SITE CHARACTERIZATION
QUALITY ASSURANCE PROJECT PLAN

FORMER MOM'S CLEANERS SITE
SITE # 1-52-184
556 UNION BOULEVARD
WEST ISLIP, NY 11795

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1.0 INTRODUCTION

As required in the New York State Department of Environmental Conservation (NYSDEC) document entitled: "*NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation*," dated May 2010, as amended, the purpose of this Quality Assurance Project Plan (QAPP) is to provide the field, office and laboratory quality assurance / quality control (QA / QC) measures and procedures to be followed during the execution of the Site Characterization Work Plan (SC Work Plan) being conducted at the Former Mom's Cleaners Site (hereinafter referred to as the "Subject Property") located at 556 Union Boulevard in West Islip, New York (see ***Figure 1-1***: Site Location Map). The Subject Property represents a former lease space on the eastern portion of a strip-mall shopping center known as the Captree Village Shopping Center. According to a NYSDEC Order on Consent and Administrative Settlement (Order), the Subject Property is currently listed as Site # 1-51-184 in the New York State Registry of Inactive Hazardous Waste Sites. The Subject Property is currently listed as a Class 4 site by the NYSDEC.

It is understood that the NYSDEC is requesting completion of SC activities at the Subject Property based upon the following:

- Groundwater samples collected and analyzed in November of 2009 from two (2) on-site monitoring wells (i.e., MW-6 and MW-9) contained tetrachloroethene (PCE) in exceedance of its New York State Class GA groundwater quality standard of 5.0 micrograms per liter (ug/l); and,

- Due to the presence of shallow groundwater impacted by halogenated volatile organic compounds (VOCs) in the vicinity of the on-site building, there is the potential for soil vapor intrusion (SVI) into the overlying occupied structures.

1.1 Project Goals and Scope

The SC Program has been designed to meet the following goals:

- Evaluate on-site groundwater quality conditions in the vicinity of the Subject Property, as well as directly upgradient of the nearest off-site residential structures; and,

- Evaluate SVI conditions and determine if any further action(s) (e.g., continued monitoring, mitigation, etc.) is warranted.

The scope of the planned investigation includes the following:

- Installation of two (2) additional groundwater monitoring wells, one (1) at an upgradient site location and one (1) at a downgradient site location;

- Collection and analyses of groundwater samples from existing wells MW-6, MW-9 and the two (2) newly-installed wells for NYSDEC Target Compound List (TCL) VOCs; and,

- Conduct of a SVI evaluation of the on-site structures in accordance with prevailing New York State Department of Health (NYSDOH) protocols.

QA / QC controls are required to prevent, identify and correct errors that may occur at any point during the investigation process including surveys; monitoring well installation; sampling and handling; sample analysis; and final reporting.

1.2 Data Quality Objectives and Criteria

The overall data quality objectives (DQOs) of this QAPP are to ensure the appropriate development and implementation of procedures for field sampling, chains-of-custody (COC) protocol, laboratory analyses and reporting that will yield reliable data that can easily be verified and defended. Specific procedures to be utilized for sampling, COC tracking, instrument calibration, laboratory analyses, field procedures / reporting, internal QC audits, and corrective actions are described in this QAPP. The purpose of this section is to define goals for data completeness, accuracy, precision, bias, representativeness and comparability. The QA requirements for each parameter are contained in the EPA guidance document *Test Methods for Evaluating Solid Waste*, *Physical/Chemical Methods (SW-846)* and *NYSDEC DER-10*.

1.2.1 Data Accuracy

Accuracy is defined as the degree of agreement of a measurement X, with an accepted reference value T, and is measured by calculating percent recovery. The difference between X and T will be expressed as a percentage of the reference value according to the formula:

- Percentage Difference = 100 (X-T) / T

Accuracy is influenced by random error or precision and systematic error or bias that may occur during sampling and analysis. External accuracy audits will be conducted by the quality

assurance officer (QAO) with the support of the approved laboratory by submitting blind standards, spikes and field blanks to the laboratory. The analytical results must meet acceptable accuracy objectives.

Each laboratory utilized for the project must participate in ongoing performance audit programs administered by Apex and / or by New York State. Reference or spiked samples will be used where appropriate.

1.2.2 Data Precision

Precision is defined as a measure of mutual agreement among individual measurements of the same property. External precision audits will be conducted by submitting blind duplicate samples to the laboratory and comparing the results with the acceptance criteria.

1.2.3 Data Bias

Bias is the measure of the systematic variance in the expected sample measurement from the samples true value.

1.2.4 Data Completeness

Completeness is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is to generate a sufficient amount of valid data. A 90 percent completeness value will be utilized as a guideline.

