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REMEDIAL INVESTIGATION FEASIBILITY STUDY (RI/FS) WORK PLAN

Jimmy's Dry Cleaner
61 Nassau Road, Roosevelt, New York
NYS DEC SITE NO. 1-30-080

July 20, 2001

Submitted to:

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1.0 INTRODUCTION

1.1 Project Background

This Remedial Investigation and Feasibility Study Work Plan (RI/FS Work Plan) for the Jimmy's Dry Cleaner Site (The Site) has been prepared by IT Corporation, Inc. (IT Corporation) on behalf of the New York State Department of Environmental Conservation (NYSDEC). The Jimmy's Dry Cleaner Site is an inactive dry cleaning facility that is listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites (the Registry) as a Class 2 Site, indicating that Site conditions are considered to constitute a significant threat to the environment.

As a result of Site inspections by the Nassau County Department of Health (NCDOH) in 1988, it was concluded that the dry cleaning operations and hazardous material storage at the Site presented a significant risk to public health and the environment. This conclusion was based on the observation of poor house keeping practices, specifically leaking dry cleaning equipment and inappropriate hazardous waste storage practices. The NCDOH also noted the presence of an unregistered below grade fuel oil tank and potential for discharge of hazardous materials to a dry well located near the dry cleaning facility.

To evaluate subsurface conditions, three environmental Site investigations have been performed to date at the Site. The first investigation was conducted by C.A. Rich Consultants, in the spring of 1994. The second investigation was conducted by NCDOH in December 1995 and the third investigation was conducted by the NYSDEC in November 1999. All three investigations identified the presence of volatile organic compounds (VOCs) in groundwater and soil that exceed NYSDEC action levels. The presence of abandoned waste materials was also confirmed within the former dry cleaning facility. The NYSDEC determined that a Remedial Investigation/Feasibility Study (RI/FS) is required for the Site to comprehensively characterize and delineate contaminants and evaluate remedial alternatives, as necessary. In February 2001 the NYSDEC awarded IT Corporation a work assignment under the State Superfund Standby Contract to complete the RI/FS program.

On March 13, 2001, the NYSDEC and IT Corporation conducted a Site visit to familiarize the project team with the current Site conditions. During the Site visit, discussions were held between the NYSDEC and IT Corporation relative to the work steps that are necessary to assess conditions at and down-gradient of the Site. After the Site visit, the NYSDEC and IT Corporation conducted a project work session to define the required Site investigation work

steps. The agreed upon work steps were formalized in a Project Scoping Plan. The elements of this RI/FS Work Plan have been prepared in accordance with the Project Scoping Plan that was submitted to the NYSDEC on April 11, 2001. The work plan was also developed in accordance with the *New York State Division of Environmental Remediation Technical and Administrative Guidance Memorandum 4025 (TAGM 4025), "Guidelines for Remedial Investigations/Feasibility Studies", March 31, 1989, and TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites*.

1.2 RI/FS Project Objectives

Based on the review of the historic subsurface Site investigation results and the Site inspections, the NYSDEC determined that an RI/FS is required to properly characterize Site conditions and evaluate remedial options, as necessary. The objectives of the RI/FS are as follows:

1. Determine the nature and extent of contamination at and down-gradient of the Site
2. Determine the extent to which contaminants pose a risk to human health or the environment
3. Determine if all subsurface contamination is related to on-site source areas or other off-site sources
4. Determine if remedial action is required to address surface and subsurface conditions within and adjacent to the former dry cleaning facility.

If remedial action is required, the additional Site data will be used during the preliminary and detailed evaluation of potential remedial alternatives as part of the Focused Feasibility Study.

1.3 Work Plan Objective

The objectives of this RI/FS Work Plan are as follows:

- Outline the field activities and methodology that will be implemented to effectively collect representative data during the completion of the investigation;
- Develop a Site specific Health & Safety Plan that will be used by field personnel to safely and effectively complete project work steps;

- Develop a Community Participation Plan that will create an open line of communication between the public and the NYSDEC during the RI/FS process;
- Develop a Site Specific Quality Assurance Plan that will specify the analytical methodology and quality control/quality assurance methodology that will be used to evaluate the presence/absence of contaminants of concern within soil, air and groundwater;
- Identify the project team that will be utilized to complete and manage the RI/FS program;
- Develop a RI/FS project schedule with project milestones;
- Develop a level of effort and project budget associated with the execution of the investigation and reporting activities;
- Develop a program to identify and implement Interim Remedial Measures (IRMs) for the Site if necessary;
- Develop a process to evaluate Site data and identify applicable remedial alternatives, inclusive of presumptive remedies and treatability testing or other analyses that may be required as part of the Focussed Feasibility Study.

1.4 Work Plan Organization

The RI/FS Work Plan is organized into nine sections, one appendix and three associated documents, as described below:

- **Section 1.0: Introduction**: includes a brief overview of the Project Background, the RI/FS Objectives and an outline of the Work Plan Objectives and Work plan Organization.
- **Section 2.0: Site Background**: includes a review of the Site Background including Site Description and a Summary of Previous Investigations conducted at the Site.
- **Section 3.0: Work Plan Rationale**: includes a description of the Data Quality Objectives and Work Plan Approach for the Remedial Investigation.
- **Section 4.0: Remedial Investigation Scope of Work**: includes descriptions of the Field Investigation tasks, the Analytical Program, the Remedial Investigation Report, and the Management of Investigation Derived Waste.
- **Section 5.0: Focussed Feasibility Study Scope of Work**: presents a description of the Development of Remedial Alternatives, the Preliminary Screening of the Remedial Alternatives, proposed treatability Studies, the method for conducting a Detailed

Evaluation of Alternatives, the Remedy Selection and describes the focused Feasibility Study Report.

- **Section 6.0: Project Management Approach**: includes a description of the Project Organization and Project Schedule to complete the RI/FS field and reporting activities.
- **Section 7.0: References**: includes a list of documents prepared as a result of investigations conducted at the Site, a list of guidance documents utilized in the RI/FS process and correspondence between State agencies and representatives of the responsible party.
- **Section 8.0:** Subcontracts and M/WBE Utilization Plan
- **Figures:** Includes all figures referenced in this work plan.
- **Tables:** Includes all tables referenced in the work plan.
- **Appendix A:** Project Team Resumes

Other IT Corporation documents related to the Jimmy's Dry Cleaner RI/FS include

- Health and Safety Plan (HASP), May 2001
- Quality Assurance Project Plan (QAPP), July 2001
- Citizen Participation Plan (CPP), July 2001

2.0 SITE BACKGROUND

2.1 Site Description

2.1.1 Site Physical Setting

The Jimmy's Dry Cleaner Site is located in Nassau County at 61 Nassau Road in Roosevelt New York (**Figure 1, Site Location Map**). The Site is rectangular in shape, and in its original layout, appears to have consisted of approximately one acre of land. Most of this area appears to have once been part of the Jimmy's Dry Cleaner property and is now used as a storage yard areas for adjacent businesses **(Figure 2, Site Map)**. The former dry cleaner building now occupies approximately one quarter acre of land. The area noted on the Site map will be referred to within the Work Plan as the "Site" and the area down-gradient of the Site where additional off-site assessment activities will be performed will be referred to as the "down-gradient area".

The building is oriented roughly north-south. The property is comprised of a one-floor masonry building, approximately 1,500 square feet in area. A small section on the south end of the former dry cleaning building is currently under commercial use as a delicatessen (deli). Most of the Site is covered by asphalt or gravel (parking areas) and the former dry cleaning building. Immediately adjacent to the building on its north and west sides are vacant lots with vehicles being stored on them. Immediately adjacent to the building on its south side is a storage area used by the deli. The east side of the building is used for parking for the deli and the former dry cleaner. Currently the dry cleaning facility is abandoned and the dry cleaning equipment and several waste storage containers remain on-site. A back door is located on both the northwest corner and southwest corner of the building. The entrance to the deli and the former dry cleaning facility are located on the east side of the building facing Nassau Road. The building is in disrepair and requires significant maintenance.

Outside of the immediate properties adjoining and comprising the Site, the area surrounding the Site is a mixture of residential and commercial properties. The commercial properties are located predominantly along Nassau Road. Most utilities are brought to the Site through underground connections with the exception of electricity, which is brought on site via overhead cables. The facility discharges waste water to a sanitary sewer and historically to two on-site dry well located at the northeast corner of the property near Nassau Road **(Figure 2).** Anectdotal information indicates that a catch basin located in the southeast corner of the property also served as a dry well over the years.

2.1.2 Site History

During the period of 1988 to 1990, the Nassau County Department of Health (NCDOH) performed several Site inspections at Jimmy's Dry Cleaners according to the Public Health Ordinance (Article XI) and noted several concerns relative to the storage and use of hazardous dry cleaning materials. Subsequently it was concluded that Jimmy's Dry Cleaners was not compliant with applicable laws and regulations regarding hazardous waste storage/use and there were concerns that the potential discharge of hazardous materials presented a significant risk to public health and the environment. Between 1991 and 1992, the facility owner received several Notice of Infraction from the NCDOH and was eventually fined for operating without a permit and not having performed a tightness test on the 3,800 gallons underground storage tank (UST) located south of the building. The UST was reportedly replaced by a 250 gallon above ground storage tank (AST) located inside the facility.

In spring 1994, a Site inspection/Site assessment was conducted by CA Rich Consultants, Inc. on behalf of a lending institution preparing to foreclose on the Subject Property. Groundwater and soil sample analyses revealed elevated concentrations of VOCs in groundwater and soil. Maximum concentrations of total VOCs in soil and groundwater were 713 µg/kg (parts per billion (ppb)) and 38,420 ug/L (ppb) respectively. (**Figures 3** and **4 Historical On-Site Soil Sampling Location Map and Historical On-Site Groundwater Sampling Location Map respectively**). The Site investigation data was forwarded to the New York State Department of Environmental Conservation (NYSDEC), Division of Hazardous Waste Remediation for appropriate action. The facility was subsequently listed in the NYSDEC Registry of Inactive Hazardous Waste Sites in December 1994. During the CA Rich Consultants inspection, spent PCE filters, cartridges and pieces of dry cleaning equipment with self contained PCE tanks were observed along the northern wall of the facility with no containment.

In 1995 the NCDOH completed additional Site assessment activities on-site. Soil samples and groundwater sample analytical results revealed the presence of VOCs in soil as depicted on **Figure 3,** and highly elevated concentrations of VOCs in groundwater (**Figure 4**).

Several Notices of Non-Compliance were issued to Jimmy's Dry Cleaning in 1998. As a result of a Site inspection of the dry cleaning facility and adjoining deli on September 29 and 30, 1998 a notice of violation requesting immediate action was issued by the NYSDOH. Based on available information from various inspection reports, the dry cleaning activities stopped in November 1998 and have not resumed since.

The NYSDEC collected confirmatory soil and groundwater samples at and down-gradient of the Site in 1999. Results of these investigations revealed elevated VOC concentrations in groundwater samples collected down-gradient at a distance of up to 1,500 feet from the Site

(**Figures 5A, 5B and 5C, Total VOC Concentration in Groundwater Isocontour Maps**). The source of the contamination is apparently a result of the mishandling of PCE and PCE related waste resulting in the discharges of PCE to soils, groundwater and to the dry wells located outside the Jimmy's Dry Cleaning building.

One other manufacturing facility (Ranco Wiping Cloth Company) located at the intersection of Mt. Joy and Nassau Road, has been listed as a Class 2 Site on the State's Registry of Inactive Hazardous Waste Disposal Sites and is either being investigated or remediated. Chemicals of interest at the Ranco Wiping Cloth Company Site also include chlorinated VOCs. The project files and the degree of soil and groundwater impacts from this facility will be evaluated.

2.1.3 Regional and Local Geology

The Site is located in western Long Island, which generally consists of approximately 1,000 to 1,500 feet of clastic, glacial sediments described as glacial kame deposits, fluvial sands or variably sorted till moraine deposits (D. Cadwell, *Surficial Geologic Map of New York, Lower Hudson Sheet*, 1989). No subsurface soil samples have been collected at depth at the Site to further characterize the Site's geology.

2.1.4 Regional and Local Hydrogeology

Limited site-specific data exists regarding groundwater flow direction or gradient. An investigation conducted by NYSDEC at the Site in 1999 indicates that groundwater generally flows in a southern direction and occurs at approximately 15 to 20 feet below ground surface.

2.1.5 Groundwater Usage in the Vicinity of the Site

As documented in the *NYSDEC Division of Hazardous Waste Remediation Inactive Hazardous Waste Disposal Report, 1994*, the nearest water supply is located 1,750 ft south of the Site. The nearest water body is Middle Bay, located 15,000 feet south of the Site. Results from an Environmental Data Resources (EDR) search revealed the presence of several wells upgradient of the Site. Potential impact from the Site to these potential receptors will need to be assessed during the RI/FS.

2.2 Summary of Previous Investigations

Previous investigations have presented data identifying several potential source areas of contamination at the Site:

- Soils and groundwater near the dry well located on the northeastern side of the building;
- Soils and groundwater underneath the building;
- Soils and groundwater in the immediate surroundings of the building, along it's north, west and south sides.

PCE is the most prevalent compound detected in Site soil and groundwater samples. Other compounds detected at the Site include various VOCs and chlorinated VOCs.

2.2.1 Subsurface Soils Investigation Results

Table 1A presents a summary of the soil data collected during the previous investigations at the Site and the historical sampling locations are presented on **Figure 3, Historical On-Site Soil Sampling Locations Map**. Low level VOC impacts were identified in the shallow soils at all sampling locations. Limited information exists on subsurface soil quality in the areas surrounding and underneath the building or surrounding the UST reportedly located on the south side of the property.

None of the surface and shallow soil samples collected at the Site exceeded the to NYSDEC's TAGM 4046 "Determination of Soil Cleanup Objectives and Cleanup Levels", dated January 1994 (TAGM 4046) for the analyzed compounds.

2.2.2 Groundwater Investigation Results

Table 1B presents a summary of the groundwater data collected during previous investigations at the subject property and historic sampling locations are presented on **Figure 4, Historical On-Site Groundwater Sampling Location Map** and **Figures 5A, 5B and 5C**, **Off-Site Total VOC Concentration in Groundwater Isocontour Maps**. Groundwater is impacted with PCE at most of the sampling locations, at various sampling depths. The most elevated concentration of PCE was found at the Site in 1994 at a sampling location north of the building (GWGP-1: 38,000 ppb). PCE was also detected in off-site, down-gradient groundwater samples collected in 1999 (GP-1 through GP-7).

Other VOC contaminants in groundwater include, but are not limited to, 1,1-dichloroethane (8 ppb), 1,2-dichloroethene (2 ppb), cis-1,2-dichloroethene (180 ppb), 1,1,1-trichloroethane (9 ppb), 1,1,2-trichloroethane (16 ppb), 1,1,1,2-tetrachloroethane (17 ppb), methyl-tert butyl ether (14 ppb) and trichloroethene (710 ppb). VOC concentrations are typically more elevated near ground surface close to the Jimmy's Site and at depth as distance from the Site increases towards the south (down-gradient).

2.2.3 Site Assessment – CA Rich Consultants, Inc. - 1994

In 1994, CA Rich Consultants performed a Site inspection/Site assessment for a lending institution that was preparing to foreclose on the property. The information currently available from this investigation is a Site map showing the soil and groundwater sampling locations and the analytical results of two groundwater samples: 31,000 ppb at the south end of the building and 38,000 ppb at the north end of the building. Following the receipt of these results by the regulatory agencies (NYSDOH and NYSDEC), the Site was classified as a Class 2 Inactive Hazardous Waste Site in 1994. The available analytical results of soil and groundwater samples collected during this investigation have been incorporated in **Table 1B** and the sampling locations and groundwater sampling results are presented in **Figure 4**.

Site Assessment — Nassau County Department of Health (NCDOH) – December 1995

A field sampling program was performed by representatives of the NCDOH on December 4, 1995. Soil and groundwater samples were collected to evaluate alleged illegal disposal of PCE waste by the facility owner. The results of the investigation revealed the presence of low level total VOC in soil near the facility (<713 ppb) and elevated VOC concentration in groundwater (max 32,037 ppb) near the facility. The analytical results of soil and groundwater samples collected during this investigation have been incorporated in **Table 1A** and **Table 1B** and the sampling locations and results are presented in **Figures 3 and 4**.

Site Assessment – NYSDEC – November 1999

The NYSDEC performed a limited groundwater investigation in the neighborhood located south (down-gradient area) of the Site in November 1999. The data was utilized to assess if a Remedial Investigation/Feasibility Study was warranted at the Site. During this investigation, multiple groundwater samples were collected at various depths from seven geoprobe sampling locations. Two of the geoprobe sampling locations (GP-1 and GP-2) were converted into micro-piezometers (PZ-1 and PZ-3 respectively), and a third piezometer was installed without collecting water samples (PZ-2). The groundwater analytical results revealed that elevated VOCs were present in groundwater (max. total VOC of 4,600 ppb) at a significant distance from the Site. Groundwater sampling depths ranged between 20 feet and 80 feet below grade and the results have been incorporated in **Table 1B.** Sampling locations and the total VOC concentrations at various depths are presented in **Figures 5A, 5B and 5C.**

Laboratory analytical results indicated that tetrachloroethylene (PCE) concentrations above the regulatory concentration of 5 ppb are present at all sampling locations. The most elevated PCE concentration (4,600 ppb) was located in GP-2 at 20 feet below ground surface. Elevated PCE concentrations were also found at depth in GP-1 (198 ppb at 67 feet), GP-2 (176 ppb at 63 feet), GP-3 (460 ppb at 60 feet), GP-4 (99 ppb at 80 feet), GP-6 (430 ppb at 49 feet) and GP-7 (500 ppb at 62 feet).

Figures 5A, 5B and 5C also present Isocontour maps of Total VOC concentrations at various depths for groundwater samples collected off-site. The isocontours were interpreted by IT Corporation based on available data and are approximate.

3.0 WORK PLAN RATIONALE

3.1 Data Collection Objectives

In general, the overall goals of the Jimmy's Dry Cleaner RI/FS Work Plan are to outline the data collection process that will be utilized to define the physical characteristics of the Site, define the extent of contamination that has occurred as a result historic of Site operations and identify potential receptors and remedial alternatives. Achieving these goals will:

- Determine if contaminants of concern present potential threats to human health and/or the environment, and
- Develop and evaluate remedial alternatives that could be utilized to reduce risks associated with the contaminants of concern.

These goals will be achieved at the Jimmy's Dry Cleaner Site by designing data collection activities to address the following specific objectives:

- Characterize the background concentrations of the contaminants of potential concern (COPCs) in the subsurface soils and groundwater up-gradient of the Site;
- Characterize depth to groundwater and groundwater flow patterns at and down-gradient of the Site;
- Characterize soil characteristics at and down-gradient of the Site;
- Locate and examine reasonably accessible paths of potential releases within the facility (drain lines, dry wells, etc) in order to determine to what extent, if any, these structures acted as conduits for the migration of contaminants;
- Investigate the extent of subsurface soil impacts that may exist beneath and proximate to the building that may still be contributing to soil and groundwater impacts;
- Investigate the air quality in the adjacent deli after the removal of dry cleaning equipment formerly used at the Site;
- Investigate other potential source areas;
- Assess potential health risks posed by contaminants at the Site;
- Determine Remedial Action Objectives (RAOs) for the Site;
- Evaluate applicable remedial alternatives, potentially including treatability testing or other analyses that may be required as part of the Focussed Feasibility Study.

3.2 Work Plan Approach

The overall approach for the Jimmy's Dry Cleaner RI/FS is described in the following subsections of this work plan. Each subsection corresponds to an overall RI/FS goal as described in EPA *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 540 G-89 004, 1988).

3.2.1 Investigate Site Physical Characteristics

Tasks to be completed in support of this overall goal and the following specific objectives include:

Objective	*Planned RI/FS Tasks*
Characterize soil composition and evaluate local geology.	Collect and characterize soil samples during the installation of soil borings at the Site, perform conductivity survey, review existing literature on local geology.
Characterize groundwater conditions.	Evaluate depth to water during soil boring installations and monitoring well installations; determine flow direction.
Determine where releases at the Site may have occurred.	Perform visual inspection of the facility floor for drains, especially at the location of dry cleaning equipment and inspect the dry well locations.

3.2.2 Define Contaminant Source Areas

Tasks to be completed in support of this overall goal and the following specific objectives include:

Objective	*Planned RI/FS Tasks*
Investigate soil quality underneath and immediately adjacent to the building.	Install soil borings, collect and field screen soil samples, perform soil gas survey and analyze soil and soil gas samples by portable gas chromatograph.
Investigate groundwater quality in the immediate vicinity of the building.	Collect deep groundwater samples at select locations and analyze groundwater samples for VOCs by portable gas chromatograph.
Estimate volumes of material that may require treatment at the Site and determine appropriate remedial response.	Complete soil borings and groundwater sampling and analyze available data to complete a thorough Site characterization, evaluate potential Interim Remedial Measures (IRM's) and perform waste characterization analysis.

3.2.3 Define Nature and Extent of Contaminants and Associated Risk

Tasks to be completed in support of this overall goal and the following specific objectives include:

Objective	Planned RI/FS Tasks
Characterize the distribution and concentrations of the contaminants of concern (COCs) in the subsurface soils and groundwater.	Soil and groundwater characterization sampling and analyses for VOCs by portable gas chromatograph.
Determine the nature and extent of potential groundwater-related impacts to the neighborhood located down-gradient.	Collect deep groundwater samples and install monitoring wells; collect and characterize groundwater samples via a fixed base laboratory.
Determine if off-site sources are impacting Site groundwater quality (Ranco Wiping Clothing Inc.).	Evaluate the distribution and occurrence of specific chemicals as determined from groundwater characterization sampling.
Compile and evaluate all Remedial Investigation data.	Complete a Remedial Investigation Report.
Assess potential human health risks.	Collect soil gas samples adjacent to residences and if warranted conduct indoor air quality sampling. Conduct air quality sampling in the Deli adjacent to the former dry cleaner. Evaluate other potential receptors down-gradient of the Site. Complete a Qualitative Human Health Risk Assessment

The proposed sampling tasks, testing tasks, laboratory procedures, and risk and alternative evaluations to be performed during the Jimmy's Dry Cleaner RI/FS are described in detail in following sections of the work plan.

