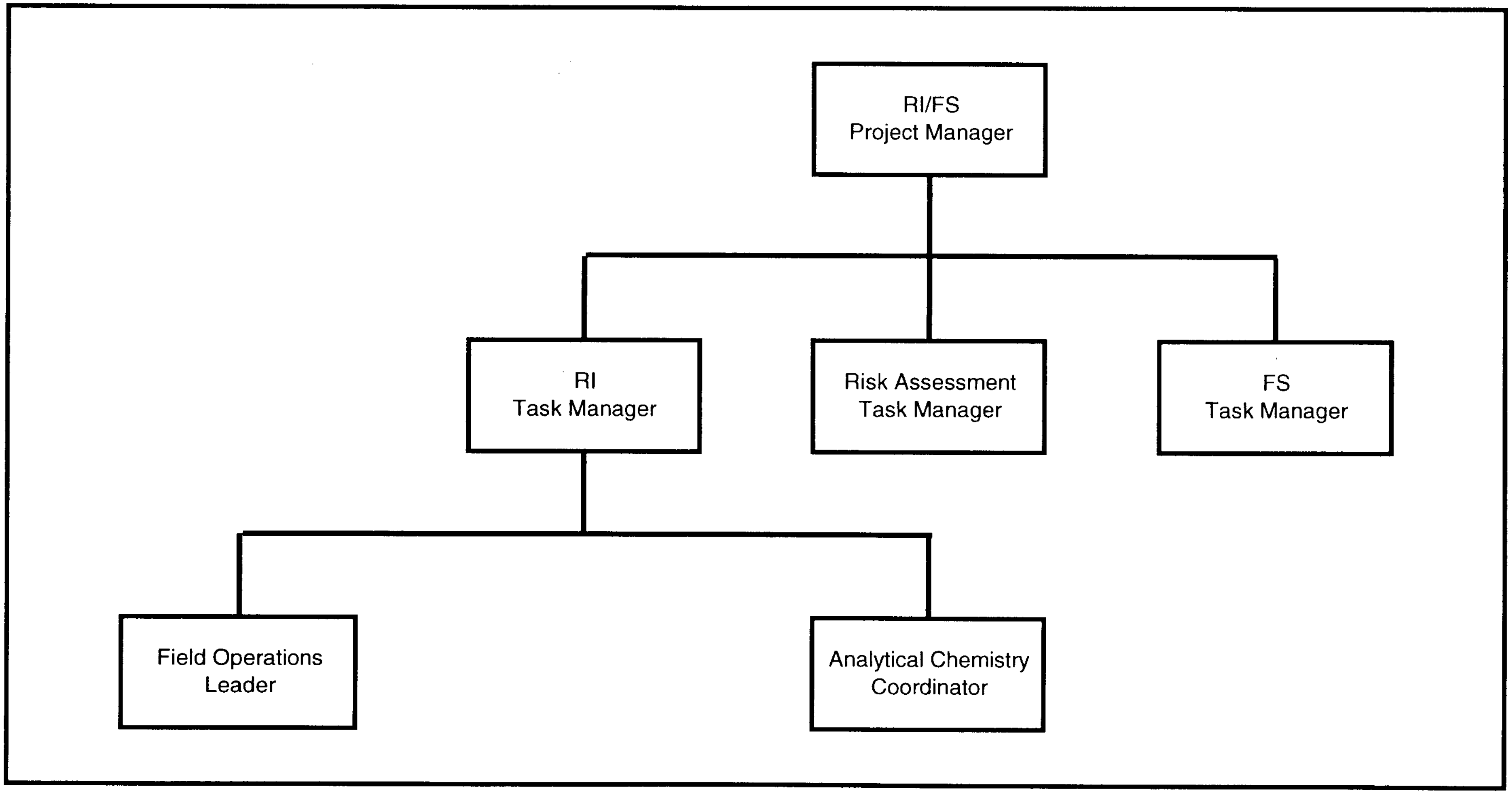

Figure 6-1
SMP RI/FS Project Organization

Manager will also work closely with the FS Task Manager during the development of ARARs and To Be Considered as well as the development of site-specific cleanup levels, if necessary.

The Analytical Chemistry Coordinator will ensure that the analytical laboratory performs the analyses as described in the Field Sampling Plan. The chemistry coordinator will be responsible for assuming that proper collection, packaging, preservation, and shipping of samples are performed in accordance with USEPA guidelines.

The task numbering system for the RI/FS effort is described in this work plan (Section 5.0). The Tasks are numbered as follows:

Task 001:	Project Planning and Management
Task 002:	Community Relations
Task 003:	Field Investigations
Task 004:	Analytical/Validation
Task 005:	Data Evaluation
Task 006	Risk Assessment
Task 007	Treatability Studies, if required (optional)
Task 008	Remedial Investigation Report
Task 009	Focused Feasibility Study Report
Task 010	Post RI/FS Support

Project progress meetings will be held, as needed, to evaluate project status, discuss current items of interest, and review major deliverables such as the RI and FS reports.

6.2 Quality Assurance

The project quality assurance requirements are stipulated in the QAPP, which will be prepared in accordance with EPA Region II Guidelines. The QAPP will include a description of the quality assurance and quality control protocols necessary to achieve the initial DQOs in the Work Plan. This plan will identify the data validation expert responsible for assessing the quality of the data, and the individual's qualifications and experience will also be presented.

6.3 Project Schedule

The proposed Project Schedule is outlined in the following table:

TASK DESCRIPTION	DATES OF PERFORMANCE
Project Planning Phase	
Development of Work Plan Scoping	5/13/98-7/2/98
NYSDEC Review and Comment on Scoping	7/2/98-3/29/00
Revise Scoping Document/Develop Draft Work Plan	3/30/00-5/23/00
NYSDEC Review and Comment on Draft Work Plan	5/23/00-6/23/00
Develop Draft SAP/HASP/CP	6/23/00 – 7/21/00
NYSDEC Review and Comment on SAP/HASP	7/21/00 - 8/18/00
Finalize SAP/HASP and Obtain NYSDEC Approval	8/18/00 - 9/15/00
Field Investigation Phase I	
Perform Phase I Field Investigation	9/15/00 – 10/6/00
Phase I Sample Analysis	10/6/00-11/3/00
Data Usability Summary Report (DUSR)	11/3/00-11/17/00
Development and Submission of Phase I Data Summary Tables	11/17/00-12/15/00
Field Investigation – Phase II	
Phase II Scoping	12/15/00-1/12/01
Project Plan Addendum for Phase II	1/12/01-2/9/01
NYSDEC Review and Approval of Phase II Addendum	2/9/01-3/9/01
Phase II Field Investigation	3/9/01-3/30/01
Phase II Sample Analysis	3/30/01-4/27/01
Phase II DUSR	4/27/01-5/11/01
Report Development	
Draft Remedial Investigation (RI) Report Development	5/11/01-6/8/01
NYSDEC Review and Comment on RI	6/8/01-7/6/01
Finalize RI and Obtain NYSDEC Approval	7/6/01-8/3/01
Feasibility Study (FS) Scoping Meeting	8/3/01-8/24/01
Draft FS Development	8/24/01-9/21/01
NYSDEC Review and Comment on FS Report	9/21/01-10/19/01
Finalize FS and Submit RI/FS to Record	10/19/01-11/16/01
Prepare Proposed Plan and Submit to Record	11/16/01-12/14/01
30-Day Public Comment Period	12/14/01-1/11/02
Prepare and approve ROD	1/11/02-2/8/02

7.0

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APPENDIX
A

Appendix A

Selected H2M Soil Investigation Report Figures and Tables

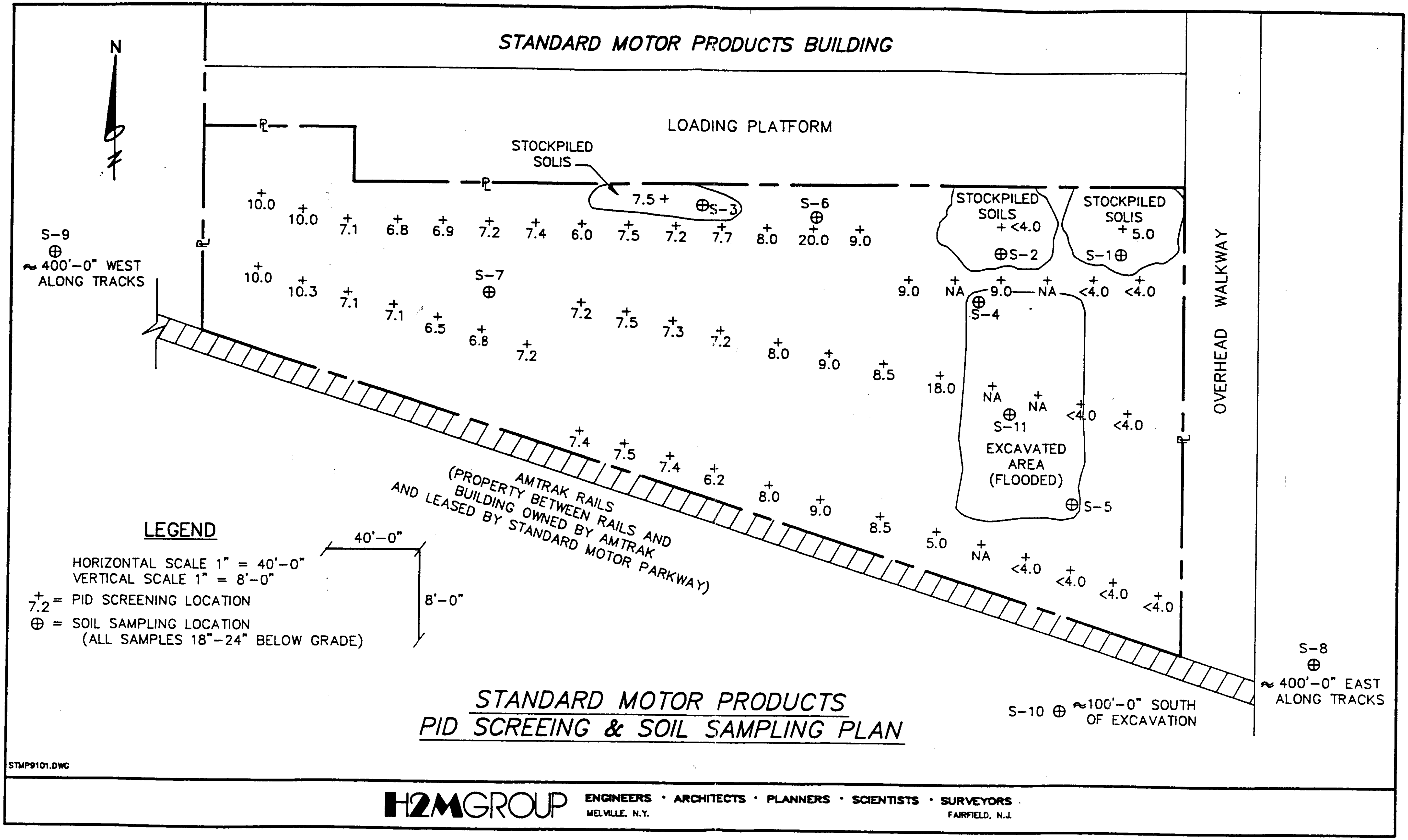

STANDARD MOTOR PRODUCTS BUILDING
LOADING PLATFORM
STOCKPILED SOLIS
STOCKPILED SOILS + <4.0
STOCKPILED SOLIS + 5.0
S-1
S-2
S-3
S-4
S-5
S-6
S-7
S-11
EXCAVATED AREA (FLOODED)
OVERHEAD WALKWAY
S-9 ≈ 400'-0" WEST ALONG TRACKS
S-8 ≈ 400'-0" EAST ALONG TRACKS
S-10 ≈100'-0" SOUTH OF EXCAVATION
AMTRAK RAILS
(PROPERTY BETWEEN RAILS AND BUILDING OWNED BY AMTRAK AND LEASED BY STANDARD MOTOR PARKWAY)
N
40'-0"
8'-0"
LEGEND
HORIZONTAL SCALE 1" = 40'-0"
VERTICAL SCALE 1" = 8'-0"
+ 7.2 = PID SCREENING LOCATION
⊕ = SOIL SAMPLING LOCATION (ALL SAMPLES 18"-24" BELOW GRADE)
STANDARD MOTOR PRODUCTS
PID SCREEING & SOIL SAMPLING PLAN
STMP9101.DWG
H2M GROUP ENGINEERS · ARCHITECTS · PLANNERS · SCIENTISTS · SURVEYORS
MELVILLE, N.Y.
FAIRFIELD, N.J.

TABLE 1

SOIL ANALYSES

SAMPLE POINT	VOC (mg/kg)	TPH (mg/kg)	Pb (mg/kg)	TCLP Pb (mg/L)
S-1 [1]	48.612	5,300	647.5	0.07
S-2 [1]	58.287	2,380	419.5	0.17
S-3 [1]	37.487	3,325	302.9	0.10
S-4	10.944	3,270	340.6	0.12
S-5	0.021	557	21.1	<0.05
S-6	894.210	68	568.5	0.27
S-7	0.374	99	582.5	0.21
S-8 [2]	0.337	48	209.5	<0.05
S-9 [2]	0.164	<5	40.3	0.08
S-10 [2]	0.015	<5	151.2	0.19
S-11	1.100	272	278.9	0.11

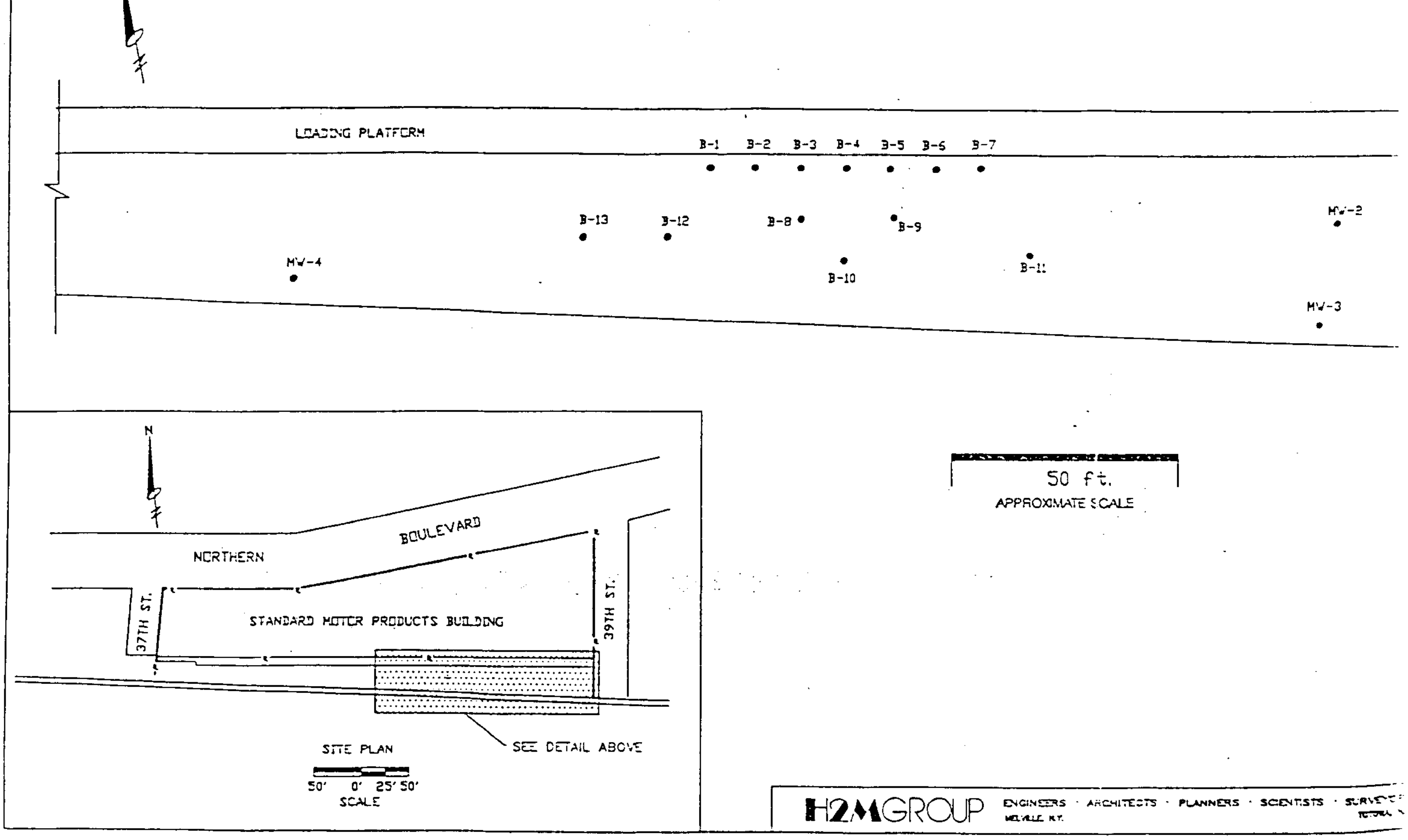
[1] Stockpiled soils
[2] Background soils

APPENDIX
B

Appendix B

Selected H2M Remedial Investigation Report Figures and Tables

FIGURE 2-2
SOIL BORING LOCATIONS



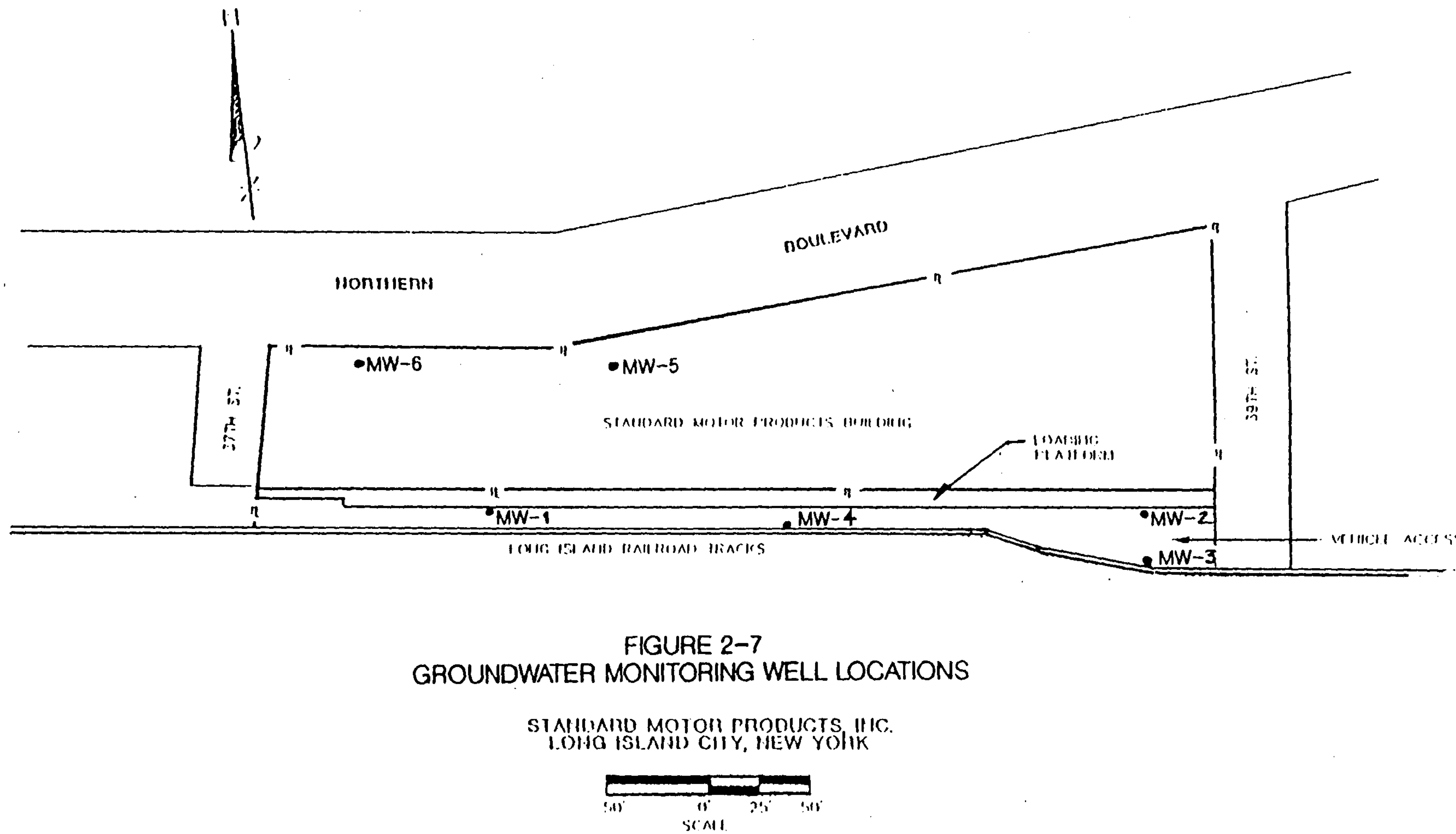


FIGURE 2-7
GROUNDWATER MONITORING WELL LOCATIONS

STANDARD MOTOR PRODUCTS, INC.
LONG ISLAND CITY, NEW YORK

H2M GROUP

TABLE 2-1
SPLIT SPOON SAMPLE SCREENING RESULTS

LOCATION	DEPTH FT.	Split Spoon FID (c.g.e.-ppm)	Soil Jar FID (c.g.e.- ppm)	BLOW COUNTS No. of Blows Per 12 inches.
B-1	5	5	25	18
	10	1	12	18
	15	1	20	16
	20	0	7	15
B-2	5	40	220	20
	10	NA	26	18
	15	1	60	20
	20	0	100	20
B-3	5	9	560	22
	10	4	90	20
	15	4	240	16
	20	2	50	19
B-4	5	3	NA	20
	10	11	840	14
	15	8	330	15
	20	0	28	17
B-5	5	30	680	NA
	10	9	NA	16
	15	10	590	16
	20	10	160	18
B-6	5	1	150	18
	10	10	700	NA
	15	1	80	16
	20	6	110	18
B-7	5	4	1000	14
	10	10	100	NA
	15	7	190	NA
	20	1	24	18
B-8	5	0	100	12
	10	0	10	18
	15	0	26	17
	20	0	28	NA
B-9	5	2	440	14
	10	0	110	15
	15	0	5	NA
	20	0	60	NA
B-10	5	9	160	21
	15	6	100	20
	20	20	100	NA
	30	35	220	20
	40	8	24	22
B-11	5	1000	310	18
	10	140	310	NA
	15	480	350	NA
	20	50	100	NA
B-12	5	83	22	14
	10	26	8	17
	15	9	10	14
	20	7	6	12
B-13	5	16	10	15
	10	15	6	30
	15	14	NA	50
	20	22	42	18

NA - Data Not Available
Soil Jar OVA Readings taken at least 1 hour after storage in jars.

TABLE 2-2
SOIL DATA SUMMARY

Boring ID, Depth	Total VOCs	Methylene Chloride	1,1-Dichloro-ethene	1,1-Dichloro-ethane	C/T-1,2-Di-chloroethene	1,1,1-Tri-chloroethane	Trichloro-ethene	Benzene	Tetrachloro-ethylene	Toluene	Ethyl-benzene	Total Xylenes	Acetone
B-1, 5'-7'	1.750	0.350	0.011	0.017	0.044	0.770	0.110	0.008	0.390	0.009	0.006	0.035	<0.012
B-1, 10'-12'	2.967	0.780	0.015	0.350	0.290	0.940	0.450	<0.006	0.064	<0.006	<0.006	0.041	0.037
B-1, 20'-22'	0.110	0.036	<0.005	<0.005	<0.005	0.057	0.017	<0.005	<0.005	<0.005	<0.05	<0.005	<0.010
B-2, 5'-7'	2.232	0.800	0.045	0.200	0.650	<0.006	0.310	<0.006	0.180	0.012	<0.006	<0.006	0.035
B-2, 10'-12'	1.309	0.380	0.013	0.081	0.240	0.280	0.290	<0.006	0.011	<0.006	<0.006	0.014	<0.011
B-2, 20'-22'	0.650	0.480	<0.005	0.012	0.065	0.035	0.024	<0.005	<0.005	<0.005	<0.005	<0.005	0.034
B-3, 5'-7'	4.125	1.000	0.460	0.500	0.620	<0.006	0.290	0.035	0.930	0.034	<0.006	0.240	0.016
B-3, 15'-17'	3.670	0.770	0.120	0.058	0.290	1.000	0.290	0.008	0.470	0.011	0.140	0.460	0.053
B-4, 5'-7'	7.604	0.580	<0.006	0.095	0.059	5.000	1.400	<0.006	0.310	<0.006	0.086	0.074	<0.011
B-4, 10'-12'	14.095	0.130	<0.007	<0.007	0.036	2.100	0.130	<0.007	0.810	0.350	2.400	8.100	0.039
B-4, 20'-22'	2.570	0.100	<0.005	<0.005	<0.005	0.480	0.050	<0.005	0.140	<0.005	0.300	1.500	<0.010
B-5, 5'-7'	5.118	0.260	<0.006	0.059	0.061	2.200	0.260	<0.006	0.690	0.038	0.250	1.300	<0.011
B-5, 15'-17'	26.980	0.590	<0.021	<0.021	<0.021	7.600	<0.021	<0.021	0.390	<0.021	3.400	15.000	<0.042
B-6, 10'-12'	2.158	0.300	<0.011	<0.011	<0.011	0.890	0.400	<0.011	0.048	<0.011	<0.011	0.520	<0.022
B-6, 20'-22'	0.315	0.075	<0.006	<0.006	<0.006	0.240	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.012
B-7, 5'-7'	35.309	0.330	0.050	1.100	0.480	26.000	3.900	<0.026	1.500	0.079	0.270	1.600	<0.053
B-7, 10'-12'	1.260	0.580	<0.007	<0.007	<0.007	0.680	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.015
B-7, 15'-17'	0.808	0.220	<0.009	<0.009	<0.009	0.120	<0.009	<0.009	<0.009	<0.009	0.068	0.400	<0.019
B-7, 20'-22'	0.130	0.130	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.014
B-8, 5'-7'	2.861	2.100	<0.008	0.022	0.040	0.160	0.490	<0.008	<0.008	<0.008	<0.008	<0.008	0.049
B-8, 15'-17'	0.320	0.130	0.011	<0.008	<0.008	0.029	0.150	<0.008	<0.008	<0.008	<0.008	<0.008	<0.016
B-8, 20'-22'	0.076	0.024	<0.005	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	0.044
B-9, 5'-7'	0.518	0.500	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.018
B-9, 10'-12'	0.244	0.230	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	<0.007	0.014
B-9, 20'-22'	0.770	0.770	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.018
B-10, 5'-7'	1.273	0.910	<0.009	<0.009	0.023	0.150	0.190	<0.009	<0.009	<0.009	<0.009	<0.009	<0.017
B-10, 15'-17'	1.335	1.200	<0.007	<0.007	0.013	0.029	0.075	<0.007	<0.007	<0.007	<0.007	<0.007	0.018
B-10, 20'-22'	0.269	0.230	<0.006	<0.006	<0.006	0.024	0.015	<0.006	<0.006	<0.006	<0.006	<0.006	<0.013
B-10, 30'-32'	0.190	0.170	<0.007	<0.007	<0.007	<0.007	0.020	<0.007	<0.007	<0.007	<0.007	<0.007	<0.014
B-10, 40'-42'	0.016	0.016	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.012
B-11, 5'-7'	0.077	0.028	<0.007	<0.007	<0.007	<0.007	0.010	<0.007	<0.007	<0.007	<0.007	<0.007	0.039
B-11, 15'-17'	0.059	0.052	<0.005	<0.005	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.011
B-11, 20'-22'	0.191	0.100	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	<0.005	0.080
B-12, 5'-7'	0.000	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.012
B-12, 10'-12'	0.000	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010
B-12, 15'-17'	0.000	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.012
B-13, 5'-7'	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010
B-13, 10'-12'	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.011
B-13, 15'-17'	ND	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.011
B-13, 20'-22'	0.009	0.009	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.011

* All results in mg/kg except as noted. ND = Non Detectable

** Depths refer to depth below grade., Boring locations are indicated in Figure

TABLE 2-3
STANDARD MOTOR PRODUCTS, INC.
GROUNDWATER INORGANICS SAMPLE RESULTS SUMMARY

PARAMETER	ROUND ONE- 10/31/91				ROUND TWO - 2/18/92						NYSDEC CLASS GA WATER STANDARDS PART 700-705 (9/91)
	MW-1	MW-2	MW-3	MW-4	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	
Aluminum	165.0	9.2	21.6	103.0	39.3	5.1	18.4	37.0	10.2	6.7	NA
Antimony	0.073	<0.028	<0.028	<0.028	<0.0246	<0.0246	<0.0246	<0.0246	<0.0246	<0.0246	NA
Arsenic	0.032	<0.0023	<0.0023	<0.0023	<0.0023	0.003	<0.0023	0.007	<0.0023	<0.0023	0.025
Barium	1.320	0.310	0.435	1.170	0.275	0.329	0.267	0.369	0.111	0.105	1.000
Beryllium	0.013	0.001	0.002	0.008	0.003	0.002	0.002	0.004	0.002	<0.0009	NA
Cadmium	0.0660	0.0071	0.0119	0.0578	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0100
Calcium	122.0	125.0	93.5	150.0	48.6	105.0	55.3	118.0	105.0	47.0	NA
Chromium	0.740	0.040	0.080	0.140	0.113	0.018	0.053	0.117	0.028	0.016	0.050
Cobalt	0.165	0.016	0.024	0.165	0.037	0.007	0.017	0.053	0.012	0.008	NA
Copper	1.870	0.174	0.203	0.651	0.376	0.089	0.085	0.204	0.038	0.042	0.200
Iron	330.0	33.7	67.0	305.0	64.9	53.9	48.3	90.8	20.0	12.8	0.3
Lead	0.848	0.097	0.132	0.808	0.097	0.034	0.030	0.111	0.018	0.011	0.025
Magnesium	99.8	39.3	29.6	89.6	26.2	24.5	15.3	55.1	30.6	13.8	NA
Manganese	5.370	4.530	8.900	9.260	2.230	5.530	5.470	2.820	6.330	0.607	0.300
Mercury	0.0011	0.0002	0.0002	0.0016	<0.0002	0.0003	0.0003	0.0003	<0.0002	<0.0002	0.0020
Nickel	0.332	0.052	0.097	0.362	0.067	0.045	0.047	0.103	0.068	0.024	NA
Potassium	38.1	8.5	11.7	25.4	9.0	5.5	7.3	12.0	4.3	0.0	NA
Selenium	<0.018	<0.0018	<0.0018	<0.0018	0.002	<0.0023	<0.0023	<0.0023	<0.0023	0.006	0.010
Silver	<0.0022	0.005	<0.0022	<0.0022	0.002	<0.0012	<0.0012	<0.0012	<0.0012	45.700	0.050
Sodium	49.5	91.4	50.3	102.0	22.2	60.9	16.9	98.9	79.1	45.7	20.0
Thallium	<0.0007	<0.0007	<0.0007	<0.0007	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	<0.0022	NA
Vanadium	0.638	0.109	0.094	0.426	0.125	0.070	0.059	0.139	0.036	0.022	NA
Zinc	2.080	0.210	0.219	0.993	0.427	0.140	0.133	0.294	5.420	0.102	0.300
Cyanide	<0.010	<0.010	<0.010	<0.010	NA	NA	NA	NA	NA	NA	0.100

NOTES:
All results in ug/l except as noted.
B - Entered if the reported value is less than the Contract Required Detection Limit, but greater than the Instrument Detection Limit.
NR - Data not analyzed for or reported.
NA- Data not available.