1.2.5 Data Representativeness

Representativeness is the assurance that analytical data are derived from sampling techniques and laboratory procedures that achieve a characteristic sample. To assure representativeness, all sampling will be conducted according to the protocols set forth in ***Section 3.0***, below.

1.2.6 Data Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The data generated will be reported in units consistent with other laboratories that report similar analyses and data QA / QC protocols. This will allow comparison of data among organizations and the adjacent Farrand Controls Site. Standardized data formats for calculating and reporting of analytical results will facilitate the process. The standard operating procedures (SOPs) for sampling described in ***Section 3.0*** will be followed for each sampling event.

2.0 PROJECT ORGANIZATION

Since the key element of any remedial investigation is the project team, a project team with extensive NYSDEC Inactive Hazardous Waste Disposal Site and USEPA Superfund site experience has been assembled. The proposed project team organization is presented in ***Figure 2-1***.

The Project Manager (PM) for this project will be **Richard J. Baldwin, C.P.G., P.G.** Mr. Baldwin is a hydrogeologist with more than 20 years of experience in the fields of environmental consulting, hydrogeology and geology with particular experience in conducting and supervising environmental investigations and remedial actions at industrial, private, Federal and publicly-owned facilities and sites. Additionally, Mr. Baldwin has experience in evaluating potential environmental impacts of projects including golf courses, housing developments, senior housing, schools and retail shopping centers. For the last several years, Mr. Baldwin's work has focused primarily on sites and facilities located in the Long Island, New York City and Upstate New York areas. A copy of Mr. Baldwin's resume is included in ***Appendix A***.

The Apex Project Director and QAO for the project will be **Daniel J. Smith, P.E.** Mr. Smith is a New York State-licensed Professional Engineer (PE) in Chemical Engineering with over 20 years of experience in the environmental consulting industry. Mr. Smith has been responsible for the implementation of investigations and remedial actions at numerous NYSDEC-regulated sites under the SPILLS and IHWDS program. The QAO's project responsibilities include conducting site audits to ensure that the QA/ QC procedures included in this Work Plan are being implemented. Additionally, the QAO will review all of the analytical data collected as part of the investigation to assure that the data are of sufficient quality to support the goals of the investigation. Mr. Smith is an officer of Apex and the Project Director for this project; thus he has the authority to ensure that appropriate staffing is available to complete the investigation. A copy of Mr. Smith's resume is included in ***Appendix A***.

Field sampling and oversight of contractors will be performed by personnel experienced in proper field sampling techniques. All analytical work will be performed by a NYSDOH ELAP-certified analytical laboratory and drilling services will be performed by experienced contractors with extensive NYSDEC regulated site experience.

3.0 MEASUREMENT/DATA ACQUISITION

Previous investigations conducted at the Subject Property indicated that the potential contaminants of concern were limited to VOCs. Therefore, the SC Work Plan, to which this QAPP was prepared in support of, has been specifically designed to evaluate for the presence of VOCs in soil vapor, air (both indoor and outdoor) and groundwater matrices.

3.1 Field Documentation and Records

Project-dedicated field notebooks will be initiated at the start of on-site work and will be maintained with information pertinent to site activities. The field notebook will include the following daily information for all site activities:

- Date;
- Meteorological conditions (temperature, wind, precipitation, etc.);
- Site conditions (e.g., dry, damp, dusty, etc.);
- Identification of crew members and other personnel (e.g., agency or site owner) present;
- Description of field activities;
- Location(s) where work is performed;
- Problems encountered and corrective actions taken;
- Records of field measurements or descriptions recorded; and,
- Notice of modifications to the scope of work.

During soil vapor sampling, field samplers will include the following information:

- Sampling point locations and photo-ionization detector (PID) results;
- Information about sample collection (depth, odors, etc.); and,
- COC information.

During the installation of monitoring wells, field samplers will include the following information regarding soils encountered during their installation:

- Sampling point locations and PID results;
- Description of soil samples collected as part of the well installation process (color, odor, consistency, etc.);

- Field equipment calibration; and,
- Equipment decontamination.

During sampling of wells, field samplers will add the following:

- Sampling point locations and test results such as pH, conductance, etc.;
- Information about sample collection;
- COC information, and,
- Field equipment calibration.

Each sample must have a COC record that includes sample identification number, date and time of collection, place of collection, environmental matrix, sample container, preservation method, signature of the collector, and signature and dates of persons involved in the transportation and handling of the sample. Further, for tasks requiring repetitive note taking such as groundwater sampling, pre-printed field forms will be utilized to ensure that the appropriate data are collected and recorded.

Final reports including technical review documentation, raw data, data collection sheets (as specified above), calculations, instrument calibration records and QA information will be maintained.