3.2.4 Select an Appropriate Remedial Alternative

Objective	Planned RI/FS Tasks
Assess appropriate remedial action to address the COCs.	Complete a Focussed Feasibility Study including development, screening and selection of remedial alternatives.

4.0 RI SCOPE OF WORK

This section describes the work effort, which will constitute the RI at the Jimmy's Dry Cleaner Site. The scope of work is based on the results of the March 19, 2001 scoping session between the NYSDEC and IT Corporation, as well as the requirements stated in NYSDEC's Work Assignment for the Jimmy's Dry Cleaner Site (DEC Site No. 130080).

This section details the proposed investigation, assessment, and reporting tasks designed to generate information sufficient to enable IT Corporation to identify the presence and extent of the impacted soils and groundwater on-site. RI/FS activities will be performed in accordance with US EPA and NYSDEC requirements, protocols, and guidance including EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA 540 G-89 004, 1988), NYSDEC's TAGM 4025 "Guidelines for Remedial Investigations/Feasibility Studies" dated March 31, 1989, and TAGM 4030 "Selection of Remedial Actions at Inactive Hazardous Waste Sites".

4.1 Field Investigation

A description of proposed field activities for the Jimmy's Dry Cleaner Site is presented in the following sections. All field investigation activities will be coordinated with on-Site tenants in order to minimize impact to their daily activities.

4.1.1 Pre-Field Work Site Reconnaissance

The primary objectives of this task are to coordinate Site investigation activities with the current on-site tenant, to verify the locations for all proposed soil borings, as well as to identify staging areas for equipment, materials and decontamination zones. Additionally, coordination with the Underground Facilities Protection Organization (UFPO) and current on-site personnel for clearance of subsurface utilities and services will be included in this task. The IT Corporation Project Manager will arrange a Site reconnaissance meeting including the Site Manager, Project Geologist, a representative from the drilling subcontractor, and a NYSDEC representative at least one to two weeks prior to the scheduled start date of on-site activities. This will allow time for the facility to be notified of the scheduled activities and for moving stored equipment or materials for access to the proposed drilling/sampling locations (if necessary).

The NYSDEC will be responsible for notifying off-site property owners and establishing any necessary access agreements. To the extent practicable, access agreements will allow for flexibility in locating the sample/boring locations in case of subsurface interference or other conditions requiring minor changes in the positioning of sample/boring locations.

4.1.2 Base Map Revision

In order to provide an accurate graphic presentation of boring locations, sampling locations and related Site data, a Site map and a Site area map will be developed for the Site and the area down-gradient of the Site. The maps will be completed by a New York State Licensed Land Surveyor. The maps will delineate current property boundaries, sampling/boring locations, and surface features such as buildings, roadways, and aboveground utilities at the Site and general Site boundaries in the down-gradient area. Elevations will be referenced horizontally to the North American Datum of 1983 (NAD 83) and projected on the New York State Plan Coordinate System and Vertically to the National American Datum of 1988 (NAVD 88).

Subsequent to soil boring and monitoring well installation, each location will be identified on the survey map and will include the ground surface elevation. The ground surface and top of the inner casing elevations will be provided for each monitoring well.

On-site and off-site utilities will be identified by the Underground Facilities Protection Organization (UFPO) to protect the health and safety of field personnel and to prevent damage to underground utilities during intrusive activities. Public and privately owned utilities will be located by contacting responsible agencies/parties to provide mark-outs of underground utilities. Utility locations at the Site will be provided on the Site map for future reference.

4.1.3 Field Sampling Activities

This section describes the specific field data collection activities and the rationale for these activities and analyses. A summary of proposed field activities; including sampling and analyses for Jimmy's Dry Cleaner Site is provided in **Tables 2A, 2B and 2C**. **Figures 6A, Proposed On-Site Sampling Location Map and Figure 6B, Proposed Off-Site Sampling Location Map** present the locations of proposed sampling activities. Additional details regarding the proposed sampling activities are provided in subsequent sections of the Work plan. In general, the field sampling program will consist of a three-phased approach.

The initial phase will include an evaluation of soil and groundwater quality immediately adjacent to the facility (the Site) including soil gas survey, soil sampling, direct push drilling (geoprobe) groundwater sampling and the analysis of these samples with portable GC. The second phase

will include sampling of groundwater with the geoprobe down-gradient of the Site and the collection of air samples inside the deli using PCE badges. Groundwater samples collected during sampling activities in the down-gradient area will be sent to a fixed base laboratory for analysis. The PCE badges for air sampling will be supplied by NCDOH. After the badges have been exposed to ambient air within the buildings, the badges will be sent to NCDOH for analysis. The third phase will include monitoring well installation, water table monitoring, additional groundwater sampling at monitoring wells and laboratory analysis at a later date (after the review of the Phase I and Phase II data) at locations dictated by the initial two phases of the investigation. The laboratory analytical program designed for this investigation is described in **Section 4.2**.

Prior to the beginning of the field work, an Interim Remedial Measure (IRM) will be conducted at the Site. The IRM which will consist of the decontamination of the dry cleaning equipment and the removal of tetrachloroethene (PCE) drums still present in the building will be performed by NYSDEC.

4.1.3.1 Portable Gas Chromatograph

During the first phase of the investigation, a portable gas chromatograph (portable GC) will be used to analyze soil gas samples, soil samples and groundwater samples to provide real-time results. This will allow for field decisions to be made regarding the extent of contamination and the area(s) of maximum contamination at the facility (the Site). This characterization of on-site soil gas, soil samples and groundwater will aid in the placement of groundwater sampling locations in the down-gradient area during subsequent phases of the investigation. Details regarding portable GC procedures are described in the Quality Assurance Project Plan (QAPP), which is presented under separate cover.

4.1.3.2 Soil Gas Survey

A total of 18 soil gas vapor sampling locations are proposed as indicated on **Figure 6A,** and in **Table 2A**. The soil gas survey will be conducted in order to investigate the extent of subsurface impact in the immediate vicinity of Jimmy's Dry Cleaner building and assess if indoor air quality monitoring is necessary in the adjacent dwellings.

Soil gas samples will be collected by driving a clean stainless steel drive point adapter and expandable point to the desired depth of 2 to 4 feet below ground surface. The probe rod will then be retracted approximately 3-4 inches to create a void below the bottom of the drive point adapter. A clean, unused piece of ¼" polyethylene tubing will be threaded to the stainless steal adapter in a manner that will create an air tight seal. The line will be purged by drawing a

measured volume of soil/gas vapor through the tubing using a vacuum/volume system mounted on the direct push drilling (geoprobe) vehicle. The vacuum system will subsequently be used to draw a known volume of soil gas within a tedlar air sample bag. The air samples will be analyzed by the portable GC.

4.1.3.3 Air Quality Sampling

Air quality data will be collected from within the Deli currently located adjacent to the former dry cleaner, within the same building. PCE passive sampler (badges) will be supplied by NCDOH and located as close at the worker breathing zone as possible. The badge is unsealed and "exposed" to ambient air for a precise period of time (usually 8 hours), representing typical worker exposure for a day. The badge is then resealed and sent to an off site laboratory for analysis.

4.1.3.4 Soil Boring and Sampling

Direct Push Drilling (Geoprobe) Sampling:

A total of eight borings are proposed in the immediate area of the facility at locations indicated on **Figure 6A** and the proposed sampling program is presented in **Table 2A**. The drilling and sampling of the direct push borings will be conducted in order to investigate the extent of unsaturated subsurface soil impacts that may exist around and underneath the building. This data will be utilized to estimate the potential volume of contaminated soil and contaminant that could continue to contribute to off-site groundwater contamination.

The 8 direct push soil borings will be advanced through the unconsolidated deposits to an approximate depth of 20 feet in order to provide vertical characterization of impacted soils and to provide stratigraphic information for the Site. Two borings will be advanced inside the building, at the location of former dry cleaning equipment or down-gradient from the equipment. Soil samples will be collected continuously using a 4-foot Macro Core Sampler and acetate liner and analyzed for potential Site-related impacts using the portable GC and a photoionization detector (PID).

Sample Screening Overview:

The physical characteristics of each soil sample will be visually classified and described based upon the unified soil classification system (ASTM D 2487-85). Each sample will be monitored with an photoionization detector (PID) using an 11.7 lamp or OVA flame-ionization detector (FID) for volatile organic compounds. All sample classification descriptions, sample recovery, FID or PID readings and any other pertinent information will be recorded in field notebooks and on blank boring log forms.

Select soil samples will be collected and analyzed in the field for volatile organic compounds using the portable GC according to EPA method 8021. The soil samples will be placed in 16 oz. glass jars with septum seals and then prepared for headspace analysis as outlined in the QAPP. The sample jar will be labeled with the date collected, boring number, sample number, depth. Additionally, 0% of the samples will be submitted to an off-site laboratory for duplicate analysis. Duplicate samples will be selected based upon the results of visual/olfactory and PID screening, with the intent of verifying the portable GC results. The number of samples submitted for analysis may be reduced at boring locations where no elevated PID readings or obvious visual/olfactory qualities, characteristic of industrial by-products, are observed. Following completion of each boring, the borings will be backfilled with native soils and sand and the top two feet of the borehole will be filled with a cement-bentonite grout. The surface areas of boring locations will be repaired as needed. One soil boring will be completed as temporary micro-piezometers, the temporary piezometer will be installed inside the former dry cleaner building. Decontamination procedures between each sample collection and between sampling location will follow the procedures outlined in the QAPP.

4.1.3.5 Deep Groundwater Sampling

Deep groundwater samples will be collected using a SP15 screen point sampler with a direct push (Geoprobe) drill rig. The proposed deep groundwater sampling locations are presented in **Figure 6A and 6B** and the proposed sampling program is presented in **Table 2B**. To collect groundwater samples using the Geoprobe, a clean sampler is threaded onto the leading end of a probe rod and driven to the desired sampling interval. While the sampler is driven to depth, O-ring seals at the drive head and expendable drive point provide a watertight system. Once at the desired sampling interval, chase rods are sent downhole until the leading rod contacts the bottom of the sampler screen. The tool string is then retracted while the screen is held in place with the chase rods. As the tool string is retracted, the expendable point is released from the sampler sheath, an O-ring on the screen head maintains the seal at the top of the screen. As a result, any liquid entering the sampler during screen deployment must first pass through to screen. The tool string and sheath may be retracted the full length of the screen or as little as a few inches if a small sampling interval is desired. During the RI field activities, the tool string and sheath will be retracted no more than 12 inches. The probe will be driven at depth first and water samples will be collected at 100 feet, 80 feet, 60 feet, 40 feet and 20 feet, (subsurface condition permitting). The Screen Point SP 15 Sampler utilizes a screen with a standard slot size of 0.004 inches (0.1 mm) and an exposed length of 41 inches (1041 mm).

Following the completion of each deep groundwater sampling boring, the borehole will be filled with sand, with the top 2 feet sealed with a cement/bentonite grout and the surface area

completed as a temporary piezometer. Decontamination procedures between each sample collection and between sampling location will follow the procedures outlined in the QAPP.

Sample collection and analysis

With the exception of the groundwater samples collected on-site, the water samples will be collected and sent to an off-site laboratory for volatile organic compounds (VOCs) analysis according to ASP-95-1. The water samples will be placed in 40 ml glass vials with septum seals with no headspace. The vials will be placed on ice until shipment to the laboratory, no later than 24 hours after sample collection, as outlined in **Section 4.1.3.10**. As a quality control measure, 5% of the water samples will be sent to the laboratory as a blind duplicate (one blind duplicate per 20 samples).

4.1.3.6 Conductivity Borings

A direct sensing soil conductivity (DSSC) probe will be utilized to assess the local geology to a depth of 100 feet below ground surface at two pre-selected locations (**Figure 6B**). The DSSC probe, connected to a field computer, will register the variability in soil conductivity between the different stratigraphic units. The probes and DSSC unit will be thoroughly decontaminated between each borehole, as outlined in the QAPP (provided under separate cover). The DSSC data will be reviewed to determine if stratigraphic changes (i.e. less permeable strata) are present that may influence groundwater flow.

4.1.3.7 Temporary Micro-piezometers

Two temporary micro-piezometers will be installed in selected soil borings. The first piezometer will be installed in the soil boring upgradient of the Site, the second will be installed inside the former dry cleaning building. The piezometers will be constructed of 1 inch diameter PVC and will be constructed with 10 feet of screen (0.010-inch screen opening size) and No 0 Morie sand will be used as filter pack. The sand pack will extent approximately 2 feet above the screen Following placement of the sand pack, a two-foot thick (minimum) bentonite pellet or granular bentonite seal will be placed above the sand pack

A flush-mount, traffic-rated roadbox will finish the well head. The roadbox will have a bolt-down steel cap. A concrete apron will be installed around the roadbox after the grout has dried. The apron will be sloped to route drainage away from the well. An experienced geologist will supervise the soil boring and monitoring well installation.

4.1.3.8 Monitoring Well Installation and Development

Subsequent to review of the data collected at the Site and the down-gradient data collected during the second phase of the investigation, twelve new groundwater monitoring wells may be installed at select locations. The location of these groundwater monitoring wells is dependent upon the results of the soil and groundwater samples collected during the direct push drilling groundwater and soil sampling activities. The monitoring wells will be installed in areas that permit the vertical and horizontal extent of contamination to be delineated. The monitoring wells will be installed to investigate groundwater quality, characterize groundwater flow patterns and determine the extent of impacts from the Site.

At each proposed monitoring well location, borings will be advanced utilizing hollow stem auger drilling techniques. The wells will be constructed of 2-inch-diameter PVC and will be screened at various depths as presented in **Table 2C**. Each well will be constructed with 10 feet of screen (0.010-inch screen opening size) and No. 0 Morie Sand will be used as filter pack. The screen and filter pack sizes may be changed depending upon the nature of the material encountered in the boreholes. However, at this time, it is anticipated that 0.010-inch slot well screen and No. 0 Morie sand will be used. The sand will be placed in increments to assure that native material does not collapse around the well screen. Frequent measurements of the sand level will be made using a weighted measuring tape. The sand pack will extend to approximately two feet above the top of the well screen. Following placement of the sand pack, a two-foot thick (minimum) bentonite pellet or granular bentonite seal will be placed above the sand pack The remainder of the borehole will be filled with bentonite and Portland cement grout mixture tremied to within one foot of the ground surface. Monitoring wells will be installed as indicated in **Figure 7 - Typical Monitoring Well Cross Section**.

A flush-mount, traffic-rated roadbox will finish the well head. The roadbox will have a bolt-down steel cap. A concrete apron will be installed around the roadbox after the grout has dried. The apron will be sloped to route drainage away from the well. An experienced geologist will supervise the soil boring and monitoring well installation.

The drilling equipment will be decontaminated at the decontamination (decon) station prior to each well installation. All water generated during decontamination procedures will be stored in NYS Department of Transportation 55 gallons drums and sampled for disposal characterization.

The newly constructed monitoring wells will be developed by pumping or surging to create a good hydraulic connection between the well screen and the adjacent formation. Wells will be developed either by air-lift pumping techniques using the drill-rig or a variable-speed submersible pump. Fine-grained material around the well screen will be drawn into the well and removed by agitating the well water with a surge block, by pumping water from the well at

alternating discharge rates or by manual bailing. Accumulated sediments will be removed from the wells by pumping or bailing the agitated water.

Development shall proceed until the turbidity reaches 50 NTU or until at least three to five well volumes are removed within a one hour period. This will minimize the effect of residual formational silts and clays that could potentially interfere with chemical analysis. Well development also increases the hydraulic conductivity immediately around the well, which, in turn, reduces the potential of the well, yielding an insufficient volume of water during the sampling procedure.

Each monitoring well will be developed as soon as possible, but not less than 48 hours after installation. The appropriate well development method will be selected depending on water level depth, well productivity and sediment content of the development water.

4.1.3.9 Water-Level Measurements

The water level in each monitoring well will be gauged to provide information on hydraulic gradients and groundwater flow at the Site, as well as to provide information on the presence/absence of immiscible liquids. Measurements of water levels will be obtained using an interface probe capable of measuring depth to water/depth to product with a +/- 0.01-foot accuracy.

4.1.3.10 Groundwater Sample Collection

Groundwater samples will be collected from accessible on-site pre-existing monitoring wells and the twelve monitoring wells, as stated in **Table 2C**. The water table will be allowed to stabilize for a minimum of 24 hours after the development procedure prior to the beginning of the sampling activities. Sample collection will be performed in accordance with the procedures described below:

1) Obtain appropriate laboratory-prepared sample containers prior to sampling.

2) Determine the appropriate level of health and safety according to the approved Health and Safety Plan.

3) Calibrate a pH pen, conductivity meter, turbidity meter and thermometer.

4) Obtain a depth to water measurement, then determine the volume of water in each well by using $V = \pi r^2 h$ where:

V = volume of water (feet^3)
π = 3.14
r = radius of well (feet)
h = height of column of water in well (feet)

Determine four well volumes in gallons by using ft^3 x 7.48 gallons/ft^3 x 4.

5) Use a clean pump to purge the low-yield wells to dryness. Purge high-yield wells of at least four to ten well volumes until turbidity has been reduced to 50 NTUs or less. The purge pump will be leakproof and free of oil and other adulterating components.

6) Purge water will be containerized and sampled for disposal characteristics (See **Section 4.5.2**) if evidence of contamination is observed (sheen, odor, etc) during purging process.

7) Put on clean disposable latex sampling gloves prior to collecting samples.

8) Collect water samples in 40 ml glass vials for volatiles utilizing clean disposal sampling pumps tubing and/or bailers.

9) Place the samples in an ice chest at 4° C after labeling.

10) Obtain duplicate and blank samples at the frequency required by **Tables 2A, 2B and 2C.**

11) Label the sample containers using cloth labels and waterproof ink and seal containers with custody seals. Labels will include the following information:

a. sample identification number,
b. job name and identification number,
c. well number and designation,
d. date and time of sample collection,
e. type of analysis requested (i.e., VOA, metals, etc.), and
f. name of sampler.

12) Fill out chain-of-custody form and reference the preservation technique in the remarks section.

13) Store the collected samples together with any blank samples collected for that sampling event. The sample set and blanks must be stored together, under refrigeration, in an area known to be free of contamination.

14) Transport the sample set, on ice, via overnight courier, maintaining custody as described in the QAPP.

4.1.4 Data Reduction/Completeness Evaluation

As completed data packages are received from the contract laboratory, preliminary reduction and evaluation of the data will be conducted. The objective of this task is to evaluate, based on the historic and newly collected data, if data gaps still exist which warrant the collection of additional field data.

Preliminary geologic cross-sections and VOC distribution maps will be constructed to assist in the data completeness evaluation. The results of the data completeness evaluation will be transmitted to the NYSDEC in letter format prior to initiation of the remedial investigation report. If it is determined that data gaps exist, additional field activities will be proposed within the evaluation letter.

4.2 Analytical Program Summary

4.2.1 Data Quality Control/Quality Assurance and Management

4.2.1.1 Field Custody

Strict control over possession and integrity of the samples will be maintained by the following procedures:

- Integrity of all sample containers to be used for the sampling tasks to be conducted;
- Establishing and maintaining the record of custody;
- Ensuring that each sample is protected and preserved properly during shipment;
- Checking laboratory handling procedures and samples information systems.

Detailed custody and handling procedures are listed in the QAPP (provided under separate cover).

4.2.1.2 Field Quality Control Checks

The intent of the internal quality control program is to detect potential problems at the source of sample collection and if necessary, trace the sample's analytical pathways for introduction of contamination. The quality control data generated in the field will be used to monitor sampling technique reproducibility and cleanliness. Quality control data generated by the laboratory will

not only monitor reproducibility (precision) in laboratory methods and cleanliness, but accuracy in analyzed samples submitted for analysis.

The field quality control checks monitor the data quality as they are affected by field procedures and conditions. The degree of effort (number of check samples per total samples taken) is stated in this section for each category. The acceptability criteria are outlined in the QAPP (provided under separate cover). All field quality control samples are submitted blind to the laboratory.

The function of each quality control sample is described as follows:

Rinseate Blank:
A sample of rinse water from final decontamination of sampling equipment (split spoons, etc) will be collected and forwarded to the laboratory for analyses. This sample will provide a measure of the degree of sampling equipment decontamination and possible cross-contamination between locations. A minimum of one rinseate blank will be submitted for each analytical parameter.

Duplicate:
Blind field duplicates (as opposed to duplicate containers full of sample intended as backup) are sequential or co-located grab samples that are collected to monitor laboratory precision. A minimum of 20% of the total number of samples will be taken and submitted for analysis. Up to 10 % of the samples analyzed by the field laboratory will be sent to an off-Site laboratory for confirmatory analysis

Trip Blank:
A sample of deionized water will be placed into a sample container at the laboratory and will accompany the containers and samples throughout the sampling process. These samples will provide a measure of the possible cross-contamination of samples through contact with the sample containers and through leaks or diffusion through the containers' caps. One trip blank will accompany each shipping cooler and will only be analyzed for volatile organic compounds.

4.2.1.3 Laboratory Quality Control
Quality control data will be generated by the laboratory to monitor reproducibility (precision) accuracy in samples submitted for analysis.