TABLE 2-4
STANDARD MOTOR PRODUCTS, INC.
GROUNDWATER VOC SAMPLE RESULTS SUMMARY

Well ID	Methylene Chloride	1,1-Dichloro-ethene	1,1-Dichloro-ethane	C/T-1,2-Di-chloroethene	1,1,1-Tri-chloroethane	Carbon Tetrachloride	Trichloro-ethene	Benzene	Tetrachloro-ethylene	Toluene	Ethyl-benzene	Total Xylenes	Acetone
ROUND 1 - October 31, 1991													
MW-1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	0.014	<0.010	<0.010	<0.010	<0.010
MW-2	<0.010	0.011	0.013	0.011	0.120	<0.010	0.012	0.044	<0.010	0.100	0.050	0.740	<0.010
MW-3	<0.010	0.007	0.083	<0.010	0.130	<0.010	<0.010	0.100	<0.010	0.120	0.610	2.600	<0.010
MW-4	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Field Blank	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Trip Blank	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
ROUND 2 - February 18, 1992													
MW-1	0.002	<0.005	<0.005	<0.005	0.030	<0.005	0.003	<0.005	<0.005	0.004	<0.005	<0.005	<0.010
MW-2	<0.005	0.009	0.018	<0.005	0.210	<0.005	<0.005	0.086	0.014	0.190	0.570	1.800	<0.010
MW-3	<0.005	0.014	0.041	<0.005	0.240	<0.005	0.003	0.120	0.035	0.330	0.290	1.700	<0.010
MW-4	0.002	0.004	0.006	0.030	<0.005	<0.005	0.002	<0.005	0.003	<0.005	0.002	<0.005	0.005
MW-5	0.002	<0.005	<0.005	0.003	<0.005	<0.005	0.023	<0.005	0.069	<0.005	<0.005	<0.005	<0.010
MW-6	0.002	<0.005	<0.005	0.002	0.007	<0.005	0.010	<0.005	0.017	<0.005	<0.005	<0.005	0.003
Field Blank	0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010
Trip Blank	0.003	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.010

NOTES:

All results in mg/l except as noted.

Where necessary, samples were analyzed at a secondary dilution factor.

APPENDIX
C

Appendix C

Selected EnviroAudit Report Figures and Tables

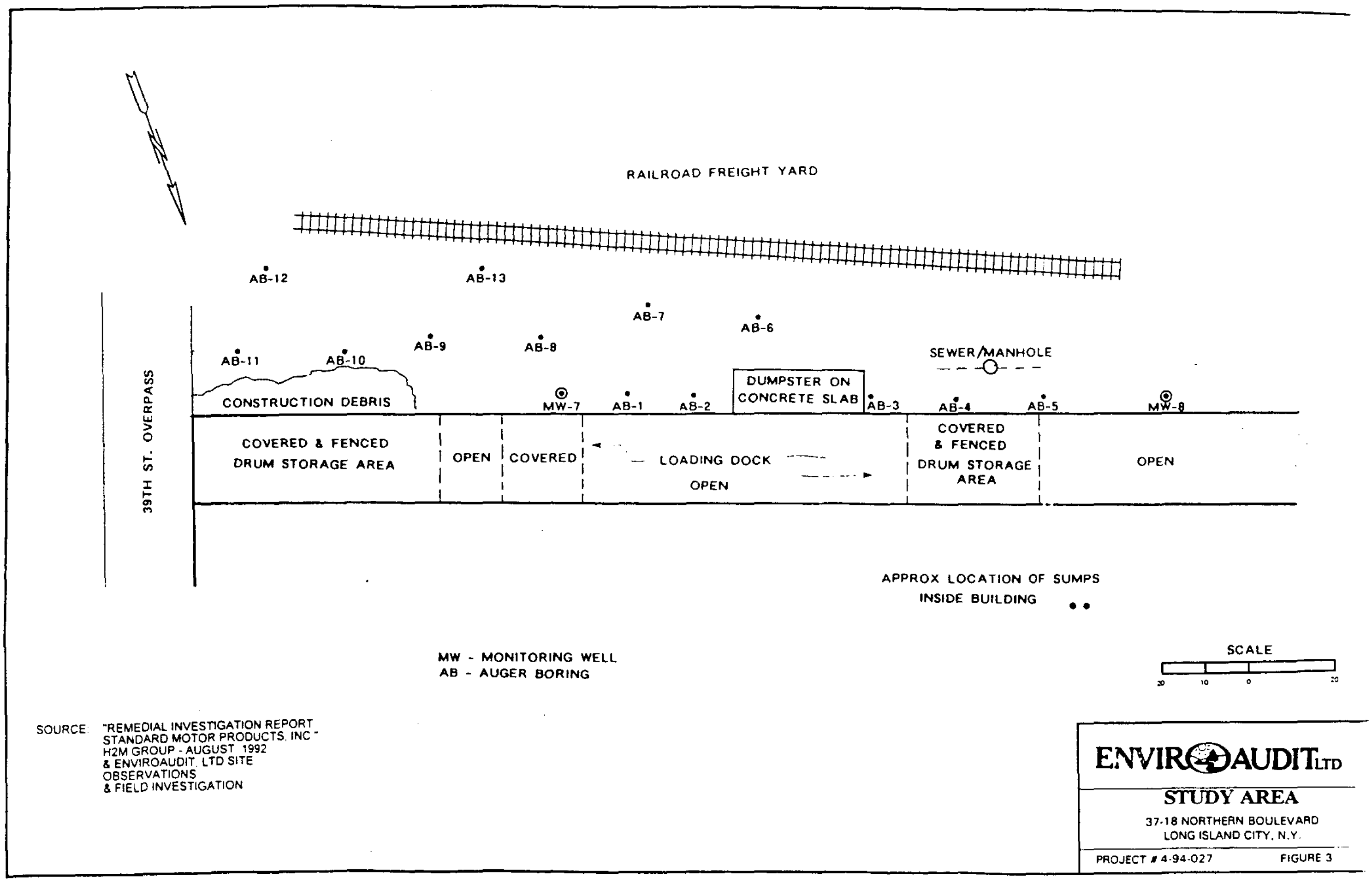

RAILROAD FREIGHT YARD
39TH ST. OVERPASS
AB-12
AB-13
AB-7
AB-6
AB-11
AB-10
AB-9
AB-8
SEWER/MANHOLE
CONSTRUCTION DEBRIS
DUMPSTER ON CONCRETE SLAB
MW-7
AB-1
AB-2
AB-3
AB-4
AB-5
MW-8
COVERED & FENCED DRUM STORAGE AREA
OPEN
COVERED
LOADING DOCK
OPEN
COVERED & FENCED DRUM STORAGE AREA
OPEN
APPROX LOCATION OF SUMPS INSIDE BUILDING
MW - MONITORING WELL
AB - AUGER BORING
SCALE
10
0
SOURCE: "REMEDIAL INVESTIGATION REPORT STANDARD MOTOR PRODUCTS, INC." H2M GROUP - AUGUST 1992 & ENVIROAUDIT, LTD SITE OBSERVATIONS & FIELD INVESTIGATION
ENVIROAUDIT LTD
STUDY AREA
37-18 NORTHERN BOULEVARD
LONG ISLAND CITY, N.Y.
PROJECT # 4-94-027
FIGURE 3

Table 1
Summary of Soil Analytical Results

Sample ID:	95-341	95-342	95-343	95-344	95-345	95-346	95-347	95-348	NYSDEC Standards
Sample Location / Depth (feet):	MW-7 / 0-2	MW-7 / 5-7	MW-7 / 10-12	Field Blank	AB-1 / 0-2	AB-1 / 5-7	AB-1 / 10-12	AB-2 / 0-2	
Sample Date	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	
PID Readings (ppm)	NA	39.1	824	NA	835	203	1,370	466	
Lead TCLP (mg/l)	0.062	ND	0.022	NA	0.222	ND	0.028	0.586	
TPH (ppm)	8,800	1,400	490	NA	66,000	5,700	6,700	94,000	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	320	ND	ND	7900
1,1-Dichloroethane	360*	1,800*	ND	ND	41,000*	ND	580*	640,000*	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	400
cis-1,2-Dichloroethene	ND	1,100*	ND	ND	34,000*	ND	ND	ND	300
Ethylbenzene	ND	ND	4,500	ND	1,900	ND	ND	ND	5500
Methylene Chloride	770*^	ND	3,500*^	ND	4,900*^	750*^	660*^	ND	100
MTBE	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethene	ND	220*	ND	ND	34,000*	860	ND	ND	1400
1,1,1-Trichloroethane	2,400*	14,000*	1,500*	ND	1,600,000*	4,600*	ND	7,000,000*	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	500*	6,400*	ND	ND	820,000*	3,600*	ND	510,000*	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	ND	ND	26,000*	ND	4,300*	ND	ND	ND	120
Total VOCs (ppb)	4,030	23,520*	35,500*	ND	2,540,100*	10,130*	1,240	8,150,000*	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	7100	7600	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	7100	7600	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 1
Summary of Soil Analytical Results

Sample ID:	95-349	95-350	95-351	95-352	95-353	95-354	95-355	95-356	NYSDEC Standards
Sample Location / Depth (feet):	AB-2 / 10-12	AB-3 / 0-2	AB-3 / 5-7	AB-3 / 10-12	MW-8 / 0-2	MW-8 / 5-7	MW-8 / 10-12	AB-5 / 0-2	
Sample Date	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	
PID Readings (ppm)	978	18.2	14.6	18.6	102	15.3	7.6	15.3.	
Lead TCLP (mg/l)	ND	0.624	ND	0.158	0.218	0.117	0.053	0.158	
TPH (ppm)	6,800	2,300	72	93	1,500	17	25	1,800	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	7900
1,1-Dichloroethane	910*	250*	ND	ND	ND	ND	ND	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	300
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5500
Methylene Chloride	720*^	ND	ND	ND	120*^	ND	7^	ND	100
MTBE	ND	ND	ND	ND	ND	ND	ND	ND	
Tetrachloroethene	ND	96	ND	ND	ND	ND	ND	320	1400
1,1,1-Trichloroethane	7,000*	3,500*	ND	ND	300	ND	ND	930*	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	ND	1,100*	ND	ND	68	ND	ND	990*	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	810*	66	ND	ND	ND	ND	ND	ND	120
Total VOCs (ppb)	9,440	5,012	ND	ND	488	ND	7	2,240	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 1
Summary of Soil Analytical Results

Sample ID:	95-357	95-358	95-359	95-360	95-361	95-362	95-363	95-364	NYSDEC Standards
Sample Location / Depth (feet):	AB-5 / 5-7	AB-5 / 10-12	AB-4 / 0-2	AB-4 / 5-7	AB-4 / 10-12	Trip Blank	AB-6 / 0-2	AB-6 / 5-7	
Sample Date	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/26/1995	09/27/1995	09/27/1995	
PID Readings	ND	12.2	15	24.5	17.8	NA	22	15.7	
Lead TCLP (mg/l)	ND	ND	0.115	ND	ND	NA	0.012	ND	
TPH (ppm)	31	13	3,500	13	78	NA	57	10	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	7900
1,1-Dichloroethane	ND	8	170	44	18	ND	ND	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	400
cis-1,2-Dichloroethene	ND	ND	ND	16	18	ND	ND	ND	300
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5500
Methylene Chloride	ND	10^	140*^	8	10	ND	ND	ND	100
MTBE	ND	ND	ND	ND	ND	ND	ND	13	
Tetrachloroethene	ND	ND	100	ND	ND	ND	ND	ND	1400
1,1,1-Trichloroethane	ND	19	1,200*	92	180	ND	6,300*	ND	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	ND	10	470	13	82	ND	23,000*	ND	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	120
Total VOCs (ppb)	ND	47	2,080	173	308	ND	29,300*	13	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - decied in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 1
Summary of Soil Analytical Results

Sample ID:	95-365	95-366	95-367	95-368	95-369	95-370	95-371	95-372	NYSDEC Standards
Sample Location / Depth (feet):	AB-6 / 10-12	AB-7 / 0-2	AB-7 / 5-7	AB-7 / 10-12	AB-8 / 0-2	AB-8 / 5-7	AB-8 / 10-12	AB-9 / 0-2	
Sample Date	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	
PID Readings (ppm)	9.2	90.4	23.3	16.8	300	60.1	20.7	26.8	
Lead TCLP (mg/l)	0.013	0.145	ND	ND	0.021	ND	ND	0.043	
TPH (ppm)	15	3,500	24	9	15,000	29	200	2,600	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	7900
1,1-Dichloroethane	ND	1,100*	ND	ND	2,500*	ND	ND	1,600*	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	1,100*	ND	ND	350	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	1,700*	ND	ND	ND	300
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5500
Methylene Chloride	ND	1,100*^	ND	ND	650*^	ND	ND	510*^	100
MTBE	ND	ND	18	ND	ND	6	ND	ND	
Tetrachloroethene	ND	1,400*	ND	ND	ND	ND	ND	ND	1400
1,1,1-Trichloroethane	ND	9,500*	ND	ND	140,000*	ND	86	20,000*	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	ND	38,000*	ND	ND	120,000*	ND	95	2,500*	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	120
Total VOCs (ppb)	ND	51,000*	18	ND	265,950*	6	181	24,960*	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 1
Summary of Soil Analytical Results

Sample ID:	95-373	95-374	95-375	95-376	95-377	95-378	95-379	95-380	NYSDEC Standards
Sample Location / Depth (feet):	AB-9 / 5-7	AB-9 / 10-12	Field Blank	AB-10 / 0-2	AB-10 / 5-7	AB-10 / 10-12	AB-11 / 0-2	AB-11 / 5-7	
Sample Date	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	
PID Readings	26.8	25.5	19.4	9.7	24.5	65	21.4	27.7	
Lead TCLP (mg/l)	ND	0.014	NA	0.127	ND	ND	0.015	ND	
TPH (ppm)	13	30	NA	2,800	99	21	7,500	43	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	280	ND	7900
1,1-Dichloroethane	ND	ND	ND	1,600*	ND	ND	6,200*	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	310	ND	100
1,1-Dichloroethene	ND	ND	ND	240	ND	ND	930*	ND	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	290	ND	300
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	5500
Methylene Chloride	7	ND	7^	620*	ND	ND	3,200*	ND	100
MTBE	8	7	ND	ND	160	30	ND	78	
Tetrachloroethene	ND	ND	ND	760	ND	ND	2,300*	ND	1400
1,1,1-Trichloroethane	ND	ND	ND	13,000*	ND	ND	39,000*	ND	760
1,1,2-Trichloroethane	ND	ND	ND	190	ND	ND	840	ND	
Trichloroethene	ND	ND	ND	5,300*	ND	ND	10,000*	ND	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	890	ND	
Xylenes	ND	ND	ND	ND	ND	ND	790*	ND	120
Total VOCs (ppb)	15	7	7	21,710*	160	30	65,030*	78	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	25	NA	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	25	NA	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 1
Summary of Soil Analytical Results

Sample ID:	95-381	95-382	95-383	95-384	95-385	95-386	95-387	95-388	NYSDEC Standards
Sample Location / Depth (feet):	AB-11 / 10-12	AB-12 / 0-2	AB-12 / 5-7	AB-12 / 10-12	AB-13 / 0-2	AB-13 / 5-7	AB-13 / 10-12	Trip Blank	
Sample Date	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	09/27/1995	
PID Readings (ppm)	24.7	35.1	33.1	43.7	31.1	30.6	25.1	NA	
Lead TCLP (mg/l)	ND	0.105	ND	ND	0.09	ND	ND	NA	
TPH (ppm)	7	5,900	15	68	420	120	15	NA	
VOCs - EPA 8240 (ppb)									
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	7900
1,1-Dichloroethane	ND	2,200*	ND	ND	1,300*	ND	ND	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	300	ND	ND	ND	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	300
Ethylbenzene	ND	ND	12	ND	ND	ND	ND	ND	5500
Methylene Chloride	37^	870*	ND	58^	930*	10^	8^	7^	100
MTBE	ND	ND	ND	94	ND	ND	ND	ND	
Tetrachloroethene	ND	ND	ND	ND	1,000	ND	ND	ND	1400
1,1,1-Trichloroethane	ND	3,700*	ND	ND	14,000j*	ND	ND	ND	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	
Trichloroethene	ND	1,300*	ND	ND	4,700*	ND	ND	ND	700
Trichloroflouromethane	ND	ND	ND	ND	ND	ND	ND	ND	
Xylenes	ND	ND	38	53	ND	ND	ND	ND	120
Total VOCs (ppb)	37	8,070	50	205	22,230*	10	8	7	10,000
EPA METHOD 8015 (modified)									
TPH - GC (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	
#4/#6 Fuel Oil (ppm)	NA	NA	NA	NA	NA	NA	NA	NA	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volitale Organic Compounds
5. ppb - parts per billion
6. ppm - parts per million
7. ND - not detected above the method dection limit
8. NA - Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
13. * - over NYSDEC Standards
12. J - estimated value

Table 2
Summary of Groundwater Analytical Results

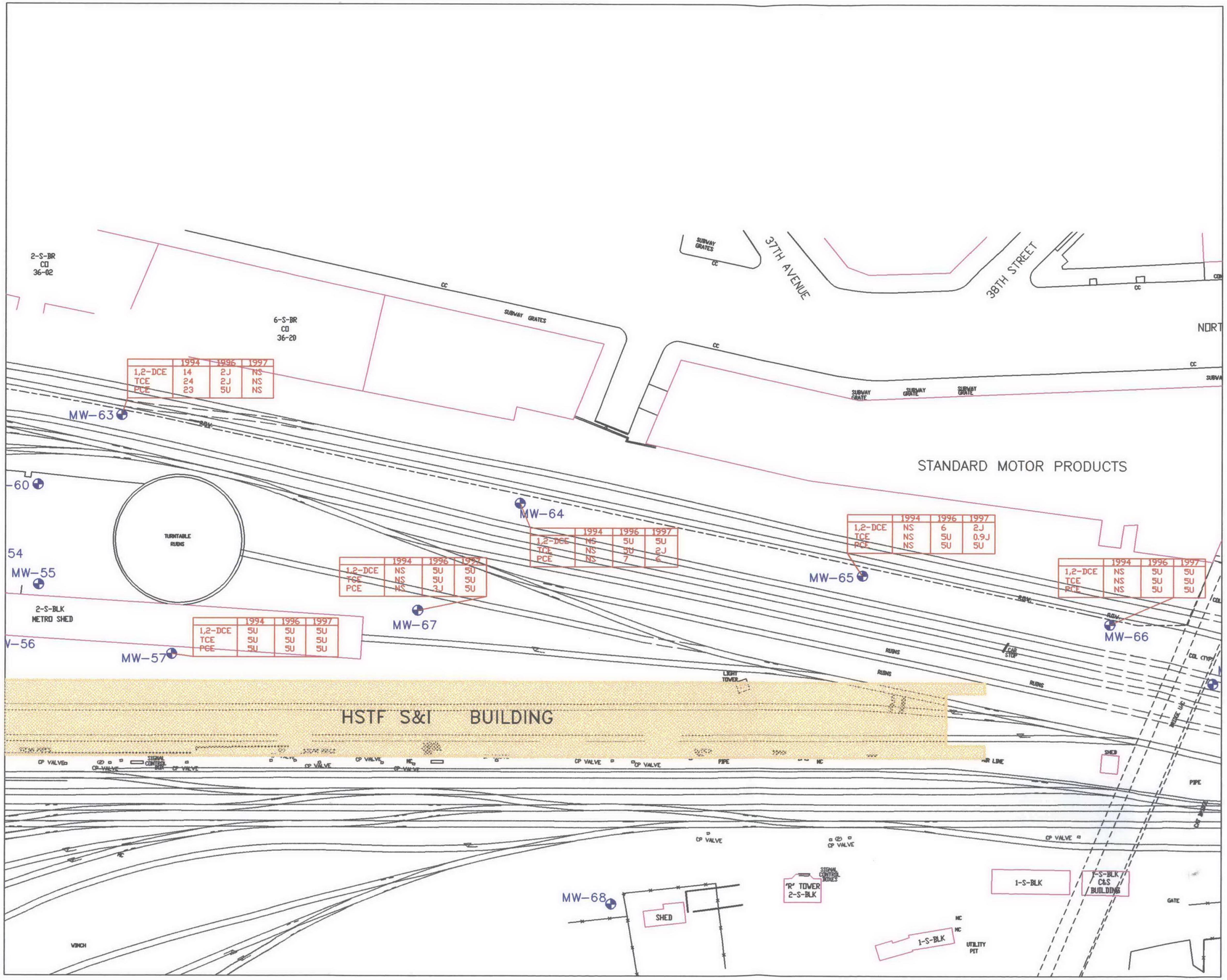
Sample ID.	95-389	95-390	95-392	95-393	95-394	95-395	95-396	NYSDEC Standards
Sample Location	Trip Blank	Field Blank	MW-6	MW-7	MW-8	Shallow Sump	Deep Sump	
Sample Date	10/11/95	10/11/95	10/11/95	10/11/95	10/11/95	10/11/95	10/11/95	
TPH (ppm)	NA	NA	ND	4.2	ND	ND	ND	
Inorganic Analysis (ppm)								
Iron	NA	NA	0.16	18	0.12	0.56	ND	300
Lead	NA	NA	ND	ND	ND	ND	ND	25
Magnesium	NA	NA	16.2	13.2	11.2	33.4	31.6	35,000
Calcium	NA	NA	79.3	80.9	69.0	97.0	88.3	Not listed
Hardness as CaCO3	NA	NA	215	256	218	379	350	Not listed
VOCs - EPA 8240 (ppb)								
Benzene	ND	ND	ND	ND	ND	7*	ND	0.7
Chloroethane	ND	ND	ND	ND	ND	17*	ND	5
1,1-Dichloroethane	ND	ND	ND	6,800*	ND	26*	ND	5
cis-1,2-Dichloroethene	ND	ND	ND	1,200*	ND	14*	ND	5
MTBE	ND	ND	9	380*	53*	37*	ND	50
Tetrachloroethene	ND	ND	65*	ND	ND	ND	ND	5
1,1,1-Trichloroethane	ND	ND	ND	4,700*	ND	24*	ND	5
Trichloroethene	ND	ND	11*	810*	ND	8*	ND	5
Vinyl Chloride	ND	ND	ND	ND	ND	3*	ND	2
Xylenes	ND	ND	ND	350*	ND	7*	ND	5
Total VOCs (ppb)	ND	ND	85	14,240	53	143	ND	

1. Only those compounds detected are listed in the above table
2. PID - Photo Ionization Detector
3. TPH - Total Petroleum Hydrocarbons
4. VOCs - Volatile Organic Compounds
5. ppm - parts per million
6. ppb - parts per billion
7. ND - not detected above the method dection limit
8. Not analyzed
9. MTBE - Methyl tert Butyl Ether
10. TCLP - Toxicity Characteristic Leaching Procedure
11. ^ - dected in laboratory method blank
12. J - estimated value
13. * - over NYSDEC Standards

APPENDIX
D

Appendix D

Selected Amtrak Sunnyside Yard Groundwater Analytical Results



⊕	MONITORING WELL
NS	NOT SAMPLED
U	UNDETECTED
J	DETECTED BELLOW DETECTION LIMIT
1,2-DCE	1,2 -DICHLOROETHENE
TCE	TRICHLOROETHENE
PCE	TETRACHLOROETHENE

NOTE: ALL CONCENTRATIONS IN UG/L

40 0 40 80
SCALE OF FEET

PROJECT MANAGER: M. WATT — DRAWN BY: J.R.D. — DATE: 5/21/00

INTERNATIONAL TECHNOLOGY CORPORATION

FIGURE D-1
OFF-SITE GROUNDWATER SAMPLING RESULTS
AMTRAK SUNNYSIDE YARD

REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORKPLAN

Prepared For:
STANDARD MOTOR PRODUCTS
JUNE 1998

PROJECT NO.	FILE NO.	CHK'D: ENG. APPVD.	DRAWING NUMBER	REV. NO.
SMP-2	B1		SMP-2	

775699-B2.dwg 05/22/00 11:36am J.R.D.