3.2 Sampling Methods

Environmental sampling will be conducted in general accordance with the appropriate techniques presented in the following guidance documents:

- Sampling Guidelines and Protocols, NYSDEC, Division of Water, March 1991;
- Compendium of Superfund Field Operations Methods, US EPA, December 1987 (EPA/540/P-87/001);
- RCRA Ground-Water Monitoring: Draft Technical Guidance, US EPA, November 1992 (EPA/530-R-93-001);
- Soil Sampling Quality Assurance User's Guide (Second Edition), US EPA, March 1989, (EPA/600/8-89/046);
- USEPA Region II CERCLA Quality Assurance Manual, Revision 1, USEPA Region II, October 1989;
- NYSDEC DER-10 – Technical Guidance for Site Investigation and Remediation, May 2010;

- NYSDOH Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, dated October 2006; and,
- NYSDEC New York State Brownfield Cleanup Program Development of Soil Cleanup Objectives Technical Support Document, September 2006.

Samples must be collected using equipment that has been properly decontaminated and procedures appropriate to site-specific factors including the matrix, the parameters to be analyzed, and the DQOs of specific tasks.

The volume of the sample collected must be sufficient to perform the analyses requested, as well as the QA / QC requirements. Sample volumes, container types, and preservation techniques will also be confirmed with the approved laboratory.

Before leaving the facility, the sampler will:

- Check all paperwork for accuracy and completeness;
- Match the physical samples with the associated paper work. The sampler will check for proper samples in the correct containers and that the field number on the samples correspond with the numbers on the completed COCs;
- Verify that samples are properly stored and secure for transport;
- Clean and package all non-disposable equipment;
- Make sure the items on the sample labels, request forms, COC record, and log book match;
- Bag all disposable items that need to be discarded; and,
- Ensure that all sample containers are free of any debris.

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the following procedures outlined below.

Decontamination of non-dedicated reusable equipment will include scrubbing / washing with a laboratory-grade detergent (e.g., alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute. Equipment should be allowed to dry prior to use. Spent decontamination liquids will be discharged to the ground surface adjacent to the sampling points where they were generated.

Disposable sampling equipment (e.g., bailers, tubing, gloves, etc.) will be acquired from sources with strict factory-decontamination protocols; therefore, field contamination will not be required of such items.

3.3 Sample Handling and Custody

In order for analytical results to be defensible, a COC must be established for all samples collected which demonstrates that samples have not been tampered with during collection, transfer, storage or analysis. This requires custody of the samples to be documented from the time the samples are collected through final analyses. A sample is considered as under custody if:

- It is in the person's (e.g., field sampler, laboratory technician, etc.) possession;
- It is in the person's view, after being in the person's possession;
- It was in the person's possession and then it was locked up or placed in a sealed container to prevent tampering; and / or,
- It is in a designated secure area.

3.3.1 Coordination with the Analytical Laboratory

The PM / sampler will contact the selected State-approved laboratory(s) before sampling to verify that the selected laboratory is capable of conducting the sample analysis within the holding time specified in SW 846, 3rd edition.

3.3.2 Preservation and Shipping Procedures

Samples for groundwater VOC analyses must be placed on ice immediately after collection to minimize the loss of volatiles. Once the sampling is complete and the sampler has left the site, COC must be maintained and properly documented. The Summa canisters utilized to collect soil vapor and air samples do not require any special preservation methods.

Preferably project samples should be transported directly to the laboratory by the sampler or a laboratory representative. When shipping is required, the samples will be placed in a container acceptable to both the laboratory and the carrier.

3.4 Analytical Methodologies

The matrices to be sampled and analyzed as part of the SC Work Plan include soil vapor, air (both indoor and outdoor) and groundwater. The following provides summaries of the analytical methodologies which will conduct the analyses. A list of the samples and analytical

methodologies per matrix is included in ***Table 3-1***. ***Table 3-2*** provides a summary of container, preservation and holding time requirements. The sampling locations proposed in the SC Work Plan are included in ***Figures 3-1 and 3-2***.

Analytical method selection is based on whether the method provides comparable, representative, complete, precise and accurate data for the sample matrix and the range of expected values for constituents for which the samples are being analyzed.

3.4.1 Soil Vapor and Air Analysis

The soil vapor, indoor air and outdoor air samples collected as part of this work will be analyzed by a NYSDOH Environmental Laboratory Accreditation Program (ELAP) -certified laboratory (with appropriate chain-of-custody) for NYSDOH-specified VOCs by EPA Method TO-15. The soil vapor samples may also be analyzed for helium to assist in data quality review.

The samples will be analyzed in accordance with NYSDEC ASP Category B laboratory data deliverable format. Information regarding the analytical methodologies is available on request. The specific analyte list is included in ***Appendix B***.