The internal quality control checks to be routinely implemented by the lab include replicates, matrix-spiked samples, matrix spike duplicates, surrogate spikes, and method blanks. The

functions of each of these control checks, and performance specifications for each parameter are contained in the QAPP (provided under separate cover).

4.2.1.4 Field Data Collection and Reduction

IT Corporation field personnel will log all field measurements, observations, and field instrument calibrations in bound, waterproof field notebooks. Notebook entries will be dated, legible, and contain accurate and inclusive documentation of an individual's project activities and all other pertinent information. Each individual making an entry into the field notebook will date and sign their entry.

Data reduction for this investigation will consist of compiling drilling logs, tabulating field analytical results, and calculating groundwater elevation values from water level measurements and surveyed casing elevations.

4.2.1.5 Laboratory Data Collection and Reduction

The data reduction scheme used in the lab for each of the measurement parameters, including the formulas used for calculating concentrations for both water and soils, will be that stated in the standard operating procedure for the analytical methods used. All analyses will utilize a bound notebook into which will be recorded the following items, at a minimum:

- analyst,
- date,
- sample number (lab #), and
- analysis set-up conditions, e.g., dilutions, auto-sampler position number, or other instrument specifics not covered by an SOP.

For instrumental analysis, this analysis notebook will be instrument-specific and referred to as an instrument log. For other types of analysis, this analysis logbook will also contain all raw data collected by the analyst.

For all analyses, the data will not be blank-corrected and will be flagged if blanks do not meet acceptability criteria. Additionally, any result that is less than ten times the value of the blank will be considered suspect.

Chemists and technicians will be responsible for the measurement/analysis of each specified laboratory quality control parameter, and for calculations associated with the determination of parameter concentrations. All calculations are listed in the EPA SW-846 or NYSDEC ASP Category B method referenced. The chemists and their supervisors will review analytical

results, applying calculation checks on a minimum of 10 percent of the results on each report. These individuals will determine whether or not the results are acceptable, though the ultimate authority to determine acceptability will be with the laboratory's Director of Quality Assurance.

The laboratory section manager will be responsible for the final review of all data and for the proofing of reports, prior to submittal to IT Corporation.

Final reports will be typed from the in-process report forms approved by the supervisor after the review of all supporting data. The in-process forms, along with all hardcopy data output and other case records, will be stored together in a single secure location indexed by project number for at least three years. This location will be in IT Corporation's Latham, New York office. At the end of the three-year period, the files will be returned to NYSDEC for archiving.

All data will be cross-checked for correctness by the analytic laboratory's QA Director for reported values, detection limits, percent moisture and dilution factors (if applicable), after data has been reduced and transcribed into the final reporting format.

4.2.1.6 Data Usability Summary Report

A complete record of each sample's history will be available for documenting its progress from the time of sample collection to arrival at the laboratory and through the laboratory from sample receipt to reporting. Data Usability Summary will include the following:

- use of dated entries (signed by analysts and supervisors) on worksheets and logbooks used for all samples
- use of sample tracking and numbering systems to logically follow the progress of samples through the laboratory, and
- use of quality control criteria to reject or accept specific data.

The Data Usability Summary Report (DUSR) procedures for volatile and semi-volatile organic compounds are outlined below, and will be performed by an independent third-party validator certified to produce DUSRs in New York State.

The requirements that will be checked in during the review are listed below:

- Holding Times
- Blanks
- Surrogate Recovery
- Matrix Spike/Matrix Spike Duplicate or Laboratory Control Samples
- Field Duplicates
- Compound Identification

- Compound Quantitation and Reported Detection Limits
- Overall Assessment of the Data for the Case

4.2.1.7 Reporting of Data and Outliers

Outliers are unusually large or unusually small values in a population of observations. It is necessary to eliminate outliers during QC data review because of the skewing effect, which can destroy the effectiveness of the QC data.

All analytical data (field and laboratory) will then be summarized in tables in the RI/FS Report with appropriate qualifications as indicated by review of field and laboratory performance. Unusable data will be identified by the process described above.

Analytical data will be used in the assessment of Health Risk to determine cleanup levels for the Site that are adequately protective of human health.

4.2.2 Environmental Sample Analyses and Collection Methods

The RI/FS sampling and analytical program for Jimmy's Dry Cleaner has been designed to meet the specific project objectives stated in **Section 3.1**. **Tables 2A, 2B and 2C** present a summary of the sampling and analysis program designed for the Jimmy's dry cleaner RI/FS, including field and laboratory analyses and quality control sample requirements.

Soil and groundwater samples collected during the direct push drilling sampling activities will be analyzed either in the field for VOCs using a portable GC (EPA method 8021) or in a conventional laboratory (ASP-95-1). The VOCs to be screened include tetrachloroethene (PCE), trichloroethene (TCE), trichloroethane (TCA), dichloroethene (DCE), dichloroethane (DCA), vinyl chloride, and BTEX. Following the field analysis, 10% of the samples analyzed by the portable GC will be forwarded to a fixed based laboratory for QA/QC purposes. For groundwater samples that will be sent directly to a fixed based laboratory, 5 % of the samples (1 per 20 samples) will be sent to the lab as blind field duplicate.

Analysis for disposal purposes is proposed for drill cuttings and water generated during drilling and sampling activities. These analyses are: ignitability, corrosivity, reactivity, and TCLP volatiles, semivolatiles, PCBs/Pesticides, and metals.

Laboratory sample analyses will be performed using NYSDEC Analytical Services Protocol (ASP 1995) - CLP levels, whenever possible. The laboratory will be an accredited Environmental Laboratory Approval Program (ELAP) laboratory, and well-versed in generating

data under the NYSDEC ASP and Superfund program. Use of ASP methods and formats for reporting and other deliverables facilitates the DUSR, as discussed in **Section 4.2.1.6**.

Portable GC and laboratory analytical results will be compared to NYSDEC's TAGM 4046 "Determination of Soil Cleanup Objectives and Cleanup Levels, dated January 1994, and Division of Water Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, dated June 1998.

4.2.2.1 Soil

A portable GC will be used during the on-site direct push soil sampling activities in order to obtain real-time results of target analytes. Subsequent to the field analyses, 10% of the soil samples will be forwarded to a fixed base laboratory for confirmatory analysis. The laboratory analyses will be used to further characterize soil samples collected from the subsurface borings, and for QA/QC purposes. **Tables 2A and 3** indicate the number of soil samples that will be analyzed in the field and laboratory and the analytical methods respectively.

4.2.2.2 Soil Gas

A portable GC will be used during the soil gas survey to analyze soil gas samples. The laboratory results will be evaluated to determine the locations where VOCs are present in shallow soils and to identify additional sampling locations as necessary. The soil gas samples will be analyzed for VOCs according to EPA method 8021.

4.2.2.3 Groundwater

The groundwater samples collected at the three on-site sampling locations will be analyzed with the portable GC for VOCs according to EPA method 8021. Other water samples collected down-gradient during the plume delineation efforts will be forwarded directly to the laboratory; they will not be analyzed via a portable GC. **Tables 2B, 2C and 3** indicate the tentative number of samples that will be analyzed by the laboratory and the analytical method.

The laboratory analytical data will be compared to New York State standards and guidance values, and will be used to assess risks to human health and the down-gradient groundwater quality. In addition, data from up-gradient monitoring wells (if accessible) will be used to assess contamination potentially due to off-site sources (if any).

4.3 Remedial Investigation Report Preparation

Following a completion of the field program, data generated during the investigation will be evaluated and a remedial investigation report prepared for submittal to the NYSDEC. The Jimmy's Dry Cleaner Site Remedial Investigation/Feasibility Study report will contain a detailed and comprehensive synopsis of the tasks completed to date, as well as those intended for the future as required by applicable portions of the CERCLA, NCP, and USEPA reporting guidelines. Supporting data, including raw analytical data, boring logs, and well construction diagrams will be included in the report. The report will be organized as follows:

4.3.1 Introduction

The introductory section will summarize the purpose and scope of the Site remedial investigation studies. In order to accomplish this task the following information will be provided:

- project objectives,
- Site location and description,
- background,
- previous investigations, and
- report organization

4.3.2 Study Area Investigations

A detailed description of the scope and methodologies employed to complete the remedial investigation at the Site will be provided. This discussion will present the number, locations, and media of sample collection activities, as well as the field techniques employed to accomplish such activities. The scope of the analytical program will also be addressed in this discussion where upon the parameters tested and methodologies used will be described. Deviations from the field program as described in this work plan will be described and explained.

At a minimum, the following subsections are anticipated to be incorporated into the field methodologies section:

- soil gas sampling and analysis
- air quality sampling and analysis
- direct push drilling soil boring installation, sampling and analysis
- direct push drilling (geoprobe) deep water sampling/analysis
- direct push drilling conductivity probing
- temporary piezometer installation and development
- monitoring well installation and development

- groundwater level measurements
- groundwater sampling/analysis
- disposal characterization sampling

4.3.3 Physical Site Characteristics

The geologic and hydrogeologic conditions, which characterize the Jimmy's Dry Cleaner Site as determined by both the literature review and the Site investigation, will be presented in this section. Physical characteristics of Site soils will be described. Hydrogeologic conditions, as determined through the evaluation of water table evaluations and preparation of groundwater contour maps, will be discussed. This section will consist of the following subsections:

- regional geologic setting
- local/site-specific geology
- regional hydrologic setting
- local/site-specific hydrology

4.3.4 Nature and Extent of Impacts

The nature and extent of impacts within the various media, including soil and groundwater, will be discussed in this section. These evaluations will include:

- assessment of source areas,
- assessment of soil observable impacts - vertical and horizontal, and
- assessment of observable groundwater impacts

4.3.5 Conclusions and Recommendations

This section of the Jimmy's Dry Cleaner Site Remedial Investigation report will summarize the conclusions of the field investigation. These conclusions will be based on the geologic and hydrogeologic information, the analytical results for the soil and groundwater samples collected at the Site and a review of potential source areas of the contamination.

4.4 Qualitative Human Health Risk Assessment

The purpose of performing a qualitative risk assessment for the Former Jimmy's Dry Cleaner Site is to determine the potential current and future risk to human health posed by potential exposure to chemicals of potential concern in environmental media. The objectives of the qualitative risk assessment developed by IT Corporation will be as follows:

- Determine if exposure to constituents detected at the Site result in potential exposure to humans;
- Identify the chemicals of potential concern which may contribute to potential risk of exposure; and
- Identify potential human receptors to the selected chemicals of potential concern.

In order to accomplish these objectives, the qualitative evaluation will review available Site data to select the chemicals of potential concern, identify potential exposure scenarios, and qualitatively characterize the potential risk from exposure to the chemicals of potential concern based on the toxicity of the constituents. The risk assessment will be conducted according to the U.S. Environmental Protection Agency's (USEPA) *Risk Assessment Guidance for Superfund: Volume I-Human Health Evaluation Manual (Part A)* and applicable New York State Department of Environmental Conservation's (NYSDEC) guidance based on recommendations provided by the NYSDEC Site manager. Based on IT Corporation's preliminary review of the Site, the following steps are proposed to support the RI/FS.

4.4.1 Identify Chemicals of Potential Concern

The data from previous Site investigations and the data from the proposed RI/FS sampling activities will be reviewed and summarized. This evaluation will include a general description of the data collected at the Site, including background sampling, sampling locations, and media. It is anticipated that data summary tables will be completed for all chemicals detected and a subset of chemicals will be selected as chemicals of potential concern in each environmental medium. The objective of this selection process is to reduce the complexity of the assessment by focusing on the chemicals of potential concern (COPCs) that present the most significant potential for human exposure. The goal of this process is to identify the chemicals in each media that will most likely contribute to potential risks. As a result, the assessment focuses on the most significant chemicals from a risk perspective. At the Site, volatile organic compounds (VOCs) such as tetrachloroethene (PCE), trichloroethylene (TCE) and cis-1,2-dichloroethene have been detected in soil and groundwater.

COPCs in each medium will be reviewed using a panel of selection criteria based on EPA and NYSDEC requirements including:

- chemical characteristics
- frequency of detection
- essential nutrient status
- laboratory or sampling artifacts
- comparison with background concentrations

- comparison with applicable standards or criteria (i.e., groundwater standards; soil cleanup objectives, ambient water quality criteria, sediment criteria)

For example, soil data will be compared to the appropriate criteria provided in NYSDEC's *Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives and Cleanup Levels* (TAGM 4046). While groundwater data will be compared to applicable NYSDEC standards outlined in Part 703 *Surface Water and Groundwater Quality Standards and Groundwater Effluent Standards* of Title 6, Article 2: Classification and Standards of Quality and Purity. If site-specific, up-gradient or literature background, concentrations are higher than the risk-based criteria, then background values will be used in the comparison for both soil and groundwater. A table summarizing the COPCs for human health will be prepared with the basis for exclusion of chemicals from the risk evaluation.

4.4.2 Human Health Exposure Assessment

The next step is the process of identifying human receptors at the Site based on current and foreseeable future Site activities and uses and characterizing the nature of their contact with COPCs. The objective of the exposure assessment is to estimate the type and magnitude of human exposure to the selected COPCs in the soil and groundwater. This is called a site conceptual model and describes the realistic potential exposure pathways for the Site.

Potential land use scenarios will be evaluated to determine what populations might be impacted from exposure to chemicals in impacted media. This evaluation will be based on local zoning and established land use trends in the areas surrounding the Site. Preliminary analysis of potential land use scenarios assumes the Site will remain an active commercial/industrial Site based on historical use (this may require a deed restriction) with the surrounding area being mixed use, i.e. industrial/residential. Preliminary investigation suggests that several important pathways of exposure to Site-related COPCs may exist.

4.4.3 Qualitative Risk Assessment Results

Using the information generated during the first two steps, IT will determine the potential risks from exposure to human health in qualitative terms. The final phase will compare the measured levels against applicable criteria to determine if the concentrations of COPCs either individually or in mixtures, at or near the Site present a potential risk to human receptors. The objectives of the risk assessment to be completed during Jimmy's Dry Cleaner's Site RI/FS will be to determine the following:

- if exposure to Site constituents results in significant risk to human health and the environment;

- to determine what constituents contribute most significantly to the risk; and
- to identify the most sensitive receptors.

In order to accomplish these objectives, the baseline risk assessment will identify the constituents of interest, identify potential exposure scenarios, define the toxicity of the constituents of interest and ultimately characterize the potential risk to human health resulting from exposure to these constituents. The risk assessment will only address those exposure pathways that are plausible. This approach will also provide the basis for establishing practical remediation goals if the risk assessment indicates that remediation is necessary.

4.5 Management of Investigation Derived Waste

Management of the Investigation derived waste (IDW) generated on-site during the RI field activities will be handled by an approved subcontractor. The appropriate number of samples for each matrix will be collected by the subcontractor and forwarded to an approved laboratory to be analyzed for waste disposal characterization. Upon receipt of the analytical results, the subcontractor will complete the appropriate waste characterization profiles, manifests and remove all impacted soils and groundwater and dispose of properly at an off-site facility.

4.5.1 Drill Cuttings

Drill cuttings generated during monitoring well installation will be placed in 55 gallons DOT approved steel drums and staged adjacent to the former dry cleaning facility. The soils will be sampled and analyzed for waste characterization (ignitability, corrosivity, reactivity, and TCLP VOC, SVOC, PCBs/Pesticides, and metals) and subsequently disposed of off-site by a licensed waste disposal firm.

4.5.2 Development and Decontamination Water

Water generated during decontamination of equipment, monitoring well development, and purging of monitoring wells during sampling activities will be placed in NYS Department of Transportation approved 55-gallon drums, analyzed for waste characterization and subsequently properly disposed of off-site.

4.5.3 General Refuse and PPE

Waste personal protective equipment (PPE) generated on-site will be placed in NYS Department of Transportation approved 55-gallon drums and handled by the approved

subcontractor to be removed and properly disposed of off-site. In addition, general refuse generated on-site will be placed into plastic bags and removed from the Site on a weekly basis.

5.0 FS SCOPE OF WORK

This scope of work outlines the activities to be completed as part of the Focussed Feasibility Study (Focussed FS) for the Jimmy's Dry Cleaner Site. The objective of the Focussed FS will be to develop and evaluate remedial alternatives for the Site. The approach of the Focussed FS will be to evaluate three conventional technologies and one innovative technology in the selection of remedial alternatives. The FS will be based on the NYSDEC's Technical and Administrative Guidance Memorandum (TAGM) applicable to selection of remedial action at inactive hazardous waste Sites (TAGM HWR-90-4030) and the U.S. EPA *Guidance for Conducting Remedial Investigations and Feasibility Studies* under CERCLA (U.S. EPA 1988).

5.1 Development of Remedial Alternatives

Remedial alternatives for Jimmy's Dry Cleaner will be developed in this section of the Focussed FS. This will be accomplished through the following steps:

5.1.1 General Response Actions

General response actions for each medium of interest will be developed that may be taken to satisfy the remedial action objectives for the Jimmy's Dry Cleaner Site. The general response actions will define removal, treatment, disposal, containment or other actions, singularly or in combination to satisfy remedial action objectives.

5.1.2 Volumes or Areas of Media

Volumes or areas of environmental media (soil, sediment, groundwater, etc.) to which general response actions may be applied will be determined and will take into account the requirements for protectiveness as identified in the remedial action objectives and the chemical and geological characterization of the Site. The media to be addressed will be determined by information on the nature and extent of contamination, risk assessment, applicable or relevant and appropriate New York State Standards, Criteria, and Guidelines (SCGs), cleanup criteria/standards, etc.

5.1.3 Identification and Screening of Technologies

Based on the general response actions, treatment technologies applicable to each medium of interest will be identified and screened to ensure that only those technologies applicable to Site impacts and site characteristics are considered. This screening will identify those technologies that would effectively address the impacts and media at the Site, but will also take into account a technology's implementability and cost. Because of their historical success with similar contaminants and at the request of NYSDEC, soil vapor extraction (SVE), a combination of SVE and air sparging and pump and treat remedial technologies were selected as potential remedial alternatives to be evaluated as part of this Focussed FS. A forth technology, to be determined, will also be evaluated in the Focussed FS.

Preference will be given to those technologies "that, in whole or in part, will result in a permanent and significant decrease in the toxicity, mobility, or volume of hazardous substances, pollutants, or impacts" (TAGM HWR-90-4030). Preference will be given to technologies which have been demonstrated to be successful on other similar Sites. The following provides the hierarchy of technologies, as defined in the guidance, from most desirable to least desirable:

- Destruction
- Separation/Treatment
- Solidification/Chemical Fixation
- Control and Isolation Technologies
- Off-Site Land Disposal

5.1.4 Assembly of Alternatives

The potential technologies and process options will be assembled into media-specific or site-wide alternatives. The developed alternatives will be defined with respect to size and configuration of the representative process options; estimated time for remediation; rates of flow or treatment; spatial requirements; distances for disposal; and required permits, imposed limitations, and other factors necessary to evaluate the alternatives.

5.2 Preliminary Screening of Remedial Alternatives

The preliminary screening of remedial alternatives will narrow the list of potential alternatives to be evaluated through the use of presumptive remedies. The criteria for this screening will include effectiveness, implementability, and cost.

5.2.1 Effectiveness Evaluation

The extent to which the alternative will eliminate significant threats to public health and the environment through reductions in toxicity, mobility, and volume of the hazardous waste at the Site will be evaluated. Both short-term and long-term effectiveness will be evaluated with short-term referring to the construction and implementation period and long-term referring to the period after the remedial action is in place and effective. The expected lifetime or duration of effectiveness will be identified for each alternative.

5.2.2 Implementability Evaluation

Both the technical and administrative feasibility of constructing, operating, and maintaining a remedial action alternative will be evaluated. Technical feasibility refers to the proven ability to construct, reliably operate and meet technical specifications or criteria, and the availability of specific equipment and technical specialists to operate necessary process units. It also includes operation, maintenance, replacement, and monitoring of technical components of an alternative. Administrative feasibility refers to the compliance with applicable rules, regulation, and statue and the ability to obtain approval from other offices and agencies. In addition, the availability of treatment, storage, and disposal services and capacity will be evaluated. Specifically, the implementability evaluation will include the following analysis factors:

- Technical Feasibility
    - Ability to construct technology
    - Reliability of technology
    - Schedule of delays due to technical problems
    - Need of undertaking additional remedial action, if necessary
- Administrative Feasibility
    - Coordination with other agencies
- Availability of Services and Materials
    - Availability of prospective technologies
    - Availability of necessary equipment and specialists

5.2.3 Cost

During the completion of screening of alternatives, comparative cost estimates for alternatives will be performed so that cost decisions can be made. Cost estimates will be of relative accuracy (+50% to –30%) and based on a variety of cost-estimating data including but not limited to prior estimates, site cost experience and good engineering judgement.

5.3 Treatability Studies

Treatability studies pertaining to the remedial technologies identified in the screening of remedial alternatives may be conducted to determine the suitability of the identified technologies to site-specific conditions. However, since remedial action objectives, general response actions, or remedial alternatives have not been developed for the site, development of site-specific treatability studies is not appropriate at this time. Data collected from the Jimmy's Dry Cleaner site and surroundings during RI activities will be sufficient to evaluate general treatment, disposal, and containment technologies for the FS, allowing unsuitable technologies to be eliminated from further consideration. In addition, this information, combined with literature regarding the performance of the selected technologies, will allow a detailed evaluation of alternatives to be completed. Additional, site-specific testing relating to the detailed design or operating parameters of the selected alternative will be addressed during the remedial design phase of this project.

5.4 Evaluation of Alternatives

5.4.1 Analysis of Alternatives

This section of the FS report will present an analysis of the remaining individual alternatives utilizing the seven criteria presented below. The analysis will focus only on a limited number of alternatives remaining from the preliminary screening. It will build on previous evaluations conducted during the development and preliminary screening of alternatives and will incorporate any treatability data and additional site characterization information collected during the RI. The detailed analysis of alternatives will be presented as a narrative discussion accompanied by summary tables. On overview of the seven criteria which will be discussed is presented below.