APPENDIX
E

Appendix E

Selected Merit "Northern" Station Site Investigation Report Figures and Tables

GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

SOURCE: USGS 7.5 MINUTE SERIES
TOPOGRAPHIC QUADRANGLE 1979
CENTRAL PARK, N.Y. – N.J.
CONTOUR INTERVAL = 10 feet

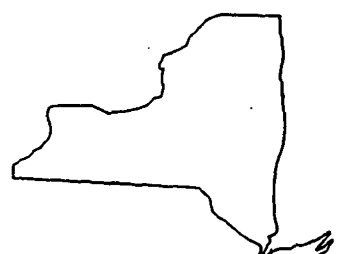
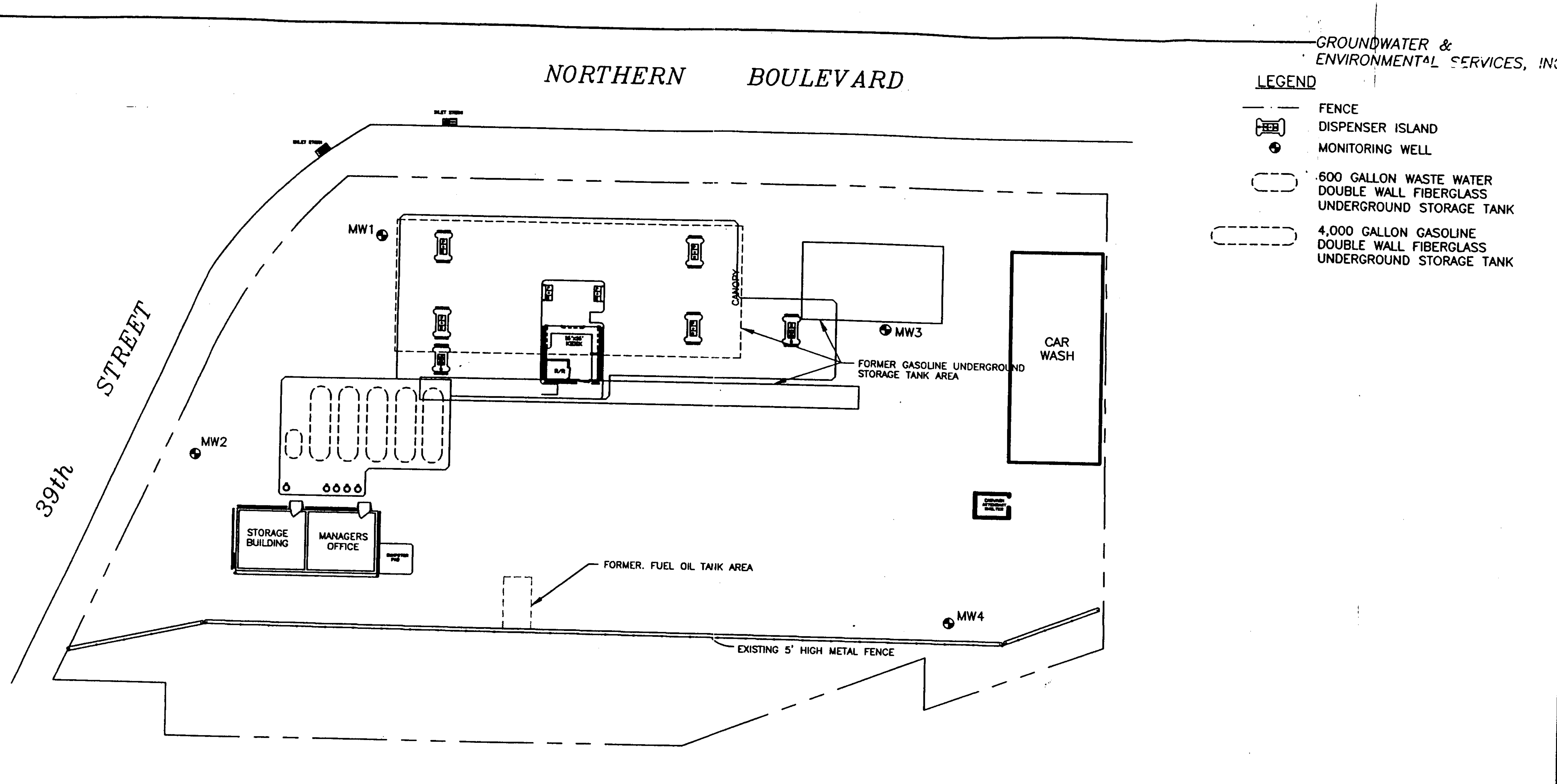

QUADRANGLE LOCATION

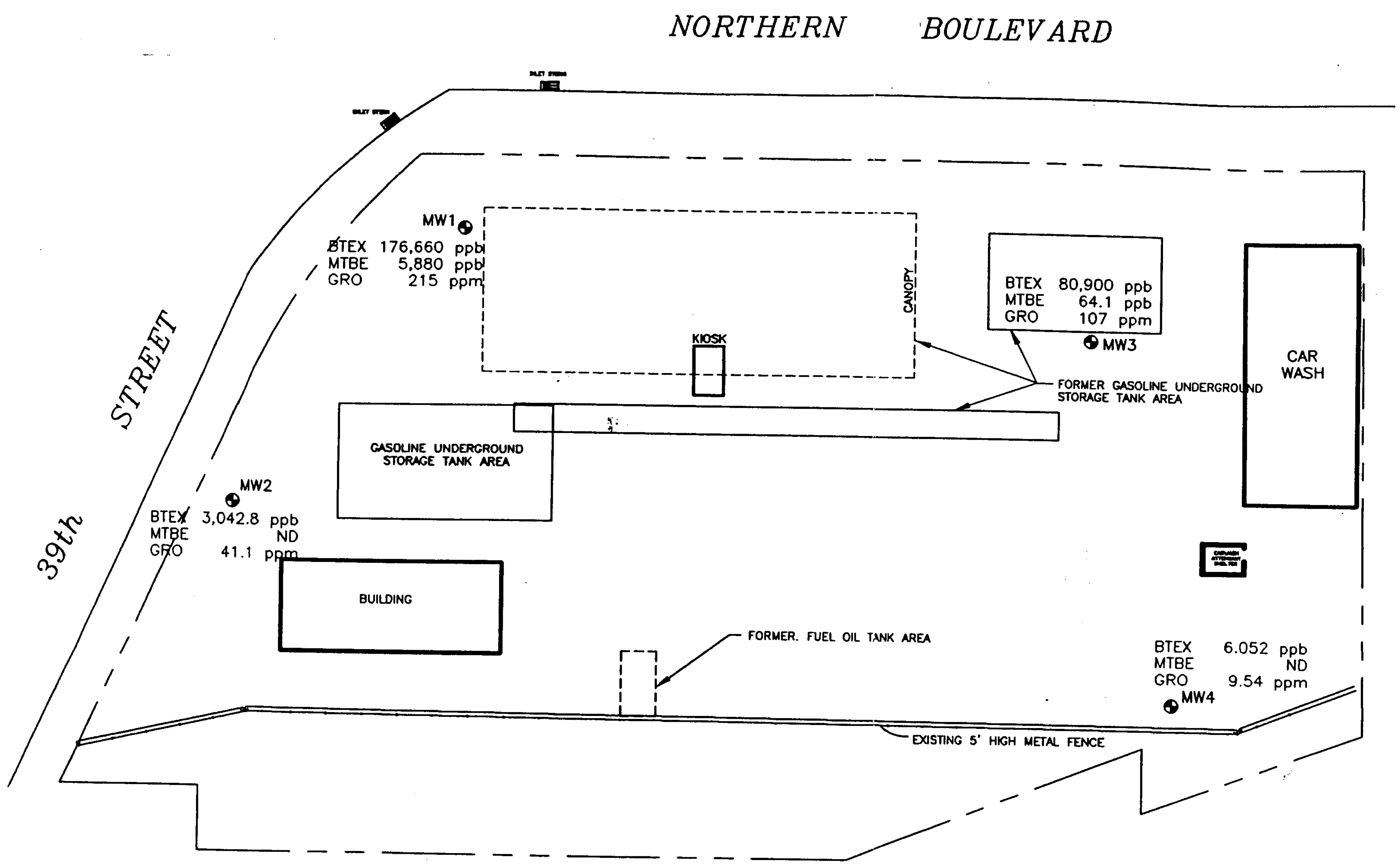
FIGURE 1
SITE LOCATION MAP
MERIT GASOLINE STATION
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, NEW YORK



SITE PLAN

MERIT OIL OF NEW YORK, INC.
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, QUEENS, NEW YORK

NORTH	SCALE IN FEET 0 15 30	DATE 5-1-98	SOURCE B
		DWG # RS0024	FIGURE 2



GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

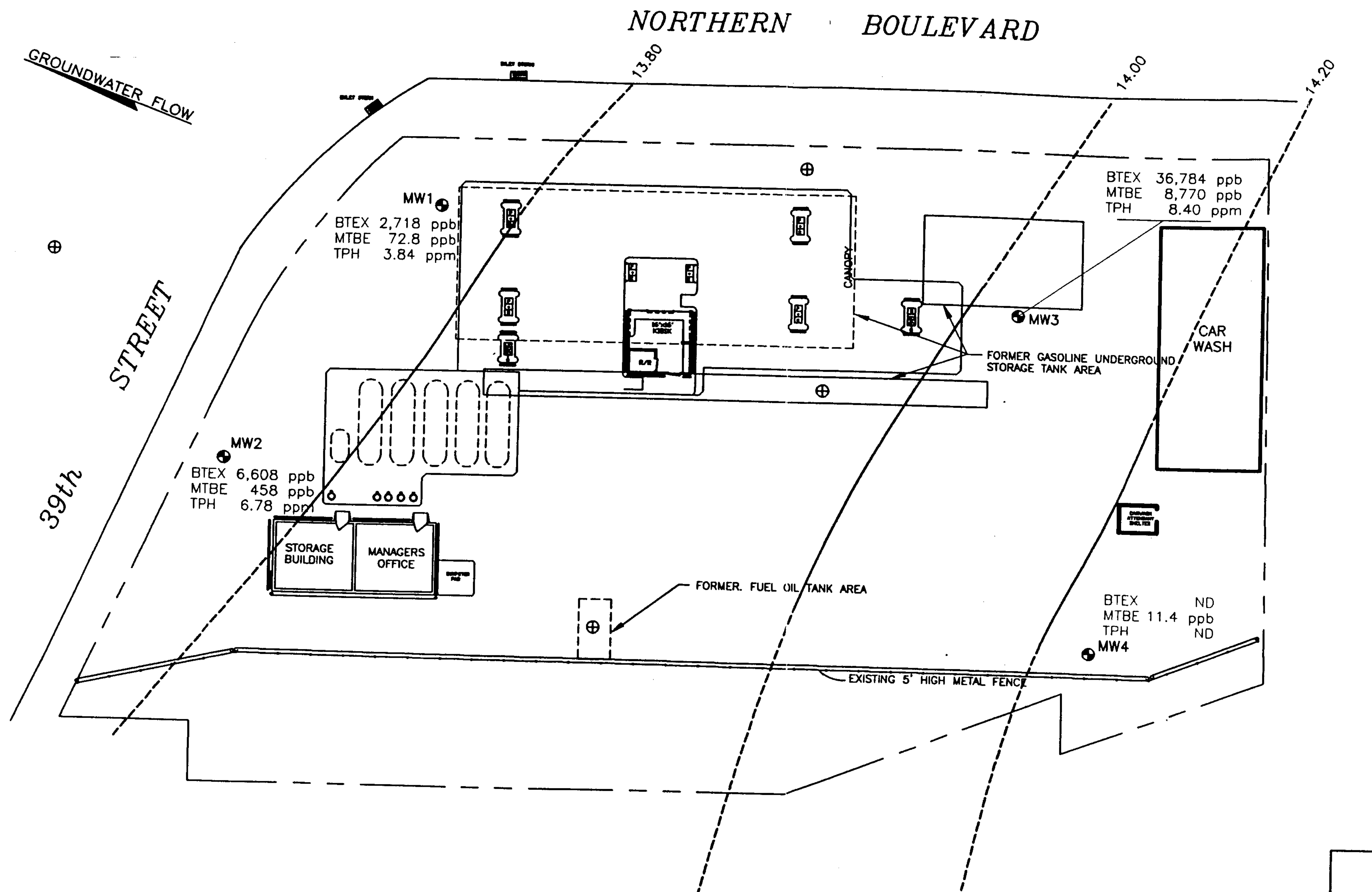
LEGEND

— · —	FENCE
⊕	MONITORING WELL
BTEX	BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
MTBE	METHYL *tert*-BUTYL ETHER
ppb	PARTS PER BILLION
ND	NOT DETECTED
GRO	GASOLINE RANGE ORGANICS
ppm	PARTS PER MILLION

SOIL SAMPLING PLAN
JANUARY – FEBRUARY 1996

MERIT OIL OF NEW YORK, INC.
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, QUEENS, NEW YORK

NORTH	SCALE IN FEET 0 15 30	DATE 2-19-98	SOURCE B
		DWG # RS0024	FIGURE 4



GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

LEGEND

- FENCE
- DISPENSER ISLAND
- MONITORING WELL
- 600 GALLON WASTE WATER DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- 4,000 GALLON GASOLINE DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- ⊕ PROPOSED MONITORING WELL
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
- MTBE METHYL tert-BUTYL ETHER
- ppb PARTS PER BILLION
- ND NOT DETECTED
- GW EL GROUNDWATER ELEVATION (feet)
- TPH TOTAL PETROLEUM HYDROCARBONS
- ppm PARTS PER MILLION

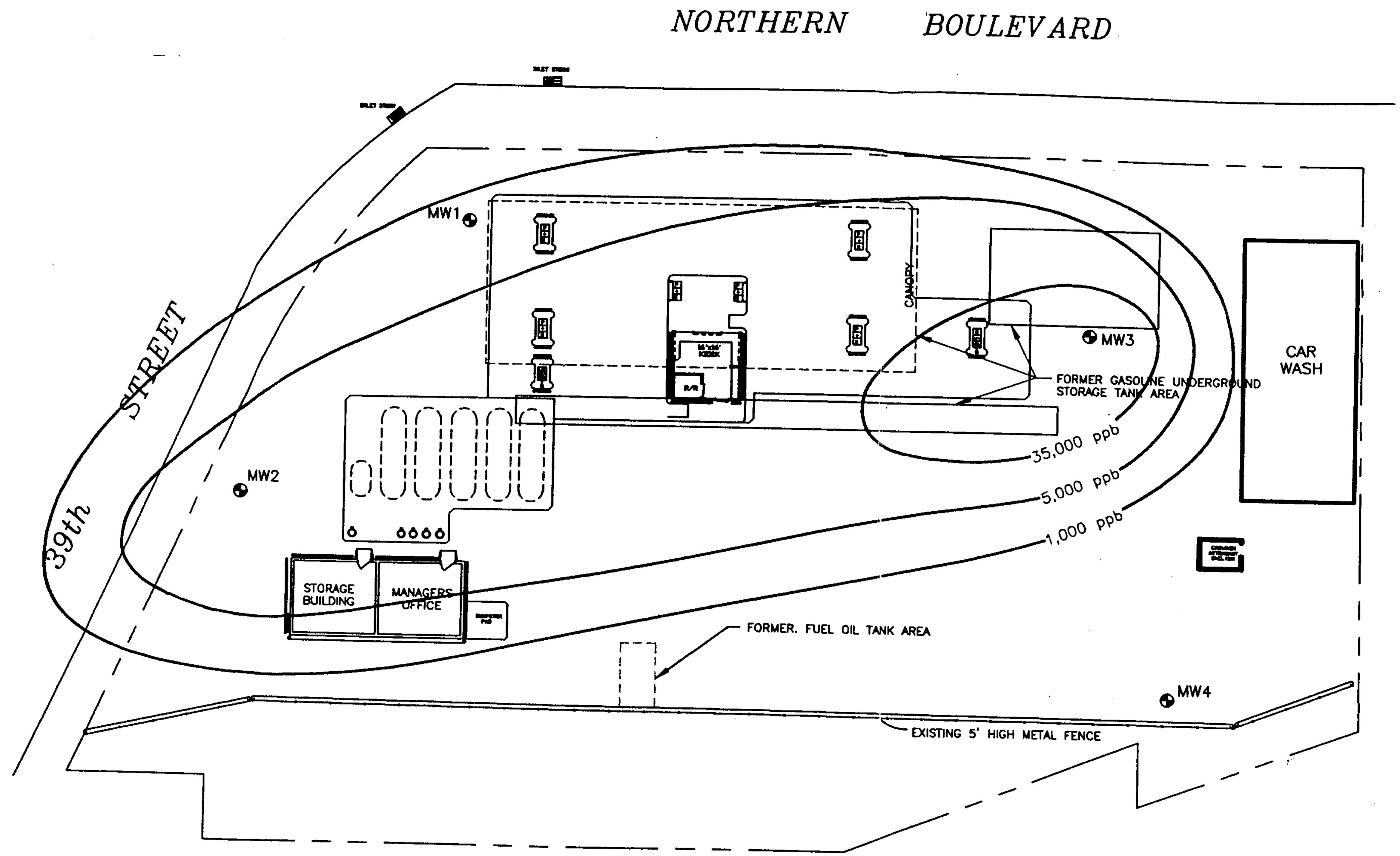
MW	GW EL
1	13.78
2	13.78
3	14.01
4	14.21

NOTE:
GROUNDWATER ELEVATION CONTOURS IN FEET

SITE INFORMATION PLAN
13 MARCH 1996

MERIT GASOLINE STATION
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, QUEENS, NEW YORK

NORTH	SCALE IN FEET 0 15 30	DATE 2-19-98	SOURCE B
		DWG # RS0024	FIGURE 5



GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

LEGEND

- FENCE
- DISPENSER ISLAND
- MONITORING WELL
- 600 GALLON WASTE WATER DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- 4,000 GALLON GASOLINE DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- BTEX — BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
- ppb — PARTS PER BILLION
- ND — NOT DETECTED

MW	BTEX (ppb)
1	2,718
2	6,608
3	36,784
4	ND

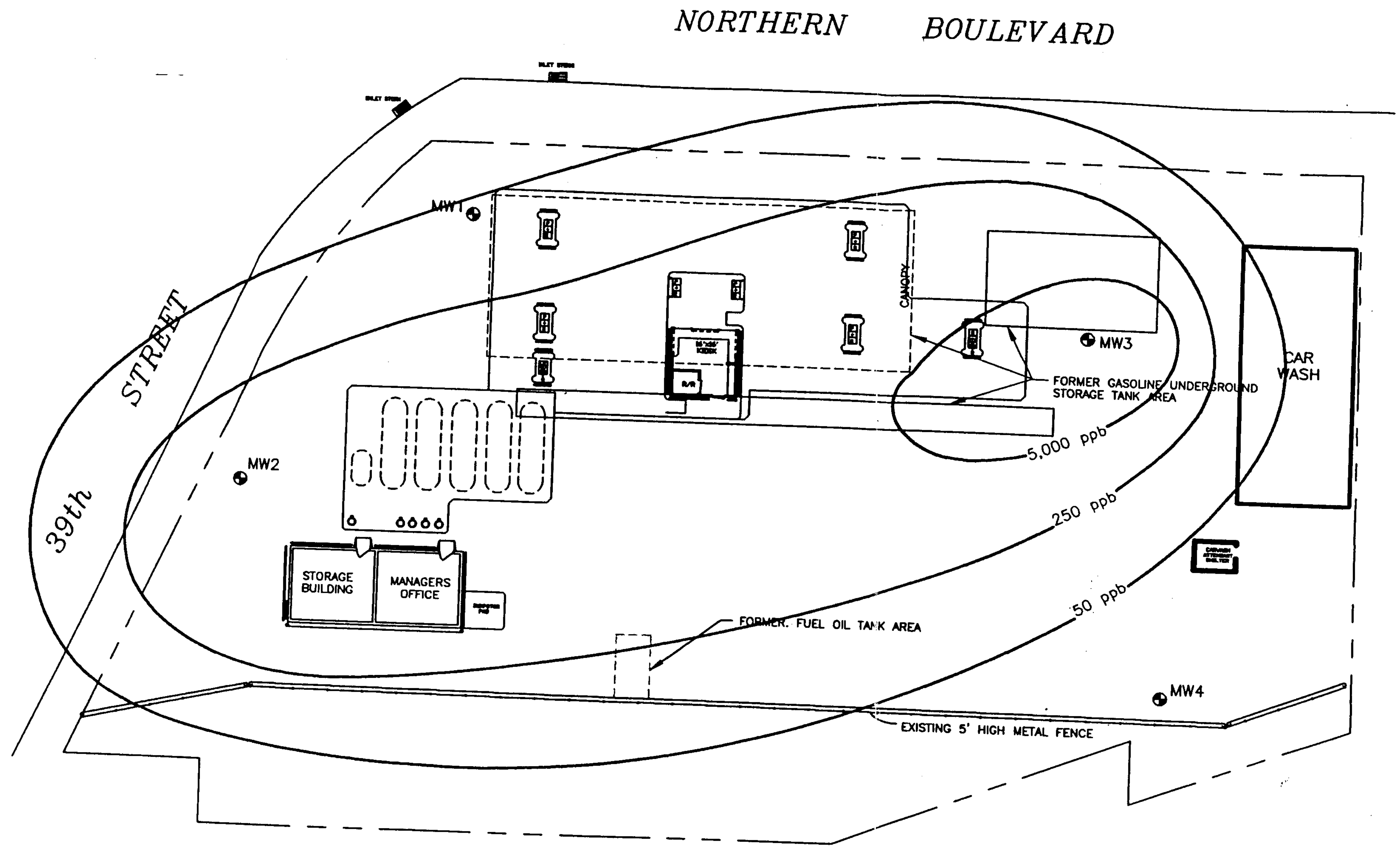
NOTE:

THIS MAP USES A STAGGERED CONTOUR INTERVAL.

BTEX PLUME MAP
13 MARCH 1996

MERIT OIL OF NEW YORK, INC.
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, QUEENS, NEW YORK

NORTH	SCALE IN FEET 0 15 30	DATE 2-19-98	SOURCE B
		DWG # RS0024	FIGURE 6



GROUNDWATER & ENVIRONMENTAL SERVICES, INC.

LEGEND

- FENCE
- DISPENSER ISLAND
- MONITORING WELL
- 600 GALLON WASTE WATER DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- 4,000 GALLON GASOLINE DOUBLE WALL FIBERGLASS UNDERGROUND STORAGE TANK
- MTBE — METHYL *tert*-BUTYL ETHER (ppb)
- ppb — PARTS PER BILLION
- ND — NOT DETECTED

MW	MTBE (ppb)
1	72.8
2	458
3	8,770
4	11.4

NOTE:

THIS MAP USES A STAGGERED CONTOUR INTERVAL.

MTBE PLUME MAP
13 MARCH 1996

MERIT OIL OF NEW YORK, INC.
3904 NORTHERN BOULEVARD
LONG ISLAND CITY, QUEENS, NEW YORK

NORTH | SCALE IN FEET 0 15 30 | DATE 2-19-98 | SOURCE B | DWG # RS0024 | FIGURE 7

Table 1
Summary of Soil Sampling Analytical Results
Merit Northern
3904 Northern Boulevard
Long Island City, New York

Analysis by Methods EPA 8020 (modified to include MTBE) and API REV 5

All results in parts per billion unless otherwise noted

Sample #	Date	Depth (Feet)	PID (ppm)	Benzene	Toluene	Ethyl-benzene	Total Xylenes
Boring #1 (MW-1)	1/31/96	22-24	200	**4,060**	**27,600**	**30,000**	**115,000**
MW-2	2/22/96	22-25	188	ND	73.8	**369**	**2,600**
MW-3	2/23/96	18-20	280	ND	**1,600**	**12,300**	**67,000**
MW-4	2/23/96	18-20	1.2	ND	ND	0.892	5.16
NYSAGV				**14**	**100**	**100**	**100**

Sample #	Date	Depth (Feet)	PID (ppm)	BTEX	MTBE	GRO (ppm)
Boring #1 (MW-1)	1/31/96	22-24	200	176,660	**5,880**	215
MW-2	2/22/96	22-25	188	3,042.80	ND	41.1
MW-3	2/23/96	18-20	280	80,900	64.1	107
MW-4	2/23/96	18-20	1.2	6.052	ND	9.54
NYSAGV				**nvg**	**1000**	**nvg**

NYSAGV=New York State
Alternative Guidance Values
Concentrations exceeding Alternative Guidance Values are in bold type
MTBE=Methyl Tert Butyl Ether
ND=Not detected
GRO=Gasoline Range Organics
ppm=parts per million
nvg=no value given

Table 2
Summary of Groundwater Monitoring Data
Merit Northern
3904 Northern Boulevard
Long Island City, New York

All measurements are in feet

Well #	Date	Casing Elevation	Depth to Water	Depth to LPH	Groundwater Elevation
MW-1	3/13/96	31.79	18.01	*	13.78
MW-2	3/13/96	32.88	19.12	*	13.76
MW-3	3/13/96	31.61	17.60	*	14.01
MW-4	3/13/96	32.12	17.91	*	14.21

LPH= Liquid Phase Hydrocarbons
*= LPH not detected by monitoring

Table 3
Summary of Groundwater Sampling Analytical Results
Merit Northern
3904 Northern Boulevard
Long Island City, New York

Analysis by EPA Method 602 (modified to include MTBE) and NJDEPE 418.1

All results in parts per billion unless otherwise noted

Well #	Date	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Total BTEX	MTBE	TPH (ppm)
MW-1	3/13/96	**249**	**635**	**304**	**1,530**	2,718	**72.8**	3.84
MW-2	3/13/96	**1,110**	**348**	**2,370**	**2,780**	6,608	**458**	6.78
MW-3	3/13/96	**434**	**11,600**	**4,250**	**20,500**	36,784	**8,770**	8.4
MW-4	3/13/96	ND	ND	ND	ND	ND	11.4	ND
NYSWQR		**0.7**	**5**	**5**	**5***	**nvg**	**50**	**nvg**

NYSWQR=New York State Water Quality Regulations
MTBE=Methyl Tert Butyl Ether
ND=Not detected

TPH=Total Petroleum Hydrocarbons
ppm=parts per million
nvg=no value given
*=for each isomer

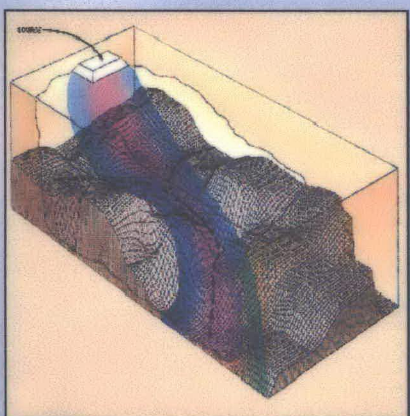
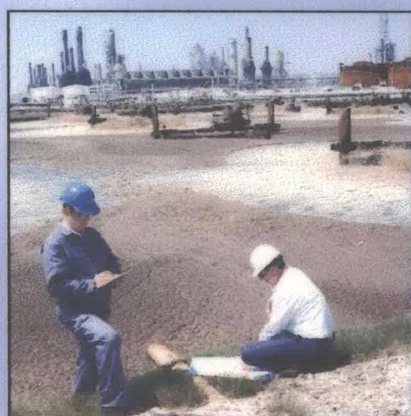
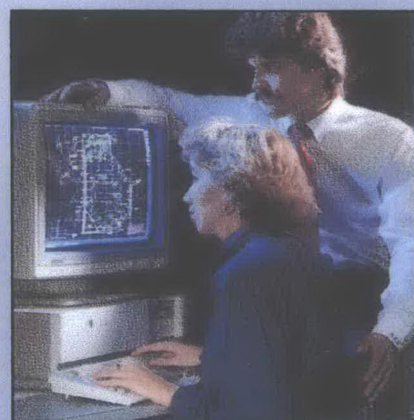
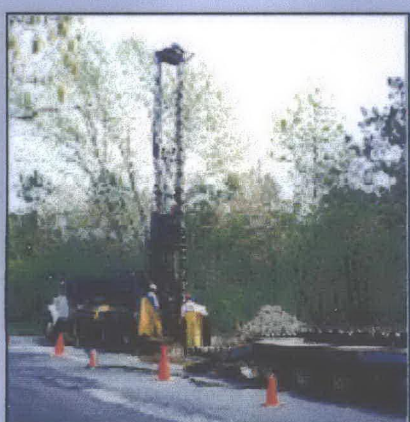
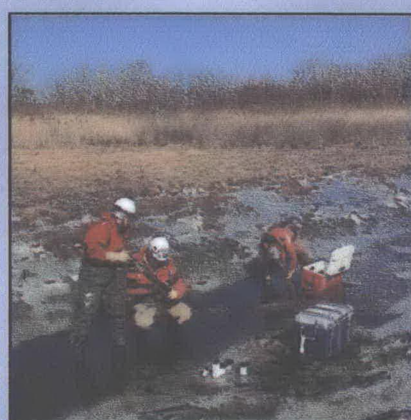
Concentrations exceeding NYSWQR standards are in bold type

PROPOSAL FOR REMEDIAL INVESTIGATION FEASIBILITY STUDY

Volume 2 of 2
Statement of Qualifications

Prepared for:

Standard Motor Products, Inc.


Presented by:

INTERNATIONAL TECHNOLOGY CORPORATION

IT Corporation
Somerset, New Jersey

INTERNATIONAL TECHNOLOGY CORPORATION

2200 Cottontail Lane
Somerset, New Jersey 08873-1248
732-469-5599
Fax: 732-469-7275

April 24, 1998

Mr. Joseph M. O'Connell
Project Manager/Region 2
New York State Department of
Environmental Conservation
Division of Environmental Remediation
One Hunters Point Plaza
47-40 21st Street
Long Island City, NY 11101

SUBJECT: REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STANDARD MOTOR PRODUCTS, INC.
LONG ISLAND CITY, NEW YORK

Dear Mr. O'Connell:

As requested by Mr. Thomas Jackson of Kelley Drye & Warren LLP, enclosed is a copy of the Statement of Qualification (SOQ) prepared by IT Corporation (IT) for performing Remedial Investigation/Feasibility Study (RI/FS) projects within the New York State Department of Environmental Conservation regulatory framework. This SOQ was presented as Volume 2 of IT's Proposal to Standard Motor Products, Inc. for performing an RI/FS study at their site in Long Island City, New York.

If you have any questions, please call me at (800) 445-1588.

Sincerely,

IT Corporation

Maria D. Watt, P.E.
Project Manager

Copy to: cover letter only
Mr. Thomas Jackson - Kelley, Drye and Warren
1200 19th Street NW, Suite 500
Washington, DC 20036

IT Corporation is a wholly owned subsidiary of International Technology Corporation

PROPOSAL FOR REMEDIAL INVESTIGATION FEASIBILITY STUDY

Volume 2 of 2
Statement of Qualifications

Prepared for:

Standard Motor Products, Inc.

37-18 Northern Boulevard

Long Island City, NY 11101

Submitted by:

IT Corporation

2200 Cottontail Lane

Somerset, NJ 08873-1248

(732) 469-5599

1-800-445-1588

http://www.itcorporation.com

April 1998

INTERNATIONAL TECHNOLOGY CORPORATION

Table of Contents

1.0

Remedial Investigation/Feasibility Study Capabilities Statement of Qualification

1.0 Introduction

The successful execution of the technical oversight of a remedial investigation/feasibility study (RI/FS) is significantly enhanced if the selected contractor has demonstrable experience in the remedial investigation/feasibility study process. IT Corporation has substantial RI/FS experience and capabilities particularly in New York State and on Long Island.