3.4.2 Groundwater Analyses

The groundwater samples collected as part of this work will be analyzed by a NYSDOH ELAP-certified laboratory (with appropriate chain-of-custody) for NYSDEC target compound list (TCL) VOCs.

The samples will be analyzed in accordance with NYSDEC ASP Category B laboratory data deliverable format. Information regarding the analytical methodologies is available on request. The specific analyte list is included in ***Appendix B***.

3.5 Quality Control Protocols

This section provides details with respect to both field and laboratory QC protocols.

3.5.1 Field Quality Control Samples

Field QC samples will be submitted to a NYSDOH-approved laboratory as appropriate and as often as reasonably practical during the field investigation. The PM, working in coordination with the QAO and the laboratory, will select the appropriate field-originated QC samples. The approach outlined in this document for QC samples represent standard SOPs and may need to be change or varied under some circumstances. The following QC samples will be utilized in support of the soil and groundwater sampling program to support the preparation of ASP

Category B deliverables. The types and frequencies of field QC samples to be utilized as part of the project are summarized in ***Table 3-1***.

3.5.1.1 Duplicates

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method. Aqueous field duplicate samples are second samples collected from the same location, at the same time, in the same manner as the first, and placed into a separate container (technically, these are co-located samples) and are submitted to the laboratory with a fictitious identifier. For vapor / air samples, the blind duplicate sample shall be collected associated with one (1) of the indoor air samples. Each duplicate sample will be analyzed for the same parameters as the original sample collected that day. The blind field duplicate Relative Percent Difference (RPD) objective will be +50% percent RPD. Field duplicates will be collected at a frequency of one (1) per 20 environmental samples for both matrices (aqueous and vapor) and all test parameters.

3.5.1.2 Trip Blanks

Trip blanks are prepared in the laboratory for VOC analysis only prior to sampling by filling the appropriate container with distilled / deionized water, or analyte-free air, and are utilized to determine if VOC cross contamination occurs during sample shipment. The trip blank is transported to the field, handled in the same manner as the other VOC samples, and submitted to the lab with the other samples for analysis. There will be a minimum of one (1) trip blank per shipment containing samples for VOC analyses. Criteria for acceptance are below detection limits of any analyte being tested for at the site.

3.5.1.3 Rinsate Blanks

Rinsate blanks are prepared in the field by collecting distilled / deionized water in sample containers after the water has been used to rinse decontaminated equipment (e.g., bailers, macrocore samplers, etc.) prior to sampling. One (1) rinsate blank will be collected for the groundwater sampling apparatus during sampling events. Criteria for acceptance are below detection limits of any analyte being tested for at the site. It is not applicable to collect a field rinsate blank for soil vapor / air samples as no decontaminated equipment is utilized during the sampling.

3.5.1.4 Spiked Samples:

Matrix spikes and matrix spike duplicates (MS / MSD) blanks are site-specific samples which are "spiked" in the laboratory with a known concentration of a known chemical. The laboratory then analyzes the samples for the spiked chemical to evaluate whether matrix interferences are either resulting on a loss of the spiked chemical (i.e., results in low-biased data) or an increase

in the spiked chemical (i.e., results in high-biased data). MS / MSD will be analyzed at a frequency of one (1) (pair) for every 20 samples.

3.5.2 Laboratory QC Procedures

Internal QC procedures for sample analysis are the responsibility of the laboratory and are dependent upon the project DQOs and the level of NYSDEC ASP being employed. These procedures include the use of duplicate analysis, spikes, calibration standards, internal standards, blanks, QC charts, standard reference materials, reagent checks, and sample splits. All of the soil vapor, air and groundwater samples will be analyzed by a NYSDOH-approved laboratory in accordance with NYSDEC ASP Category B protocols. The specific ASP Category B protocols are available upon request from the laboratory(s) selected to conduct the Project analyses.

3.5.3 Performance, System Audits, and Corrective Action

The QAO, or designee, will monitor and audit performance of the QA procedure to ensure that all sampling activities are performed in accordance with approved QA procedures. Performance audits by the staff-sampling activities will be conducted periodically to evaluate whether samplers are adhering to the QA / QC controls identified herein, including the proper execution and use of sample identification, sample control, COC procedures, documentation and sampling procedures.

Analytical results meeting DQOs of completeness, accuracy and precision will be accepted. If QC samples are outside acceptance criteria, they will be evaluated by including field audit sets with internal laboratory QC samples. If combined sets meet acceptance criteria the data will be accepted. All analyzed data still not meeting acceptance criteria will be referred for corrective action. The corrective action may entail reanalysis of the sample(s) or QC, recalibration and reanalysis of the sample batch, re-prepping and analyzing the sample batch.