5.4.1.1 Compliance with Applicable New York State Standards, Criteria, and Guidelines (SCGs)

Compliance with SCGs addresses whether or not a remedy will meet all of the applicable or relevant and appropriate New York State requirements or other Federal environmental standards which are more stringent than state SCGs. If a SCG is not met, justification for use of one of the six waivers allowed under CERCLA and SARA will be discussed.

5.4.1.2 Overall Protection of Human Health and the Environment

Overall Protection of Human Health and the Environment addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.

5.4.1.3 Short-Term Effectiveness

Short-Term Effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved. The evaluation will focus on the following factors: protection of the community during remedial actions; environmental impacts; time until remedial response objectives are achieved; and protection of workers during remedial actions.

5.4.1.4 Long Term Effectiveness and Permanence

Long-Term Effectiveness and Permanence addresses the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met. The evaluation will focus on the following factors: permanence of remedial alternative; magnitude of remaining risk; adequacy of controls; and reliability of controls.

5.4.1.5 Reduction of Toxicity, Mobility, and Volume

Reduction of Toxicity, Mobility, or Volume through Treatment addresses the anticipated performance of the remedial technologies that a remedy may employ. The evaluation will focus on the following factors: the amount of hazardous material to be addressed; the degree of expected reduction in toxicity, mobility, or volume; the degree to which treatment is irreversible; and the type and quantity of treatment residuals.

5.4.1.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy, including the availability of material and services needed to implement a particular option. The technical feasibility evaluation will focus on: construction and operation; reliability; ease of undertaking additional remedial action; and monitoring considerations. The administrative feasibility evaluation will focus on activities needed to coordinate with other offices and agencies. The availability evaluation will focus on: treatment, storage, and/or disposal options; necessary equipment or specialists; and required services and materials.

5.4.1.7 Cost

Cost addresses the estimated capital and operation and maintenance costs, and net present worth costs. Capital costs will include: construction costs; equipment costs; land and site-development costs; buildings and services costs; relocation expenses; disposal costs; engineering expenses; legal fees and licenses or permit costs; and contingency allowances. Operation and maintenance costs will include: operating labor costs; maintenance, materials, and labor costs; auxiliary material and energy; disposal of residues; purchased services; administrative costs; insurance, taxes, and licensing costs; replacements costs; and costs of periodic site reviews. In addition, future capital costs and costs of future land use will be considered. Present worth costs will use a discount rate equivalent to the 30-year U.S. treasury bond rate and periods of performance will not exceed 30 years.

5.4.2 Comparative Analysis

A comparative analysis will be conducted to evaluate the relative performance of each alternative in relation to each specific evaluation criterion. The purpose of this comparative analysis is to identify the advantages and disadvantages of each alternative relative to one another so that the key trade-offs for the alternatives can be identified. This section will be presented as a narrative discussion accompanied by a summary table.

5.5 Remedy Selection

The recommended remedial alternative for the site, based on the comparative analysis, will be presented in this section. It will include a discussion of the alternative and clear rationale for its selection.

5.6 Feasibility Study Report

The results of the feasibility study will be presented in a stand-alone feasibility study report for submittal to NYSDEC. The report will be developed consistent with the NCP and patterned after

U.S. EPA 's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (October 1988).

A typical outline of the major sections of the report will include:

- Introduction
  - Purpose and Organization of Report
  - Background Information (Summarized from Remedial Investigation Report)
  - Volume/Area Estimates
- Remedial Action Objectives
  - SCGs
  - Baseline Risk Assessment
  - Media Specific RAOs
- Development/Preliminary Screening of Alternatives
  - General Response Actions
  - Development of Remedial Alternatives
  - Preliminary Screening of Remedial Alternatives
- Detailed Evaluation of Alternatives
  - Description of Evaluation Criteria
  - Comparative Results of Specific Alternative Evaluation
- Selection of Preferred Alternative
  - Presentation of Selected Remedy

A draft feasibility study report will be submitted to NYSDEC for review, and a final feasibility study report which includes appropriate NYSDEC comments will be submitted.

6.0 PROJECT MANAGEMENT APPROACH

6.1 Project Cost and Schedule Control System

Timeline and internal accounting programs will be used to monitor and control schedules, performance, and cost weekly on a task-specific basis. The Project Manager will oversee the production of all reports and deliverables. The Project Manager will authorize all work and expenditures on the project and will receive regular reports from the task leaders, and reports from IT Corporation's senior management.

6.2 Information Flow Patters

The management structure for the proposed project will be designed to ensure information exchange among all members of IT Corporation's senior management; the Project Manager and subcontractors; and the Project Manager and NYSDEC's Project Manager. The Project Manager will be the primary point of contact with NYSDEC's Project Manager.

Monthly progress reports will be provided to NYSDEC by the fifth day of each month. The progress report format will be formatted to briefly and concisely address the issues of scope, schedule and budget.

6.3 Project Organization

The management and technical staff required to execute this project and their areas of responsibility are identified in **Figure 8**, **Project Organization**. The responsibilities of key personnel are further described as follows:

Project Director, Tom Antonoff
The Project Director is responsible for ensuring that the project is performed in accordance with the contract requirements and that the performance of the project manager and project staff is acceptable to the NYSDEC. The Project Director will support the project team with compliance issues relative to regulatory agency guidelines and regulations as well as perform senior

technical review of project deliverables. The Project Director will also support technical project review meetings and citizen participation activities.

Project Manager, Steven Meier

The Project Manager is responsible for maintaining the schedule, keeping the project within budget, and ensuring the technical adequacy of the work performed. The project manager will be familiar with all aspects of the project work scope and provide timely updates on overall project progress to the NYSDEC. The Project Manager will also be responsible for verifying that QA requirements are followed by the project team.

Site Manager and Health and Safety Officer, Julie Bergeron

The Site Manager is responsible for the coordination of all site activities, organization, review and summary of site data and management of all IT Corporation and subcontractor field staff. As the Site Health and Safety Officer (SHSO), the Site Manager will also be responsible for the preparation of the Health and Safety Plan, verifying that subcontractors have adequate Health and Safety training and insure that all project personnel comply with Health and safety protocol.

Technical Advisor, Stephanie Commerford

The Technical Advisor will provide technical support and review of site data and site deliverables for overall quality assurance. The technical advisor will also address the broad range of technical activities and provide technical support needed for successful support of this RI/FS.

6.4 Project Schedule

A detailed project schedule of activities with milestones is presented as a Gantt chart schedule in **Figure 9**.

7.0 REFERENCES

NYSDEC, Division of Hazardous Waste Remediation, Division Technical and Administrative Guidance Memorandum. *Selection of Remedial Actions at Inactive Hazardous Waste Sites*, HWR-90-4030, May 1990.

NYSDEC, Division of Water, Technical and Operation Guidance Series (1.1.1), *Ambient Water Quality Standards and Guidance Values*, June 1998.

NYSDEC, Division of Hazardous Waste Remediation, Division Technical and Administrative Guidance Memorandum. *Determination of Soil Cleanup Objectives and Cleanup Levels*, HWR-92-4046, January 1994.

U.S. EPA, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*, EPA 540/G-89/004, October 1988.

D. Cadwell, Surficial Geologic Map of New York, Lower Hudson Sheet, 1989.

Work Assignment, State Superfund Standby Contract, Work Assignment# D003666-32.0, Notification Letter to Suffolk County Development Agency, November 1998.

Registry Site Classification Decision, NYSDEC, NYSDOH, Second quarter of 1994.

Letter from NYSDOH entitled "Chronology of Events Leading to the Field Investigation of 12/4/95 @ Jimmy's Dry Cleaners, 61 Nassau Rd, Roosevelt, NY", December 1995.

Letter dated November 2, 1998 to James Lawrence from Nassau County Department of Health (Bryan W. Matthews, R.S.) regarding the violation of air quality.

Letter dated August 10, 1998 to James Lawrence from NYSDEC (regarding July 31, 1998 Inspection).

Letter dated August 14, 1998 to James Lawrence from Nassau County Department of Health.

Letter dated October 27, 1998 to James Lawrence from NYSDEC (regarding October 26, 1998 Inspection report).

Nassau County Department of Health Inspection reports dated 10-26-98, 11-23-98 and 11-25-98.

8.0 SUBCONTRACTS AND M/WBE UTILIZATION PLAN

There are seven areas of service under Tasks 1 and 2 for the Jimmy's Dry Cleaner Site amenable to subcontracting. These are:

- Direct Push Drilling (geoprobe)
- Hollow Stem Auger Drilling
- On-Site Laboratory Services
- Laboratory analysis
- Data Validation
- Waste Management
- Surveying

Services for drilling, laboratory analysis and data validation, will be procured from standby subcontracts maintained for this purpose by IT Corporation. Site-specific bids will solicited for the direct push drilling activities, on-Site Laboratory services, waste management and surveying.

Three quotes will be solicited from well drilling firms on standby subcontract to IT Corporation for work at the Jimmy's Dry Cleaner Site.

Mitkem Corporation will provide fixed base analytical services for this work assignment. This laboratory is a standby subcontractor to IT Corporation. Mitkem is a Disadvantage Business Enterprise (DIS)

Data Validation services shall be provided by Eco Chem Inc., a standby subcontractor to IT. Echo Chem, Inc. is a Women-owned Business Enterprise (WBE).

Competitive bids were solicited from 5 firms for direct push drilling services, according to NYSDEC procedures. The lowest quote was received from Zebra Environmental Corporation, who was selected to provide this service.

Competitive bids were solicited from 3 firms for On-Site laboratory services, according to NYSDEC procedures. The lowest quote was received from Severn Trent Corporation (STL) On-Site Technologies, who was selected to provide this service.

Competitive bids were solicited from 3 firms for surveying services, according to NYSDEC procedures. The lowest quote was received from Chazen Engineering & Land Surveying Co., P.C., who was selected to provide this service.

Competitive bids were solicited from 3 firms each for waste management, according to NYSDEC procedures. The lowest quote was received from Philip Services Corp., who was selected to provide this service.

TABLES

Table 1A
Historical Soil Analytical Results
NYSDEC, Jimmy's Dry Cleaner, Roosevelt, NY

Analytes (ug/kg)	NYSDEC Standards [1]	**SP-1** 5'-7 12/4/95	**SP-2** 0'-2' 12/4/95	**SP-2** 5'-7' 12/4/95	**SP-3** 13'-15' 12/4/95	**SP-5** 0'-2' 12/4/95	**SP-5** 5'-7' 12/4/95	**SP-6** 5'-7' 12/4/95	**South lot** 0'-2' 12/4/95
1,1 Dichloroethene	400	ND	ND	ND	ND	ND	ND	ND	ND
cis 1,2 Dichloroethene	300	ND	ND	ND	ND	ND	ND	ND	110
1,1,1 Trichloroethane	800	ND	23	23	23	6	28	9	28
1,2,4 - Trimethylbenzene	---	ND	5	ND	ND	ND	ND	ND	5
1,3,5 - Trimethylbenzene	---	ND	ND	ND	ND	ND	8	ND	270
p- Isopropyltoluene	---	ND	ND	ND	ND	ND	5	ND	26
Methylene Chloride	100	8	9	8	5	6	8	7	8
Napthalene	13000	ND	ND	ND	ND	ND	ND	ND	120
mp-Xylene		ND	7	ND	ND	ND	ND	ND	ND
o-Xylene		ND	ND	ND	ND	ND	ND	ND	100
Xylene (total)	1200	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene (TCE)	700	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene (PCE)	1400	5	120	7	6	9	79	45	46
Total VOCs	10 000	13	164	38	34	21	128	61	713

Notes:
All results in ug/kg (ppb)
ND: not detected above method detection limit
(1) :NYSDEC Div of Haz Waste Remediation Technical and Administrative Guidance Memorandum 4046 (TAGM 4046) of Soil Cleanup Objectives and Cleanup Objectives used for this table.
Above NYSDEC Standards

Table 1B
Historical Water Analytical Results
NYSDEC Jimmy's Dry Cleaner, Roosevelt, NY

Analytes	NYSDEC Standards [2]	GWGP-1 na 4/7/94	GWGP-2 na 4/7/94	SP-1 21'-23' 12/4/95	SP-2 21'-23' 12/4/95	DW-1 [1] na 12/4/95	SP-4 21'-23 12/4/95	SP-5 21'-23' 12/4/95	SP-6 21'-23' 12/4/95	GP-1 19' 11/03/99
1,1 Dichloroethene	5	ND	1	ND	ND	ND	ND	ND	ND	NA
1,1 Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,2 Dichloroethene	---	ND	2	ND	ND	ND	ND	ND	ND	NA
c,1-2 Dichloroethylene	5	ND	ND	ND	ND	ND	ND	5	4	NA
trans,1-2 Dichloroethylene	5	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,1,1 Trichloroethane	5	ND	ND	ND	ND	ND	ND	1	1	NA
1,1,2 Trichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,1,1,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	17	ND	NA
Chloroform	7	ND	ND	ND	ND	1	3	2	ND	NA
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	1	ND	NA
Bromoform	50	ND	ND	ND	ND	3	ND	ND	ND	NA
Bromodichloromethane	50	ND	ND	ND	ND	3	ND	ND	ND	NA
Dichlorodifluoromethane	20	ND	ND	ND	ND	ND	ND	ND	ND	NA
Dibromochloromethane	50 (guid)	ND	ND	ND	ND	6	ND	ND	ND	NA
methyl-tert butly ether	10 (guid)	ND	ND	ND	ND	ND	ND	ND	ND	NA
Trichloroethylene (TCE)	5	420	21	ND	ND	ND	ND	11	5	NA
Tetrachloroethene (PCE)	5	38,000	31,000	1	54	120	1,600	32,000	11,000	0 [3]
Total VOCs	na	38,420	31,024	1	54	133	1,603	32,037	11,010	0[3]

Notes: All concentration in ug/L (ppb)
(1): Liquid collected from the dry well
(2): NYSDEC Division of Water Technical and Operation Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values, dated June 1998
(3): Based on information provided by NYSDEC
na: not available
ND: not detected above method detection limit
Above NYSDEC Standards

Table 1B
Historical Water Analytical Results
NYSDEC Jimmy's Dry Cleaner, Roosevelt, NY

Analytes	NYSDEC Standards [2]	GP-1 44' 11/03/99	GP-1 67' 11/03/99	GP-2 20' 11/04/99	GP-2 44' 11/04/99	GP-2 63' 11/04/99	GP-3 20' 11/04/99	GP-3 44' 11/99	GP-3 60' 11/99	GP-4 20' 11/05/99
1,1 Dichloroethene	5	NA	NA	ND	ND	NA	ND	ND	ND	NA
1,1 Dichloroethane	5	NA	NA	ND	ND	NA	ND	8	7	NA
1,2 Dichloroethene	---	NA	NA	ND	ND	NA	ND	ND	ND	NA
c,1-2 Dichloroethylene	5	NA	NA	ND	ND	NA	180	4	4	NA
trans,1-2 Dichloroethylene	5	NA	NA	ND	ND	NA	7	ND	ND	NA
1,1,1 Trichloroethane	5	NA	NA	ND	ND	NA	ND	9	7	NA
1,1,2 Trichloroethane	1	NA	NA	ND	ND	NA	ND	16	6	NA
1,1,1,2-Tetrachloroethane	5	NA	NA	ND	ND	NA	ND	ND	ND	NA
Chloroform	7	NA	NA	ND	ND	NA	ND	ND	ND	NA
Chlorobenzene	5	NA	NA	ND	ND	NA	ND	ND	ND	NA
Bromoform	50	NA	NA	ND	ND	NA	ND	ND	ND	NA
Bromodichloromethane	50	NA	NA	ND	ND	NA	ND	ND	ND	NA
Dichlorodifluoromethane	20	NA	NA	ND	ND	NA	ND	ND	ND	NA
Dibromochloromethane	50 (guid)	NA	NA	ND	ND	NA	ND	ND	ND	NA
methyl-tert butly ether	10 (guid)	NA	NA	ND	ND	NA	ND	14	14	NA
Trichloroethylene (TCE)	5	NA	NA	ND	ND	NA	710	ND	3	NA
Tetrachloroethene (PCE)	5	50 [3]	198	4,600	500	176 [3]	51	1,000	460	ND [3]
Total VOCs	na	50 [3]	198	4,600	500	176 [3]	948	1,051	501	ND [3]

Notes: All concentration in ug/L (ppb)
(1): Liquid collected from the dry well
(2): NYSDEC Division of Water Technical and Operation Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Va ues, dated June 1998
(3): Based on information provided by NY DEC
na: not available
ND: not detected above method detection
Above NYSDEC Standards

Table 1B
Historical Water Analytical Results
NYSDEC Jimmy's Dry Cleaner, Roosevelt, NY

Analytes	NYSDEC Standards [2]	GP-4 46' 11/05/99	GP-4 80' 11/05/99	GP-5 20' 11/09/99	GP-5 46' 11/09/99	GP-5 72' 11/09/99	GP-6 21' 11/10/99	GP-6 49' 11/10/99	GP-6 81' 11/10/99	GP-7 20' 11/11/99
1,1 Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2 Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
c,1-2 Dichloroethylene	5	6	ND	ND	ND	ND	ND	ND	ND	ND
trans,1-2 Dichloroethylene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2 Trichloroethane	1	ND	ND	ND	1	ND	ND	9	ND	ND
1,1,1,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	20	ND	ND	ND	ND	3	ND	ND	9	ND
Dibromochloromethane	50 (guid)	ND	ND	ND	ND	ND	ND	ND	ND	ND
methyl-tert butly ether	10 (guid)	ND	ND	ND	1	4	ND	3	10	ND
Trichloroethylene (TCE)	5	ND	ND	1	1	1	ND	3	1	ND
Tetrachloroethene (PCE)	5	440	99	6	37	5	5	430	3	1
Total VOCs	na	446	99	7	40	13	5	445	23	1

Notes: All concentration in ug/L (ppb)
(1): Liquid collected from the dry well
(2): NYSDEC Division of Water Technical and Operation Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Va ues, dated June 1998
(3): Based on information provided by NY DEC
na: not available
ND: not detected above method detection
Above NYSDEC Standards

Table 1B
Historical Water Analytical Results
NYSDEC Jimmy's Dry Cleaner, Roosevelt, NY

Analytes	NYSDEC Standards [2]	GP-7 46' 11/11/99	GP-7 62' 11/11/99
1,1 Dichloroethene	5	ND	ND
1,1 Dichloroethane	5	ND	7
1,2 Dichloroethene	---	ND	ND
c,1-2 Dichloroethylene	5	ND	160
trans,1-2 Dichloroethylene	5	ND	ND
1,1,1 Trichloroethane	5	ND	ND
1,1,2 Trichloroethane	1	ND	ND
1,1,1,2-Tetrachloroethane	5	ND	ND
Chloroform	7	ND	ND
Chlorobenzene	5	ND	ND
Bromoform	50	ND	ND
Bromodichloromethane	50	ND	ND
Dichlorodifluoromethane	20	ND	ND
Dibromochloromethane	50 (guid)	ND	ND
methyl-tert butly ether	10 (guid)	ND	4
Trichloroethylene (TCE)	5	2	73
Tetrachloroethene (PCE)	5	39	500
Total VOCs	na	41	744

Notes: All concentration in ug/L (ppb)
(1): Liquid collected from the dry well
(2): NYSDEC Division of Water Technical and Operation Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Va ues, dated June 1998
(3): Based on information provided by NY DEC
na: not available
ND: not detected above method detection
Above NYSDEC Standards

Table 2A
FIELD INVESTIGATION SAMPLING AND ANALYSIS SUMMARY
NYSDEC - Jimmy's Dry Cleaner
Roosevelt, New York

Phase I: Subsurface Investigation
Soil Gas and Soil Samples

Sample ID	Sampling Depth					Proposed Analyses VOCs	
						PGC	To Lab
SOIL GAS SURVEY							
	3 '	10 '	na	na	na		
ITVP-1	X					1	
ITVP-2	X					1	
ITVP-3	X					1	
ITVP-4	X					1	
ITVP-5	X					1	
ITVP-6	X					1	
ITVP-7	X					1	
ITVP-8	X					1	
ITVP-9	X	X				2	
ITVP-10	X	X				2	
ITVP-11	X					1	
ITVP-12	X					1	
ITVP-13	X					1	
ITVP-14	X					1	
ITVP-15	X					1	
ITVP-16	X					1	
ITVP-17	X					1	
ITVP-18	X					1	
	18	**2**				**20**	**0**
				Field Duplicates		na	na
				ms/msd		na	na
				rinseate		na	na
				trip blanks		na	na
				Total		**20**	**0**

AIR SAMPLING
Air Sampling to be performed as requested by Nassau County Department of Health using Passive Sampler for PCE (PCE Badges)

SOIL SAMPLING						VOCs PGC	VOCs To Lab [2]
	0-4 '	4-8 '	8-12 '	12-16 '	16-20 '		
ITSB-1	X	X	X	X	X	5	
ITSB-2	X	X	X	X	X	5	
ITSB-3	X	X	X	X	X	5	1
ITSB-4	X	X	X	X	X	5	1
ITSB-5	X	X	X	X	X	5	1
ITSB-6	X	X	X	X	X	5	
ITSB-7	X	X	X	X	X	5	1
ITSB-8	X	X	X	X	X	5	
	8	**8**	**8**	**8**	**8**	**40**	**4**
				Field Duplicates		**2**	na
				ms/msd		**2**	na
				rinseate		**2**	na
				trip blanks		**na**	na
				Total		**46**	**4**