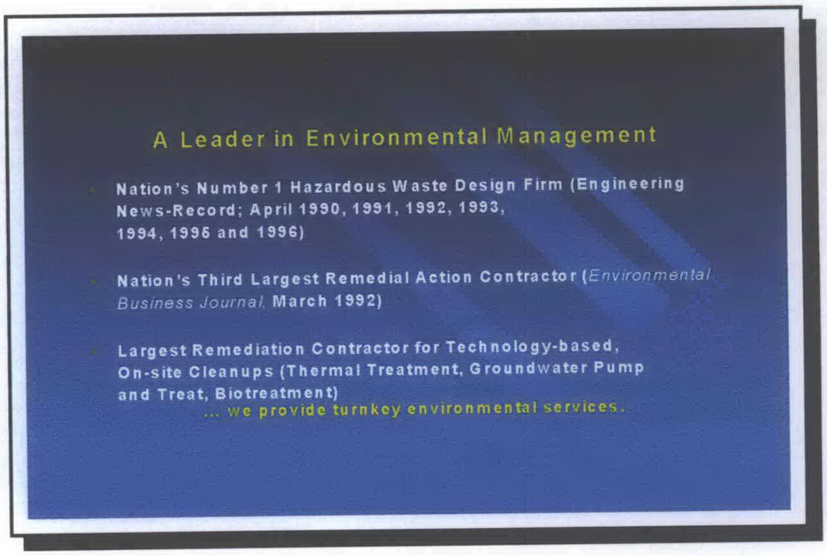
These capabilities begin with RI/FS activities, including problem definition, waste characterization, nature and extent of contamination determination, risk assessment, remedial alternative evaluation, conceptual design, and pilot testings and extend to detailed remedial design, remediation, and operation and maintenance of facilities. IT's participation can be tailored to suit our client's needs, including engineering, final design and bid specifications, construction, turnkey systems, contracted operations, and maintenance. With our strong risk assessment credentials, showcased by our wholly-owned subsidiary, Gradient Corporation, IT has been able to offer a further benefit to some clients--the reduction or, in some cases, elimination of remediation as an outcome of the RI/FS process.

RI/FS projects require a combination of technical disciplines, including chemical, mechanical, geotechnical, and civil engineering, as well as geology, hydrology, hydrogeology, geochemistry, biology, and computer modeling. IT's experts in these technical fields have extensive experience in developing and implementing RI/FS programs. IT's excellent success record in providing solutions to environmental problems and implementation of remedial measures is attributed to our multidisciplined staff.

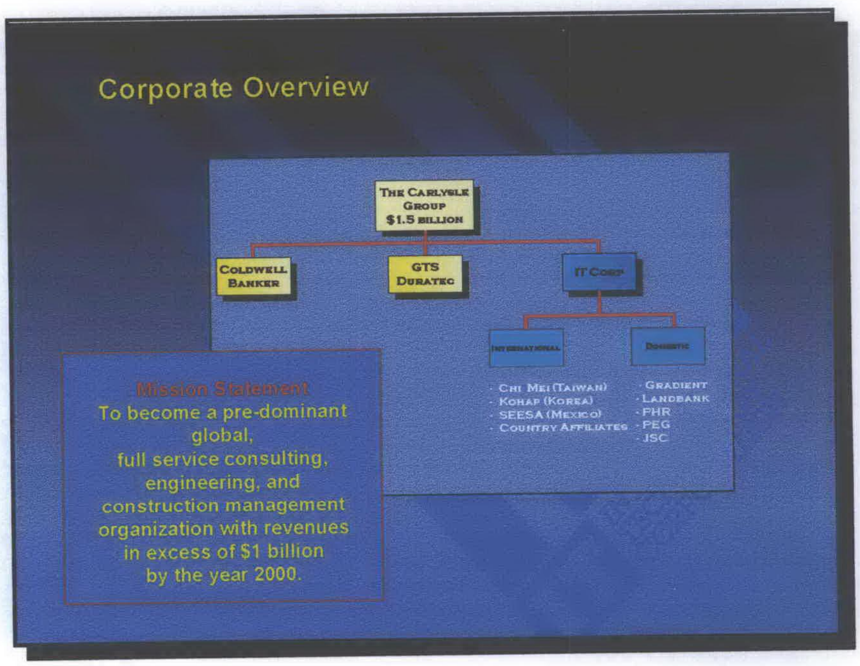
Section 2.0 provides a brief corporate overview including IT's background and lineage, presence and staffing, organization, and service areas and client base. Section 3.0 presents a brief overview of IT's RI/FS capabilities originating with project planning activities and resulting in comprehensive RI/FS documents. Section 4.0 presents relevant project summaries focusing on the RI/FS process performed under New York State regulatory authority. Section 5.0 describes some of the key personnel and potential candidates for this RI/FS project.

2.0

2.0 IT Corporate Overview



Industry Position: IT Corporation, a wholly-owned subsidiary of International Technology Corporation, is a nationally pre-eminent, full service environmental consulting, engineering, and remediation firm with headquarters in Pittsburgh, Pennsylvania. Annual revenues of approximately $400M earned totally from the environmental services sector make IT the leading "pure-play" company in the industry.



Lineage: IT's predecessor company, California Ship Service (CSS) was established in 1926 to provide marine cleaning services of ocean vessels, ship tanks, and machinery. Since then CSS expanded to include other industrial cleaning services, ownership of a large fleet of vacuum trucks, hazardous waste landfills, and began to provide emergency response cleanup services. In 1977 the name was changed to International Technology. By the early 1980's, IT had divested itself of its vehicle fleet, embarked upon closure of its landfills, and began expansion into the engineering market by acquisition of several leading engineering firms and environmental chemistry laboratories. ITC went public in 1983 (NASDAQ) and was listed on the NYSE in 1985. In 1994 IT and Corning merged their laboratory businesses to form the affiliate and independently operated *Quanterra Environmental Services*, the nation's largest analytical network. In 1996 IT bought *Gradient Corporation*, a nationally recognized risk assessment firm, to enhance our services in the areas of human health risk assessment, site cleanup negotiations, and air quality. We also formed JVs and affiliations overseas (Pacific rim, Mexico), acquired a Brownfields services provider, *Landbank*, and an environmental consulting firm in Taiwan, *Chi Mei*. In November, 1996, the *Carlysle Group*, an investment banking firm headquartered in Washington, D.C. acquired a strong equity position in IT, on the strength of our technical resume, successful project management skills and management systems, and national presence and leadership. In 1996 and through the present we have acquired additional corporations including:

- *Gradient Corporation* - a nationally recognized risk assessment firm, is acquired by IT as a wholly owned subsidiary to enhance our services in the areas of human health and ecological risk assessment, RI/FS, site cleanup negotiations, and air quality.

- *PHR Environmental Consultants, Inc.* - a specialized environmental and historical research firm which assists business entities in economically confronting potential or existing environmental liabilities through interdisciplinary investigative approach of science, history, and information to identify avenues for cost reallocation, share reapportionment, insurance claims coverage, etc.

- *Jellnick, Schwarty & Connolly, Inc.* - provides economically driven, science-based environmental consulting and advocacy services, including chemical product registration, environmental regulatory and management strategy, and risk management.

IT has announced a merger with *OH Materials* (OHM), a $550M per annum environmental remedial action/construction firm. This transaction will be completed by April 1998. The surviving company and management will be IT Corporation. Revenue from IT after the merger should exceed $1 Billion in 1998.

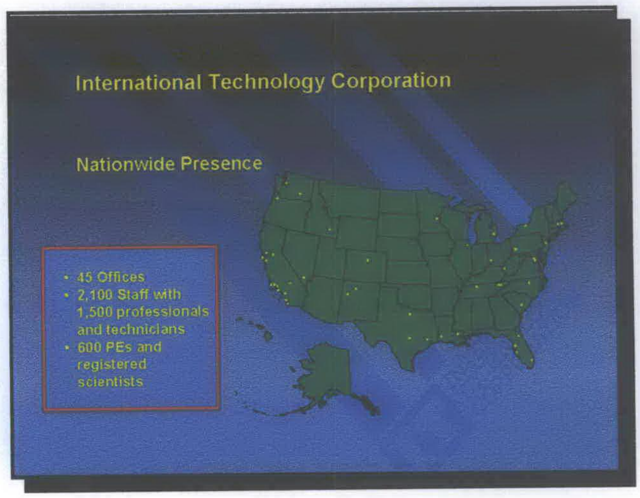
- *OHM Corporation* - a major provider of broad-based environmental remediation and facility operation and maintenance services, and will fully integrate OHM into IT's operations.

The acquisition of Gradient significantly strengthened IT's ability to perform both human health and ecological risk assessments. The IT/Gradient staff of highly specialized personnel are leaders in their industry for using risk assessment in the negotiations of cleanup levels, Record of Decisions (RODs) and RCRA based Corrective Action.

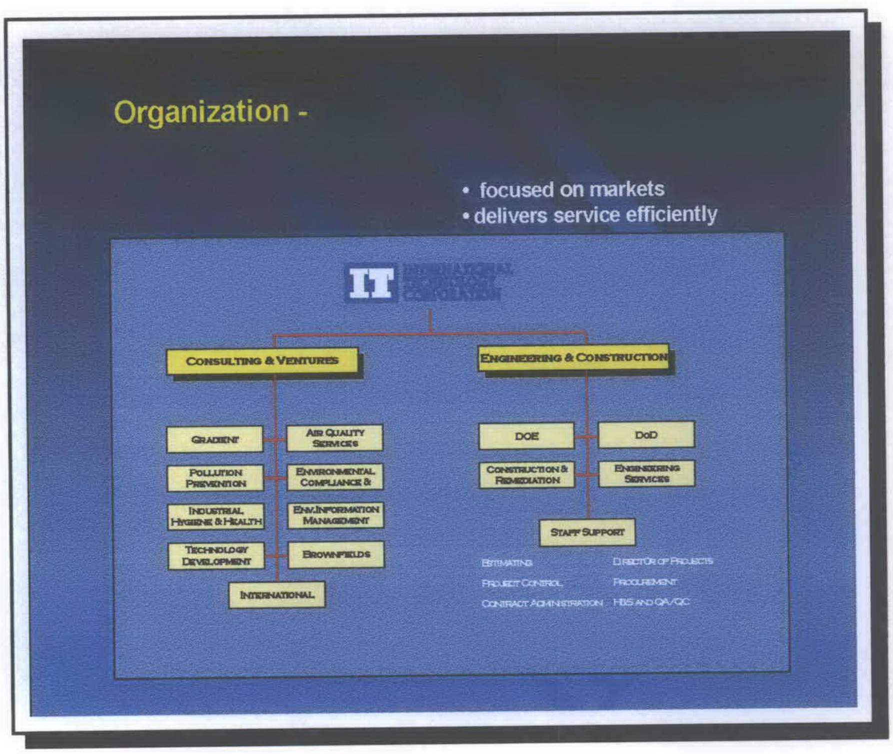
PHR and JSC enhance IT's capability to identify areas of potential or existing environmental liabilities, to provide science-based environmental consulting and advocacy services and to perform environmental regulatory and management strategy and risk management. These additional capabilities support any regulatory negotiations and provide a platform for a detailed understanding of the regulatory frame-work.

IT's broadened remediation experience via the merger with OHM results in IT being the nations leader in remediation services. In-house remediation expertise is critical to the accurate development and evaluation of remedial alternatives. Reliance on external vendors and dated documentation is diminished and hands on experience with innovative solutions is required to provide a value-added approach to the development of the Feasibility Study.

Presence and Staff Mix: Our staff applies engineering and scientific skills to solve complex, multi-disciplinary environmental and environmental management problems. Accordingly we make every effort to attract, develop and retain the best and the brightest associates to/on our staff. Today our 2,500 staff resources include approximately 2,000 degreed engineers, scientists, and environmental specialists, including more than 500 masters degrees and 100 doctorates, and more than 600 registered Professional Engineers (PEs), Professional Geologists (PGs/CPGs), Certified Industrial Hygienists (CIHs), and other professional certifications. Our 43 offices, and well developed project and matrix management systems, enable us to bring the best thinking, science, or technology to our client's doorstep. *Following the merger with OHM staff size will be approximately 5500 operating from 70(+) offices across the United States.*



Organization: In October 1996, IT implemented the organization shown here. This was done to more closely align our skills with the markets now emerging within the environmental sector, e.g., environmental information management. At the same time our long standing service areas, e.g., construction and remediation, retain their core status and are fully supported by state-of-the-art project management systems, procedures, and highly trained staff, as well as a fully integrated engineering staff.



Service Areas/Client Base Our turnkey service capability enables us to satisfy a wide variety of client requirements without turning to a host of specialty service providers (Table 1). Similarly we cross the spectrum of client-types, both commercial and governmental (Table 2). As previously mentioned, we have formed alliances, partnered, or become preferred nationwide service providers to clients on this list. These relationships have proven beneficial to both parties as commonality of purpose, beneficial pricing strategies, and more importantly, the ability to derive measurable economic benefit from strategic environmental practices as well as cost savings from the adoption of proven compliance regulatory, or remedial approaches on site/problem specific activities are brought into action or put into place.

Table 1
IT Corporation Service Areas

Acquisition investigation	Emissions inventories	Engineering test plans
Air permitting & compliance	Endangered species surveys	Environmental action plans
Air process engineering & design	Endangerment assessments	Environmental assessments (NEPA)
Animal surveys	Environmental data management/systems	Environmental, health, and safety compliance audit
Aquatic stream surveys	Engineering design	Environmental impact assessments
Aquatic weed harvesting impact analysis	Literature reviews	Environmental impact statements
Biological remediation/bioremediation	Management information tracking system	Environmental profiles
Corrective action	Microbiological characterization	Environmental reports
Diagnostic/feasibility studies	Negotiation of cleanup levels	Environmental site assessments
Environmental, safety, and health operations	Nonoccupational pesticide exposure studies	RCRA Implementation Plans
Evaluation Facility planning/upgrade	Oil spill cleanup	Reconnaissance inspection (CWA)
Feasibility studies	Performance audit inspection (CWA)	Regional contingency plans
Field data collection	Performance evaluation studies	Regulatory analysis
Field sampling plans	Plan preparation and implementation (i.e., sedimentation control, restoration, etc.)	Regulatory analysis facility profiles
Final safety analysis reports	Preliminary assessments	Remedial action
Floodplain evaluations	Preliminary assessment/site inspection (PA/SI)	Remedial design
Fugitive emissions control	Preliminary design reviews	Remedial engineering management
Groundwater monitoring	Preliminary draft environmental impact statements	Remedial investigations
Habitat assessments	Preliminary safety analysis reports	Remedial investigation (s)/feasibility study(ies) (CERCLA RI/FS)
Hazard and operability studyies	Probabilistic risk assessments	Risk analysis
Hazardous waste management	Process monitoring	Risk assessments
Hazardous waste operations	Program management	Risk based corrective action (RBCA)

Table 1

IT Corporation Service Areas

Health and environmental effects profile	Program management information systems	Risk evaluations
Health effects assessments	Program management system	Safety analysis reports
Health and safety plans	Property assessments	Sampling and analysis plans
Human exposure modeling	Property transfers	Sampling and testing
Human health risk assessments	Public health evaluations	Site health and emergency response plans
Incineration	Public participation program/community relations	Site inspections
Indoor air monitoring	Quality assurance	Site safety and health plans
Installation restoration program	Quality assurance management plans	Site-specific work plans
Integrated support plans	Quality assurance program plans	Source testing & trial burns
Laboratory data integrity programs	Quality assurance project plans	Source inventory emission factor analysis
Laboratory evaluation programs	Quality control	Spill plan preparation
Laboratory information management systems	Quality implementation plans	Storm water management model
Lake and watershed management plans	RCRA Facility Investigations	Surface water recovery system design
Landfills - design, closure, constructions/ monitoring, leachate/gas	Technical and environmental evaluations	Waste minimization
Leachate detection, collection, and removal systems	Thermal desorption	Wastewater engineering
Leak detection and removal system	Threshold planning quantity	Wetland assessments
Limnological surveys	Total organic analysis	Wetland delineation
Ecological risk assessments	Total quality management	Wetland restoration/mitigation
Ecological surveys	Toxic air monitoring systems	Wetland evaluation technique
Emergency operations plans	Treatment system designs	Winter habitat assessment
Emergency response cleanup services	Value engineering	Waste analysis Plans (RCRA)

Table 2
IT Corporation Client Base

AES Corporation	Ford Motor Company	Occidental Chemical Corporation
Air Products	Foster Wheeler	OXY Chemical
Albemarle	General Electric Company	OXY USA
Allied Signal Inc.	General Motors Corporation	Pacific Bell
American Cyanamid	Gibson, Dunn, and Crutcher	Pennsylvania Power & Light
American Standard, Inc.	GPU Corporation	Pennzoil Company
AMOCO	GTE, Inc.	Placer Dome of Canada
Anitec Image Corporation	Hardage Site Remediation company (PRP Group	PPG Industries, Inc.
ARCO Mining	Henkel	Praxair, Inc.
Armoco Steel company	Hoechst Celanese Corporation	Quaker State Corporation
Ausimont	Huls America	Rhone-Poulenc AG Company
Babcock & Wilcox company	IBM Corporation	Star Enterprise
BASF Corporation	Indiana Gas	South Jersey Gas
Bechtel National, Inc.	Interlake Corporation	Sun Oil Company
Bridgestone/Firestone, Inc.	J. Makowski Associates	TAMS Consulting, Inc.
Cabot Corporation	Koch Industries	Tenneco
Chevron U.S.A Incorporated	Konoike	Texas Eastern Gas Pipeline Company
Ciba-Geigy/Sandos	LTV (Republic) Steel	Tosco
Chrysler Corporation	Mapco Petroleum, Inc.	Unocal
Citgo	McDonnell Douglas	Union Carbide Corporation
Conestoga Rovers and Associates Limited	Merck & Co., Inc.	U.S. Department of Defense
CYTEC	Michigan Consolidated Gas	U.S. Department of Energy
Consumers Power	Mobil Oil Corporation	U.S. EPA (nonenforcement)
Delta Faucet	Monsanto	U.S. Steel Group
Eastman Kodak Company	National Starch and Chemical	Valley Title Company
EG&G, Inc.	New Jersey National Gas	Westinghouse Electric Corporation
Exide	New York City-Dept. of Sanitation	Wheeling-Pittsburgh Steel Corporation
Exxon Corporation, USA	New York State Gas & Electric	Zinc Corporation of America (Horsehead Industries)
Fairchild Industries, Inc.	NL Industries	

3.0

3.0 RI/FS Capabilities

IT's comprehensive knowledge of the CERCLA RI/FS process encompasses:

- Project planning

- Remedial investigation
  - Site characterization
  - Groundwater modeling
  - Risk assessment

- Feasibility Study
  - Technology screening
  - Developing and screening remedial alternatives
  - Detailed evaluation of remedial alternatives

The following sections illustrate IT's RI/FS capabilities in remediation activities and site operations.

3.1 Project Planning

The most critical stage of the RI/FS is the project planning stage. If the entire project is not properly scoped, major data gaps as well as severe cost impacts can occur. The "end-driven" approach will be used in scoping the project. Mutually agreed upon project goals will be established to prevent unforeseen surprises. The potential ultimate solution to the environmental problem will be evaluated first in order to decipher the steps necessary to reach the project goal. A key element to an "integrated project management approach" is up-front planning. One way of defining an "up-front approach" would be to "begin with the end in mind". This philosophy will be applied in selecting a well-rounded project team as well as evaluating the technical aspects of the project.

The selection of project resources begins with an evaluation of the overall needs of the project throughout the duration of the project in order to optimize personnel utilization. An up-front scoping meeting with regulatory agencies, the client, the project manager and key task managers (including RA and FS managers) is recommended to ensure that mutually agreed upon goals are established and clearly communicated. Extensive project plan comments can be reduced by presenting more details during the scoping meeting and obtaining unofficial up-front approvals.

After the development of a preliminary scope of the field activities, an internal scoping meeting will be held with the senior peer reviewers to discuss the mutually agreed upon project goals and the proposed scope of work. The project manager, task managers as well as the senior peer reviewers will ensure that adequate information will be collected during the proposed field program to support the RA and FS evaluations. The nature and extent of contamination requires delineation only to the degree necessary to complete these critical evaluations. The primary objective of an RI field program is to collect enough information to develop the most feasible remedial solution. The "end driven" approach will be utilized in scoping the project plans. A preliminary risk assessment is developed to focus the project team on critical exposure routes and potential contaminants of concern. Potential remedial actions are developed and addressed in the project plans in order to keep the project team focused on the overall project objective. Project plans for an RI/FS typically include a Work Plan (WP), Health and Safety Plan (HASP), Sampling and Analysis Plan (SAP) and a Quality Assurance Plan (QAP).

3.2 Remedial Investigations

In the completion of remedial investigations, IT has a full range of capabilities from field investigations through data analysis, evaluation, and report preparation. Many of our investigative projects for hazardous waste sites are comprehensive RI/FS activities to determine the nature and extent of contamination at a site and identify the appropriate remedial actions which may be required.

3.2.1 Site Characterization

IT has been involved in the completion of environmentally-oriented site investigations and assessments for more than a decade. IT has groundwater experts with many years of experience designing and conducting groundwater monitoring programs and hydrogeologic investigations and interpreting subsequent data results. Their expertise includes managing field activities, such as drilling operations, soil and groundwater sampling, well construction, aquifer testing, waste sampling, and geophysical surveys.

IT's strength in remedial investigations has been demonstrated during numerous projects involving:

- Geophysical surveys to locate buried wastes, drums, and contaminant plumes (magnetic radar and electromagnetics)

- Hydrogeologic and geologic characterizations (boring programs, installing monitoring wells and aquifer testing)

- Surface water hydrologic characterizations

- Waste inventories (boring programs, drum counting, backhoe trenching, and geophysical surveys)

- Waste sampling and chemical characterization

- Collection and laboratory analysis of soils, sediment, groundwater, surface water, and air to determine contaminant levels.

Several cost saving techniques are available for collecting samples. Even after the project plans are approved, the project manager will be continually developing methods and strategies to perform tasks cheaper, quicker and smarter. For example, by using geoprobe techniques, the costs of collecting both soil and groundwater samples are reduced by more than 50%. By gaining agencies trust and respect, this new technique has been easily approved by USEPA. Other innovative sampling approaches such as pieziocone, vertical profile screening, and on-site analytical testing will be evaluated for use on a site to save time and money. Even if procedures are already specified and approved in the work plan, the project manager as well as task managers will be continually evaluating the proposed scope of work for areas that can be improved.

Scheduling is an important area that can be manipulated to provide an efficient field program. By scheduling all sampling activities in the shortest period possible without overloading the Field Operations Leader (FOL) and the sample coordinator, the cost of the field program can be significantly decreased by reducing travel and per diem costs as well as equipment rental costs. The field program will be evaluated to determine where substantial portions of the budget are allocated and what can be modified to reduce these costs (whether it is equipment rental costs, travel and per diem costs, or level of effort required during certain activities). This evaluation is critical since the field effort usually amounts to approximately 40-50% of the overall project budget.

3.2.2 Groundwater Modeling

IT's staff utilize computer models to evaluate, simulate, and predict the performance of hydrogeologic regimes. These computer models serve as an analytical tool in hydrogeologic investigations to design optimum, cost-effective technical solutions for groundwater problems. Computer modeling activities vary, depending on the degree of complexity of the project site conditions and the level of detail required for analyses. For many projects, detailed computer modeling may not be required but there are other cases where IT's computer models are powerful and effective tools. These include situations where long-term prediction under complex field and design conditions with variable hydrogeologic and geochemical components is necessary.

IT maintains computer models that have proven useful for groundwater simulation. These programs have been successfully used in hydrogeologic investigations to:

- Compute changes in potentiometric head due to deep well injection, dewatering, and underground drains
- Optimize the number of wells required to restore a contaminated aquifer and prevent contaminated groundwater from reaching other water resources
- Predict migration of contaminants
- Compute effect of coal mining on hydrologic regimes
- Compute geochemical parameters to establish an equilibrium state of reaction and to model the water chemistry upon mixture of an injection liquor
- Simulate migration of chemical species (including organic chemicals, radionuclides, and heavy metals) in groundwater with attenuation caused by soil adsorption and acid neutralization
- Forecast effects of various types of waste disposal facilities and land uses on the hydrogeologic regime
- Determine regional changes in stream flow rates, flooding, sediment transport, stream quality, and mass transport in large drainage basins as a result of various land uses
- Assess sediment transport and chemical dispersion in streams and rivers.

3.2.3 Risk Assessment

Human Health and Ecological Risk Assessments are essential components of a Remedial Investigation and Feasibility Study in establishing remediation cleanup goals for a site. Risk usually drives cleanup costs, making risk assessment critical to effective management of the remediation process. Our team of scientists, biologists, toxicologists, and engineers are experts at developing scientifically sound, innovative approaches to risk assessment and are skilled at recommending cost effective risk-based cleanup levels and remedies acceptable to regulatory agencies.

IT and Gradient have performed hundreds of quantitative risk assessment studies, including many at Superfund sites. Our staff has a thorough understanding of U.S. Environmental Protection Agency and New York State guidelines for risk assessment acceptability under CERCLA and RCRA, and keeps abreast of the most recent changes which have occurred, especially within ecological risk assessments, in both state and federal guidelines. This knowledge is used to develop innovative approaches to complex, site-specific problems. This includes designing monitoring programs, writing work plans, developing cleanup levels or challenging agency cleanup levels, and evaluating remedial alternatives. In addition, we have the skills and experience to communicate information about risks to a wide range of audiences in a clear and concise way.

3.3 Feasibility Studies

The FS process consists of the following broad categories:

- Technology screening
- Development and screening of remedial alternatives
- Detailed evaluation of remedial alternatives.

3.3.1 Technology Screening

IT screens various treatment technologies as they apply to the remediation of contaminated soils, air, and groundwater. These treatment technology evaluations provide clients with an overview of applicable treatment technologies.

The screening of technologies is accomplished by completing the following site-specific activities:

- Developing general response actions
- Identifying the volumes and areas of media/wastes
- Evaluating technology process options
- Assembling alternatives.

The completion of this initial activity establishes the framework for completing the FS.

IT has extensive technical expertise with many treatment technologies and utilizes in-house, bench-scale, and mini- and pilot-plant treatability facilities to support these process definition activities. The laboratories—designed for evaluating chemical and chemical engineering treatment techniques—provide support facilities for performing testing with microscale systems to pilot-plant operations.

3.3.2 Development and Screening of Remedial Alternatives

Site-specific remedial action alternatives are developed to address areas that require further action. These alternatives are selected to protect human health and the environment and include a range of appropriate waste management options such as source control, off-site remedial action, and on-site remedial action as appropriate.

Initial screening consists of identifying alternatives for remedial action which will be analyzed in detail and screening according to the preliminary criterion. Alternative screening aids in streamlining the FS process while ensuring that the most promising alternatives are being considered for detail analysis. Screening of alternatives is accomplished by completing the following activities:

- Refinement of alternative definition

- Preliminary evaluation of alternatives based on effectiveness, implementability, and cost.

In addition, evaluations and comparisons consider capital and operating costs, as well as performance and application of the treatment technology.

IT has demonstrated that most major restoration projects generally take several years to complete. Therefore, the investment of time and effort to properly evaluate a site-specific situation initially will more than pay for itself in the long run. The favored approach involves developing capital and operating cost estimates based on preliminary process design, using site-specific parameters such as:

- Feed composition
- Flow rate
- Desired effluent criteria
- Availability and cost for utilities
- Treatment period

- Assumed value for key design parameters
- Fate of by-products.

A remedial alternative cost is assembled from:

- Operating cost
- Labor
- Capital-related charges.

Design bases are usually established in conjunction with client personnel. For each alternative, IT uses values for key design parameters based on IT's broad-based experience. For some processes, it may be appropriate to assume more than one value for a key design parameter in order to test the sensitivity of costs to that parameter. Based on these assumptions, process designs are developed so the relative capital costs and operating costs can be calculated and compared. This approach to screening alternatives is valuable and cost-effective because it identifies those alternatives that will be too expensive, even if the optimistic values for key design parameters can be realized. The approach also identifies values for critical design parameters that will become targets for subsequent definition.

3.3.3 Detailed Evaluation of Remedial Alternatives

A complete detailed evaluation of alternatives demonstrates and documents the capacity of each alternative to satisfy the statutory requirements that must be established in the Record of Decision (ROD). These include the requirements of CERCLA and SARA to:

- Protect human health and the environment
- Attain ARARs or support grounds for a waiver
- Be cost-effective
- Apply permanent solutions to the extent practical
- Preferentially select treatment that reduces toxicity, mobility, or volume.

To promote a systematic approach to evaluate alternatives in terms of these statutory requirements, the following nine criteria are used in the detailed process:

- Short-term effectiveness
- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, or volume
- Implementability

- Cost
- Compliance with ARARs
- Overall protection of human health and the environment
- State acceptance
- Community acceptance.

Once the detailed analysis has been completed, a comparative analysis is initiated to evaluate the relative performance of each alternative in relation to each specific evaluation criterion. The advantages and disadvantages of each alternative relative to other alternatives is identified and summarized. The summary includes documenting the relative strengths and weaknesses of each alternative, effects of variations in key uncertainties, and key differences (qualitative and/or quantitative) among alternatives. This analysis is used as a basis to evaluate the trade-offs among alternatives.