3.6 Instrument / Equipment Testing, Inspection, and Maintenance

A PID will be used during on-site sampling activities to screen ambient indoor air, soil vapor and groundwater for the presence of VOCs. A multi-meter capable of measuring pH, conductivity and turbidity will be utilized during the collection of groundwater samples from on-site monitoring wells. Any additional instrument / equipment needs will be determined on site. Preventative maintenance tasks and schedules recommended by the manufacturers will be conducted and followed for all field instrumentation. Records of preventative maintenance will be maintained. The QAO and the field staff will ensure that the prescribed maintenance on field instrumentation is conducted.

Preventative maintenance procedures for laboratory equipment are the responsibility of the laboratories and must be documented in logbooks that will be monitored periodically.

3.7 Instrument / Equipment Calibration and Frequency

Laboratory calibrations will be conducted according to the 1995 Revised NYSDEC ASP Superfund Contract Laboratory Program and DER-10 for each parameter or group of similar parameters, and maintained following professional judgment and the manufacturer's specifications. Equipment used for field measurements will be calibrated according to manufacturer's specifications. The field staff is responsible to record calibration procedures for each sampling event.

3.8 Inspection / Acceptance of Supplies and Consumables

Sample containers and all other sampling supplies and consumables will be inspected by the sampler prior to use for any defects. Any defective supplies or consumables will be discarded or returned to the laboratory and acceptable replacements will be obtained.

3.9 Data Management

ASP Category B deliverable format for all soil vapor, air and groundwater analytical results will be obtained from the laboratory and maintained along with daily logs, calibration records, etc. Any data which is transferred into reports and/or spreadsheets will be reviewed by the QAO or designee to ensure the accuracy of data transcription.

4.0 ASSESSMENT / OVERSIGHT

4.1 Assessments and Response Actions

Data will be evaluated using accuracy, precision, and completeness criteria as detailed in ***Section 1.2***. Approved laboratories will report only data that meet those criteria.

If the samples meet the criteria above, the reported data will be accepted. If not, the laboratory QAO will be consulted to evaluate which lab QC samples were included. These samples will be included with the field audit set and reevaluated. If the combined set meets the acceptance criteria, the reported data will be accepted. If not, the data from analyzing the sample set will be used as a basis for a corrective action referral.

4.2 Reports to Management

Site-specific QA / QC information will be included in the appropriate facility files from each sampling event. The final summary of reported data from the laboratory will reflect all laboratory QA / QC measures taken. If further reporting and clarification is necessary, the laboratory QA chemist will prepare a report detailing recommendations and submit the report with the data to the project director and the QAO. These individuals will review the QA recommendations and take necessary corrective actions.

5.0 DATA VALIDATION AND USABILITY ELEMENTS

5.1 Data Review, Verification and Validation

Data validation procedures will focus on determining if the data were generated according to USEPA and NYSDEC protocols. Specifically, the QAO will audit sampling, calibration, field measurement, field logging and COC procedures. Where possible, generated data sets will be compared with previous data sets to evaluate consistency. Any data generated outside standard protocols will be either rejected or identified with the inconsistency.

All data review, validation, and verification requirements, other than the ones described above, are the responsibility of the approved laboratory.

5.2 Data Summary Usability Report

In accordance with DER-10 requirements, the QAO will prepare a Data Summary Usability Report (DUSR) for the project.[1] The DUSR evaluation will be conducted to:

- Ensure that all holding times were met;
- Confirm that all the QC data (e.g., blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data) fall within the protocol-required limits and specifications;
- Confirm that all of the data have been generated using established and agreed upon analytical protocols;
- Confirm an evaluation of the raw data;
- Confirm the results provided in the data summary sheets and quality control verification forms; and,
- Confirm that correct data qualifiers have been used.

[1] *According to DER-1, the purpose of the DUSR process is to provide a thorough evaluation of analytical data without the costly and time consuming process of third party data validation. The primary objective of a DUSR is to determine whether or not the data, as presented, meets the site / project-specific criteria for data quality and data use. If data validation is found to be necessary, this can be carried out at a later date on the same data package used for the development of the DUSR as all of the soil and groundwater samples will be collected and analyzed in accordance with NYSDEC ASP Category B protocols.*

5.3 Reconciliation with User Requirements

If a QC audit results in detection of unacceptable conditions or data, the PM and the QAO will be responsible for developing and initiating corrective action(s), as warranted. If the unacceptable conditions indicate a project difficulty or if corrective action is likely to require expertise not immediately available to the project team, the appropriate resource will be notified.

Corrective action may include:

- Reanalyzing the samples, if holding time criteria permit;
- Re-sampling and analysis of the samples;
- Evaluating and amending sampling and analytical procedures; and,
- Acceptance of data, with an acknowledgment of the level of uncertainty surrounding the analytical results.