DEEP CONDUCTIVITY PROBE [1]						VOCs PGC	VOCs To Lab
ITDCP-1						na	na
ITDCP-2						na	na

Note: (1): Deep Conductivity Profile to a approximate depth of 100 feet
(2): All soil sample will be screened using a photoionization detector (PID), samples presenting highest reading per hole will be sent for VOCs analysis
na: not applicable

Table 2B
FIELD INVESTIGATION SAMPLING AND ANALYSIS SUMMARY
NYSDEC - Jimmy's Dry Cleaner
Roosevelt, New York

Phase I: Subsurface Investigation
Deep groundwater Direct Push Sampling

Sample ID	Proposed Sampling Depth					Proposed Analyses	
						VOCs	
	20'	40'	60'	80'	100'	PGC	To Lab
DGW-1	X	X	X	X	X	5	0
DGW-2	X	X	X	X	X	5	1
DGW-3	X	X	X	X	X	5	1
DGW-4	X	X	X	X	X	0	5
DGW-5	X	X	X	X	X	0	5
DGW-6	X	X	X	X	X	0	5
DGW-7	X	X	X	X	X	0	5
DGW-8	X	X	X	X	X	0	5
DGW-9	X	X	X	X	X	0	5
DGW-10	X	X	X	X	X	0	5
DGW-11	X	X	X	X	X	0	5
DGW-12	X	X	X	X	X	0	5
DGW-13	X	X	X	X	X	0	5
DGW-14	X	X	X	X	X	0	5
DGW-15	X	X	X	X	X	0	5
DGW-16	X	X	X	X	X	0	5
DGW-17	X	X	X	X	X	0	5
DGW-18	X	X	X	X	X	0	5
DGW-19	X	X	X	X	X	0	5
DGW-20	X	X	X	X	X	0	5
Total						**15**	**87**
					Duplicates (approx 1 / 20 samples)		**5**
					MS/MSD (approx 1 / 20 samples)	1	5
					Rinseate blanks (approx 1 / 20 samples)	1	5
					Trip Blanks (approx 3/week for 4 weeks for all samples)		12
					Total	**17**	**114**

Table 2C
FIELD INVESTIGATION SAMPLING AND ANALYSIS SUMMARY
NYSDEC - Jimmy's Dry Cleaner
Roosevelt, New York

Phase II: Subsurface Investigation
Monitoring well installation and sampling

Sampling Location	Existing Well Location*			Well Construction		Proposed Analyses		Depth to Water[2]
	MW?	ON/S	Off/S	Material	Screen Depth	VOCs	Turbidity[1]	
IT MW-1			X	2" PVC	30'-40'	1	1	1
IT MW-2			X	2" PVC	70'-80'	1	1	1
IT MW-3		X		2" PVC	30'-40'	1	1	1
IT MW-4		X		2" PVC	80'-90'	1	1	1
IT MW-5			X	2" PVC	40'-50'	1	1	1
IT MW-6			X	2" PVC	70'-80'	1	1	1
IT MW-7			X	2" PVC	40'-50'	1	1	1
IT MW-8			X	2" PVC	80'-90'	1	1	1
IT MW-9			X	2" PVC	30'-40'	1	1	1
IT MW-10			X	2" PVC	70'-80'	1	1	1
IT MW-11			X	2" PVC	30'-40'	1	1	1
IT MW-12			X	2" PVC	60'-70'	1	1	1
PZ-1	X		X	1" PVC	10'-20'	1	1	1
PZ-2	X		X	1" PVC	10'-20'	1	1	1
PZ-3	X		X	1" PVC	10'-20	1	1	1
IT PZ-4		X		1" PVC	10'-20'	1	1	1
ITDGW-1			X	1" PVC	TBD	0	0	0
Totals:	3	3	14			16	16	16
				Duplicates:		1	field	field
				ms/msd		1		
				Rinseate Blank:(1 per 20 sample)		1		
				Trip Blank: (one/lab shipment)		3		
				Total		**22**		

Note
* Screened interval of shallow and deep wells will be adjusted according to field conditions
On/S = On site poposed/found at 61 Nassau Road
Off/S= Off Site Proposed/ found on adjacent town property
PVC= Polyvinyl Chloride well materials
(1): Parameter measured in the field
(2): Parameter measured in the field using and oil/water interface probe.

TABLE 3
FIELD INVESTIGATION SAMPLING AND ANALYSIS SUMMARY
SUMMARY OF FIELD SAMPLING PLAN

NYSDEC - Jimmy's Dry Cleaner
Roosevelt, New York

MATRIX	No. of Samples	Analytical Parameters	Analytical Method No.	Types of Containers	Holding Times*	Preservatives Used
SOIL GAZ	See Table 2a	VOCs	ASP 95-1	Tedlar Bag	24 hours	na
AIR	See Table 2a	PCE	To be performed by NCDOH	Passive Sampler (badges)	na	na
SOIL	See Table 2a	VOCs	ASP 95-1	2 @ 40 ml	14 days	HCL to pH <2
		SVOCs	ASP 95-2	1 @ 1L/glass	7 days to extr.	Ice
GROUNDWATER (collected from Geoprobe)	See Table 2b	VOCs	ASP 95-1	2 @ 40 ml	14 days	HCL to pH <2
		SVOCs	ASP 95-2	1 @ 1L/glass	7 days to extr.	Ice
		Metals	200.7 clp-m	1 @ 500 ml/polyethylene	6 months	H_2SO4 to pH <2
GROUNDWATER (Collected from monitoring Wells	See Table 2c	VOCs	ASP 95-1	2 @ 40 ml	14 days	HCL to pH <2
		SVOCs	ASP 95-2	1 @ 1L/glass	7 days to extr.	Ice
		Metals	200.7 clp-m	1 @ 500 ml/polyethylene	6 months	H_2SO4 to pH <2
EQUIPMENT (RINSEATE) BLANK	1 per 20 samples or, 1 per area and per matrix type	See Specific Matrix	See Specific Matrix	See Specific Matrix	See Specific Matrix	See Specific Matrix
FIELD DUPLICATE	1 per 20 samples or, 1 per area and per matrix type	See Specific Matrix	See Specific Matrix	See Specific Matrix	See Specific Matrix	See Specific Matrix

Notes:
*: From verified time of sample receipt at the laboratory (samples must be received by laboratory within 48 hours of collection
NCDOH: Nassau County Department of Health
na: Not Applicable

FIGURES

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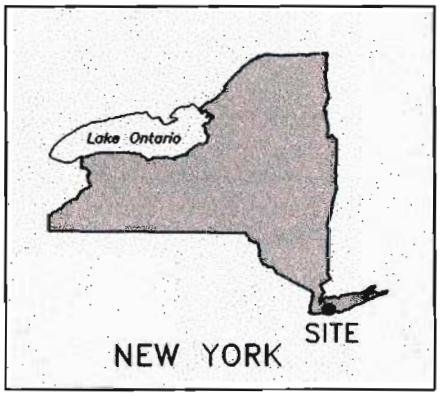

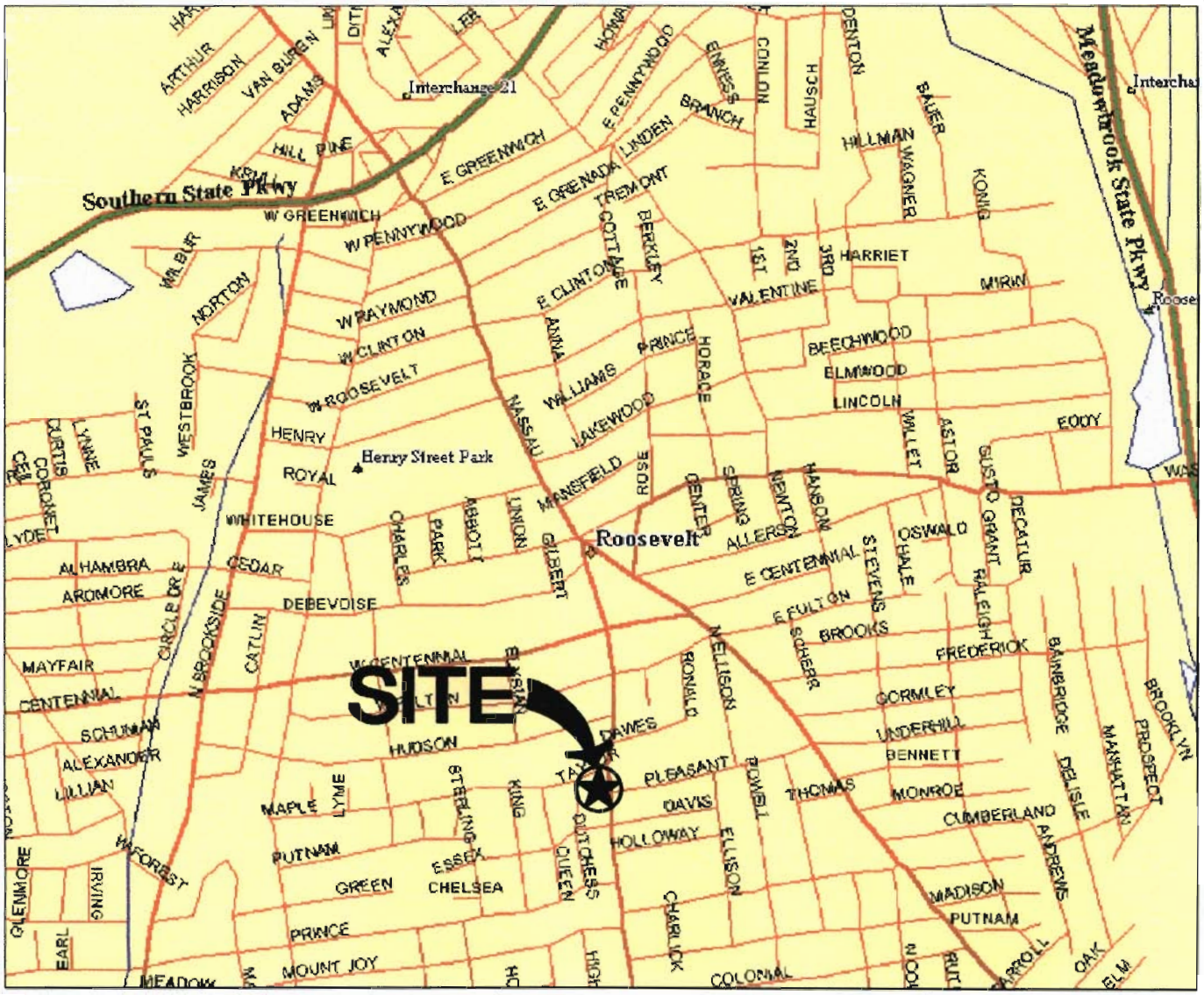

NOT TO SCALE

REFERENCE:
MAP FROM DELORME'S MAP EXPERT,
FREEPORT, MAINE.

IT CORPORATION

NYSDEC
JIMMY'S DRY CLEANER

FIGURE 1
SITE LOCATION MAP

ROOSEVELT, NEW YORK

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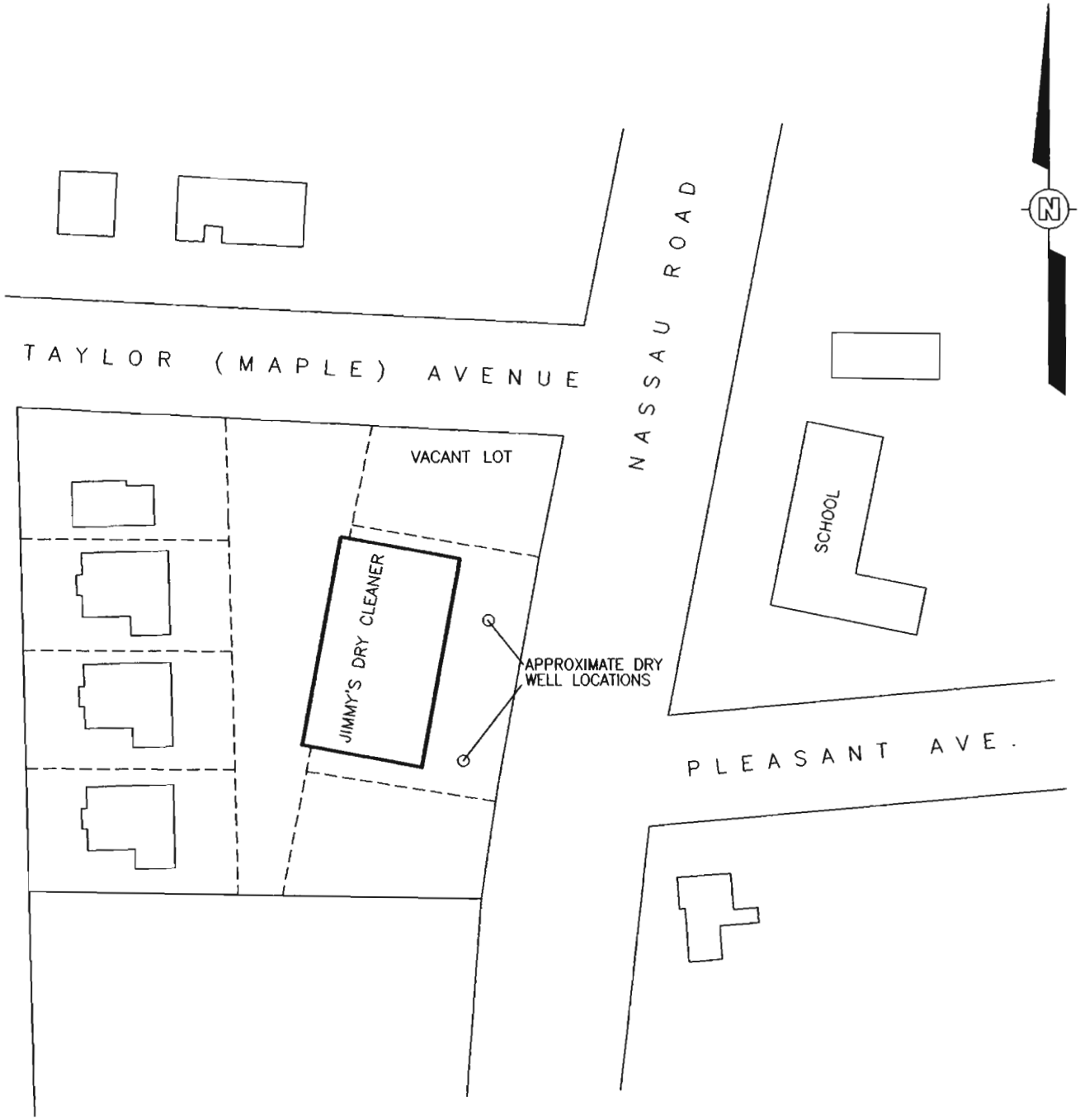

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LEGEND:

- o — DRY WELL
- ---- — APPROXIMATE PROPERTY BOUNDARIES

APPROXIMATE SCALE

0 80 160 FEET

IT CORPORATION

NYSDEC
JIMMY'S DRY CLEANER

FIGURE 2
SITE MAP

ROOSEVELT, NEW YORK

NOTE:
APPROXIMATE SAMPLING LOCATION.

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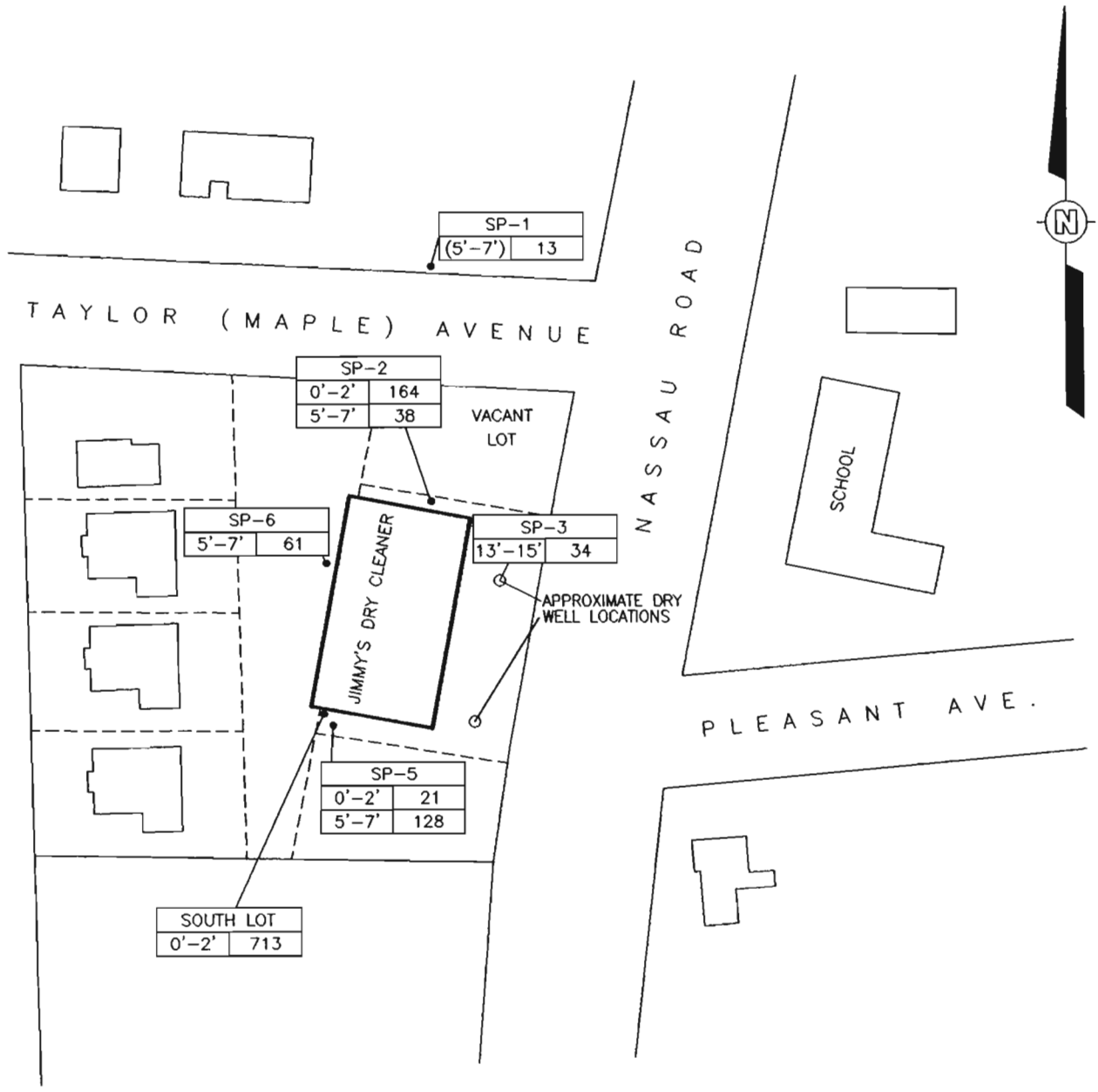

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LEGEND:

SP-4 | 1600 — CONC. OF TOTAL VOCs IN SOIL (PARTS PER BILLION)

SAMPLE LOCATION

• 1995 SOIL SAMPLING LOCATIONS

O DRY WELL

---- APPROXIMATE PROPERTY BOUNDARIES

APPROXIMATE SCALE

0 80 160 FEET

NOTE:
APPROXIMATE SAMPLING LOCATION.

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NYSDEC
JIMMY'S DRY CLEANER

FIGURE 3
HISTORICAL ON-SITE SOIL SAMPLING LOCATION MAP

ROOSEVELT, NEW YORK

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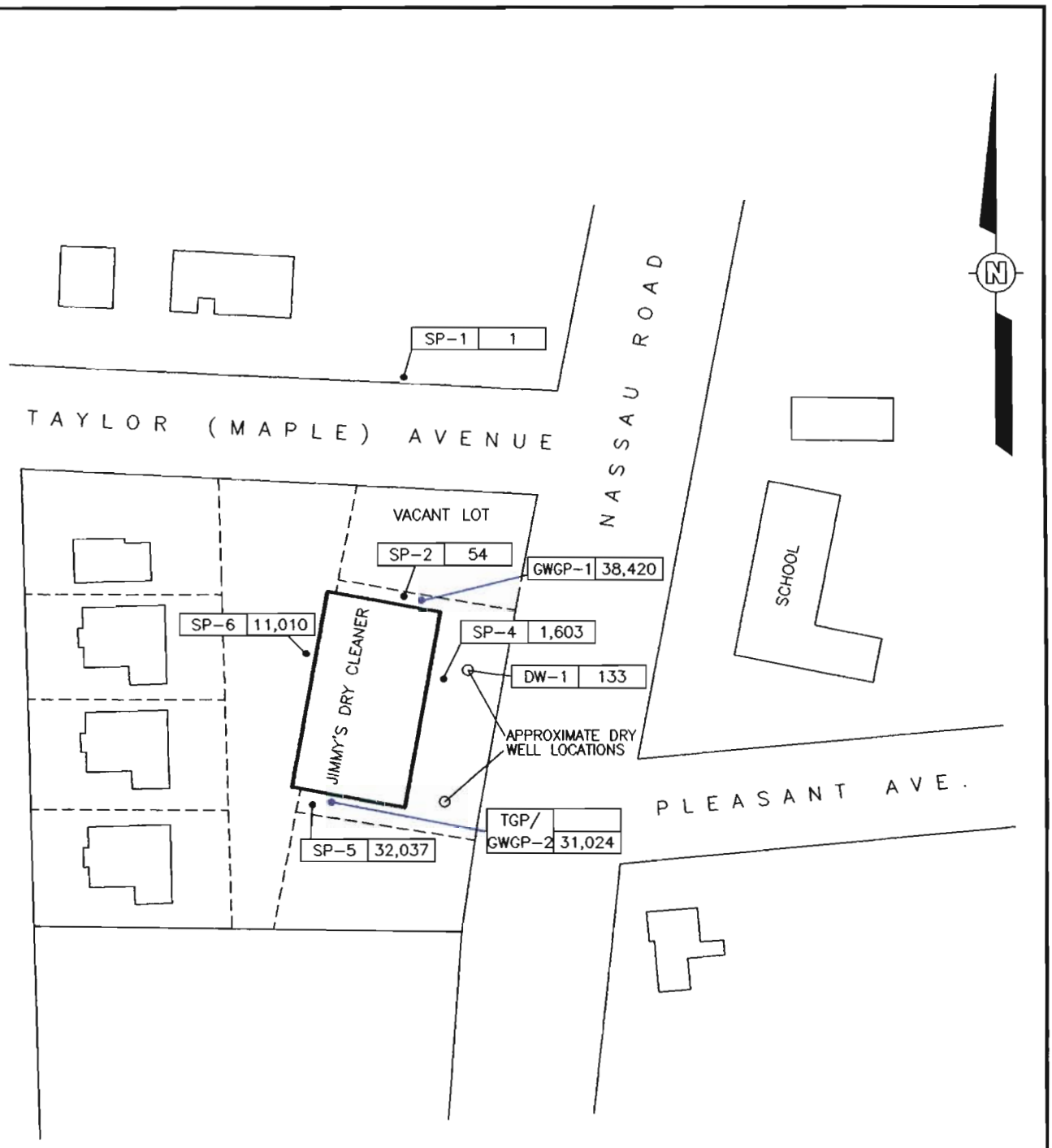

LEGEND:

SP-4 | 1600 — CONC. OF TOTAL VOCs IN WATER (PARTS PER BILLION)

SAMPLE LOCATION

1994 WATER SAMPLING RESULTS (ppb)

1995 WATER SAMPLING RESULTS (ppb)

DRY WELL

APPROXIMATE PROPERTY BOUNDARIES

APPROXIMATE SCALE

0 80 160 FEET

NOTE:
APPROXIMATE SAMPLING LOCATION.