Following completion of the RI/FS, the results of the detailed analysis, when combined with the risk assessment, becomes the rationale for selecting a preferred alternative and in preparing the proposed plan and Record of Decision documents.

4.0

4.0 Relevant Project Summary

A representative sample of the RI/FS projects, or relevant risk assessment projects that IT has completed under the regulatory frame work of New York and New Jersey are contained in Appendix A. Many of these projects have received commendations from either the clients or regulatory agencies. These commendations documents are contained in Appendix B.

The Brookhaven National Laboratory RI/FS program, the Mattiace RI/FS and the Fresh Kills Landfill RI/FS were conducted at sites located on Long Island, New York. These sites involved organic contamination and required significant negotiations with Long Island and New York State agencies. The proposed project manager Ms. Maria D. Watt, P.E., and several other professionals proposed for this project have been intimately involved with these projects. These RI/FS's have also received commendations from both the client and regulatory agencies.

The Stony Point RI/FS, the Solvay RI/FS and the Sealand RI/FS were conducted on sites located in New York State. These RI/FS involved chlorinated organics and required negotiation with the New York State agencies. Commendations on the Solvay site are anticipated after the approval of the RI/FS documents. The Sealand site received an "exceeds expectations" rating from the regulatory agency.

The last three project summaries are relevant projects. The Navy Trenton project is an RI/FS project that was located in New Jersey. Even though the regulatory framework of RI/FS performed for a New Jersey site differs from a New York State site, there are many similarities potentially due to the close proximity of these two states. The last two project summaries were included to demonstrate the state-of-the-art risk assessment capabilities and negotiation expertise that IT/Gradient posses in New York State. The OxyChem project did receive commendations from the client (see Appendix B).

5.0

5.0 Key Personnel

Local experienced professionals have been identified as key personnel for this project. These personnel are primarily located at the Somerset, New Jersey office which is one to two hours from Long Island, New York. These personnel are intimately familiar with the NYSDEC RI/FS process and have negotiated remedial solutions with many of the NYSDEC agencies. Some of the key personnel have been responsible for either eliminating the need to remediate certain sites or have successfully negotiated cleanup levels that are orders of magnitude higher than current regulatory standards or guidance value. These negotiations have saved clients millions of dollars in remediation costs.

The proposed Project Manager (PM) for this project is Ms. Maria Watt. She is a registered Professional Engineer (PE) with over 13 years of experience. Twelve of her thirteen years of experience has been in developing and managing RI/FSs in New York and New Jersey. Since project specific details have not been adequately evaluated at the time of this SOQ, assignment for the remedial investigation manager, risk assessment manager, and feasibility study manager cannot be determined. Appendix C contains the resume of probable candidates for these positions.

APPENDIX
A

Appendix A

Project Descriptions

PROJECT EXPERIENCE

Project Title:	Brookhaven National Laboratory RI/FS Program
Site Location:	Upton, New York
Client:	Brookhaven National Laboratory

Project Description: In 1992, IT was awarded a 5 million dollar contract that included CERCLA PA/SI, RI/FS, Proposed Plan/ROD, Remedial Design and Interim Response Actions for three of the five Operable Units (OU). The 8 square mile site was divided into 5 Operable Units. IT was awarded OU II/VII, III and V. Due to IT's exceptional performance on this contract, approximately 5 million in additional work was assigned to the contract which doubled the contract value.

Detailed Project Plans including CERCLA Work Plans, Sampling and Analysis Plans comprised of a Field Sampling Plan and a Quality Assurance Project Plan, and Health and Safety Plans were developed for OU II/VII, III V and IV for RI/FS and RD activities. Due to the radioactive waste found on the site, both a Certified Industrial Hygienist and a Certified Health Physicist reviewed these plans and were responsible for H&S. OU II/VII addresses low-level radioactive contaminated soils, OU III addresses site-wide groundwater, OU V addresses the Sewage Treatment Plant and associated areas and OU IV addresses the Central Steam Facility.

IT has completed extensive monitoring well installations, vertical profile installations, geophysical surveys, soil vapor surveys, radiation walkover surveys, surface and subsurface geophysical survey (gama-logging, EM, GPR and magnetic surveys), Geoprobe™ drillings (groundwater and soil sampling), monitoring well sampling, surface water and sediment sampling, and test pit installations. As part of an innovative approach to reduce overall field investigation costs and duration, IT implemented several field screening methods and on-site analysis. IT utilized Geoprobe drilling to obtain soil and shallow groundwater samples (~75 ft bls). Vertical Profiling of the groundwater column using a screened casing was used to characterize the aquifer to determine the horizonal extent as well as the vertical extent of the groundwater plume. Vertical Profiling collected groundwater samples every 10 feet from the water table to approximately 200 feet below land surface (bls). Samples were analyzed by an on-site laboratory for VOAs. This screening technique lead the installation of permanent monitoring wells. These field techniques reduced the amount of conventional drilling required and reduced the overall field cost by approximately 1 million. The project schedule was also reduced by approximately 6 months.

Developed a State-of-the-Art GIS system that was able to consolidate information collected by over 7 different consultants working for BNL as well as different BNL department. IT received a letter of commendation from BNL for providing a comprehensive, collated database for the entire BNL site on an expedited bases while maintaining a high quality product. IT's database is also able to download information for local, state and federal agencies concerning regulations, recent RODs and treatment and disposal facilities.

Site-wide and OU-wide hydrogeologic modeling was used to evaluate nature and extent of contamination as well as modeling feasible remedial alternatives in all Ous. The modular finite-difference groundwater flow code, MODFLOW, was used for simulation of the groundwater flow field and the three-dimensional solute-transport model code MT3D was utilized for solute transport modeling.

Detailed human health and ecological risk assessments were performed for all Ous for both radiological and chemical parameters. The computer code RESRAD was used to model the radiological exposure. IT developed the protocol for a detailed ecological risk assessment that was used site-wide. IT trained other BNL consultants in this ecological assessment methodology that was approved by both state and federal regulatory agencies.

These evaluations along with nature and extent assessments were documented in a comprehensive Remedial Investigation Report for each OU. Engineering Assessment and cost estimates of several remedial alternatives were documented in a detailed Feasibility Study (FS)for each OU. The FS for each OU recommended the most feasible alternative and contained a preliminary design of this alternative.

Engineering Evaluations/Cost Assessments and Focused Feasibility Studies were performed to evaluate expedited Interim Remedial Measures for the Sewage Treatment Plant, Underground tanks and contaminated groundwater at the site's southern boundary.

In support of an ecological risk assessment as well as a feasibility study, IT conducted toxicity tests at our in-house bioassay laboratory located in Somerset, N.J. Tests were habitat-specific and included sediment toxicity tests (chironomid growth test and reproduction test), and fish tissue testing for bioaccumulation parameters. An innovative approach was used to back calculate site-specific cleanup levels from these test which significantly reduced the cost of stream sediment remediation.

In support of feasibility studies as well as the New York Harbor Sediment Study, IT conducted sediment treatability studies at our in-house Technology Development Laboratory. Sediment treatability studies included thermal treatment, fixation, dewatering and physical parameter testing.

All tasks were performed on a Firm Fixed Price basis and all work was completed on or under budget and on or ahead of schedule. The innovative approaches used reduced overall client costs significantly (approximately 1 million).

Performing tasks on an expedited basis won IT several letters of commendations as well as additional contract fee. IT was able to provide a quality product on an expedited basis.

During the Project Planning Phase of the OU RI/FS, the regulatory agencies denied a request for extension by DOE due to funding problems. When the agencies denied this request, IT completed 6 months of work in under 6 weeks and recieved commendation from both the client, BNL, as well as the regulatory agencies and the DOE on the quality of the work.

PROJECT EXPERIENCE

Project: Remedial Investigation/Feasibility Study
Mattiace Petrochemical Superfund Site

Location: Glen Cove, New York

Client: Foster Wheeler Corporation

Project Description: As subcontractor to USEPA Region II, IT was contracted to perform an RI/FS for the Mattiace Petrochemical Superfund Site under the Alternative Remedial Contracting Strategy II Program (ARCS II). The site is an abandoned organic chemical (primarily solvents) repackaging facility. Contamination to site soils and groundwater was due primarily to leaking tanks and drum washing discharges to the leach field system.

Directly Relevant Highlights:

- Preparation of a comprehensive work plan, sampling and analysis plan, site management plan, and a health & safety plan. All plans were reviewed and approved by both USEPA Region II and the New York Department of Environmental Conservation.

- Upon completion of the USEPA approved project plans, IT performed a 6-month field investigation consisting of ambient air monitoring; installation of 11 monitoring wells; completion of 20 soil borings; tank, surface water, sediment, soil, and groundwater chemical sampling; aquifer testing and performance of an ecological evaluation. A geophysical investigation was also performed to delineate areas suspected of containing buried drums.

- Sampling and field investigations were performed according to the USEPA Contract Laboratory Procedures (CLP). The analytical results were validated according to the ARCS II validation guidelines.

- The validated data were evaluated and modeled to support a fate and transport study as well as a Superfund risk assessment. An RI Report presented the data, as well as the risk assessment and transport study. The risk assessment established cleanup levels on contaminants not mandated by Applicable or Relevant and Appropriate Requirements (ARARs). Based on results of the RI Report, an engineering feasibility study report was developed to technically and economically evaluate feasible alternatives for a site-wide remediation which would lead to site closure.

- A second operable unit Focused Feasibility Study (FFS) was initiated based on results of the geophysical investigation solely to address the buried drums found on site. A test pit investigation was performed to delineate the drum burial areas and a feasibility study was prepared to technically and economically evaluate feasible remedial alternatives. A USEPA Record of Decision (ROD) and Remedial Action was received for the drum burial areas.

IT Corporation was awarded a performance evaluation of 4.5 out of 5.0 for the FFS. Following the USEPA approval of project plans, the Test Pit Investigation mobilized within one week. Within two weeks of USEPA approval to initiate, the FFS was developed and was finalized within three days from receipt of USEPA's comments. This FFS was expedited to meet a fourth quarter ROD deadline. An ROD for the entire site was received in 1991.

PROJECT EXPERIENCE

Project Title: Fresh Kills Landfill Leachate Mitigation

Site Location: Staten Island

Client: The City of New York Department of Sanitation

Project Description: IT is currently addressing a wide range of problems involving leachate at the Fresh Kills Landfill. Located on Staten Island, Fresh Kills is the only remaining active city-owned solid waste disposal site for the city of New York. The landfill complex consists of four unlined landfills of varying size located along Fresh Kills Creek and the Arthur Kill River. An estimated 1,000,000 gallons per day (gpd) of leachate discharges from the landfill into the two surrounding estuarine areas.

A key component of the project was the Feasibility study. The goal of the study was to choose a remedial option that would satisfy the terms of the consent order and those applicable state a federal criteria. The Consent Order stipulates a minimum capture percentage which required the use of detailed numeric groundwater model to evaluate the leachate capture efficiency of each remedial alternative. The federal and state ARAR's concerned three major areas; 1) surface water quality of the adjacent rivers and streams, 2) groundwater quality of underlying aquifers; and 3) environmental impacts to adjacent wetland and nearby sensitive areas. The reports (Interim, Draft Final, and Final) followed the current CERCLA Feasibility Study format. The elements were part of the overall FS process.

- Summarize available data that would be present to the evaluation process
  - Hydrogeologic Investigation(s)
  - Sediment and Surface Water Investigation
  - Slope stability reports
  - NYC DOS 1990-92 Master Waste Management Plan(s)
  - Final Closure Plan(s)
  - Treatability Studies (Waste Water Treatment)

- Perform impact analysis and develop remedial action goals

- Develop remedial alternatives for individual landfill section and evaluate and screen each alternative against the remedial action goals. The analysis include groundwater model, surface water modeling. The slope stability modeling of the various alternatives. The costing effort was brought to a predesign phase due to sensitivities involved.

- The preferred remedial alternatives for each individual landfill section were combined to evaluate site wide remedial alternatives. Each site-side alternation were evaluated using groundwater and surface water models.

- A conceptual design on the two most feasible site-wide alternatives.

In 1990, the City of New York State Department of Environmental Conservation (NYSDEC) signed an Administrative Consent Order (ACO) to allow continued disposal operations while addressing a wide range of environmental management of problems. The central requirements of the ACO is control of leachate via design and construction of a containment and collection system and a leachate treatment plant. Some portions of the landfill complex would also be closed and capped to reduce leachate production. Operating as the prime contractor to the Department of Sanitation, IT will:

- Conduct a comprehensive surface-water investigation of Fresh Kills and the Arthur Kill River and develop a dispersion model to determine the impact of leachate on the tidal estuaries of the region.

- Conduct a hydrogeological investigation and prepare a three dimensional cross-sectional computer models of the complex to establish the key requirements for the leachate containment and collection system. The modeling effort was both on an individual landfill section level and a separate regional model.

- Establish a groundwater and geotechnical monitoring program consisting of approximately 400 wells and borings, an automated data collection system, and an on-site lab.

- Evaluate, redesign, retrofit, and operate an existing leachate collection and treatment system for one portion of the landfill complex. This evaluation became an integral part of the remedial selection process.
- Conduct a full feasibility study to establish the most feasible alternative remedial option both on a section level and a site-wide level. This included conceptual design, areal and two-dimensional cross-sectional.

- Design the leachate containment, collection and treatment systems and maintain a reside engineer on-site during construction.

- Perform a wasteload allocation study to determine the assimilative capacity of potential receiving waters so a leachate treatment plant can be designed and built.

- Prepare the necessary environmental documentation for construction of a resource recovery residual landfill.

- Develop an on-line computerized data analysis and reporting system to manage all of the analytical data from the monitoring well system, as well as the experimental data needed to develop groundwater and surface water models. To accomplish this IT employed the use of the ITEMS™ program, a proprietary software package developed by IT for use in major environmental management projects. A dedicated network connecting the IT, other project team members, and DOS has been established, permitting real time analysis and presentation of analytical and engineering design data.

PROJECT EXPERIENCE

Project Title:	RI/FS and Interim Remedial Design
Site Location:	Stony Point, New York
Client:	Hüls America Inc.

Project Description: IT has been providing environmental consulting services to Hüls America Inc. (Hüls) at the former Kay Fries site in Stony Point, New York, since 1990. The facility was acquired by Hüls and subsequently sold to Universal process Equipment (UPE) in 1987. The sale agreement requires that Hüls be in compliance with the New York State Department of Environmental Conservation (NYSDEC) Administrative Consent Order, which requires investigation and remediation of the site.

The property has been divided into two operable units (OU). OU1 contamination included volatiles in groundwater such as benzene and chlorinated organics. OU2 contaminant of concern is primarily trichloroethylene (TCE) in groundwater. Areas of environmental concern include groundwater contaminated by leaking underground storage tanks (UST), former laboratory bottle dump, and soil adjacent to and beneath a former chemical storage area.

IT has performed the following tasks as part of this project.

- Completed three phases of remedial investigation (RI) for OU1 and one phase for OU2. Completed a full-scale feasibility study (FS) for OU1 and submitted it to NYSDEC in July 1992. Prepared and submitted complete technical documentation, including work plans and engineering reports for a groundwater recovery system to NYSDEC for use in completing the Record of Decision (ROD). All documentation was approved by NYSDEC. A U.S. Environmental Protection Agency (EPA) ROD was received for this site.

- Designed a major groundwater recovery system consisting of a 300-foot-long recovery trench averaging 10 feet in depth to address benzene contamination. Prepared detailed work plans and technical specifications for trench construction and piping connections to the air stripping treatment system.

- Provided coordination with government, private, and related groups, including the NYSDEC case manager as well as the current property owner. Extensive negotiations developed between NYSDEC, local utilities, and owner over treated groundwater discharge. IT resolved the issues by revising the discharge criteria based on an aquatic toxicity evaluation. Revised standards allow for discharge to surface water.

- Prepared a habitat assessment for submittal to the NYSDEC Fish and Wildlife Division. This report received a commendation for excellence by NYSDEC. IT also performed a baseline risk assessment.

- Performed hazardous toxic and radiologic waste (HTRW) design for the OU1 final remedy which included two additional recovery trenches, an air stripper, and a carbon adsorption/ion exchange groundwater recovery and treatment system. Installation of the final remedy is expected in early 1995.

- Procured a NYSDEC air permit in compliance with the Clean Air Act (CAA) for the air stripping operation.

- Determination Resource Conservation and Recovery Act (RCRA) classification of soil to allow for transportation and disposal of contaminated soil during an interim remedial measure (IRM). Sampling and analysis was performed in order to determine the extent of contamination.

IT is providing construction oversight and field support for the installation of the IRM and final remedy.

PROJECT EXPERIENCE

Project Title:	Remedial Investigation/Feasibility Study at the Former Chloro-Alkali Plant
Site Location:	Solvay, New York
Client:	Allied Signal, Inc.

Project Description: IT/Gradient is currently leading a RI/FS at a chloro-alkali plant. Groundwater and surface water from the site discharge into a drainage ditch, which discharges into a nearby lake, also a Superfund site. Mercury and PCBs are the primary contaminants, although VOCs (BTEX and chlorinated organics), hexachlorobenzene, lead, and chromium have also been investigated. The overall design of the RI was driven primarily by the human health and ecological risk assessment needs with limited data collected to define nature and extent of contamination.

Key accomplishment of the RI and risk assessments (human health and ecological), which have been completed, include:

- Using existing information (i.e., knowledge of the former plant processes and available analytical data), IT/Gradient developed a Conceptual Site Model (CSM) describing potential source areas, contaminant transport mechanisms, and potential human and ecological receptors. All data collection proposed in the RI Work Plan was aimed at confirming the hypothesis set forth in the CSM, thereby limiting the scope of the investigation.

- Since the approach to the RI data collection program was based on a CSM and adequate data were existing. Phase 2 of the RI was essentially limited to resampling a few selected monitoring wells.

- Transport modeling conducted using data collected in the RI has been successful in demonstrating that the mercury loading to the nearby Lake is an order of magnitude lower than prior estimates.

- The human risk assessment, which included a number of creative elements, such as a procedure for handling data with elevated detection limits, has demonstrated that the site (with deed restrictions) poses no significant risk to human health.

- The ecological risk assessment which relied on screening against standards, ecological testing, and quantitative risk calculations, has shown that ecological risks posed by certain media are unacceptable, although risks at locations upstream of the site are also unacceptable.

Negotiations with NYSDEC and EPA Region 2 are ongoing to finalize the RI report and risk assessments. IT/Gradient and an engineering subcontractor are presently performing the Feasibility Study.

PROJECT EXPERIENCE

Project Title:	Alternative Remedial Contracting Strategy II (ARCS II)
Site Location:	NJ and NY
Client:	Foster Wheeler Corporation

Project Description: IT performed a wide range of CERCLA site assessment projects under EPA Region II's Alternative Remedial Contracting Strategy II Program (ARCS II). IT completed RI/FSs for the Mattiace Petrochemical, Glen Cove, New York and the Sealand Restoration, Lisbon, NewYork CERCLA sites. Additional work under this pre-remedial evaluation contract included Preliminary Assessments/ Site Inspections (PA/SI) and Hazard Ranking System (HRS) scoring for dozens of other New York and New Jersey sites under CERCLA.

Tasks performed include:

- CERCLA site assessments, including PA/SI, Site Investigation Prioritization, Expanded Site Investigations and HRS scoring.
- Preparation of RI/FS workplans, sampling and analysis plans, site management plans, QA/QC plans, and health and safety plans for review and approval by both EPA Region II and NYSDEC.
- Development of conceptual site models, identifications of ARARS, and performance of human health risk assessments.
- Performance of remedial investigations and feasibility studies, including groundwater modeling, geophysical investigations, ecological inventories, and HTRW groundwater, soil, surface water, and sediment sampling.

Upon approval of project work plans, IT performed a remedial investigation at both the Mattiace and Sealand CERCLA sites consisting of ambient air monitoring; installation of monitoring wells; completion of soil borings; tank, surface water, sediment, soil, and groundwater sampling and chemical analysis; aquifer testing; and performance of an ecological inventory. In addition, geophysical investigations were performed to locate buried drums at the Mattiace site.

HTRW soil and water sampling and chemical analyses for both sites were performed according to EPA CLP. Analytical results underwent data validation according to EPA ARCS II data validation guidelines.

Hydrologic modeling was performed to support contaminant fate and transport studies for both RI sites. Human health and ecological risk assessments were performed and conceptual site models were developed for both sites. Cleanup levels for contaminants not covered by Applicable or Relevant and Appropriate Requirements (ARARs) were developed using the results of the risk assessments on each of these sites.

Based on results of the RI Report for the Mattiace site, IT developed the FS to evaluate remedial alternatives for a site-wide remediation and site closure. Alternatives were screened based on both technical and economic considerations, and a ROD was issued identifying soil venting and groundwater pump/treat as the preferred methods of treatment. A fast turnaround (3 months) Focused Feasibility Study (FFS) was also conducted for the drum burial area at Mattiace, and an expedited ROD was achieved.

The RI Report for the Sealand Site has been reviewed and approved by EPA and NYSDEC. Work on the FS report has recently been completed and submitted to EPA Region II for review.

PROJECT EXPERIENCE

Project Title: Remedial Investigation/Feasibility Study, NAWC Trenton

Site Location: Trenton, New Jersey

Client: Naval Facilities Engineering Command - Northern Division

Project Description: IT Corporation (IT) was contracted by the Naval Facilities Engineering Command (NAVFAC) Northern Division (NORTHDIV) to conduct an Installation Restoration Study, including a Remedial Investigation/Feasibility Study (RI/FS) at the Naval Air Warfare Center NAWC) in Trenton, New Jersey. Since World War II, the site has been used as a testing facility for airplane and jet engines. The primary sources of contaminants include a trichloroethane (TCE) cooling system, underground sewers and sumps, an aboveground jet fuel tank farm, wastewater treatment sludge drying/disposal areas, several underground tanks, and associated piping systems. IT was the prime contractor and only used outside firms for drilling and data validation. Additional technical assignments as part of the RI/FS (C.27.1) included a geophysical survey (C.5.6), ecological assessment (C.20), and a baseline risk assessment(C.27.1.3). All assignments included work plan preparation health and safety plans (C.29) and sampling and analysis (C.25) of soil, groundwater, surface water and/or sediments. The following tasks were conducted:

- During the early portion of the project, IT evaluated the site based on EPA's Hazard Ranking System (HRS) for possible inclusion on the National Priorities List (NPL) of hazardous sites under the Superfund Program. The HRS Scores indicated a borderline status, and the site was ultimately not listed.

- Based on the results of an initial assessment done by others in 1986, IT prepared a Site Investigation (SI) work plan to investigate nine areas of concern, a geophysical survey consisting of magnetometer and ground-penetrating radar surveys, soil borings, and installation of one bedrock and twenty overburden monitoring wells. Soil and water samples were collected and were analyzed by an IT laboratory for the Target Compound List (TCL) using EPA Contract Lab Program (CLP) protocol. The analytical data were validated by IT according to EPA and Naval Energy and Environmental Support Activity (NEESA) protocols.

- Groundwater contour maps and geological soil profiles were generated for the entire site. In 1992, IT prepared a report that identified contaminant levels for soil and groundwater at each area and recommended additional investigations including installation and development of additional monitoring wells, performance of aquifer pump tests, and further background delineation and chemical sampling and analysis. These recommendations became the basis for the project moving to the RI/FS stage and for development of the Remedial Investigation (RI) work plan.

- The RI was completed in two phases: I in 1992 and II in 1993. At the conclusion of the RI, IT had installed 64 monitoring wells in three hydrogeologic formations: *overburden, shallow* bedrock and deep bedrock. Well depths ranged from approximately 10 feet to 130 feet. IT also completed 98 soil borings, and four test trenches. In 1993, IT designed and conducted a complete aquifer test to identify the hydraulic characteristics of the bedrock aquifers. The testing included step and slug tests, as well as a 72-hour pump test in the shallow bedrock.

- An ecological assessment of Gold Run, including sediment and aquatic organisms was conducted. All field work was completed on time and within budget.

- A Baseline Risk Assessment was performed to evaluate the potential threat to human health and the environment. Constituents of concern in surficial soils and groundwater included: chlorinated solvents, petroleum-related contaminants and heavy metals. Present and future land use scenarios indicated negligible risk on-site and to nearby residents, as long as groundwater is not used as a potable source (which it is not).

- Upon completion of the RI, IT conducted a focused feasibility study concerning the groundwater contamination in the fractured bedrock. IT's management of the water quality and aquifer test data and expert hydrogeologic interpretation of the results led to rapid identification of a feasible remedial option. Based on the RI data, it was determined that the contaminant plume corresponded to the physical characteristics of the geologic formations and that pumping the shallow aquifer was an efficient means of capturing contamination in both the shallow and deep bedrock formations. IT performed the comparative evaluation of the alternatives and NORTHDIV implemented the groundwater pump and treat option as an interim remedial measure (IRM). Carbon was used for groundwater treatment initially, however less costly treatment options are under consideration.

PROJECT EXPERIENCE

Project Title:	Environmental Impact Statement for the Storage and Incineration of Liquid and Solid Materials from Remedial Activities in Western New York
Site Location:	New York
Client:	Oxychem

Project Description: IT prepared the environmental impact statements (EIS) in accordance with 6 New York Completion of Rules and Regulations (NYCRR) Part 617 State Environmental Quality Review Act (SEQRA) which included human health risk assessments, terrestrial risk assessments, and food chain bioaccumulation studies of the proposed projects to be submitted to the New York State Department of Environmental Conservation (NYSDEC) and the U.S. Environmental Protection Agency (EPA). In addition to NYCRR Part 617, 361 and 373 were completed. A state-of-the-art impact assessment was negotiated with NYSDEC in response to new EPA guidance. Incorporating EPA guidance into existing NYSDEC SEQRA regulations was in an infantile stage at the onset of this project. IT developed protocols that set precedence for NYSDEC policy. An expedited response to Administrative Consent Order (ACO) deadlines resulted in a letter of commendation from the client. The nature of the proposed action was the comprehensive solution of past waste disposal problems at several locations around western New York, including:

- Love Canal
- 102nd Street Landfill
- Hyde Park Landfill
- North Tonawanda Sewer System
- Blacks Creek
- Evergreen Golf Course Drum Burial Area

This project focused on a multiphase approach to handling hazardous waste through the construction of an on-site storage facility, solid materials thermal destruction unit, and modification of an existing liquids waste incinerator. The waste material at these sites included 2,3,7,8-tetrachlorodibenxzo-p-dioxin (2,3,7,8-TCDD); polychlorinated biphenyls (PCB); phenols; and various inorganic elements.

The purpose of the project was to remove this material from off-site locations by excavation into either double-lined bags or drums. Once enclosed, the material was shipped to the centralized storage facility (CSF) at the Oxychem plant in Niagara Falls. After being secured in the CSF, the material would eventually be destroyed in either the liquids incinerator (LI) or the thermal destruction unit (TDU).

Detailed computer modeling of air quality was conducted using EPA and NYSDEC protocols. Long-term, short-term, and synthetic meteorological data were used in conjunction with the Industrial Source Complex Air Quality Dispersion Model. This information was used in conjunction with analytical soils and sludge data for the CSF, emissions data created by three trail burns for the LI, and stack emissions estimates for the TDU as the basis for the risk assessments and terrestrial food chain studies.

These studies in turn focused on quantifying reasonable exposures of human receptors at the maximally exposed workplace (MEW), maximally exposed residence (MER), and an average location in Niagara Falls. For the terrestrial animals, eight representative target species were selected and exposures quantified at five different habitats. Estimated exposure concentrations were determined in the following media:

- Air
- Surface water
- Soil
- Vegetation
- Fish
- Meat
- Mother's milk

A toxicity assessment was performed for each and risk levels evaluated.

APPENDIX
B

Appendix B

Client and Regulatory Agency Commendation Letters

AUG 17 1995

BROOKHAVEN NATIONAL LABORATORY
ASSOCIATED UNIVERSITIES, INC.

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Office of the Director

August 10, 1995

Mr. Jock Merriam
IT Corporation
2200 Cottontail Lane
Somerset New Jersey 08837

Dear Mr. Merriam:

SUBJECT: EVALUATION - IT'S OU V PROGRAM

I would like to take this opportunity to commend both Ms. Maria Watt, Program Manager and Mr. Steven Moran, Remedial Investigation Task Manager on their outstanding performance during the execution of the Brookhaven National Laboratory (BNL) Operable Unit (OU) V field investigation and preliminary evaluation of the Phase I analytical results. The OU V field program was mobilized within two weeks of receiving authorized funding and was executed on an expedited basis in order to overcome schedule delays due to initial lack of funding. The field investigation was executed in a cost effective manner which resulted in a net $200,000 saving to BNL.

The preliminary evaluation of the Phase I data was completed within one month from the demobilization of the field program. A comprehensive database was developed on the Intergraph, GIS system on an expedited basis and was used to screen the phase I analytical data against developed screening levels. The Preliminary Evaluation of the Phase I Analytical Data was issued in record time and was a high quality document. This document allowed BNL to negotiate a scope of work for a Phase II investigation with appropriate agencies and still allowed enough time to complete the Phase II investigation and meet schedule milestone submittal dates.