The selected corrective action will depend on how critical the samples are and the range of the reported values. If reported data is not adequate to determine whether contamination is present or not, the samples will be reanalyzed or retaken.

TABLES

Table 3-1
Former Mom's Cleaners Site
Soil Vapor and Groundwater Sample Analyte Selection Rationale and Field QA Sample Summary

Type / Methodology	Indentification Number	Sample Matrix	VOCs by TO-15	TCL VOCs by 8260	Field QC Samples						Analyte Selection Rationale
					TB	RB	BD	MS	MSD	Total QA/QC	
Soil Vapor Intrusion	PT-SS-1	Sub-Slab Soil Vapor	1								VOCs by TO-15 per NYSDOH Guidance Document for Evaluating SVI Issues in New York State
	PT-SV-1	Indoor Air	1		1	NA	1	1	1	4	
	CVS-SS-1	Sub-Slab Soil Vapor	1								
	CVS-SV-1	Indoor Air	1								
	CVS-SS-2	Sub-Slab Soil Vapor	1								
	CVS-SV-2	Indoor Air	1								
	CVS-SS-3	Sub-Slab Soil Vapor	1								
	CVS-SV-3	Indoor Air	1								
	RA-SS-1	Sub-Slab Soil Vapor	1								
	RA-SV-1	Indoor Air	1								
	Outside Ambient-1	Outdoor Air	1								
	Total No. of Samples:		11		1	NA	1	1	1	4	
Permanent Monitoring Wells	MW-13[1]	Groundwater		1	1	1	1	1	1	5	TCL VOCs by EPA Method 8260 Appropriate for Assessing Potential Impacts Associated with Former Dry-cleaning Activities
	MW-14[1]	Groundwater		1							
	MW-6[2]	Groundwater		1							
	MW-9[2]	Groundwater		1							
	Total No. of Samples:			4	1	1	1	1	1	5	

Notes:
[1] Monitoring well to be installed as part of the SC work.
[2] Existing monitoring well installed by others.
NA - Not Applicable.
TB - Trip Blank - One per sample cooler or shipment.
RB - Rinsate / Field Blank - One per sample equipment type.
BD - Blind Duplicate one in 20.
MS / MSD - Matrix Spike / Matrix Spike Duplicate one in 20.

Table 3-2
Former Mom's Cleaners Site
Summary of Container, Preservation and Holding Time Requirements

Matrix	Analytical Parameter	USEPA Method	Sample Container		Sample Preservative	Holding Time
			Type	Number		
Soil Vapor	VOC	TO-15	Summa Canister	1	NA	28 days
Groundwater	TCL VOCs	8260B	40 ml glass vial w/ septum	2	4^{o} C and HCl	14 days

Notes:
NA - not applicable.