IT CORPORATION

NYSDEC
JIMMY'S DRY CLEANER

FIGURE 4
HISTORICAL ON-SITE GROUNDWATER SAMPLING LOCATION MAP

ROOSEVELT, NEW YORK

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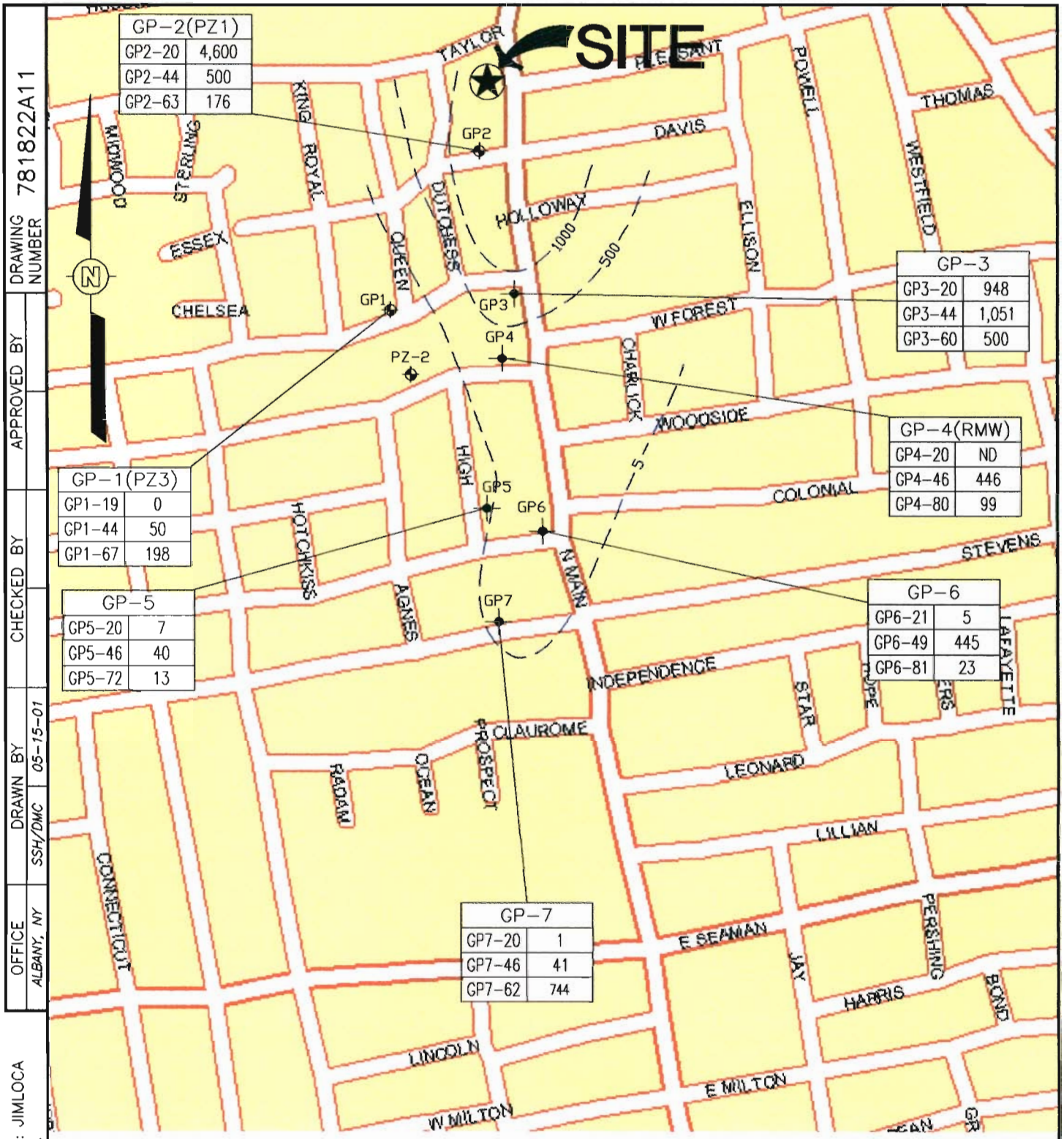

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LEGEND

GP-7	
GP7-20	10
GP-46	39
GP7-62	733

SAMPLE DEPTH (IN FEET)

BORING LOCATION

CONC. OF TOTAL VOLATILE ORGANIC COMPOUNDS IN WATER (PARTS PER BILLION) NOV. 1999

HISTORICAL(1999) MONITORING WELL LOCATION

HISTORICAL(1999) DIRECT PUSH DRILLING GROUNDWATER SAMPLING LOCATION

5 TOTAL VOC CONCENTRATION IN ug/l (ppb)

ESTIMATED TOTAL VOC CONCENTRATION

REFERENCE:

MAP FROM DELORME'S MAP EXPERT, FREEPORT, MAINE.

APPROXIMATE SCALE

0 500 1000 FEET

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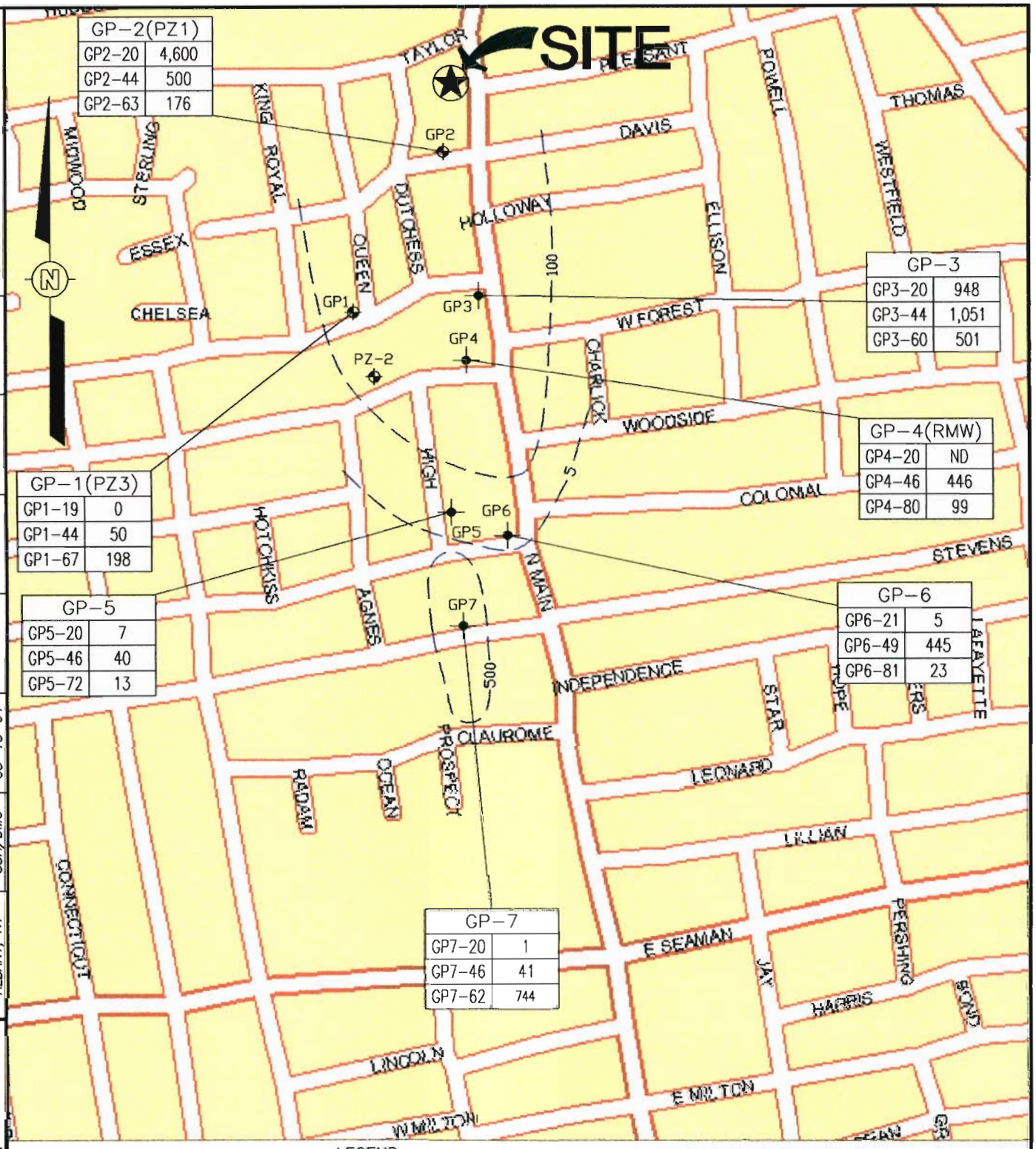
NYSDEC
JIMMY'S DRY CLEANER

FIGURE 5A
TOTAL VOC CONCENTRATION IN GROUNDWATER ISOCONTOUR MAP(20')

ROOSEVELT, NEW YORK



LEGEND

GP-7 / GP7-20 10 / GP-46 39 / GP7-62 733 — BORING LOCATION; CONC. OF TOTAL VOLATILE ORGANIC COMPOUNDS IN WATER (PARTS PER BILLION) NOV. 1999; SAMPLE DEPTH (IN FEET)

HISTORICAL(1999) MONITORING WELL LOCATION

HISTORICAL(1999) DIRECT PUSH DRILLING GROUNDWATER SAMPLING LOCATION

5 TOTAL VOC CONCENTRATION IN ug/l (ppb)

– – ESTIMATED TOTAL VOC CONCENTRATION

REFERENCE:

MAP FROM DELORME'S MAP EXPERT, FREEPORT, MAINE.

APPROXIMATE SCALE

0 500 1000 FEET

IT CORPORATION

NYSDEC
JIMMY'S DRY CLEANER

FIGURE 5C
TOTAL VOC CONCENTRATION IN GROUNDWATER ISOCONTOUR MAP(>60')

ROOSEVELT, NEW YORK

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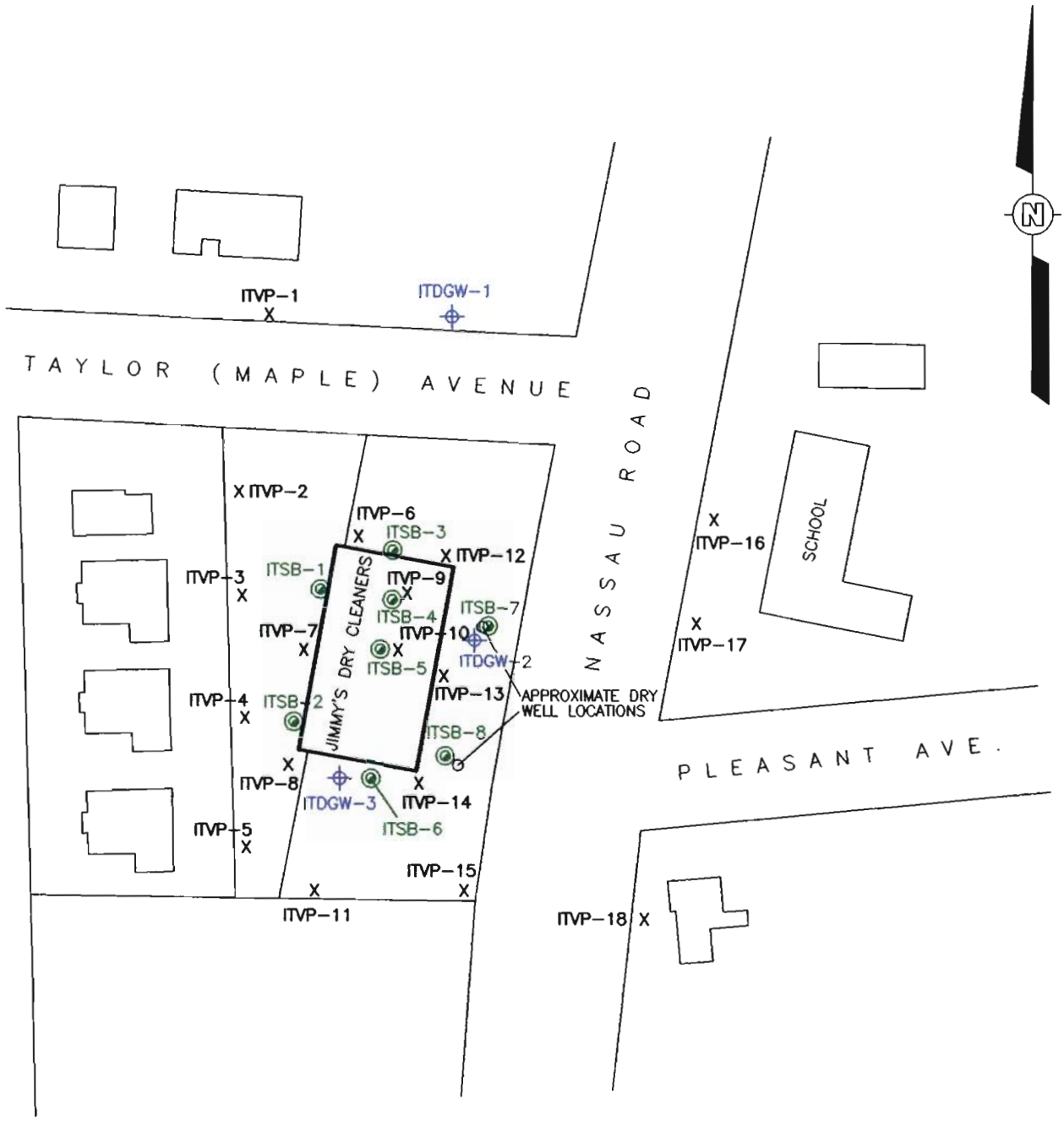

LEGEND:

- o DRY WELL
- PROPOSED SOIL BORINGS
- PROPOSED DEEP GROUNDWATER SAMPLING BORING
- X PROPOSED SOIL GAS SAMPLING LOCATION

APPROXIMATE SCALE

0 80 160 FEET

NOTE:
ITDGW-1 & ITSB-5 WILL BE COMPLETED AS TEMPORARY PIZOMETERS.

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NYSDEC
JIMMY'S DRY CLEANER

FIGURE 6A
PROPOSED ON-SITE SAMPLING LOCATION MAP

ROOSEVELT, NEW YORK

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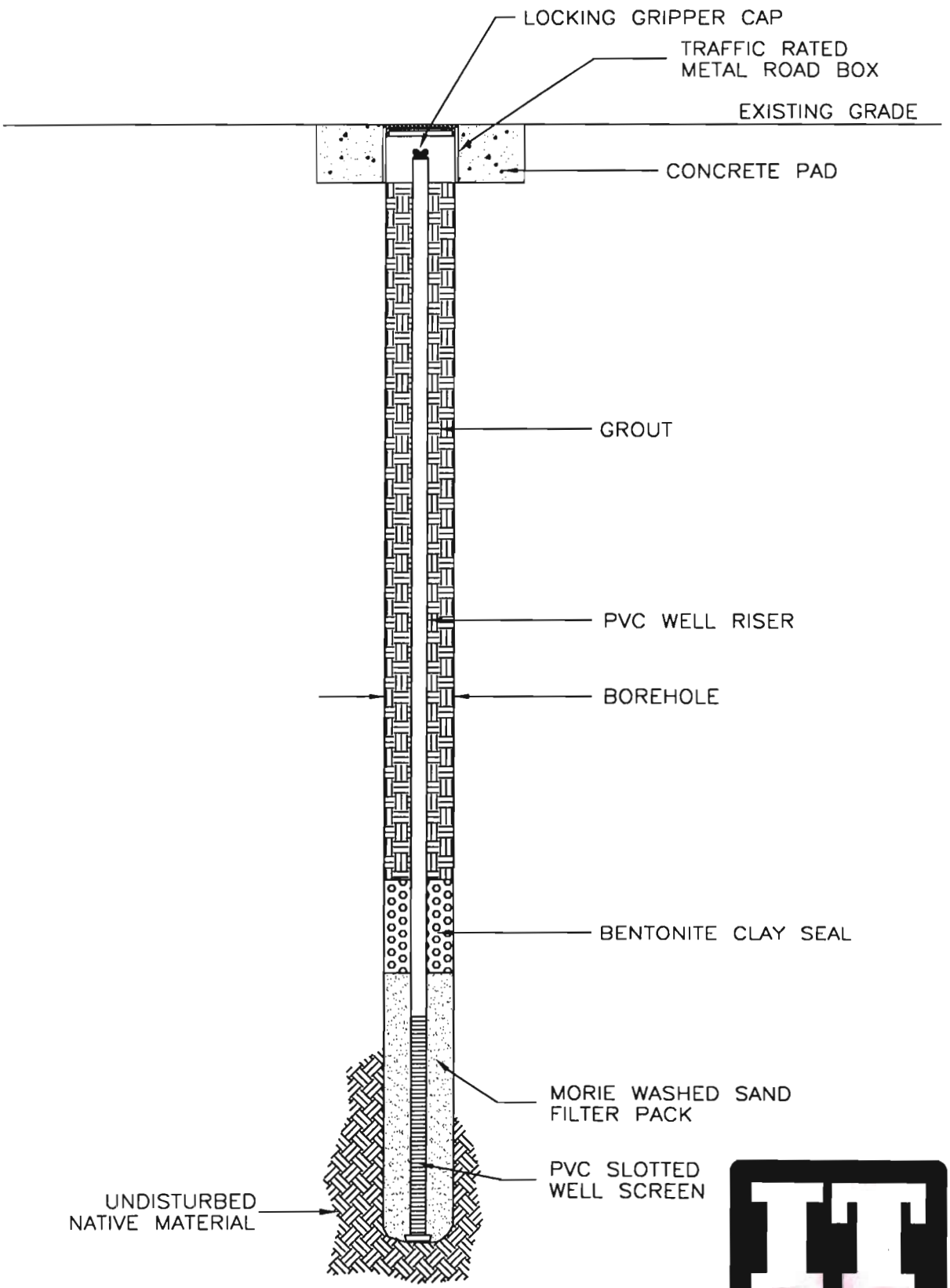
FIGURE 7
TYPICAL MONITORING WELL CROSS-SECTION