An important part of the support role which Mr. Moran has provided has been his personal and professional accessability made possible by his presence at the on-site field office.

In addition to the technical excellence which Ms. Watt and Mr. Moran have provided, dealing with them under even potentially trying conditions has always been very pleasant. BNL is very pleased with IT's work to date and looks forward to continuing the working relationship which has developed over the past two years.

Sincerely yours,

William H. Medeiros
Project Manager

WHM:mdb

c: T. Burke
W. E. Gunther
R. F. Howe
S. Moran
M. Watt
File: IT Contract 710617

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION II

JACOB K. JAVITS FEDERAL BUILDING

NEW YORK, NEW YORK 10278-0012

DEC 1 4 1993

Carson L. Nealy
Area Manager
U.S. Department of Energy
Brookhaven Area Office
53 Bell Avenue
Upton, New York 11973

Re: Brookhaven National Laboratory
Operable Unit V RI/FS Project Plans

Dear Dr. Nealy:

The United States Environmental Protection Agency (EPA) has reviewed the Operable Unit V Remedial Investigation/Feasibility Study (RI/FS) project plans dated October 29, 1993. The RI/FS project plans consist of the "Remedial Investigation/Feasibility Study Work Plan, Volume I and II", the "Sampling and Analysis Plan", and the "Site Health and Safety Plan".

In general, the plans were quite good. They reflected a great degree of thought and organization, and they accurately incorporated the consensus reached at the scoping meeting. Although the attached comments may seem extensive, there are very few major issues. The comments on the Work Plan have been organized into "Major Comments" and "Other Comments". The "major comments" must be addressed, but may require no changes to the Work Plan. The "other comments" are offered because EPA's review team felt they would improve the clarity of the document. Comments on the Sampling and Analysis Plan generally require changes to the tables or clarification of the standard operating procedures.

If you have any questions or require clarification on the comments, please contact me at (212) 264-5393.

Sincerely,

Mary P. Logan

Mary P. Logan
Remedial Project Manager

Attachment

PRINTED ON RECYCLED PAPER

DEC ? . 1995

FOSTER WHEELER ENVIRONMENTAL **INTEROFFICE CORRESPONDENCE**

DATE: December 18, 1995

TO: All ARCS II Personnel LOCATION: Lyndhurst

FROM: D Sachdev *Dev Sachdev* LOCATION: Lyndhurst

SUBJECT: ARCS II PROGRAM - EPA CONTRACT NO. 68-W8-0110
EPA EVALUATION FOR PERIOD 16 (MAY 1, 1995 TO OCT 31, 1995)

This is to inform you that we have been informed by EPA of the Performance Evaluation Board's recommendations for Evaluation Period-16 (May 1, 1995 to October 31, 1995) as follows:

Program Management (PM) - Exceed Expectation. EPA informed that PM award fee will be between 61 to 80%. We expect to receive approximately 70% PM fee (mid-high satisfactory).

Remedial Planning (RP) - During Period-16, 20 active work assignments were evaluated. Ebasco received four (4) **Outstanding**, four (4) **Exceed Expectation** and eleven (11) **Satisfactory** ratings. A **Less Than Satisfactory** rating was issued for Genzale Plating (056). The list of site managers who received superior ratings along with the list of work assignments is given below:

FWENC-SM	EPA Rating	Work Assignment
John Gorgol	Outstanding	Roebling Steel (025)
Frank Tsang	Outstanding	Fulton Terminal (042)
John Gorgol	Outstanding	Roebling Steel (067)
Edgar Aguado	Outstanding	Pre Remedial (076)
Maria Watt	Exceeds Expectation	Sealand Restoration (022)
Sue Obaditch	Exceeds Expectation	Mattiace Petrochemical (059)
Mark Sielski	Exceeds Expectation	Warwick Landfill (064)
K Subburamu	Exceeds Expectation	Circuitron (082)

The evaluation for Period-16 is one of the best evaluations received for Program Management and Remedial Planning. We received higher ratings for eight (8) of the 20 work assignments evaluated i.e., 40% of all work assignments evaluated. Furthermore the Roebling Steel and Pre-Remedial Site Assessment work assignments accounted for over 75% of the LOE expended during Period 16. This means that over 75% of our effort was evaluated as Outstanding. We, at ARCS II Program Management Office, appreciate your continued support on this program. We especially thank John Gorgol, F Tsang, Edgar Aguado, Maria Watt, Sue Obaditch, Mark Sielski and K Subburamu for getting high ratings as indicated above.

Your hard work and superior performance will ensure our position as the leading ARCS Contractor in Region II.

Once again your continued support on the ARCS II Program is appreciated.

cc:		
	S Box	J Leonard
	D Rogers	K McDonald
	M Brown	P Mavraganis
	L Carter	M Scott
	S Bieniulis	A Savino (Wehran)
	K Fitzgerald	J Merriam (IT)
	M Fitzgerald	K Howe
	J Ferrante	R Harmon
	W Dyok	J DeFeis
	F Jones	

OxyChem®

November 3, 1993

Dr. E. A. Berman
General Manager
IT Corporation
165 Fieldcrest Avenue
Edison, NJ 08837

Dear Dr. Berman:

On behalf of OxyChem, I want to express my appreciation to you and your staff, especially Ms. Maria Watt, Project Manager; Mr. Richard Prann, Risk Assessment/Air Modeling Task Manager; and Dr. Nai-chia Luke, Senior Technical Consultant. Your staff developed a comprehensive document on an expedited basis in order to meet Consent Order dates. A complex multisource air model and risk assessment was completed in an extremely tight time frame which required a high degree of technical competence. A state-of-the-art multisource impact assessment protocol was also successfully scoped with regulatory agencies.

IT Corporation's capabilities, qualifications and technical expertise in performing the Thermal Destruction Unit (TDU) Environmental Impact Statement (EIS), especially in the areas of air modeling and human health and ecological risk assessments, was of significant importance to OxyChem in negotiating with the agencies. We look forward to continuing to work together with IT on this project.

Sincerely yours,

Lloyd F. Wood

Lloyd F. Wood
Director
Special Environmental Programs

LFWW116S

New York State Department of Environmental Conservation
47-40 21st Street, Long Island City, New York 11101

Thomas C. Jorling
Commissioner

October 12, 1993

Phillip Gleason, P.E.
Director, Landfill Engineering
The New York City Department of Sanitation
Waste Management and Facilities Development
44 Beaver Street, 9th Floor
New York, New York 10004

Jane Levine, Esq.
Deputy Commissioner of Legal Affairs
New York City Department of Sanitation
125 Worth Street, Room 710
New York, New York 10013

RE: Fresh Kills Landfill Consent Order; Appendix A-6: Subject 15 (DEC Case Number D2-9001-89.03)

Dear Mr. Gleason and Ms. Levine:

The Department has completed a review of the document entitled Final Hydrogeological Report and the amendment to that document entitled Addendum to Final Hydrogeological Report. As submitted, the document is unacceptable for the fulfillment of milestone 15 in Appendix A-6. The reasons for this determination are outlined in the comments attached herein. It is the Department's determination that the issues outlined in the attached comments can be readily and promptly reconciled and, based on prior correspondence, that these appear to be issues that the New York City Department of Sanitation is willing to address. For these reasons, the remaining issues are determined to be minor in nature and a Notice of Minor Milestone Deficiency is hereby issued for the Final Hydrogeological Report as amended by the Addendum to the Final Hydrogeological Report. Consistent with the provisions defined in paragraph XIII of the Order on Consent for Fresh Kills Landfill, an additional 45 days are provided to address the attached comments to the satisfaction of the Department.

Review of the information contained in the report and the activities during performance of the hydrogeological field program during the last three years clearly indicates the high quality of data that has been obtained. This is due in large part to the management of the project by New York City Department of Sanitation staff, and particularly to the professional and highly focused efforts of consultants on the project: project manager for IT Corporation, Steve Posten; Ed Wysocki and Bob Landle of IT Corporation; Tim Pagano, Bob Miller and Larry Coddington of Wehran Envirotech, and

Don Siegel of Stearns and Wheeler. The efforts of these and other members of the Fresh Kills Landfill project team are to be commended.

If there are any questions on the substance of the attached comments you may contact me at the above address or by phone at (718) 983-0936.

Sincerely,

Daniel C. Walsh

Daniel C. Walsh
Associate Geologist

Gil Burns NYSDEC
Rich Bruzzone, NYSDEC
Paul Gallay, NYSDEC
Glenn Milstrey, NYSDEC
Bill Wurster, NYSDEC
Robert Lemieux, NYCDS
Heidi Rubinstein, NYCDS
Alex Saunders, NYCDS
Sue Bayat, NYCDS
Norma Iturrino, NYCDS
FKL Document Repository #1
FKL Document Repository #2

APPENDIX
C

Appendix C

Key Personnel Resumés

Project Manager

Maria Watt

Professional Qualifications

Ms. Watt has 13 years of experience in environmental engineering and has extensive experience in managing multitasked, multidisciplined projects requiring interoffice coordination as well as agency negotiation. Her background contains a unique blend of chemical engineering combined with groundwater and surface water hydrology providing exceptional skills for the evaluation of source-pathway-receptor relationships. Ms. Watt has managed a major EPA contract for Region II. This contract included evaluating sites involved in Hazard Ranking System (HRS) scoring; remedial investigation/feasibility studies (RI/FS); remedial design (RD); and construction oversight. Ms. Watt has also managed specific work assignments under this contract focussing on Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Region 2 RI/FSs. Ms. Watt has managed major RI/FSs within New York and New Jersey during the past eight years and serves as a CERCLA Region 2 RI/FS expert for the Northern Region of IT. She was the project manager on approximately half of these projects, and was a task manager for the rest. These projects had values between one and four million dollars. As a Program Manager, Ms. Watt has managed and provided technical support to over 50 multidisciplined professionals. Her experience provides technical insight into the negotiation of cleanup levels with appropriate state and federal regulatory agencies. Ms. Watt's familiarity with risk assessment methodologies has also been instrumental in Environmental Impact Statement (EIS) negotiation.

Specific projects include developing of Resource Conservation and Recovery Act (RCRA) permit applications; preparing RI/FSs under CERCLA Region 2 and 3 for Superfund sites; performing engineering evaluations and cost analysis (EE/CA) reports; developing design plans, process flow diagrams (PFDs), and specifications for hazardous waste treatment and groundwater extraction, treatment, and reinjection systems; developing site closure plans; and performing treatability studies. Additional areas of expertise include National Environmental Policy Act (NEPA) compliance via the preparation of EIS for incineration units and hazardous waste storage facilities, computer modeling and analysis of surface water runoff and groundwater flow, design of hydraulic structures, detention basin design, and modeling and analysis of solute transport systems.

Education

M.S., Chemical Engineering, Rutgers University, New Brunswick, New Jersey (expected 1998 completion)
B.S., Chemical Engineering, Rutgers University, New Brunswick, New Jersey; 1985

Registrations/Certifications

State of New Jersey Professional Engineers License; No. GE38847; 1994
Health and Safety Training for Hazardous Waste Operations (40 hours) EBASCO, Denver, Colorado; 1987

Experience and Background

1988 - Present
Program Manager, Design Engineering, IT Corporation, Somerset, New Jersey

- Program Manager for CERCLA contract for Brookhaven National Laboratory, U.S. Department of Energy (DOE) (approximately $10 million contract). Responsible for the management of Operable Unit III and Operable Unit V RI/FS as well as the regional groundwater model project. Provides technical and administrative guidance to seven task managers who in turn manage a staff of more than 50 personnel. Responsible for the coordination and oversight of a major team subcontractor (Geraghty & Miller) as well IT experts from over four IT offices. Negotiates directly with agencies and has daily communication with DOE representatives. Received commendations from the agencies for expediting and submitting high quality documents.

- Program Manager for the Alternative Remedial Contracting Strategy II (ARCS II) program for EPA Region 2 (approximately $24 million contract). Responsible for client negotiations, contract modifications, resource allocations and contract audits. Also responsible for ensuring adherence to the ARCS II contract guidelines and maintaining proper contract QA/QC on all deliverables. Provides daily management of contract in terms of cost and schedule control, oversee contract invoicing, and technically supports project managers on the contract. All work assignments on the contract utilize standard EPA protocols and the Contract Laboratory Program (CLP) analytical requirements. Received numerous commendations from the agency for expediting an interim removal action and for completing field activities 30 percent under budget and ahead of schedule.

- Project Manager/FS Task Manager of an EPA sponsored Alternative Remedial Contracting Strategy II (ARCS II) program CERCLA Region II RI/FS for the Sealand Restoration Inc., site located in the Town of Lisbon, New York (1.5 million dollar project). Responsible for management and technical oversight of the RI leader, field operations leader, and risk assessment manager. Reviewed and managed the development of the work plan, the sampling analysis plan (SAP), the health and safety plan (HASP), the Quality Assurance Project Plan (QAPP), the site management plan (SMP) and the RI report which contains a site-specific risk assessment performed in accordance with the Risk Assessment Guidance for Superfund (RAGS), and the Final FS Report. Responsible for the technical guidance and management of the Feasibility Study, coordination of Treatability Studies, developing remedial alternatives and evaluation of conceptual designs. Supported EPA in the development of cleanup levels, preparation of the Record of Decision (ROD) and provided other community relations support.

- Project Manager/FS Task Manager for both operable units of the EPA sponsored ARCS II program CERCLA Region 2 RI/FS for the Mattiace Petrochemical Superfund site located in Glen Cove, Nassau County, New York (1.2 million dollar project). Operable Unit One consisted of a site-wide RI/FS while Operable Unit Two focused on the delineation and treatment of over 300 buried drums. As the project manager from both operable units, Ms. Watt has been intimately involved in the Mattiace RI/FS from the EPA's issuance of the work assignment form in November 1988 and the development of the project plans to the completion of the RI/FS documents and the Signing of the RODs in September 1990 and June 1991. Since both the Sealand Project previously mentioned and the Mattiace site are both under the ARCS II contract, similar responsibilities and management skills were also performed for the Mattiace site. Guided the development of the risk assessment and negotiated ARAR based, technology based, and health risk based cleanup levels with the EPA and the NYSDEC. She has managed over 50 professionals on this project over its' 3 year life-span and is responsible for the successful completion exemplified by receiving one of the highest performance evaluations (5.0) from the EPA.

- Project Manager for an incinerator and RCRA storage EIS for Occidental Chemical Corporation (OxyChem) for the remediation of the Love Canal Site and other OxyChem associated sites. A state-of-the-art cumulative impact assessment was negotiated with the New York State Department of Environmental Conservation (NYSDEC) in response to new EPA guidance. Incorporating EPA guidance into existing NYSDEC SEQRA regulations was in an infantile stage at the onset of this project. IT Corporation developed protocols that set precedence for NYSDEC policy. An expedited response to meet ACO deadlines resulted in a letter of commendation from the client. Responsibilities included organization and management of the overall project; regulatory negotiations with NYSDEC/NYSDOH; technical guidance on the development of risk assessment, air modeling and incineration design tasks; coordinating schedules and budgets of interoffice IT personnel; managing budget and forecasting costs; and technical preparation of the Draft Environmental Impact Statement according to the State Environmental Quality Review Act (SEQRA) guidelines.

- FS Task Manager for the New York State Department of Sanitation (NYSDOS) Fresh Kills Landfill Feasibility Study ($800,000 dollar project). A feasibility study was performed for the Fresh Kills Landfill leachate mitigation project. The feasibility study integrated continuing landfill activities as well as other continuing programs with remedial alternatives. The feasibility study was streamlined to address the specific concerns of the Administrative Consent Order (ACO). Responsibilities include management of the FS evaluations, document preparation, integration of conceptual design with other DOS programs, client negotiations, performing ARARs search for the site, development of site specific cleanup levels, evaluation of leachate treatment alternatives and review of conceptual designs developed by O'Brien & Gere.

- FS Task Manager/peer review for the CERCLA Region 3 FS for the Woodland Landfill Superfund site located in Ceal County, Maryland. IT was contracted by Bridgestone/Firestone Inc. to perform a Principal Responsible Party (PRP) RI/FS. The project included preliminary investigations, site characterization, groundwater evaluation, additional field work, remedial investigation and preliminary feasibility study reports, and final feasibility study report. Some of the tasks included a soil gas survey, geophysical survey, evaluation of existing data, data management system, topographic mapping, aerial photographic interpretation, installation of monitoring wells, groundwater modeling, groundwater sampling and analysis, borings into the waste, quality assurance (QA), health and safety, data evaluation, report writing, risk assessment, treatability studies, and feasibility study.
  Specific responsibility included identification and development of work plans for treatability studies; culling state and federal ARARs including Maryland COMAR regulations; development

of cleanup levels; evaluation of appropriate remedial technologies and alternatives according to CERCLA guidelines; recommendations for remedial designs and preparation of a CERCLA approved FS Report.

- A Part 360 permit for the Kodak solid waste incinerator located in Rochester, New York. Positioned as the Technical Manager for the management and oversight of the development of an operation and maintenance manual, a contingency plan, a closure plan, and an engineering design document necessary to satisfy requirements of the Part 360 permit application. Responsibilities included management of personnel resources, schedule and budget, as well as client and agency negotiations.

1987 - 1988
Associate Engineer, Chemical and Physical Processes, EBASCO Services, Inc., Lyndhurst, New Jersey

- FS Task Manager for the CERCLA Region 2 RI/FS for the Burnt Fly Bog - Westerly Wetlands Project for the New Jersey Department of Environmental Protection. Responsibilities included evaluation of remedial technologies and alternatives for PCB and lead contaminations, modeling and analysis of surface water runoff and groundwater flow, development of a total site water balance using the HELP and TR-20 models, preparation of report documents, installation of stream weir and Stevens recorder for flowrate measurements, installation of a MET-ONE weather station, data reduction, development of a "state-of-the-art" water budget for a Superfund site and sampling of sediment and surface water.

- CERCLA Region 2 RI/FS for the Vineland Chemical Plant Project for the Environmental Protection Agency (EPA) under the REM III contract. Positioned as the Feasibility Task Manager. Responsibilities included preparation of the feasibility study for the Union Lake Area, sampling of sediment and surface water, measuring stream flowrates with a current meter, conducting water quality assessments, modeling and analysis of surface water runoff and sediment transport.

1986 - 1987
Environmental Engineer, Henderson and Bodwell Consulting Engineers, Somerset, New Jersey
Responsibilities included: computer modeling and hydraulic analysis of surface water runoff, design of hydraulic structures (i.e. detention basins and dams), water quality analyses, earthwork calculations and site plan design for residential and commercial construction projects. Additional responsibilities included the development of storm water management reports for use in site development and flood plain analysis. Methodologies involved the use of various types of software, including HEC II, TR-20, TR-55 and other computer programs used throughout the industry. In addition, responsible for submitting stream encroachment applications for company projects.

1985 - 1986
Environmental Engineer, New Jersey Department of Environmental Protection, Stream Encroachment Bureau Trenton, New Jersey
Responsibilities included the hydraulic analysis of culverts, bridges, and detention basins for state stream encroachment applications, the interpretation of hydraulic data to determine the flood potential at construction sites. Methodologies used in the flood plain analysis involved the application of various computer programs including HEC II, TR-55 and TR-20. Involved in the preparation and review of technical reports related to stream encroachment applications.

Professional Affiliations

American Institute of Chemical Engineers

Publications

Hunter D. and M. Hartmann-Watt, "Water Budget for the Burnt Fly Bog Westerly Wetland Site," EBASCO Inc., Lyndhurst, New Jersey.

Remedial Investigation

13241Somerset

Edmund J. Wysocki

Professional Qualifications

Mr. Wysocki has 17 years of experience as a geologist, with a background in both the environmental and petroleum industries. Since joining IT Corporation in 1991, he has been involved mainly with the Fresh Kills Leachate Mitigation Project; a $41.7 million project dealing with a comprehensive hydrogeological investigation and remedial design of a leachate and containment system at the largest landfill in the world. As a Project Manager/senior task manager he has experience in many aspects of a remedial investigation. He provides onsite and office supervision, inspection of field operations, coordination between the client and subcontractors, and interaction with feasibility studies. His knowledge in the environmental/waste management field includes soil and groundwater contamination evaluation.

Education

M.B.A., Finance and International Business, University of St. Thomas, Houston, Texas; 1989
B.A., Geological and Geophysical Sciences, Princeton University, Princeton, New Jersey; 1981
Additional training:
40-hour Health and Safety Training (per OSHA 29 CFR 1910.120)
Certified in Cardio-Pulmonary Resuscitation and First Aid

Registrations/Certifications

Certified Professional Geologist: AIPG 9290; 1994

Experience and Background

1991 - Present
Project Manager/Senior Task Manager, IT Corporation, Somerset, New Jersey
Responsibilities include project management of multiphase environmental investigations and design of the investigative studies. Experience includes:

- Technical operations manager for the remedial investigation for the $45 million Fresh Kills Leachate Mitigation Project/Fresh Kills Landfill System in Staten Island. This task required daily supervision of all field activities, senior review of a field data produced, and management of subcontractors (construction and engineering) involved in the installation of over 200 monitoring wells, 50 soil borings and 200 piezo-electric cone penetration tests (P-ECPTs). Coordination of data analysis and incorporation into hydrogeological studies and planning of subsequent investigative phases between subcontractors and regulatory agencies has allowed IT to meet all consent order deadlines of this extremely complex project. Specific experience includes:

- Supervision of up to 8 field geologists and drill rig crews working concurrently as well as maintaining strict protocol relative to geotechnical, stratigraphic, palynological, and downhole geophysical data collection and monitoring well installation.

- Supervision of field geologists in soil sample and rock core description, preparation of soil boring and rock core logs, and determination of site stratigraphy in order to adhere to the sampling protocol as stipulated in the Site Investigation Plan.

- Senior level review of soil sample and rock core descriptions and classifications, selection of soil samples for geotechnical analysis, and maintaining the archiving, tracking and storage system of the extensive soil and rock sample collected during numerous investigations at the Fresh Kills site.

- Performed detailed stratigraphic analysis of approximately 300 soil borings and 200 Piezo-Electric Cone Penetration Tests (performed in lieu of conventional soil borings) over a 2,700 acre site in Staten Island, New York.

- Coordinated the integration of the available stratigraphic and hydrogeologic data into the feasibility study concerning possible leachate containment systems at the Fresh Kills site.

- Prepared hydrogeological report.

1981 - 1991
Senior Geologist/Geophysicist, Pennzoil Company, Houston, Texas
Responsibilities included prospect evaluations, coordinating exploration and development programs, and preparing of detailed technical reports. Experience included generating of geological and geophysical structure maps and isopachs; identifying and correlating stratigraphic units using electric logs, core data, and seismic records; and characterizing reservoirs using porosity, permeability, fluid contacts, fluid flow, and pressure data. Specific experience and responsibilities included:

- Project geologist in charge of the daily operation and evaluation of Pennzoil's portion of the largest oil and gas field in the Gulf of Mexico (Eugene Island Block 330), as well as additional major oil and gas field. Included maintaining government compliance paperwork, notification of consortium partners of significant activity, and the geological and geophysical evaluation of the fields.

- Lead geologist/geophysicist for the evaluation of the Mobile Bay Area, Offshore Alabama/Mississippi. This was one of the most active exploration areas in the United States at the time of this assignment. Exploration objectives in this area were below 20,000 feet, complicating the exploration and development program. Reported to upper management daily concerning activity in this area due to its high profile.

- Lead geologist/geophysicists for deepwater exploration in the Gulf of Mexico. This was the most active area of exploration in the Gulf of Mexico at this time of this assignment. Responsible for tracking industry activity and reporting the details of any activity to upper management and interpretation of all available geological and geophysical data.

Professional Affiliations

American Association of Petroleum Geologists
American Institute of Professional Geologists (Application Pending)

Edward P. Rashak

Professional Qualifications

Mr. Rashak is a multi-project environmental manager with significant experience concerning major industrial sites, landfills, and chemical spills. He is accomplished in negotiating major contracts and has an extensive background in managing projects from initial site assessment through remediation. Mr. Rashak's prior government service has enhanced ability to deal effectively with complex regulatory issues. He is successful with cost-effective site remediation, customer service, and operational support units.

Education

B.A., Geology, Columbia University, New York, 1975
M.S., Geochemistry/Geology, University of Texas at Dallas, 1985
Completed course work with research toward Ph.D. at University of Texas at Dallas, 1985-86.

Registration/Certifications

Professional Geologist: Pennsylvania

Experience and Background

1987 - Present
Project Manager, Regulatory Compliance and Remediation, IT Corporation, Somerset, NJ.
Project Manager responsible for industrial site assessments, measuring environmental impairment, designing, sampling, preparation of remedial action work plans, and effecting remedial action at major industrial and chemical facilities to achieve regulatory compliance. This position has involved management of all aspects of groundwater remediation, groundwater modeling and geochemical analysis. Responsible for all technical and managerial aspects for three petroleum terminal projects, including a recent Feasibility Study, Design and Construction Remediation Project for one terminal in Carteret, NJ. Other project responsibilities include providing senior geologic evaluation on groundwater flow capture and treatment tasks.

> ***Amoco Corporation, New Jersey and New York*** - Managed all phases of geochemical and hydrogeologic site assessment and design and installation of a petroleum product recovery system at a large oil storage and distribution terminal in Carteret, New Jersey. Performed delineation, design and installation of a recovery system for a multi-million gallon petroleum product plume at a terminal in Brooklyn, New York. Managed hydrocarbon recovery operations at a terminal in Mount Vernon, New York. Designed and installed of a soil vapor extraction/sparging system at a service station in Mamaroneck, New York.

Henkel Corporation, New Jersey - Directed all phases of geochemical and hydrogeologic site investigations at two specialty chemical production facilities in Carlstadt and Harrison, New Jersey. Extensive PCB, priority pollutant metals, and volatile organic compound contamination was found in lagoons and other areas of the Carlstadt facility. Designed an $8 million soil stabilization and capping system with groundwater collection and treatment, including a cutoff wall. The design was approved by NJDEP with minimal modification. The system is currently operational.

Purex Industries, New Jersey - Managed geochemical and hydrogeologic site assessments at a former Resource Conservation and Recovery Act (RCRA) solvent reclamation facility in South Kearny, New Jersey and an aircraft engine testing and repair facility in Millville, New Jersey. Both facilities were subject to extensive volatile organic and hydrocarbon contamination. Performed extensive remediation regarding volatile compound and hydrocarbon contaminated soils at the Millville facility.

1986 - 1987
Senior Geochemist/Hydrogeologist, Dan Raviv Associates, Inc., West Orange, New Jersey.
Geochemical and hydrogeologic analysis of groundwater contamination at industrial sites, landfills and chemical spills. Specialist in all aspects of soil and groundwater quality analysis.

1984 - 1986
Staff Geochemist, Mobil R&D Corp., Dallas, Texas.
Research in all aspects of organic geochemistry with emphasis on development of analytical techniques using hydrous pyrolysis, low temperature plasma, GC and GC/MS for refinement of mathematical models used in petroleum maturation and migration.

1983 - 1984
Research and Teaching Assistant, University of Texas at Dallas, Richardson, Texas.
Thesis research, "Organic Geochemistry of Woodford and Green River Shales using Hydrous Pyrolysis" conducted entirely at ARCO R&D facility in Plano, Texas in conjunction with the University of Texas at Dallas.

1980 - 1982
Geologist to Senior Geologist, New Jersey Division of Water Resources, NJDEP, Trenton, New Jersey.
Responsibilities in the Bureau of Ground Water Management included hydrologic and geochemical analysis of industrial discharges to groundwater and the review and preparation of reports and discharge permits for approximately 50 sites. Participated in an aquifer exploration program which required seismic surveys and pump tests. Performed extensive investigation of GEMS Landfill site, New Jersey s fourth largest Superfund site, using resistivity and conductivity surveys to augment groundwater monitoring program. Prepared field investigation report which received

Commissioner s commendation. This position also required the siting and supervision of installation of several hundred groundwater monitoring wells.

1979 - 1980

Hydrogeologist, Rutgers University, New Brunswick, New Jersey.

Coordinated the collection of hydrogeologic and geologic information, water works data, samples for analysis and data from interviews with 325 water purveyors in New Jersey for the National Cancer Institute which sponsored a contract project position at Rutgers University involving drinking water and cancer.

Stephen G. Moran

Professional Qualifications

Mr. Moran is experienced in the hydrogeologic, hazardous waste and radiological aspects of groundwater projects. He is thoroughly knowledgeable of the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and Superfund Amendments Reauthorization Act (SARA) and USDOE (United States Department of Energy) regulations including the preparation of proposals, work plans, sampling plans, health and safety plans, quality assurance plans, cost estimates, and RI/FS reports. He has extensive experience evaluating the nature and extent of chemical and radiological contamination both from a geologic and hydrogeologic standpoint. Additionally, Mr. Moran has acted as Project Manager on various remedial construction projects. He has conducted aquifer characteristic, groundwater contaminant, and other groundwater flow studies and field investigations, including the design and inspection of monitoring well and collection well installations, soil investigations, radiological and chemical tank sampling, and has supervised subcontractors.