FIGURES

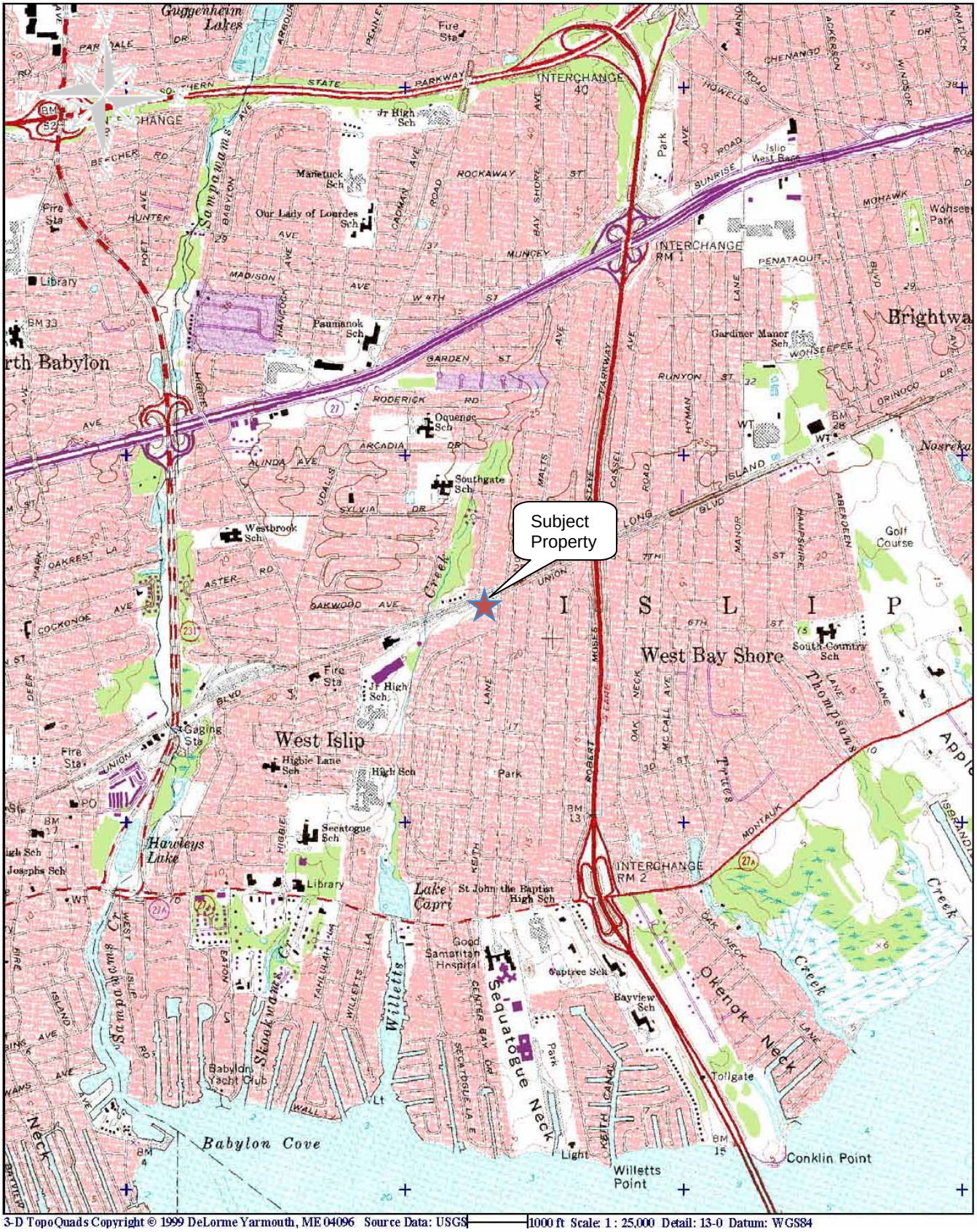


Figure 1-1
Former Mom's Cleaners Site
Site Location Map

Client:	Delilah Realty
Project No.:	85130.003
Project Location:	West Islip, NY
Date:	November 2010

Figure 2-1
Project Organization Chart
SC Team Organization Chart

New York State Department of Environmental Conservation

Quality Assurance Officer
Project Director
Daniel J. Smith, P.E.

- Principal-in-Charge
- Quality Assurance / Quality Control
- Data Usability Summary Report

Project Manager
Richard J. Baldwin, P.G., C.P.G.

- In-Charge of Field Implementation
- Ensure Appropriate Data Collection
- Report Preparation
- NYSDEC Coordination

Field Team Leader
Thomas Stolworthy

- Implement SC / RI Work Plan
- Ensure Quality Data Acquisition
- Contractor Coordination