NOT TO SCALE

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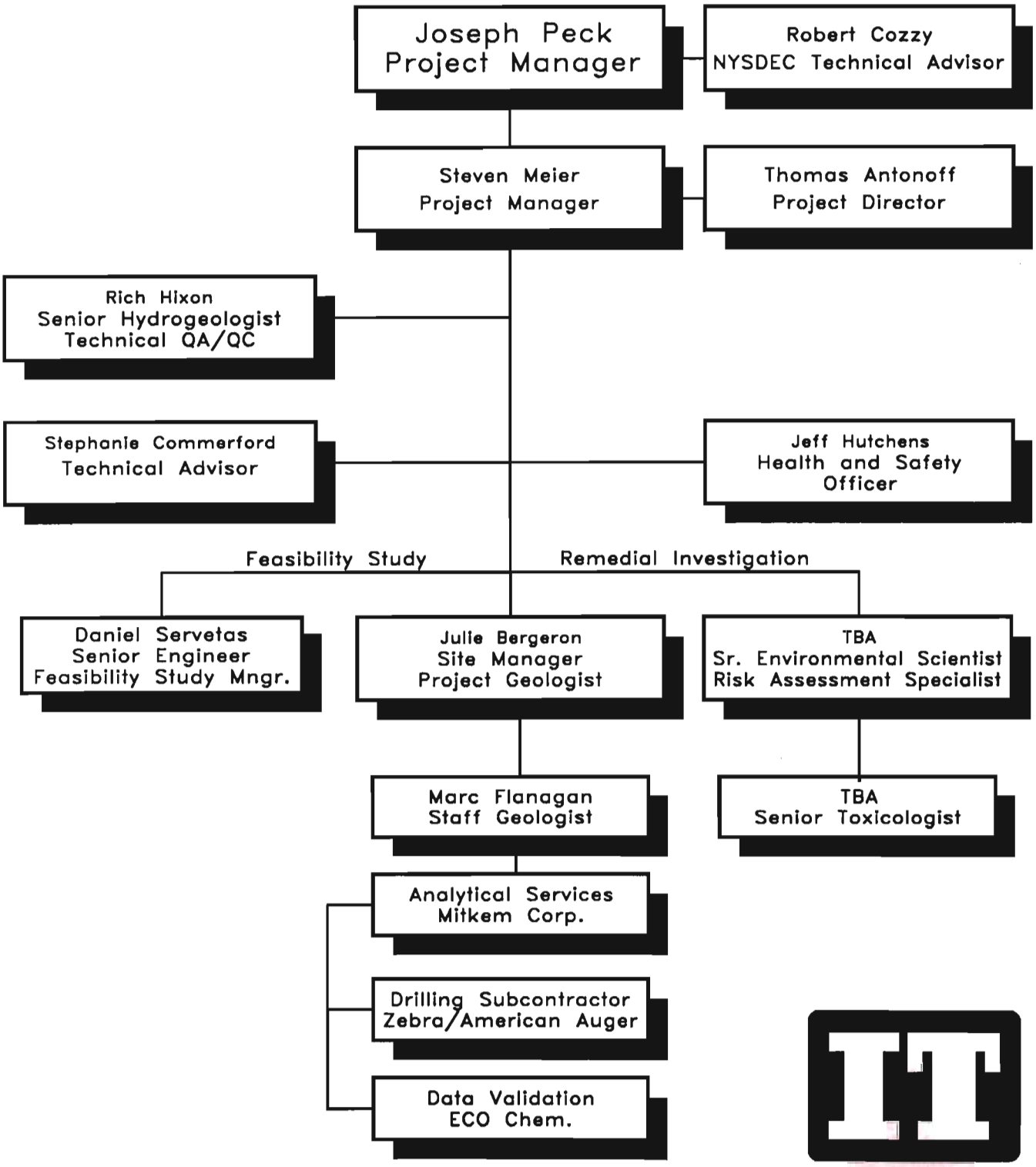
July 19, 2001

1822-MWX.DWG

Figure 8
Project Organization
Jimmy's Dry Cleaner RI/FS Study
New York State Department of Environmental Conservation



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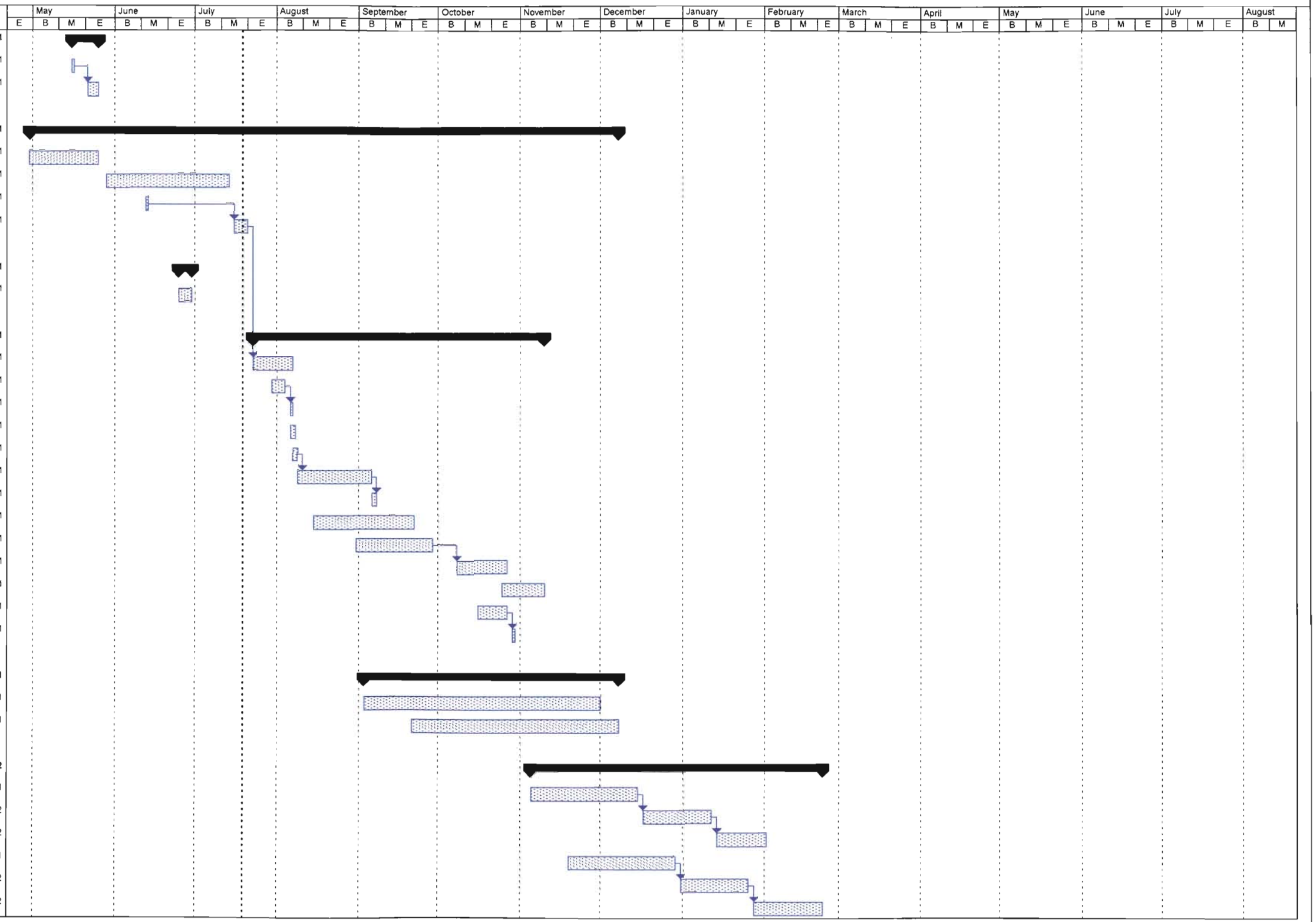
May 17, 2001

1822-ORG.DWG

Figure 9
RI/FS Final Work Plan Final Schedule
NYSDEC Jimmy's Dry Cleaner
Roosevelt, NY

ID	Task Name	Duration	Start	Finish
1	**Site Preparation**	**8 days**	**Wed 05/16/01**	**Fri 05/25/01**
2	Structural Inspection of Building	1 day	Wed 05/16/01	Wed 05/16/01
3	Building Inspection Recommendation	4 days	Tue 05/22/01	Fri 05/25/01
4				
5		**160 days**	**Mon 04/30/01**	**Fri 12/07/01**
6	Develop Draft Work Plan	20 days	Mon 04/30/01	Fri 05/25/01
7	Draft RI/FS Work Plan Review	34 days	Tue 05/29/01	Fri 07/13/01
8	Public meeting	1 day	Wed 06/13/01	Wed 06/13/01
9	Finalize RI/FS Work Plan	5 days	Mon 07/16/01	Fri 07/20/01
10				
11	**Equipment Decontamination/Removal IRM**	**5 days**	**Mon 06/25/01**	**Fri 06/29/01**
12	***Performed by NYSDEC --verify !!***	5 days	Mon 06/25/01	Fri 06/29/01
13				
14	**Field Investigation**	**80 days**	**Mon 07/23/01**	**Fri 11/09/01**
15	Request permits and Field Work Planning	11 days	Mon 07/23/01	Mon 08/06/01
16	Locate Utility	5 days	Mon 07/30/01	Fri 08/03/01
17	Mobilization on Site	1 day	Mon 08/06/01	Mon 08/06/01
18	Soil Gas Survey	2 days	Mon 08/06/01	Tue 08/07/01
19	Shallow soil boring	2 days	Tue 08/07/01	Wed 08/08/01
20	Deep Groundwater Sampling	20 days	Thu 08/09/01	Wed 09/05/01
21	Conductivity Borehole	2 days	Thu 09/06/01	Fri 09/07/01
22	Laboratory Analysis	28 days	Wed 08/15/01	Fri 09/21/01
23	Preliminary Data Evaluation	21 days	Fri 08/31/01	Fri 09/28/01
24	MW Installation / Sampling	15 days	Mon 10/08/01	Fri 10/26/01
25	Laboratory Analysis	12 days	Thu 10/25/01	Fri 11/09/01
26	Waste Profiling	9 days	Tue 10/16/01	Fri 10/26/01
27	Waste Disposal	1 day	Mon 10/29/01	Mon 10/29/01
28				
29	**Data Management**	**70 days**	**Mon 09/03/01**	**Fri 12/07/01**
30	Data Validation	65 days	Mon 09/03/01	Fri 11/30/01
31	Data Management	56 days	Fri 09/21/01	Fri 12/07/01
32				
33	**Remedial Investigation Report**	**80 days**	**Mon 11/05/01**	**Fri 02/22/02**
34	Draft RI Report	30 days	Mon 11/05/01	Fri 12/14/01
35	Draft RI Report Review	20 days	Mon 12/17/01	Fri 01/11/02
36	Final RI Report	15 days	Mon 01/14/02	Fri 02/01/02
37	Draft FS Report	30 days	Mon 11/19/01	Fri 12/28/01
38	Draft FS report review	20 days	Mon 12/31/01	Fri 01/25/02
39	Final FS Report	20 days	Mon 01/28/02	Fri 02/22/02



Project: DEC Jimmy's Draft RI Sched.
Date: Thu 07/19/01

Task | Split | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Split | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary

APPENDIX A

PROJECT TEAM RESUMES

Thomas D. Antonoff
Senior Geologist

EDUCATION

BA, Geology, State University of New York at Oswego, 1981

PROFESSIONAL PROFILE

Mr. Antonoff is a senior geologist in IT Corporation's Latham, New York Office. Mr. Antonoff designs and implements subsurface investigations, such as determining local geology, contaminant extent, contaminant transport pathways, and remedial options. He is also responsible for preparing and tracking project budgets and work plans, as well as coordinating field activities. He formerly served as operations manager of the Company's Buffalo office, where his responsibilities included general management of western New York operations. He also supervised a staff of scientists and technicians in the development and implementation of a variety of environmental assessment and remediation projects.

Before joining IT Corporation, Mr. Antonoff worked for Trahan Petroleum, Inc. of Ellington, New York, as an exploration and production geologist. He was responsible for reservoir maintenance and development of a 200 well field in western New York, regional geologic studies in New York and Illinois, and economic appraisal of properties considered for acquisition.

PROJECT EXPERIENCE

Project Management

Management responsibilities include preparing proposals, remedial action plans, and coordinating professional and technical resources for more than 50 environmental projects. Management and consulting services also include liaison services with officials of the New York State Department of Environmental Conservation (NYSDEC).

Deputy Program Manager of a preferred provider remediation contract for a Class 1 major railroad. Services include coordinating and managing Phase I and Phase II Site Assessments, interim remedial actions, long term closure strategies, and negotiations with authorized agencies. Responsible for completing all technical work for the client and administering the work in conjunction with the client's objectives.

Project Manager for $500,000 RI/FS project in Long Island, New York, involving preparation of work plans, citizen participation plans, Quality Assurance Project Plans, and attendance at public information meetings. Work scope included collection of over 250 soil and groundwater samples at a site impacted with chlorinated solvents and metals.

Direct management of 300 gallon per minute (gpm) groundwater and liquid-phase petroleum recovery system for a petroleum refinery in Buffalo, New York. Work involved managing a multidisciplinary team from assessment through detail design and installation.

Management of preliminary assessment and remedial action for a chemical processing plant in Dunkirk, New York. Concurrent management of 38 petroleum remediation projects in western New York at facilities ranging from privately owned retail service stations to petroleum refineries that are several acres in area.

Project manager of an investigation and remediation project at a 3-acre manufactured gas plant (MGP) site in western New York. The project involved preparation of a work plan for off-site contaminant investigation, remediation technology screening, pilot testing and implementation. Other work included participation at public information meetings, risk assessments, and strategic re-use planning.

Remediation
Remediation project experience includes the design and installation of various remediation technologies, including groundwater recovery and treatment, soil vapor extraction (SVE), air sparging, and bioremediation.

Technology Application
Designed and created a computer system to calculate efficiencies in SVE systems using analytical laboratory and field data.

Environmental assessment work has included numerous projects in New York involving delineation and quantification of impacts at rail yards, petroleum refineries, bulk storage facilities and retail stations; chemical processing plants and bulk storage facilities; and various industrial facilities. The assessment work included investigation for a variety of chemicals including metals, polychlorinated biphenyls (PCBs), chlorinated organic compounds, and petroleum products.

SPECIAL QUALIFICATIONS

Health and Safety Training
OSHA 40-Hour Hazardous Waste Activities Training
OSHA 8-Hour Refresher for Hazardous Waste Activities (annual)
OSHA 8-Hour Management/Supervisory Training
OSHA 24 CFR 1910.146 Confined Space Entry, Competent Entrant, Attendant, Extra-Supervisor Training
Managers Health and Safety Training

Continuing Education
Geophysics, Evansville, Indiana
Improving Management Skills, IPE, Washington, DC
RCRA Regulations, AMA, Orlando, Florida
Tough Positive Management, AMA, Washington, DC
Quality Action Teams, Organizational Dynamics, Inc., Boston, Massachusetts

Academic and Professional Affiliations
Buffalo Association of Professional Geologists
American Association of Petroleum Geologists
American Institute of Professional Geologists
Western New York Construction Users Council
National Ground Water Association
Greater Buffalo Partnership

Julie Bergeron

EDUCATION

BS, Geological Engineering, Ecole Polytechnique de Montreal (Canada), 1996.

PROFESSIONAL PROFILE

Julie Bergeron is a geological engineer in IT Corporation's Albany, New York office. Ms. Bergeron is responsible for daily project management activities, data assimilation, and report writing and preparation. With four years of environmental experience, her areas of expertise include Phase I, II and II environmental site assessments and restoration in various commercial, industrial and inactive hazardous waste disposal site and UST closures.

PROJECT EXPERIENCE

Engineer Associate, IT Corporation, Albany, New York

Project Inspector – Bulkhead Inspector, Interim Remedial Measure (IRM)
Inspected work performed during the installation of a steel sheet pile bulkhead as an IRM at a State Superfund site impacted with PCBs and heavy metals. Responsibilities included: inspect daily work for compliance with H&S protocols and work plans and drawings, document site progress, alert Site manager of any deficiencies or potential issues on a needed basis, perform environmental sampling when required, coordinate NYSDEC and Engineer-of record written approval or field/design change, prepare minutes of weekly progress meeting.

Site Supervisor – Remedial Investigation at a PCB Disposal Site
Implemented work plans and managed data for an extensive soil and groundwater remedial investigation at a State Superfund site impacted with PCBs and heavy metals. Work scope included the installation and sampling of over 80 boreholes over a period of 6 weeks. Drilling and sample collection was performed following strict sampling techniques and health and safety protocols. Also coordinated field work with on site facility managers and some field services including hazardous waste disposal, drilling and laboratory. Work included preparation of the final Remedial Investigation Report which compiled data collected by several companies over a 10-year period.

NYSDEC Inactive Hazardous Waste Site
Supervised the installation of environmental and geotechnical test borings in the Hudson River. Borings were installed with both vibracore and hollow stem auger (HAS) drilling methods, while numerous sediment samples were also collected via ponar dredge. The vibracore drilling was performed from a boat while the HAS work was completed from a barge. More than 100 samples were collected to characterize river sediments, from intervals as far as 40 feet below the river bottom.

Geological Engineer, Remediation/Field Activities, Remediation/Subsurface Investigations
Experience includes the completion of ESA on military sites; the planning and implementation of site investigation programs, collection of groundwater and soil implementation of site investigation programs, collection of groundwater and soil samples, interpretation of field data, and the preparation of reports and proposals. Work locations in Canada included British Columbia, Quebec and Ontario. Work locations in the USA included the State of New York.

Engineering In Training (EIT) – Remediation/Field Activities, Remediation/Subsurface Investigations
Experience includes the completion of several ESAs for commercial and industrial sites; the implementation of investigation programs; monitoring well installation, collection of groundwater and soil samples, interpretation of field data, and the preparation of reports. In addition, assisting with the installation of various remediation technologies, including groundwater recovery and treatment, soil vapor extraction, air sparging, and bioremediation. Work locations in Canada included Quebec and Ontario. Work location in the USA included the State of New York.

Underground Storage Tank (UST) Removals
Supervised UST Removals for major petroleum corporations, railway and other private companies.

SPECIAL QUALIFICATIONS

Health and Safety Training
OSHA 40-Hour Hazardous Waste Activities Training
OSHA 8-Hour Refresher for Hazardous Waste Activities (annually)
Lion Technology – Hazardous Waste Management Training
American Red Cross: First Aid and CPR – August 2000

Other
Other Language: French (fluent)

PROFESSIONAL AFFILIATIONS

Professional Engineer – Ordre des Ingenieur du Quebec, Quebec, Canada.

Stephanie Commerford
Geologist

EDUCATION

BS, Geology, State University of New York (SUNY) at Albany, 1993.
AAS, Chemical Technology, Hudson Valley Community College, 1990.

PROFESSIONAL PROFILE

Stephanie Commerford is a Geologist in IT Corporation's Albany, New York office. Ms. Commerford is responsible for daily project management activities, data assimilation, and proposal preparation. With six years of environmental experience, her areas of expertise include Phase I and II environmental site assessments, UST closures, and state and federal government work.

PROJECT EXPERIENCE

Geologist, IT Corporation, Albany, New York, 1996 – Present.
Project Management – Regional Project Manager, Phase I Environmental Site Assessment (ESA).
Responsibilities include coordinating technical and professional resources nationwide for retail petroleum site portfolios; management and assignment of internal resources performing the Phase I ESAs field investigations; provide quality control of reporting and assurance of on-time completion of deliverables.

Site Manager - Remedial Investigation
Developed work plans and managed data for an extensive soil vapor, soil, and groundwater remedial investigation at a State Superfund site impacted with chlorinated volatile organic compounds. Work plans included specifying drilling and sampling techniques for several borings and monitor wells exceeding 200 feet in depth. Over 200 soil vapor, soil and groundwater samples were collected and laboratory analyzed over a three month period. Also coordinated all field services including drillers, portable laboratory, fixed laboratory, facility managers, and two regulatory agencies to complete work estimated at over $500,000. Work included preparation of the final Remedial Investigation Report.

Most recent portfolio included 17 Phase I ESAs in the State of Utah with a 3-week turn-around timetable. The requested deliverables were provided to the client by the established due date.

Site Manager – Solvent Recycling Facilities.
Responsibilities include managing internal and external resources in order to maintain proper operation of on-site remediation systems; wastewater and air effluent compliance; and preparing remediation system operation and groundwater monitoring reports.

Project Manager – Real Estate Transfer Assessments.
Managed and prepared over 30 Phase I ESAs at commercial and industrial nationwide facilities for an existing real estate investment trust.

Site Manager – PCB-Disposal Site
Assisted in the development and implementation of the preliminary site assessment (PSA) at a PCB impacted site involving soil boring installation, depth-discrete immunoassay testing of soils at NYSDEC-specified locations, and collection of sediment and surface water samples form an adjacent creek.

Remediation/Field Activities, Remediation/Subsurface Investigations.
Experience includes the design and inspection of monitoring well installation, collection of groundwater and soil samples, interpretation of field data, and the preparation of reports. In addition, assisting with the design and installation of various remediation technologies, including groundwater recovery and treatment, soil vapor extraction, air sparging, and bioremediation.

Underground Storage Tank (UST) Removals.
Supervised UST Removals for major petroleum corporations, private companies, and New York State Office of General Services.

SPECIAL QUALIFICATIONS

Health and Safety Training
OSHA 40-Hour Hazardous Waste Activities Training
OSHA 8-Hour Refresher for Hazardous Waste Activities
OSHA 8-Hour Management/Supervisory Training
OSHA Confined Space Training (for Competent Entrant, Attendant, and Entry Supervisor Training)
OSHA Excavation and Trenching Safety Training
American Red Cross: First Aid
American Heart Association: CPR

PROFESSIONAL AFFILIATIONS

Town of Clifton Park Environmental Conservation Commission

Marc E. Flanagan
Geologist

EDUCATION

BS, Geology, State University of New York at Albany, 1999

PROFESSIONAL PROFILE

Marc Flanagan is a Geologist in IT Corporation's Albany, New York office. Marc Flanagan is responsible for supervising field activities, data assimilation, and report writing. Marc Flangan's areas of expertise include Phase I environmental site assessments, UST closure investigation and state and federal government work.

PROJECT EXPERIENCE

Geologist, IT Corporation, Albany, New York, 2000 – Present.
Field Geologist
Responsibilities include supervision of overburden drilling, soil and groundwater collection, decontamination protocols and health and safety issues on an inactive hazardous waste site in southern New York.

Field Geologist, New York State Office of General Services Contract.
Responsible for on-site safety, oversight of field activities, drilling, sample collection, and well installation.

Project Geologist, New York City Department of Design & Construction.
Responsible for the report writing, scheduling, and sample collection from a vast array of sites statewide.

Field Geologist, Bell Atlantic Garage, Sheridan Ave, Albanyt.
Responsible for the implementation of geoprobe borings, field activities, and sample collecting.

Field Geologist, Phillips Components Contract.
Responsible for quarterly report writing.

Field Geologist, Hess Contract.
Responsible for quarterly report writing.

Field Geologist – Texaco Beacon Contract.
Responsible for data preparation, well installation, and sample collection.

Engineer's Geologist, Former Texaco Terminal Site.
Implementation of air sparge and soil vent extraction wells, field activities, well abandonment, and report writing.