Education

B.S., Geology, New Mexico Institute of Mining and Technology; 1987

Experience and Background

1994 - Present — ***Senior Project Scientist, IT Corporation, Brookhaven National Laboratory, Upton. New York.***

- IT Corporation representative to Brookhaven National Laboratory (BNL). Currently Mr. Moran is stationed at BNL to provide enhanced project management and coordination with the BNL Office of Environmental Restoration (OER). As part of his duties at BNL, Mr. Moran has characterized three Strontium 90, one tritium, one Cobalt 60, and five large chlorinated volatile organic groundwater plumes (extending over 10,000 feet from the source areas). Mr. Moran has evaluated radiological and chemical contamination in groundwater and soil associated with several underground tanks, cesspools, three nuclear reactors and related nuclear research facilities and various material scrap yards.

- Deputy Program Manager for BNL OU III RI/FS Investigation. Responsible for team subcontractor oversight, quality assurance, technical direction and overall day-to-day management during the preparation of the project plans and cost proposals, conducting the actual field programs and completing the necessary reports. Assisted in the negotiation of the OU III Phase II contract with BNL to implement the RI/FS (total contract value approximately $5.5 million). Currently providing day-to-day management of OU III RI tasks.

- Deputy Program Manager/Remedial Investigation (RI) Manager for BNL Operable Unit (OU) V Remedial Investigation/Feasibility Study (RI/FS). Provided oversite of OU V field program, prepared a preliminary evaluation of investigation results and RI/FS reports. Currently providing day-to-day management of OU V RI tasks at BNL (total project value approximately $3.0 million).

- RI Task Manager for RI/FS for the Army Environmental Center (AEC) at Louisiana Army Ammunition Plant (LAAP). This project included 12 operable units on a 15,000-acre facility. The LAAP load, assemble and pack ammunition facility contained extensive explosive contamination (TNT, RDX, and HMX). The total project cost was approximately $6 million for the RI/FS. Duties included scoping the project plans from a geologic/hydrogeologic perspective, negotiating with the Army and preparing project plans in accordance with USEPA and USACE guidelines.

- RI Manager for Sealand Restoration Site (SRI) in Lisbon, NY. SRI is a USEPA Alternative Remedial Contracting Strategy (ARCS) site located in USEPA Region II in upstate, NY (total project value approximately $2 million). Duties included data evaluation, data interpretation and preparation of an RI report. The project included a detailed evaluation of the nature and extent of contamination and contaminant fate and transport in groundwater pathway.

- FS Task Manager for SRI site in Lisbon, NY. Duties included evaluation, development and preparation of groundwater remediation alternatives. Alternatives included groundwater extraction and recharge scenario employing collection wells, injection wells, collection trenches and recharge basins.

- Task Manager for CIBA Geigy (Toms River) Wetland Mitigation Project. Duties included evaluation of the impact of groundwater remediation on wetlands associated with Toms River.

- Project Manager for a site investigation at Lilly Industrial Coatings in Paulsboro, NJ. Duties included managing groundwater and soil investigations and preparing written and oral presentations to NJDEP. Based on these investigations, IT is attempting to reclassify the aquifer of concern as a non-drinking water body, thereby eliminating the need for a costly groundwater remediation program.

- Task Manager for Picatinny Arsenal RCRA Part B Permit. Duties included evaluation of an RI report and USGS model detailing nature and extent of contamination and contaminant fate and transport associated with two areas of concern. Additionally, Mr. Moran provided detailed responses and recommendations to USEPA comments on a previous permit application prepared by a different consultant.

- Project Manager for an arsenic contamination investigation at a Texaco Terminal in Bayonne, NJ. Tasks included preparing project plans, conducting field sampling and preparing a site report. The project was conducted under ISRA (previously ECRA) and federal guidelines.

1993 - 1994 *Project Manager, Eastern Environmental, Inc., Hopewell Jct., New York.*

- Project manager for the installation of a leachate collection system for Ancram Landfill in Columbia County, New York. This system included installing collection wells, wet wells, HDPE liner, PVC pipe, clay cap, and gravel bedding.

- Project manager for the remediation of petroleum contaminated soil associated with a fuel storage facility. The work involved the removal and disposal of contaminated soils in accordance with New York Department of Environmental Conservation (NYDEC) and U.S. Environmental Protection Agency (EPA) regulations.

- Project manager for the installation of a liquid product collection system at Anchor Motor Freight in Tarrytown, New York. The system involved the installation of collection wells, ground water collection trench, pipe and pump station.

1987 - 1993 *Project Hydrogeologist and formerly Hydrogeologist, Malcolm Pirnie, Inc., Mahwah, New Jersey.*

- Project manager of a $3 million RI/FS at a 45-acre superfund site (Nassau County Fireman's Training Center) in Long Island, New York. Work included designing and supervising the installation of monitoring wells, and delineating four floating hydrocarbon bodies, one solvent plume and one downgradient chlorinated hydrocarbon plume. The project involved preparing an RI/FS Workplan, QA Plan, H&S Plan, RI/FS cost estimates and the RI/FS report.

- Project leader for remedial activities at Tybouts Corner Landfill, a U.S. EPA Superfund site in New Castle county, Delaware. Work included preparing a Remedial Design/Remedial Action Plan (RD/RA), Quality Assurance (QA) Plan, Field Sampling (FS) Plan, Health and Safety (H&S) Plan, and RD/RA cost estimates and the RD/RA report.

- Project Manager for Remedial Design at Preferred Plating Corporation in Farmingdale, NY. Work included designing and installing a groundwater recovery well and aquifer characteristic testing. Data from the aquifer testing was evaluated and a report prepared detailing the results.

- Conducted groundwater and soil-gas investigations at North Hempstead Landfill in North Hempstead, NY. Work included oversite of drilling subcontractor, groundwater sampling and preparation of a report.

- Conducted a preliminary site investigation at a Superfund site in Mamaroneck, New York. This study included a magnetometer survey, monitoring well design and installation, exploration and removal of buried drums, groundwater sampling, and report preparation. Additionally, conducted the ensuing RI at this same site. Work included preparing RI/FS project plans, installing monitoring wells, groundwater sampling, geophysical investigations, and an RI report.

- Conducted hydrogeologic site investigation at an industrial complex in Cleveland, Ohio, along the Cuyahoga River. Work involved initial site characterization, discovery and delineation of floating product, monitoring well design and installation and report preparation.

- Conducted hydrogeologic site investigation at an industrial complex in Detroit, Michigan along the Detroit River. Work included initial site characterization, delineation of anomalously high metal and hydrocarbon concentrations, design and installation of soil borings and monitoring wells and a site hydrogeologic report.

- Conducted hydrogeologic site investigation at an industrial complex in Chicago, Illinois along the Calumet River. Work included initial site characterization, design and installation of soil borings and monitoring wells, and a site hydrogeologic report. Work was conducted in preparation of a property transfer.

- Conducted aquifer characteristic testing for water supply and groundwater contamination investigations in Ulster, Orange, Nassau, Suffolk and Putnam Counties, New York; Newton, Gibbstown and New Brunswick, New Jersey; and Fairfield County, Connecticut.

- Performed hydrogeologic ECRA site investigations for a Colgate-Palmolive Inc. at three sites in New Jersey. Work involved designing and installing soil borings and monitoring wells, determining the direction of groundwater movement, soil and groundwater sampling, determining the nature and extent of contamination at each site, and report preparation.

- Conducted hydrogeologic study in Mount Kisco, New York which revealed the metals contamination did not exist on a site where it previously was reported to be present. Work allowed contractor to proceed with the construction and sale of a multimillion dollar project.

1985 - 1987 *Hydrology Department, New Mexico Institute of Mining and Technology.*

- Monitored hydrologic sites to determine groundwater flow associated with the Rio Salado River. Duties included well installation, soil sampling, tracer element studies, and permeability testing.

Risk Assessment

Nai-chia Luke, Ph.D.

Professional Qualifications

Dr. Luke is a Manager at Gradient Corporation, an IT Company, Somerset, New Jersey. She has more than 20 years experience in environmental sciences with an expertise in risk assessment, data quality management, pesticide application/registration and environmental and regulatory toxicology. She has been named a Senior Technical Associate at IT Corporation.

Projects conducted under her direction include data qualitly and ecological and human health risk assessments for proposed waste management facilities, and uncontrolled hazardous waste sites. She has also prepared EIS/EAs siting for industrial and waste disposal facilities in accordance with federal, state and municipal requirements and NEPA documents including conduct of field investigations for potential environmental impacts on threatened and endangered plant species at DOE and DOD sites. Before joining IT she directed and managed regulatory affairs, EPA/FDA submissions, quality assurance and MSDS development for chemical manufacturers. Additional qualifications include expertise in agricultural chemicals and drug developments, environmental chemistry programs, MSDS development with standards of EPA, ANSI, CMA, EEC and IMO, and Good Laboratory Practices with requirements of EPA, FDA, European Organization for Economic Cooperation & Development (OECD), and Japanese Ministry of Agriculture, Forestry & Fish (MAFF).

Education

Ph.D. Plant Physiology, Rutgers University, New Brunswick, New Jersey
M.S. Plant Physiology, Rutgers University, New Brunswick, New Jersey
B.S. Pomology, Chung-hsing University, Taichung, Taiwan

Experience and Background

1996- Present
Manager, Risk Management and Data Quality, IT/Gradient Corporation, Somerset, NewJersey.
Direct and manage projects for human health and ecological risk assessments, data quality and fate/transport modeling.

- Direct/manage technical and financial aspects of risk assessments and data management tasks ($650K) for Brookhaven National Laboratory Operatable Units III and IV as part of RI/FS. Risk assessments included chemical and radiological human health and ecological risk assessments.

- Manage/supervise the work by the analytical contract laboratory who performs analytical program for Fresh Kills Landfill project ($55 million).

1991 - 1996
Program Director, Environmental Sciences Department, IT Corporation, Somerset, New Jersey.
Directed and managed the activities of 28 technical professional and coordinated their efforts for projects in risk assessment, terrestrial ecology, aquatic sciences, toxicity testing and air quality.

- Conducted field investigations for potential environmental impacts on threatened and endangered plant species at the Tatum Dome Test Site, U.S. DOE Lamar County, Mississippi, and Wright Patterson Air Force Base, and prepared the NEPA documentation.

- Provided technical critique of "Seafood Safety" by Institute of Medicine, National Academy of Sciences; and technical review of "Standard Operating Procedures of Remediation of Pesticides in Soil" by Department of Toxic Substances Control, California Environmental Protection Agency.

- As part of the RI/FS at the Naval Air Warfare Center Installation Restoration Study in Trenton, NJ, prepared and negotiated the cost estimate for the human and ecological risk assessment and provided a senior technical review of the Phases I and II Ecological Risk Assessment and Human Health Risk Assessment.

- Prepared the Human Health and Ecological Risk Assessment Work Plan for the RI/FS at the Volunteer Army Ammunition Plant project in Hamilton County, TN under the USATHAMA ATEPS program. Subsequently, successfully executed the tasks and developed the cleanup levels for the project.

1990 - 1991
Senior Project Manager, IT Corporation, Edison, New Jersey.
Managed the Risk Assessment Group, supervised the work of four professionals and prepared EISs and risk assessments. Areas and examples of project experience include:

- Conducted a human health risk assessment for a solid waste composting facility in Cape May County, New Jersey. The project identified the potential risks of exposure to malodorous constituents of concern and a viral pathogen by a residential population.

- Performed human health and ecological risk assessments for a petroleum refinery in Newark, New Jersey. Developed risk-based soil cleanup criteria based on in-situ concentrations of total petroleum hydrocarbons.

- Conducted human health and ecological risk assessments for a pigment manufacturer in North Haledon, New Jersey and for a specialty chemical manufacturer in Stony Point, New York.

- Managed a risk assessment project for a Superfund site in Long Island, New York. Investigated impacts of the site as a portion of a major remedial initiative.

- Performed a human health risk assessment for the U.S. Navy's photographic processing facility in Washington, D.C. The study focused on the toxicology of metals and solvents identified to be a part of photographic development.

1989 - 1990
Associate Director, Department of Environment, Toxicology and Regulatory Affairs Roussel Bio Corporation, Lincoln Park, New Jersey.
Directed and managed all regulatory affairs, EPA submission, MSDS development and quality assurance. Designed and implemented first quality assurance unit which guaranteed compliance with EPA's Good Laboratory Practices requirements.

1988 - 1989
Manager, Toxicology, Roussel Bio Corporation, Lincoln Park, New Jersey.
Directed all toxicology and environmental chemistry programs with requirements of EPA, OECD and MAFF.

- Established computerized Toxicology Central File.

- Wrote first Roussel legal contracts for toxicology and environmental studies by contract laboratories.

1985 - 1988
Administrator, Toxicology, Agriculture Research Division, American Cyanamid Company, Princeton, New Jersey.
Responsible for toxicology program supporting a $600 million agricultural chemical business. Wrote protocols, negotiated contracts with contract laboratories, monitored and audited studies, reviewed reports, inspected laboratories and reviewed GLP's and FDA and EPA compliance.

1984 - 1985
Project Supervisor, Toxicology, Agricultural Research Division, American Cyanamid Company, Princeton, New Jersey.
Established a centralized toxicology department to consolidate administrative and technical affairs and remove them from product managers' control. Increased overall scientific credibility of division.

1983 - 1984
Group Program Manager, Agricultural Research Division, American Cyanamid Company, Princeton, New Jersey. Supervised work of eight Program Managers who directed overall approval registration process for pesticides from field testing and toxicology to preparation of registration applications.

- Established a central toxicology file to manage information flow between the company and the regulatory agencies.

- Managed a Product Development Committee to improve communication between R&D managers and product managers from marketing department. Joint monthly reviews throughout project life keep all work on track.

1976 - 1983
Program Manager, Agricultural Research Division, American Cyanamid Company Princeton, New Jersey. Responsible for coordinating all work required to obtain registration of new pesticides and required registration of existing commercial products. Functions included were toxicology, residue, metabolism, formulation, analytical chemistry, field testing program and MSDS development.

- Managed eighteen successful registration submissions for three herbicides and two insecticides involving eight major crops.

- Planned and designed the testing program to secure approval for a product in Mainland China. Incorporated knowledge of local customs. Two products were approved, and have currently been marketed.

Affiliations

Society of Toxicology
Society of Quality Assurance
Society of Environmental Toxicology and Chemistry
Air and Waste Management Association

Publications

N. Luke, R.S. Prann, B. L. Roberts and M. Watt, 1996. Role of the Toxicologist in Project Management of a Remedial Investigation and Feasibility Study. *Society of Toxicology, 35th Annual Meeting*, March 10 -14, 1996, Anaheim, CA.

R. S. Prann, B.L. Roberts, D. Duh, D. Boyadjian and N. Luke. 1996. Comparison of Human Health and Ecologically-based Remediation Goals for Nitroaromatic Explosives in Soil. Society of Toxicology, *35th Annual Meeting,* March *10-14, 1996*, Anaheim, CA.

B. L. Roberts, R.S. Prann and N. Luke, 1996. Advantages of Dermal Exposure Assessment for Characterizing Occupational Risks to Soil and Water Contaminants. Society of Toxicology, *35th Annual Meeting*, March 10-14, 1996, Anaheim, CA.

B. L. Roberts, C.I., R.S. Prann, M. Watt and N. Luke, 1995. Human Health Risk Assessment of the Sealand Restoration Inc. Superfund. Society of Toxicology, 34th Annual Meeting, February 5-9, 1995, Baltimore, MD.

R.S. Prann, J. Tasca, A.R. Schnitz, M. Watt, C. Pfrommer and N. Luke, 1995. Maximum Exposure Individual Screening Procedure for Multiple Emission Sources. Society of Toxicology, 34th Annual Meeting, February 5-9, 1995, Baltimore, MD.

A.R. Schnitz, M.D. Hartmann, R.S. Prann, J.J. Tasca, P.J. Wang and N. Luke. 1992. The Mattiace Petroleum Chemical Site. Superfund Site: A Human Health Risk Assessment Case Study. *The Toxicologist*, page 355.

N. Luke and G.B. Kinoshita. 1984. Weed Control with AC 222,293 in Cereals. *Abstracts, Weed Science Society of America*, page 102.

K. Kirkland, N. Luke and G.B. Kinoshita. 1983. A new postemergence herbicide for cereals. Field Studies. *Abstracts Weed Science Society of America*, page 17.

P.G. Kneeshaw, G.B. Kinoshita and N. Luke. 1983. Weed control in cereals with AC 222,293: Canadian Results. *North Central Weed Control Conference Proceedings,* Vol. 38:76.

S.R. Busse, P.G. Kneeshaw and N. Luke. 1982. Weed control in cereals with AC 222,293: *U.S. North Central Weed Control Conference Proceedings*, Vol. 37:18.

N. Luke and P. Eck. 1978. Endogenous Gibberellin-like Activity in Cranberry at Different Stages of Development as Influenced by Nitrogen and Daminozide. J. *Amer. Soc. Hort. Sci.* 103(2):250-252.

N. Luke, C. Chin and P. Eck. 1977. Dialysis Extraction of Gibberellin-like Substances from Cranberry Tissue. *Hort Science* 12:245-246.

Daniel Duh

Professional Qualifications

Mr. Duh is a Senior Ecological Risk Assessor with IT's Risk Assessment Group. He has 10 years of experience in the field of risk assessment and aquatic toxicology. Mr. Duh has completed several ecological risk assessments for both Federal and industrial sites. Constituents of concern addressed in these ecological risk assessments include explosives, volatile organics, and metals. Mr. Duh has been involved in the design and implementation of toxicity tests on various media and of bioassessments as part of ecological investigations for commercial and government projects. Mr. Duh has applied toxicity testing methods for the development of ecologically-based, site-specific clean up goals.

Education

M.S. Program, Ecology, Rutgers University, New Brunswick, New Jersey; Expected 1998
MAMS Program, Applied Mathematics with Ecological Emphasis, University of Georgia, Athens, GA 1981-1983
B.S., Mathematics with Biology Minor, Allegheny College, Meadville, PA; 1981
40-Hour Health and Safety Training (per OSHA 29 CFR 1910.120)

Experience and Background

1997 - Present
Senior Ecological Risk Assessor, IT Corporation, Somerset, New Jersey
Conducts ecological risk assessments as well as associated remedial investigations/feasibility studies. Duties include:

- Conducting an ecological risk assessment for a federal facility in Long Island, New York. Results indicated potential risk to benthic macroinvertebrate communities from the presence of mercury and silver in the surface sediments of a coastal stream. Toxicity tests and acid volatile sulfide analyses were performed to determine bioavailability and determine the potential for impact. The test design allowed for the determination of site-specific clean-up goals developed for protection of the benthos. Fish collected from the stream and river showed bioaccumulation of mercury and PCBs. PCBs were found to pose a risk to wildlife and human consumers if restricted to consumption of on-site fish only. The feasibility study was aimed at remediating the sediments in the depositional zones and to restrict movement of contaminants off-site.

- Conducted an ecological risk assessment for a PAH contaminated site in the St. Louis River area. As part of the risk assessment team, evaluated the sediment contamination through the potential for impacts to the benthic invertebrate communities. A sediment quality triad approach was utilized in which the "reference" condition was defined by a large dataset of region-wide samples from non-impacted areas. Statistically, significant impacts were associated with the highest levels of PAH contamination; however, less elevated levels were found to be not sufficiently bioavailable to effect the resident benthic communities. This data was used in conjunction with fish and terrestrial consumer risks and plant risks in order to develop a remediation plan.

- A pacific coastal army base which was undergoing closure under the BRAC program was the subject of an ecological risk assessment. Portions of the site were to be returned to wetlands. Concerns regarding petroleum hydrocarbons in soil which could affect future aquatic and wetland receptors were addressed through the development of a bioassay test program. Three species were utilized and responses to contaminated soils were compared to "reference" non-contaminated soils, with each being treated as sediments. Both water and soil concentrations were determined for which aquatic life would be protected, based on the toxicity tests.

1997
QA/QC Officer, Aquatic Toxicology Laboratory, Somerset, New Jersey
Functions as the quality assurance/quality control officer for the aquatic toxicology laboratory. Duties include revisions of SOPs, Quality Assurance Plans, and periodic laboratory audits.

1992 - 1997
Manager, Aquatic Toxicology Laboratory, Somerset, New Jersey
Managed operation of the Aquatic Toxicology Laboratory. Coordinates all aspects of testing and reporting and managed a highly competent group of scientists and technicians. In addition, functioned as Project Scientist on ecological assessments, incorporating field and laboratory investigations on numerous projects including the Fresh Kills Leachate Mitigation Study.

- Managed over 40 projects requiring regular biomonitoring of wastewater and stormwater discharges.

- Designed testing procedures for project specific investigation of toxicity in many media including wastewater, surface water, sediments and soils.

- Completed series of tests on dredge materials to assess the effect of ocean dumping under U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (EPA) protocols. Tests involved acute toxicity tests using elutriates and suspended particulate phases and solid-phase long-term bioaccumulation studies.

- Conducted ecological assessments at the Pawtucket River in Rhode Island at the site of a former chemical manufacturer. This assessment included field surveys of indigenous flora and fauna, benthic community analysis, toxicity testing, and chemical analysis.

- Conducted an ecological risk assessment of a PAH contaminated site in Minnesota on the St. Louis River. This project included site visits to identify ecological concerns, modeling of groundwater and stormwater transport of contaminants to the St. Louis River, and the characterization of risk to both terrestrial and aquatic biota.

- Conducted an ecological risk assessment of a small creek in North Carolina to which inputs of 1,2-dichloroethane were of concern. The assessment involved the comparison of toxicity data to measure quantities in both surface water and sediment, an evaluation of the existing benthic communities, and direct measurement of toxic response via laboratory tests on both surface water and sediment.

1991 - Present
Scientist (Risk Assessment), IT Corporation, Somerset, New Jersey
Participates in many facets of human health and ecological risk assessments. Experiences include:

- Participated in preparing risk assessments for hazardous waste sites in various states.

- Conducted and/or supervised acute and chronic bioassays of sediments, soils, surface waters, pore waters, and elutriates in support of ecological risk assessments for RCRA and NEPA investigations at chemical and uranium processing plants.

- Designed and implemented biosurveys of aquatic and terrestrial fauna in support of ecological impact assessments and risk assessments.

- Participated in surveys of habitat suitability for and/or presence of endangered or threatened herpetile or avian species at a hazardous waste site in New Jersey.

- Conducted benthic macroinvertebrate surveys of marine, estuarine and freshwater habitats in support of ecological impact assessments and risk assessments for chemical plants, fossil fuel plants, uranium processing plants, and landfills. Surveys included sampling, sorting and identification of macroinvertebrates.

- Identified aquatic macrophytes in support of aquatic vegetation mappings.

1989 - 1991
Bioassay Laboratory Supervisor, IT Corporation, Edison, New Jersey
Supervised daily operation of bioassay laboratory. Coordinated all aspects of testing and report generation and directed personnel working on bioassay projects.

- Developed the chronic toxicity program to meet the strict standards needed for NJDEP certification.

- Supervised all types of acute and chronic bioassays including static, static renewal and modified static renewal as well as solenoid driven flow-through diluter systems.

- Directed a highly competent staff of bioassay technicians in daily operations of the laboratory.

1988 - 1989
Bioassay Technician, IT Corporation, Edison, New Jersey
Performed acute and chronic bioassays on industrial and municipal wastewater.

- Conducted all types of aquatic bioassay tests for industrial and municipal utilities in accordance with appropriate regulatory agencies (USEPA, NJDEP, NYDEC, ACOE, etc.).

- Prepared formal reports including data presentation and computer analysis of test results.

1987 - 1988
Environmental Technician, EA Engineering, Science, and Technology, Sparks, Maryland
Conducted data collection at two utilities sites along the Raritan River in New Jersey for use in a biological impact report.

- Completed impingement and entrainment studies at two electric generating power plants.

- Collected and identified fish and macroinvertebrates through the use of trawling nets and seines.

- Collected plankton samples through the use of plankton nets and the microscopic identification thereof.

- Performed constant water monitoring through all phases of data collection.

Professional Affiliations

American Society for Testing and Materials
Society for Environmental Toxicology and Chemistry

Publications

Vedagiri, U., D. Duh, L. Yates, and C. Papageorgis, 1992, A Status of Benthic Macroinvertebrate Communities in the Vicinity of Fresh Kills Landfill in the New York Harbor Area, Presentation at Society of Environmental Toxicology and Chemistry, November 1992.

Papageorgis, C., U. Vedagiri, and D. Duh, 1993, A Monitoring Impact/Recovery in a Multi-Stressor Environment, Presentation at Society of Environmental Toxicology and Chemistry, November 1993, Seattle, WA.

Duke, C.S., M. Murray, and D. Duh, 1991, The Role of Effluent Toxicity Testing in Ecological Risk Assessment at the Feed Materials Production Center, Fernald, Ohio, Presentation at Society of Environmental Toxicology and Chemistry, November 1991.

Duh, D., R. Zimmer, T. Pallop, W. Li, D. Root, B. McFarland, K. O'Reilly, G. Rausina, and J. Suzuki, 1994, An Identification of Petroleum Wastewater Toxicity Sources via Selective Resin Adsorption, Presented at Society of Environmental Toxicology and Chemistry, November 1994, Denver, CO.

Duh, D., 1994, Modifications of Principle Component Analysis for COC and Source Identification in a Surface Water System, Presented at Society of Environmental Toxicology and Chemistry, November 1994, Denver, CO.

Duh, D., B. Roberts, and L. Meyers-Schone 1995, An Ecologically-Based Clean-Up Criteria for Nitroaromatic Explosives using Toxicity Test Results, Presented at Society of Environmental Toxicology and Chemistry, November 1995, Vancouver, BC, Canada.

Lawrence, C., L. Meyers-Schone, and D. Duh, An Ecological Assessment of Soil using a Soil Elutriate and the Perennial Rye Grass, *Lolium perenne*, Presented at Society of Environmental Toxicology and Chemistry, November 1995, Vancouver, BC, Canada.

Prann, R., B. Roberts, N. Luke, D. Duh, and D. Boyadjian, 1996, "Comparison of Human Health and Ecologically-Based Remediation Goals for Nitroaromatic Explosives in Soil, Presented at Society of Toxicology, March 1996.

Lawrence, C., D. Duh, J. Myers, and T. Pallop, 1996, "The Effects of Grain-Size and TOC on Marine Amphipods in Whole-Sediment Bioassays, Presented at Society of Environmental Toxicology and Chemistry, November, 1996, Washington, D.C.

Duh, D. and E. Beitz, 1996, "Determination of Toxicity Not Related to Calcium in a NPDES-Regulated Wastewater, Presented at Society of Environmental Toxicology and Chemistry, November, 1996, Washington, D.C.

Murray, M. L., L. Yates, C. Danis, and D. Duh, "Abiotic Factors Affecting Benthic Macroinvertebrate Community Composition, Density and Diversity in Polluted Tidal Creeks," Presented at Estuarine Research Federation, October 1997, Providence, Rhode Island.

Mayasich, S., and D. Duh, "Assessing a Great Lakes Area of Concern Site Using Sediment Triad and Wetland Functional Endpoints," Presented at Society of Environmental Toxicology and Chemistry, November 1997, San Francisco, California.

Duh, D., and J. Myers, "Hardness Requirements for Utilizing Hyalella Azteca in Sediment Bioassays," Presented at Society of Environmental Toxicology and Chemistry, November 1997, San Francisco, California.

Luke, N., D. Duh, and M. Watt, "Role of the Ecotoxicologist in a Remedial Investigation and Feasibility Study," Presented at Society of Environmental Toxicology and Chemistry, Novemver 1997, San Francisco, California.

Manu Sharma

Professional Qualifications

Mr. Sharma is a Senior Hydrogeologist with Gradient Corporation, a wholly-owned subsidiary of International Technology Corporation. He has over 10 years of experience in groundwater and contaminant transport modeling, remedial investigations (RI), design and implementation, feasibility studies (FS), remedial action (RA) implementation, risk/exposure assessment, and risk-based cleanup.

Education

M.S., Civil Engineering, Syracuse University, Syracuse, New York; 1988
B.Tech., Civil Engineering, Indian Institute of Technology, Bombay, India; 1986
40-Hour Remedial Response Health and Safety Training Course
8-Hour Remedial Response Training Course for Supervisors

Experience and Background

1992 - Present
Senior Hydrogeologist/Team Leader of Site Assessment Team, Gradient Corporation, Cambridge, Massachusetts
Develops and critiques groundwater and contaminant transport models. Prepares work plans and overseas data collection for RIs and RA implementation. Manages large multidisciplinary projects. Supervises a staff of 6 and manages project work budgets for $1 million revenue per year.

1988 - 1992
Project Hydrogeologist, Engineering Science, Inc., Boston, Massachusetts
Developed conceptual and numerical hydrogeologic models to assist in risk assessment and evaluate remedial options at (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites. Planned and implemented RI/FS at large hazardous waste sites.

1986 - 1988
Graduate Research Assistant, Syracuse University, Syracuse, New York
Developed a numerical model for estimation of hydrodynamic forces on offshore structures during earthquakes. Assisted in the development of a finite-element model to predict tides in the English Channel.