SPECIAL QUALIFICATIONS

Health and Safety Training
OSHA 40–Hour Hazardous Waste Activities Training
OSHA Confined Space Training
American Red Cross: First Aid
American Heart Association: CPR
Rad Worker Training

PROFESSIONAL

Membership with the Geologic Society of America.

RICHARD A. HIXON, RPG
Senior Hydrogeologist

EDUCATION

MS, Geology, Rensselaer Polytechnic Institute, 1988
BS, Geology, State University of New York (SUNY) at Albany, 1977

PROFESSIONAL PROFILE

Mr. Hixon is a Senior Project Manager at the Albany, New York office of IT Corporation. Mr. Hixon has greater than 16 years of environmental project experience, and specializes in the assessment and remediation of properties intended for divestiture or reuse, including power generating facilities, component manufacturing facilities, manufactured gas plants, bulk petroleum and chemical facilities, and landfills. Mr. Hixon has designed and completed environmental "due diligence" evaluations for several utility property transactions. Mr. Hixon has also negotiated innovative strategies for site remediation and closure under the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and voluntary cleanup programs with EPA and state regulatory agencies in New York, Vermont, Maine, and Texas.

Mr. Hixon was previously employed by the New York State Department of Environmental Conservation (NYSDEC), where he performed geophysical evaluations of proposed polychlorinated biphenyl (PCB) storage sites, geotechnical assessments for dam feasibility studies, and soil and chemical investigations of inactive hazardous waste sites (IHWS). He also developed an EPA-funded database and software program to inventory groundwater resources in New York.

PROJECT EXPERIENCE

Project Manager, Site Investigation and IRM Evaluation at Former MGP Sites, Long Island, NY
Project manager for investigation work scope and interim remedial measure (IRM) evaluations at two former manufactured gas plant (MGP) sites in Long Island. Used innovative techniques to minimize community impacts and concerns during work scope implementation, including vibratory angle drilling to investigate areas under buildings. IRMs to remove surface tar and contain subsurface residuals were completed.

Technical Director, PSA and IRM Study at a Former MGP Site, Upstate NY
Provided technical direction and oversight during completion of a preliminary site assessment (PSA) work scope for a former MGP site in upstate New York. Environmental samples were collected to delineate MGP waste and source material (purifier box wastes, pure tars) and residuals in soil, surface water, and groundwater. The work scope supported human and environmental exposure analysis and preliminary evaluation of remediation alternatives. Evaluated IRMs to remediate surficial tar materials at the site.

Pentachlorophenol-treated Utility Pole Study, Metropolitan NY Area Utility

A study of the potential presence of pentachlorophenol (PCP) in soils and groundwater adjacent to treated wood utility poles in the metropolitan New York area was completed to support a utility's plan for managing potential regulatory issues associated with the presence of this chemical. The study was designed to correlate with earlier utility research studies.

Physical and chemical analyses of soil and groundwater for compounds including PCP and other chlorinated phenols were completed in order to determine the distribution and leaching potential of these chemicals from treated poles. The data collected during this study showed that PCP concentrations tended to attenuate sharply with depth and distance from the poles.

Soil samples from all studied sites were compared to human health effect criteria. The potential for induced human carcinogenic or systemic effects effects resulting from exposure to PCP in soils adjacent to in-service poles at the sites studied appeared extremely remote. The potential for PCP impacts to groundwater as a result of its use as a pole preservative appeared to be limited, as only trace detections of PCP in groundwater were measured at the location sampled.

Project Manager, Utility Divestiture Assessment, Northeast Electric and Gas Utility
Mr. Hixon managed a team that developed a comprehensive yet pragmatic environmental due diligence program to identify and quantify potential remediation liabilities associated with a utility's portfolio of 76 fossil-fuel and hydroelectric generating stations. Mr. Hixon's team of scientists and engineers worked with the utility's existing data and audit personnel, and implemented a focused sampling plan to characterize the generating asset portfolio quickly and accurately. This approach provided excellent results, was completed quickly, and at relatively low cost. A Probabilistic Cost Model was developed for the project, utilizing decision analysis and Monte Carlo simulation, to represent the range and associated probabilities of potential environmental costs for the generating asset portfolio. The utility was able to negotiate these issues favorably during sale of the asset and received a strong $/kW price return.

Project Manager, Utility Due Diligence Assessment, Metropolitan Electric and Gas Utility
Mr. Hixon developed an environmental due diligence program to identify potential remediation liabilities associated with a utility's surplus distribution assets, including a former natural gas "cracking" plant. The site was characterized quickly and a report was generated to support the utility's strategy for optimizing the value of the asset.

Project Manager, *In-Situ* Ozonation Technology Demonstration Project, Electric Utility, Metropolitan NY
A field demonstration of promising technology (*in-situ* ozonation) for remediation of recalcitrant organic substances was implemented by Mr. Hixon's project team at a former Manufactured Gas Plant. The data collected demonstrated reductions in concentrations of all classes of polynuclear aromatic hydrocarbons in subsurface soil of greater than 99% during implementation of the *in-situ* ozonation process. The project met the customer's objectives for evaluation of the technical- and cost-effectiveness of the technology.

Project Manager, PCB Dechlorination Technology Demonstration Project, Electric Utility Research Corporation, New York
Mr. Hixon managed a project which demonstrated the effectiveness of a PCB dechlorination process of interest to an electric energy research corporation. Mr. Hixon's team collected soils from a member utility and designed a data collection and quality assurance plan to quantitate reductions in PCB arochlors and congeners during the reductive chemical process. The project was completed in a cost-effective manner and conclusively demonstrated the technical effectivenes of the method.

Project Manager, RI/FS and RD/RA at an Electronics Manufacturing Plant, Mid-Hudson Valley, NY
Mr. Hixon managed a team which prepared a remedial investigation and feasibility study (RI/FS) at a manufacturing site listed on New York's Superfund Registry. The site was listed based on detection of chlorinated solvents in soil and groundwater adjacent to the facility. The RI/FS was focused on compiling previous work and performing limited sampling to fill data gaps. The FS included pilot testing to demonstrate that *in situ* air sparging and soil vapor extraction (SVE) technologies would provide a more effective and significantly less costly alternative than the option initially favored by NYSDEC. This alternative was adopted in the remedial action plan and Record of Decision (ROD). The remedial design and remedial action (RD/RA) installation was completed below budget. The successful operation of the system resulted in NYSDEC reclassifying the site to "properly closed" within 7 months of startup.

Project Manager, RFI and ICM Implementation at a Research and Development Facility, Mid-Hudson Valley, NY
A multiple-phase project at a research and development facility was undertaken as a requirement of the facility's Hazardous Waste Storage Permit. Project phases included completion of a RCRA facility investigation (RFI), corrective measures study (CMS) implementation, and closure of regulated waste storage areas and tanks. RFI performed at the facility's hazardous waste storage unit to delineate areas of petroleum and solvent release impacts was negotiated, reviewed, and approved by both EPA and NYSDEC. An ICM (*in situ* and *ex situ* bioremediation) was also implemented at an active bulk storage terminal at the facility, resulting in significant cost savings during treatment of petroleum-impacted soil.

Project Manager, Voluntary Site Investigation and Cleanup, Lower Hudson Valley, NY
Project manager for cleanup and closure of residual impacts from maintenance operations at a desirable golf course location in receivership. Source area wastes and soil were removed; residual VOCs in groundwater were monitored. Presented the cleanup data and a monitoring closure plan which was approved by NYSDEC, allowing transfer of the property to proceed.

Project Director, Site Assessment at Multiple Municipal Landfills, Upstate NY
Assessed methane gas migration from several municipal landfills in accordance with Part 360 closure requirements. A definitive procedure for sampling and tracking gas-transmissive zones was developed that was subsequently included in a NYSDEC guidance memorandum.

Project Manager, Statistical Evaluation of Groundwater Monitoring Data, Paper Sludge Landfill, Upstate NY
Historical and operating data from a paper sludge (monofill) solid waste landfill were evaluated to determine if significant increases in analytical parameters had occurred as a result of operations. As a result of the analysis and subsequent negotiation with the regulator, several monitoring parameters were dropped resulting in an annual savings of more than $30,000 to the customer.

Project Manager, Groundwater and Soil Remediation, Emergency Vapor Abatement, Central VT
A hydrocarbon spill at a municipal service center forced evacuation of several adjacent residences. Remedial response actions focused on extracting and treating hydrocarbon vapor and fugitive liquid-phase petroleum (SVE, groundwater and petroleum recovery). A residential air sampling program was completed with associated QA/QC and risk-assessment components, permitting reoccupancy of the residences.

SPECIAL QUALIFICATIONS

Health and Safety Training
OSHA 40-Hour Hazardous Waste Activities Training
OSHA 8-Hour Refresher for Hazardous Waste Activities (annual)
OSHA 8-Hour Management/Supervisory Training

Registrations and Certifications
Professional Geologist, Arkansas, Reg. No. 1239

Academic and Professional Affiliations
National Ground Water Association, member
Association of Groundwater Scientists and Engineers, member
National Safety Council, member
Town of Clifton Park Environmental Conservation Commission, member

Publications/Presentations
NYSDEC Petroleum Bulk Storage Seminar. *Testing and Remediation of Petroleum Hydrocarbons*. Vestal, NY. October, 1994.

Empire State Electric Energy Research Corporation. *Presumptive Remedy Selection for MGP Sites: A Matrix Approach*. Saratoga, NY. January , 1995

Empire State Electric Energy Research Corporation. *Environmental Due Diligence: Estimating Remediation Liabilities*. Saratoga, NY. January , 1997

Fulton County Economic Summit, Brownfields Panel. *Risk-Based Corrective Action*. March, 1997

Empire State Electric Energy Research Corporation. *Demonstration of In-Situ Chemical Degradation by Ozonation*. Saratoga, NY. January, 1998

IT Technology Exchange. *A Practical Approach to Utility Environmental Due Diligence*. Orlando, FL. February, 1999

Steven R. Meier
Project Manager

EDUCATION

BA, Geology, University of Delaware, 1986

PROFESSIONAL PROFILE

Steven Meier, is a project geologist and project manager in IT Corporation's Latham, New York, office. In this role, Mr. Meier manages a variety of projects throughout New York State, coordinating site work with customers and state regulators, supervising project personnel during site investigation and remediation activities, interpreting site data, and preparing required reports. Mr. Meier started his professional career in 1984 as a research assistant at the Delaware Geological Survey. Since entering the environmental industry in 1986, Mr. Meier has assessed, managed and remediated various types of environmental contaminants in groundwater and soil using both conventional and innovative technologies.

PROJECT EXPERIENCE

Project Manager, Inactive Hazardous Waste Site Remediation
Managed remediation system optimization and O&M at a National Priorities List (NPL) site in central New York. This system was designed to enhance the containment of TCE and PCBs in groundwater. Groundwater remediation activities utilized high volume groundwater extraction and removal of chlorinated solvents by air stripping and carbon adsorption. Designed and installed a system to remove metals from the groundwater process stream using polymer injection and settling.

Project Geologist, Site Investigation of Industrial Facilities
Investigated several large TCE spill sites in central and southern New York. Using drilling equipment, test pits, and a portable gas chromatograph, identified potential migration pathways and vertical distribution of VOCs.

Project Manager, Site Assessment, Petroleum Facilities
Assessed numerous retail petroleum facilities and bulk storage terminals for major oil companies and the New York State Department of Environmental Conservation (NYSDEC). Developed monitoring well networks, evaluated groundwater quality, conducted permeability testing, characterized secondary contaminant systems, and developed a groundwater oil spill contingency plan for several large bulk storage terminals, in accordance with on-shore storage facility license requirements.

Project Manager, Remediation System Pilot Testing, Retail Petroleum Facilities
Analyzed results of multiple remediation system pilot testing programs to determine the feasibility of applying air sparging, Soil vapor extraction (SVE), high-vacuum extraction, and groundwater pumping / treatment systems at hydrocarbon-impacted sites.

Project Manager, Remediation System Design and Installation, Retail Petroleum Facilities
Designed, installed, and supervised performance of numerous groundwater and soil remediation systems in southern and central New York. These systems were installed to control and remove hydrocarbons at high-visibility sites due to potential risks to human health or the environment.

Project Manager, Iron Fouling Treatment System Design, Major Oil Company
Designed hydrogen peroxide injection system and iron precipitate removal system to prevent biological and iron fouling of groundwater treatment systems for a major oil company.

Project Geologist – State Superfund Remediation Site

Prepared site facilities and coordinated project work scopes with state regulators, project team members, subcontractors and other interested parties during weekly project update meetings.

SPECIAL QUALIFICATIONS

Health and Safety Training

OSHA 40-Hour Hazardous Waste Activities Training, 1988
OSHA 8-Hour Refresher for Hazardous Waste Activities (annual)
OSHA 8-Hour Management/Supervisory Training, 1989
Hazardous Communications Right-to Know Training, 1994
OSHA Excavation and Trenching Safety Regulations Competent Person Training, 1995
OSHA Electrical Safety Training, 1995
Medic First Aid Training (CPR Inclusive),1997
UST Removal Training, IT Corporation, 1996

Registrations and Certifications

Certified Hazardous Materials Manager (CHMM), Institute of Hazardous Materials Management, 1996

Professional Affiliations

National Ground Water Association

Daniel Servetas
Project Engineer

EDUCATION

M.S., Environmental Engineering, University of Connecticut, Storrs, Connecticut, 1995
B.S., Civil Engineering, University of Connecticut, Storrs, Connecticut, 1990

PROFESSIONAL PROFILE

Mr. Servetas is a civil/environmental engineer located in IT Corporation's Latham, New York Office. He has eight years of diverse engineering and management experience. His experience as a project engineer includes preparation of work plans, statements of work, and procurement documentation; scheduling and oversight of subcontractors; project planning and cost estimating; and supervision of remediation/construction activities. He also has experience in construction quality control, conducting subsurface geophysical surveys, and preparing field sampling and analysis reports. His engineering interests include site remediation, construction, and water/wastewater treatment. He has conducted bench scale research of ozone/activated carbon water treatment systems and has developed course material for an EPA sponsored course in hazardous waste site remediation.

Mr. Servetas' management experience includes task management and remediation construction management of commercial, state, and federal projects.

PROJECT EXPERIENCE

Project Engineer, IT Corporation, Latham, New York, 2000 - Present.
Prepared a Feasibility Study Report for an industrial site contaminated with polychlorinated biphenyls. The Feasibility Study Report was prepared in accordance with USEPA Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA and NYSDEC Technical and Administrative Guidance HWR-90-4030. Primary responsibilities included identification, screening, and evaluation of pertinent technologies and development, screening, and analysis of remedial action alternatives.

Prepared a Stormwater Pollution Prevention Plan for construction activities associated with the implementation of an interim remedial measure at a polychlorinated biphenyl contaminated site. The Stormwater Pollution Prevention Plan was prepared in accordance with USEPA and NYSDEC guidance.

Project Engineer, IT Corporation, Martinez, California, 1997 -2000.
Managed a $500,000 remediation construction effort during a low-level radioactive, mixed, and biological waste removal action at the University of California, Davis. Prepared cost estimates and conceptual design for job proposal. Supervised five technical professionals and ten non-professionals during the waste removal from non-engineered landfills. Developed procedures for segregating wastes. Segregation procedures utilized a mechanical screening plant to separate the low-level radioactive and mixed wastes into separate waste streams. Additionally, unexpected biological wastes were removed and segregated into a separately managed waste stream. Disposal of the biowaste was facilitated by Mr. Servetas through the identification of an existing disposal vehicle within the University of California system in a manner that did not negatively impact project costs and schedule.

Managed a cost plus contract having a value of $600,000 established to provide site investigation and remedial actions to a commercial chemical manufacturing client. Soils and groundwater at the site were contaminated with ammonia, cobalt, chromium, copper, iron, nickel, and zinc. Mr. Servetas developed site clean-up goals in accordance with the California Regional Water Quality Control Board Designated

Level Methodology. Prepared work plans for investigations and remedial actions. Design of full-scale remedial action was based upon results of laboratory bench-scale study.

Developed cost estimate for a $1.4 million decommissioning task at the DOE Laboratory for Energy-Related Health Research at the University of California, Davis (DOE-LEHR). The task involved decommissioning the structures associated with the former Radium/Strontium Treatment Systems at DOE-LEHR including the 14,400 gallon Radium-226 system, the 46,000 gallon Strontium-90 system, three 40-foot deep drywells, a leach field, and a 100-foot long leach trench.

Developed cost estimate and construction schedule for $1.6 million remedial action task at DOE-LEHR. Task involved confirming the location of former waste disposal trenches, excavating approximately 1,800 cubic yards of Radium-226 and Strontium-90 contaminated soil and debris from former waste disposal trenches, separating liquid-containing glassware from the soil and debris, and packaging the waste for shipment to a DOE approved landfill facility. Supervised a crew of fourteen during the remediation construction effort.

Served as Project Engineer in soils remediation at Hamilton Army Airfield, a U.S. Army Corps of Engineers, Sacramento District Total Environmental Restoration Contract site. Remediation activities included aeration of volatile organic compound and total petroleum hydrocarbon contaminated Bay Mud soils in accordance with the guidelines specified by the Bay Area Air Quality Management District and stabilization of lead contaminated soil using Portland cement. Designed a statistically-based sampling plan to characterize 130,000 cubic yards of Bay Mud soils and test the data against ecologically-based screening values for use in a proposed wetlands development project. Evaluated erosion control products for application to 130,000 cubic yards of stockpiled soils. Evaluation included determination and applicability of physical and chemical characteristics of products with respect to site conditions and environmental constraints.

Site Engineer, Jaworski Geotech, Inc., Manchester, New Hampshire, 1996.
Performed construction monitoring services, including measurement of field density using a nuclear density gauge, sampling of concrete and masonry materials, and supervision of sub-contractors. Reviewed materials for compliance with construction specifications.

Environmental Engineer, Jacobs Engineering Group, Inc., Arlington, Virginia, 1993-1995.
Analyzed geophysical data collected over 90 acres of the Canal Creek Study Area at Aberdeen Proving Ground (APG). Apparent ground conductivity and in-phase response data were reduced using Geonics DAT31 software; contour plots were created using Geosoft and AutoCAD. Obtained historical information from facility drawings, reports, and aerial photographs for interpretation of geophysical anomalies. Presented recommendations regarding further investigation of inexplicable anomalies as part of a Remedial Investigation/ Feasibility Study (RI/FS) being conducted by Jacobs at APG.

Assembled briefing package for presentation of expert court testimony regarding tidal influence, contaminant fate and transport, and remediation of a former industrial site contaminated with lead, total petroleum hydrocarbons, and polychlorinated biphenyls. Package included data analysis, groundwater elevation contour maps, contaminant isoconcentration maps, conceptualized remedial alternatives, and remediation cost estimates. Remedial alternatives included removal of high level wastes and

consolidation of low level wastes under an engineered cap, installation of a bentonite/soil slurry cut-off wall, and on-site treatment and removal of contaminated soils.

Prepared Field Sampling and Analysis Reports for soil, surface water, sediment, groundwater, and soil gas investigations at APG — Edgewood Area. Developed report preparation schedules, verified laboratory data analyses, reviewed field data, and coordinated efforts in compiling report.

Worked with team to develop Quality Assurance Project Plan for RI/FS at APG. The team consisted of project engineers, project managers, corporate quality assurance personnel, and the client. Primary responsibilities included scheduling document preparation, drafting individual sections, and coordination of upper management and client technical review.

Research Assistant, Environmental Research Institute, Storrs, Connecticut, 1991-1993.
Studied the effects of ozone on activated carbon adsorption by conducting equilibrium and isotherm studies using natural organic matter.

Gained experience in the use of laboratory analytical instruments including the Shimadzu Total Organic Carbon Analyzer (TOC-500), the Varian Cary I UV-Visible Spectrophotometer, and the Dionex 4000i Ion Chromatograph.

Developed an economical method for chemical analysis of TCLP extract using the Shimadzu TOC-500 under a grant from the American Petroleum Institute.

Assisted with instruction of senior level civil engineering course in unit operations. Duties included lecturing, preparing laboratory demonstrations, and tutoring students.

Worked on an EPA sponsored project which involved the development of course material for a graduate level course in hazardous waste site remediation. Authored textbook chapter on thermal processes that included incineration, wet air oxidation, and low temperature thermal desorption.

Project Engineer, YWC Inc., Monroe, Connecticut, 1991.
Prepared excavation specifications and engineering drawings for RCRA impoundment's closure. Prepared equipment specifications, conceptual process flow diagrams, and cost estimates for small scale granular activated carbon water treatment system. Designed sludge pumping system for municipal wastewater treatment facility. Assisted with the design of a spring water collection and treatment system.

Participated in numerous field sampling projects including groundwater, soils/sediments, industrial wastewater, and surface water characterization projects.

Assistant Engineer, YWC Inc., Monroe, Connecticut, 1989-1990.
Assisted project engineers on numerous engineering design projects including hazardous waste storage facility for analytical laboratory and storm runoff/hazardous spill containment system for large chemical manufacturing facility.

REGISTRATIONS Registered Engineer-in-Training (Connecticut, No. J-6048)

CERTIFICATIONS

US Department of Energy Radiological Worker II
Excavation/Competent Person Course, CCR Title 8, 1504, 1539-1547
Radiation Safety and Use of Nuclear Gauges
Jacobs Total Quality Management Course
40-Hour HAZWOPER, 29 CFR 1910.120

Health and Safety Supervisor and Management Training
DOT Sample Packaging and Shipping, HM-181
American Red Cross Standard First Aid and Adult CPR

PUBLICATIONS Thermal Processes (with D. Grasso), in ***Hazardous Waste Site Remediation: Source Control.*** D. Grasso. (Lewis, 1993).