His professional experience includes the following projects:

- Developing a two-dimensional contaminant transport model using the Method of Characteristics (MOC) and MODFLOW to investigate the transport of volatile organics, polynuclear aromatic hydrocarbons, and cyanide at a former manufactured gas plant site. The model was used to ascertain our client's liability for a commingled plume, evaluate remedial alternatives, and negotiate cleanup levels. The remedy selected on the basis of the model findings resulted in a substantial cost saving for the client.

- Developing a two-dimensional contaminant transport model for PCE using MT3D to demonstrate that contaminant contribution from a dry cleaning operation to the town water supple wells was insignificant compared to contribution from other sources.

- Managing a risk assessment for Exxon, being conducted as part of a property transfer and an Administrative Consent Order at a 1,600-acre refinery in Linden, New Jersey.

- Managing an RI/FS for Allied Signal, Inc., for a former chloroalkali plant in Solvay, New York, where the primary contaminant of concern is mercury. A work plan for the RI/FS, including procedures for "ultra-clean sampling" and low-level analysis of mercury, has been submitted to the New York State Department of Environmental Conservation (NYSDEC). Field work for Phase I of the RI began in the summer of 1995.

- Developing a three-dimensional, numerical groundwater flow model using MODFLOW to evaluate groundwater supply options and study the impact of pumping on- and off-site plume. Model was calibrated for a 65-square-mile area for a two-aquifer system and was used to investigate different pumping scenarios. Modeling results led to the successful design of a groundwater supply wellfield for a cogeneration plant currently operating in Long Island, New York.

- Preparing a health scientist for expert testimony in a case involving the United States Department of Justice and a cookware manufacturing facility. Issues in the case included fate and transport of VOCs and metals from a surface impoundment and associated health effects. Instructed by attorney to be on standby for testifying as an expert, if necessary.

- Developing a two-dimensional numerical groundwater flow model using AQUIFEM to evaluate groundwater remediation alternatives as part of a Resource Conservation and Recovery Act (RCRA) corrective action. Model was calibrated using regional and site-specific groundwater elevation and streamflow data. Model was used to design a pump-and-treat system to intercept a plume migrating toward a drinking water well.

- Assisting a law firm in the development of technical and legal arguments for a case involving a number of insurance companies versus a chemical company regarding cleanup at three sites (a manufacturing facility, a surface impoundment facility, and a waste disposal site). Used fate and transport modeling to date plumes and identify potential sources of contamination. Plume dating at the manufacturing facility was responsible for limiting the liability of a number of Potentially Responsible Parties (PRPs).

- Implementing a waste inventory and waste minimization program at a paper manufacturing facility. The study led to modifications in the existing wastewater treatment plant and was instrumental in reducing its discharge to a nearby river. As part of the project, waste load allocation for the plant was also estimated using QUAL 2E, a U. S. Environmental Protection Agency river water quality modeling package. Modeling results were also used to obtain an NPDES discharge permit for the facility.

- Evaluating the effectiveness and costs associated with two remedial actions implemented at a gas station. Used fate and transport modeling and chemical characteristics of gasoline to demonstrate that an accident at the site was not responsible for contamination detected across the site. This work was conducted for a law firm and was responsible for limiting the liability of our client. It was also used to negotiate a favorable settlement.

- Performing conceptual remedy design, including cost estimates for 15 manufactured gas plant sites. The study was used for strategic planning and estimating potential liability at each of the sites.

- Planning and implementing two phases of a RCRA Facility Investigation (RFI) as part of the corrective action program at a small arms manufacturing facility in southern Maine. Tasks completed included source characterization, groundwater modeling, field work coordination, assistance in developing of media protection standards, and risk assessment. During Phase I of the project, acted as field manager to coordinate and assist in an electromagnetic survey, soil vapor survey, magnetometer survey, and monitoring well installation.

- Conducting RIs and evaluating cleanup alternatives at three former manufactured gas plant sites in Connecticut. The remedial alternatives considered included both proven and innovative technologies. Supervised implementation of interim remedial action at one of the sites.

- Providing remedy implementation oversight at a commercial office park being remediated to address soil and groundwater contaminated with chlorinated solvents. The remedy being implemented consists of soil and sludge removal, soil and bedrock venting, and groundwater withdrawal and treatment.

- Providing field oversight and supervision for sludge, sediment, and surface water sampling in a very large lagoon (about 16 acres) at an oil refinery. Samples were collected using a barge-mounted drill rig in Level B.

- Providing field/quality assurance oversight during groundwater and product sampling at two gas stations, which were among approximately 100 sites being sampled to determine the date of contaminant release and apportion liability as part of ongoing litigation between two large oil corporations.

- Reviewing and critiqing an RI to evaluate if the site had been adequately characterized. Used statistical analyses to determine the adequacy of the sampling program and dimensions of the smallest hotspot that could be detected using sampling programs at different confidence levels.

Professional Affiliations

National Groundwater Association
Syracuse University Graduate Research Committee, Research Grant; 1987
Graduate Teaching Assistant for Fluid Mechanics Courses, Syracuse University

Honors and Awards

Research Grant, Syracuse University Graduate Research Committee, 1987

Publications

Invited Technical Peer Reviewer for *Groundwater* Magazine.

Sharma, M., T.M. Slayton, and P.A. Valberg. 1996. The Use of Risk Assessment Software to Conduct MCP Method 3 Type Risk Assessments and Calculate Remediation Goals. Accepted poster presentation at the New England Environmental Exposition, Boston, MA. May.

Chapnick, S.D., A.D. Wait, and M. Sharma. In Press. Managing the Client: The Misuse of Methods (TCLP). *Environmental Laboratory.*

Sharma, M., N.S. Shifrin, and T.D. Gauthier. 1996. Application of a Solute Transport Model at a former MGP site to assist in remedy selection. May. Accepted in the proceedings of the New England Environmental Exposition, Boston, MA.

Chapnick, S.D., M. Sharma, D. Roskos, and N. Shifrin. The Misuse of the Toxicity Characteristic Leaching Procedure (TCLP). 1995. Proceedings of the 11th Annual Waste Testing and Quality Symposium, ACS and EPA, Washington, D.C.

Feasibility Study

A. David Ramineh

Professional Qualifications

Mr. Ramineh has extensive experience in the management of site assessment/remedial investigations, feasibility studies, groundwater/soil remediation system design, and operation and maintenance of treatment systems. His expertise also extends to the field of groundwater and soil remediation for sites impacted by petroleum hydrocarbon and chlorinated hydrocarbons contaminants.

He also has experience in the preparation of State of New Jersey air permit applications for a variety of sources and control equipment. He is familiar with the design of a variety of air pollution control equipment and associated air emission calculations.

Education

B.S., Chemical Engineering, The Pennsylvania State University State College, Pennsylvania; 1987

Registrations/Certifications

New Jersey UST Subsurface and Closure certification number 0001950
New Jersey Industrial System Operator, N-2 operators license number 0284
40-hour Hazardous Waste OSHA Training
8-hour Hazardous Waste OSHA Supervisory Training
First Aid and CPR certified, American Red Cross

Experience and Background

1990 - Present
Project Manager, IT Corporation, Somerset, New Jersey.

- Feasibility Study and Data Management task manager for the Brookhaven National Laboratory, Operable Units III and V Superfund RI/FS project located in Long Island, NY. The Remedial investigation included the installation and sampling of over 200 monitoring wells, 400 Geoprobes, 150 temporary vertical profile borings, and the collection of over 5,000 groundwater and soil samples. As part of the FS, he was responsible for the evaluation of remedial technologies for groundwater impacted by volatile chlorinated hydrocarbons and radionuclides such as strontium and tritium. These technologies included in-well sparging, SVE with air sparging, air stripping, bioreactors, reverse osmosis, ion exchange, reactive walls, and in-situ bioremediation. He was also required to prepare and conduct presentations of findings for DOE and EPA.

- Program Director for a completed UST Program, responsible for the management of over 100 retail service station sites involved in remedial investigations and remedial actions due to petroleum hydrocarbon releases. Responsible for negotiating costs and schedules with clients, project scheduling, cost tracking, invoicing, and regulatory negotiations.

- Responsible for the review/preparation of remedial investigation reports, remedial action work plans, design plans, treatment works approvals, air and water discharge permits. Responsible for the oversight of the design, installation; and operation and maintenance of several groundwater/soil remediation systems for petroleum impacted sites. Remediation systems have included soil vapor extraction systems with vapor controls ranging from carbon to thermal oxidizers and groundwater treatment systems ranging from carbon adsorption to air stripping.

- Assisted a major oil company in the development of a country wide strategy implementation plan to reduce total cost of ownership for the management of the all UST sites. Have successfully negotiated with NJDEP for the closure of over 10 UST sites which were impacted by petroleum releases. Have also successfully negotiated with NJDEP for the implementation of natural attenuation remediation plans for the cleanup of groundwater contamination which resulted in significant costs savings to the client.

- Project Manager for a construction project which included the installation of 1,000 feet of groundwater recovery trench with a Gundle Wall cutoff wall. The groundwater treatment system included recovery sumps, influent equalization tank, filtration system, granular activated carbon units, and PLC control system.

- Project Manager for an Emergency Response project which involved the cleanup of a non-PCB transformer fluid spill. Responsibilities included project oversight, design, installation, operation and maintenance of a 50 gallon per minute groundwater treatment system to prevent impacting a nearby river. The groundwater recovery system included a 30 well point system, holding tanks, oil water separators, and 10,000 lb granular activated carbon units.

1988 - 1990
Environmental Engineer, JACA Corporation, Fort Washington, Pennsylvania.

- Reviewed air permit applications for NJDEP, Bureau of New Source Review, as part of a contract between NJDEP and JACA. Responsibilities included reviewing permits for administrative completeness, evaluating compliance with NJDEP air regulations, conducting meetings with applicants to discuss regulations and permit modifications necessary for compliance.

- Prepared air permit applications for a variety of air pollution sources including air strippers, chemical manufacturing processes, oxidizers, and paint manufacturing processes. Permit applications involved computer air modeling, risk assessment, design calculation, air contaminant emission rates, and BAC compliance.

Prabal N. Amin, P.E.

Professional Qualifications

Mr. Amin is a licensed professional engineer with more than 8 years of experience in the environmental consulting field providing commercial and government clientele cost effective environmental engineering solutions. His educational background and professional experience includes surface water and groundwater hydrology, fate and transport of subsurface contamination, physical-chemical processes for water treatment, biological treatment for wastewater and soil, air pollution control, and hazardous waste management. This training has allowed Mr. Amin to successfully manage and participate on such projects involving remedial investigations/feasibility studies (RI/FS), the design and implementation of soil and groundwater remediation systems, treatment system operations and maintenance, contaminated soil excavation and disposal, and site assessments.

Education

M.E., Environmental Engineering, Stevens Institute of Technology, Hoboken, NJ; 1994
B.S., Mechanical Engineering, Rutgers University, New Brunswick, NJ; 1990

Certifications

Registered Professional Engineer: New Jersey No. GE40769, Pennsylvania No. PE050397E
40-hour Health and Safety Training (per OSHA 29 CFR 1910.120)
Hazardous Waste Supervisor, 1993
CPR and Standard First Aid Certified, 1995
Total Quality Management, 1995

Experience and Background

1990 - Present
Project Engineer, IT Corporation, Somerset, New Jersey.
Responsible for providing mechanical/environmental engineering services as part of the Engineering group. Experience includes:

- Managed tasks for the development and preparation of a focused Feasibility Study (FS) report for Operable Unit V at Brookhaven National Laboratory in Long Island, New York which addressed metals-contaminated river sediments. Responsible for identification and screening of remedial technologies, detailed analysis of alternatives, coordination of treatability studies, and conceptual design. Remedial alternatives included dredging, sediment dispersion control, dewatering via drying beds, phytoremediation, beneficial sediment reuse, and off-site disposal.

- Responsible for the development and preparation of a Feasibility Study (FS) report for Operable Unit III at Brookhaven National Laboratory in Long Island, New York which addressed groundwater impacted by volatile chlorinated hydrocarbons and radionuclides such as strontium and tritium. Responsible for identification and screening of remedial technologies, detailed analysis of alternatives, analysis of groundwater modeling results, and conceptual design. Remedial alternatives included natural attenuation, in-well sparging, SVE with air sparging, air stripping, bioreactors, reverse osmosis, ion exchange, reactive walls, and in-situ bioremediation.

- Managed tasks for the development and preparation of a Feasibility Study (FS) report for the Volunteer Army Ammunition Plant in Chattanooga, TN under contract to the U.S. Army Environmental Center (USAEC). The scope of the project consisted of determining risk-based remedial response levels for soil, sediments, surface water and groundwater, evaluating regulatory constraints, identifying and screening remedial technologies, a detailed analysis of remedial alternatives, conceptual design, and preparation of the final report. Remedial alternatives included incineration, solidification/stabilization, and composting technologies. Site contamination included 2,4,6-TNT, 1,3,5-TNB, 2,4-DNT, 2,6-DNT, PCBs, and metals.

- Responsible for the preparation of Spill Prevention, Control and Countermeasures (SPCC) plans for multiple bulk oil storage facilities per requirements set forth within 40 CFR 112 of the Oil Pollution Act of 1990. Included an evaluation of facility aboveground storage tank loading/unloading practices, tank overfill protection, and spill containment capacity. Client: Tosco Corporation, Linden, NJ and Procter & Gamble, Avenel, NJ.

- Supervised and directed refinery process and condenser sewer line cleaning and camera inspection activities for the purpose of evaluating sewer line condition and integrity, and also identifying potential sources of subsurface contamination. Ensured that all contractor activities were performed in compliance with refinery health and safety guidelines and the site health and safety plan. Prepared Phase I Interim Remedial Measures Reports based on inspection findings for submission to the New Jersey Department of Environmental Protection (NJDEP). Inspection findings were compared with subsurface non-aqueous phase liquid contaminant plume data and groundwater contour data gathered during the site remedial investigation, as well as sewer line invert elevation data to investigate correlations between sewer line findings and site subsurface contamination. Interpretations will be utilized to develop site remedial measures. Client: EXXON Company USA, Linden, NJ.

- Designed a groundwater recovery and granular activated carbon adsorption system for the removal of volatile organic compounds and petroleum hydrocarbons from groundwater. Treatment system effluent was discharged to a POTW. Design responsibilities included: sizing and/or selection of recovery well pumps and process pumps, process piping, flow equalization tanks, carbon adsorption units, groundwater recovery trench and submersible pump lift-station, instrumentation and controls, development of equipment layouts and construction details, and preparation of engineering bid specifications. Responsible for the development of the system Operations and Maintenance manual after system construction and installation. Also responsible for preparation of the Engineer's Report as part of the Treatment Works approval application submitted to the NJDEP. Client: Hydrocarbon Research, Inc., Lawrenceville, NJ.

- Designed an *in-situ* bioremediation system for the treatment of petroleum hydrocarbon contaminated soil. Design responsibilities included: hydrogen peroxide dosing system, nitrogen and phosphorous nutrient batch delivery system, water distribution field, instrumentation and controls, development of process and instrumentation diagrams, development of equipment layouts and construction details, and preparation of engineering bid specifications. Nutrient loading and peroxide delivery rates were calculated using parameters determined from a soil biotreatability study. Client: Hydrocarbon Research Inc., Lawrenceville, NJ.

- Provided engineering oversight for construction activities involving the installation of groundwater recovery and treatment system, the installation of an in-situ soil bioremediation system, and the removal of petroleum hydrocarbon and PCB contaminated soils for transport to a treatment, storage, and disposal facility. Ensured that work performed by general contractor was in accordance with the design and specifications. Client: Hydrocarbon Research Inc., Lawrenceville, NJ.

- Responsible for coordinating and executing underground storage tank environmental compliance audits for private and public sector clients. Audit information was ultimately used in developing specifications for the design and execution of tank removals, replacements, testing, and upgrades necessary to meet local, state, and EPA requirements.

- Designed an air sparging and soil vapor extraction system for the removal of volatile organic contaminants from the vadose zone. Design responsibilities included: blower and compressor sizing and selection, extraction and injection well spacing, well screen interval determination, air extraction and injection piping, vapor phase off-gas treatment, development of equipment layouts and construction details, and preparation of engineering bid specifications. Client: Amoco, Mamaroneck, NY.

- Executed engineering inspections of a leachate collection, pumping, and recirculation system for a landfill leachate mitigation project. Responsible for routine system inspections, troubleshooting leachate pumping stations, and recommending design and equipment modifications to optimize station performance. In addition, prepared a materials of construction compatibility evaluation report which evaluated the feasibility of using present system components in future landfill collection and pumping systems. The report included an evaluation of equipment compatibility with landfill leachate and an evaluation of equipment corrosion. Client: New York City Department of Sanitation.

- Performed an initial historical site investigation in which site engineering drawings were inspected to identify potential areas of environmental concern of sources of site environmental contamination. Information gathered will be subsequently used in the development of site remedial investigation and feasibility study reports. Client: Brookhaven National Laboratory, Long Island, NY.

- Participated in the design of a RCRA hazardous waste tank farm and processing facility. The facility included storage tanks for holding chlorinated and non-chlorinated wastes prior to off-site disposal, a hazardous waste boiler feed system, and separatory mixing process vessel. Design scope included secondary containment, overfill protection, truck transfer facility, level, volume, and mass flow control for tank and boiler house feed, fugitive emissions controls, and fire suppression and safety systems. Responsible for development of process and instrumentation diagrams, engineering layouts, and equipment and instrumentation specifications. Client: Merck and Co., Rahway, NJ.

- Responsible for a preliminary design and construction cost estimate for a drainage system to control flooding and excessive stormwater runoff in a parking lot. System sizing and design were based on a peak stormwater runoff rate calculated by assuming a "worst-case" 25 year storm event. Client: United States Postal Service, Edison, NJ.

- Prepared applications for NJPDES discharge to surface water and groundwater permits.

1989 -
Summer Engineering Intern, Hart Environmental Management Corp., Pennsauken, New Jersey. Assisted engineers in report preparation and design work. Experiences include:

- Compilation of Operations and Maintenance manuals for wastewater treatment plants.

- Cost estimation for various design alternatives involving the excavation and backfilling of contaminated soil.

- Preparation of a Design Engineers' Report required for Indirect Discharger Permit application for a landfill.

- Design of a landfill leachate collection system, including piping and pump sizing.

1988 -
Student Engineer, Atlantic Electric Co., Pleasantville, New Jersey.
Assisted Industrial Hygienists in computer data base management and the coordination of an inventory management system for power plant asbestos level measurements. Developed and implemented a hazard communication program complying with US EPA SARA-Title 3. Assisted engineers in the monitoring of CO_2 emissions from power plant stacks.

James A. Wagner

Professional Qualifications

As a Civil Engineer with over 13 years of experience, Mr. Wagner has worked primarily in the heavy construction and environmental construction fields for the investigation and remediation of hazardous waste materials. He has been design engineer for stormwater management projects with responsibilities ranging from watershed response analysis of proposed construction to preparation of plans and specifications of stormwater collection/control systems for various municipal landfill closures. His experience also includes site investigations, installation, design, closures, permitting, reporting, and remediation oversight. His background includes a strong emphasis on field management of private, municipal, and federally funded projects.

Education

B.S. Civil Engineering, New Jersey Institute of Technology Newark, New Jersey; 1989

Registrations/Certifications

Registered Professional Engineer: State of New Jersey
Registered Professional Engineer: State of New York (Pending)
Certified in New Jersey for Closure and Subsurface Evaluation under N.J.S.A. 58:10A-24.1-8.
1910 - Certified in Hazardous Waste Operations and Emergency Response in compliance with 29 120. CFR

Experience and Background

1991 - Present
Project Engineer, IT Corporation, Somerset, New Jersey
Responsible for evaluating, selecting and applying standard engineering techniques, procedures and criteria to engineering projects.

- Managed all field operations and construction remediation activities for a sitewide sewer system evaluation at the Exxon Bayway Petrochemical Refinery. Responsible for daily supervision of personnel and laborers, scheduling and client interaction. Project consisted of development of Interim Remedial Measures Workplans and Findings Reports for information gathered from methods including surveying and sewer plan mapping, cleaning dyetablet tracing, visual and camera inspections.

- Managed site inspections, coordinated plans and developed a spill plan for Monsanto Chemical Plant, Bridgeport, New Jersey. The facility stored over four million gallons of hazardous substances and involved the review of historical records and field investigations.

- Senior review engineer for a variety of UST issues including engineering design, installation specifications, retrofit and replacement of existing systems, and construction oversight. Clients included the broadcasting industry, WCAU Philadelphia, Pennsylvania, the Port Authority of New York/New Jersey, and the USPS.

- Performed site inspections and developed spill plans for: Lakehurst Naval Air and Warfare Center, Rhone Poulenc Dayton, Facility, and Union Carbide Somerset, Facility.

- Supervised and managed small engineering NJDEP and NYSDEC UST remediation projects consisting of tank testing, sampling, removal and closure for the development of Result Reports and Remedial Action Plans. Representative projects include: Floyd Bennett Field, Brooklyn, New York; Miles Inc., Haledon, New Jersey; USAC, Middlesex, New Jersey, Airco Gases, Plainfield, New Jersey.

- Prepared documentation and conducted assessments under the ARCS II program to evaluate industrial sites and landfills within EPA Region II for designation as a Superfund site.

1989 - 1991
Project Engineer, Fellows, Reed and Associates, Inc., Toms River, New Jersey
Responsible for design and investigation of remedial construction projects.

- Prepared Work Plans, Sampling Plans and directed all field operations, including the installation of monitoring wells and the sampling of groundwater, surface water, stream sediment and soil for a NPL hazardous waste landfill site under CERCLA Superfund program. Upon completion he assisted in the evaluation of analytical data and preparation of the Remedial Investigation Summary Report.

- Assisted with environmental projects involving landfill investigations and Closure/Post Closure Plans: Design and Construction Closure Plans for Commercial Township Solid Waste Landfill, and Manchester Township Landfill.

- Developed preliminary and final design plans and specifications for two vegetative waste composting/recycling facilities. Whiting Landfill and Lakewood Landfill.

- Managed and conducted Phase I Environmental Assessments and Phase II Investigations for properties ranging from undeveloped sites to manufacturing & industrial facilities for bank and private foreclosures of over two dozen commercial and industrial properties in New Jersey & Pennsylvania.

- Designed construction plans and specifications, obtained permits and provided construction inspections for the startup of over a dozen sewage pumping stations for municipal private and residential developers.

- Assisted in the design and construction services for a 0.45 MGD municipal wastewater treatment plant, Pike Brook WWTP, Belle Mead, New Jersey. Responsibilities included design, construction oversight, cost estimating, and shop drawing verification.

- Coordinated and executed the design and construction inspection services for removal and replacement of four underground storage tanks. Dover Township Municipal Utilities Authority.

- Managed and conducted hydrogeologic investigations and UST closures including DICAR investigations and closure/cleanup plans for over two dozen gas station sites for two major south jersey oil distributors.

1985 - 1989
Field Engineer, Jacobs/Consulich Environmental, Parlin, New Jersey
Responsible primarily for field inspections of construction projects owned and operated by regional and municipal utility authorities.

- Inspected construction activities for the erection of a ten-million gallon potable water storage system and operations building, Marlboro, New Jersey.

- Inspected construction activities for 1200 feet of sanitary sewer line rehabilitation including insitu form and videotaping, Old Bridge Township, New Jersey.

- Inspected construction activities and prepared as built drawings for various municipalities which included water mains, treatment plants, pump stations, collection systems, distribution systems, and potable wells.

- Prepared construction plans and specifications including cost estimating, change orders, as-built drawings, surveying, mapping, quarterly billings, inflow/infiltration studies, and liaison between local officials and contractors, Somerset Raritan Valley Sewage Authority, Middlesex County Utilities Authority and Old Bridge Township Municipal Utilities Authority.

Citizen Participation

Donna L. Creech, APR

Professional Qualifications

Ms. Creech is a professional communications expert with over 20 years of broad experience planning, administering, and implementing community relations, public participation, public relations, marketing, employee communication, and advertising programs for Fortune-500 companies, U.S. military installations, the U.S. Department of Energy, regional hospitals, and colleges. Ms. Creech has won both national and regional awards for her work.

Education

M.S., Communications, University of Tennessee, Knoxville, Tennessee; 1983
B.A., Liberal Arts, Carson-Newman College, Jefferson City, Tennessee; 1975
Mediation Training, University of Tennessee; 1994
40-Hour Health and Safety Training: OSHA (29 CFR 1910.120)

Registrations/Certifications

Accredited in Public Relations by the Public Relations Society of America, 1993. Reaccredited in 1996.

Experience and Background

1997-Present
Community Relations Manager, IT Corporation, Knoxville, Tennessee
Designs, develops, and implements community relations plans in those communities where IT or clients conduct or propose to conduct environmental investigations or treatment activities, coordinating community relations activities with permitting processes when appropriate and cooperating with regulatory agencies in organizing the logistics of official permit hearings, as well as advising clients on strategies for communicating risk. Also responsible for designing, editing, and producing documents, displays, and other materials, such as brochures, fact sheets, videos, slides, and transparencies that inform prospective clients, the general public, and the media about IT environmental investigations and treatment services; interfacing with media as required.

1994-1997
Director of Community Relations, SSA, Inc., Oak Ridge, Tennessee
Headed Oak Ridge Office of 8(a) information technology firm which additionally offered community relations and technical editing services for environmental and future-use planning clients in Oak Ridge, Tennessee and Portsmouth, Ohio. Major contracts supported the Department of Energy through Lockheed Martin Energy Systems.

1990-1994
Community Relations Specialist, IT Corporation, Knoxville, Tennessee

- Researched and developed community relations plans for five U.S. Air National Guard and Air Force bases in California and Arizona. One plan was adopted as a model for all Air Guard CRPs. Supported community relations activities for seven other U.S. Air Force, Army, and Navy remediation projects.

- Provided commercial client with community relations support during the RCRA Part B permitting of a thermal treatment unit using hazardous-waste derived fuel.
- Planned and initiated the public participation plan for the environmental remediation program at Los Alamos National Laboratory.
- For a major gas pipeline company participated in developing preliminary technical reviews of five potential incinerator facility locations that were contaminated with polychlorinated biphenyls (PCBs).
- Conducted community interviews and a random sample telephone survey as well as initiated public information campaign for a major glass manufacturer in Ohio which proposed an alternative cleanup remedy to USEPA and state regulators for acres of lime lakes developed over a 75-year period.
- Facilitated initial meeting between the U.S. Forest Service and numerous potentially responsible parties to a municipal landfill cited by the U.S. Environmental Protection Agency for cleanup.
- Reviewed and initiated update of administrative record file for U.S. Army installation.
- Won top community service award from local chapter of Public Relations Society of America in 1991 for work on the state's first household hazardous waste collection day.

1988 -1990
Account Executive, Ackermann Public Relations & Marketing, Knoxville, Tennessee
Serviced client accounts ranging from local non-profit organizations to Fortune-500 companies such as Philips Consumer Electronics, Rohm and Haas Tennessee, TRW Koyo, and Westinghouse. Received Best of Show award from local chapter of Public Relations Society of America in 1990 for work with Rohm and Haas Community Advisory Council.

1985-1988
Promoted to Director of Public Relations from Manager of Communications, Baptist Hospital, Knoxville, Tennessee
Responsible for media relations, internal and external publications, and community relations activities for the hospital. Won national Clarion Award from Women in Communications, Inc., for publicity surrounding the region's first in vitro birth as well as local awards for both internal and external publications.

1984 -1985
Marketing Assistant, St. Mary's Medical Center, Knoxville, Tennessee
Planned and executed marketing plans for medical center programs such as obstetrics, adult and adolescent drug rehabilitation, outpatient surgery, and gastroenterology-, neurosurgical-, and laser-treatment units. Handled most media contacts. Wrote and directed TV commercial which placed first in statewide hospital association's annual public relations and marketing competition.

1984
Consultant, Levi Strauss Foundation, Knoxville, Tennessee
Edited and researched specific requests for support from the Foundation to assure that grants met company-mandated requirements.

1981-1984
Communications Representative, TRW Steering & Suspension Division, Sterling Heights, Michigan
Developed and executed employee communications plans for two division plants in the South. Helped administrate and communicate division's first internal communications audit as well as photographed, wrote, and edited employee publications. Won national award from International Association of Business Communications in 1983 for special publication.

1976 -1981
Public Relations Coordinator, State Technical Institute at Knoxville, Knoxville, Tennessee
Planned and administered all advertising, media, community relations, and publications projects.

1979
Instructor, Carson-Newman College, Jefferson City, Tennessee
Taught first public relations course at the college to upperclass communications students.

1977 -1978
Instructor, Center for Government Training, University of Tennessee, Knoxville, Tennessee
Taught human relations and public relations courses for government employees.

Honors/Awards
Who's Who in the Media and Communications, 1997
Who's Who in the South and Southwest, 1996
IT Technical Associate Award, 1993

Professional Affiliations
International Association for Public Participation, past president of Tennessee Valley Chapter
Public Relations Society of America

Publications
Creech, Donna L., 1983, "Evaluating Organizational Image and Symbols Using the Trait Ascription Questionnaire and Preference Ranking," Master's Thesis, University of Tennessee, Knoxville, Tennessee.