Project Staff
Robert Bennett

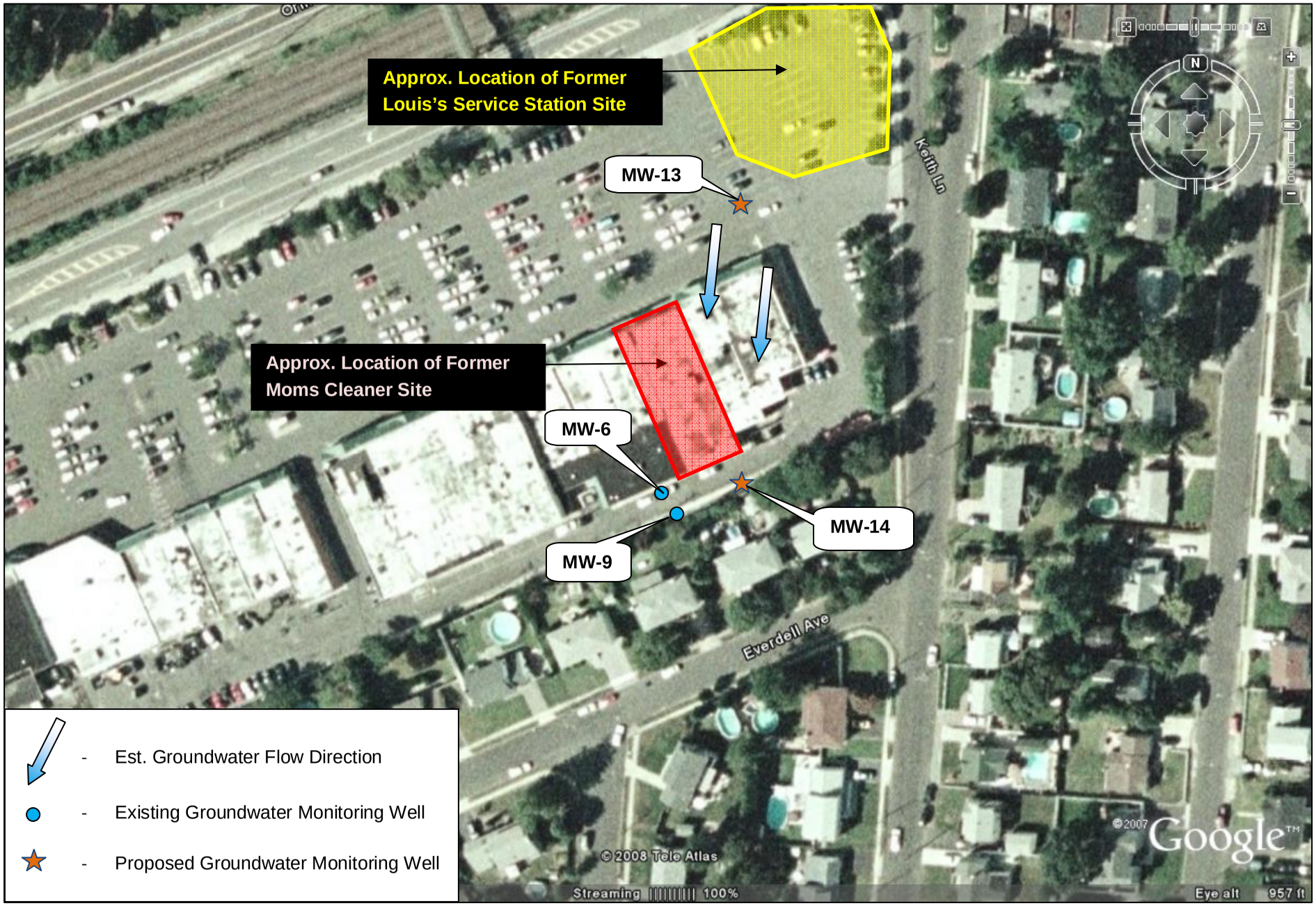
- Oversee Contractors
- Collection of Samples
- Data Summary Tables

Project Staff
Heather Moran-Botta

- Oversee Contractors
- Collection of Samples
- Field Data Tabulation

Project Support
Tim Botta

- Contractor Coordination
- Data Management
- Data Table QA / QC



Apex Companies, LLC

Figure 3-1
Former Mom's Cleaners Site
Site Map

Client:	Delilah Realty
Project No.:	85130.003
Project Location:	West Islip, NY
Date:	November 2010

PT-SS-1 and PT-SV-1

CV-SS-3 and CV-SV-3

CV-SS-2 and CV-SV-2

CV-SS-1 and CV-SV-1

Outside Ambient -1

Note: RA-SV / RA-SS – Rite Aid Sampling Location Located to the West, Off of this Map

- Proposed Sampling SVI Sampling Location
- November 2009 Sampling Location

CODE ANALYSIS FLOOR PLAN

SITE PLAN

BUILDING ELEVATIONS - NORTH

Figure 3-2: SVI Sampling Locations

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FOR
PHYSICAL THERAPY REHABILITATION CENTER
AT
560 UNION BLVD
WEST ISLIP, NEW YORK

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TITLE
CODE COMPLIANCE

SCALE	- AS NOTED
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PROJECT NO.

DRAWING NO.
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APPENDICES

Appendix A

Resumes of Key SC Team Personnel

Richard J. Baldwin, Baldwin, C.P.G., P.G
Apex Companies, LLC
Senior Project Director

Mr. Baldwin is a hydrogeologist/environmental scientist with over twenty years of experience in the fields of environmental consulting, hydrogeology and geology with particular experience in conducting and supervising environmental investigations and remedial actions at industrial, private, Federal and publicly-owned facilities and sites. Mr. Baldwin has extensive experience in evaluating and remediating gasoline and fuel oil releases, many of which included the contaminant methyl tertiary-butyl ether (MTBE). Additionally, Mr. Baldwin has experience in evaluating potential environmental impacts of projects including golf courses, housing developments, senior housing, schools and retail shopping centers. For the last several years, Mr. Baldwin's work has focused primarily on sites and facilities located in the Long Island, New York City and Upstate New York areas. He has extensive knowledge and experience pertaining to Long Island's federally-designated sole-source drinking water aquifer system.

Education

- *Graduate Course Work, San Jose State University, 1985-1988*
- *BA Geology, San Francisco State University, 1982*

Professional Registrations

- *Professional Geologist, PG-000552-G, Commonwealth of Pennsylvania*
- *Certified Professional Geologist, CPG #9158, Amer.Inst. of Prof. Geologists*
- *OSHA Certification, 40-hour Health and Safety Training at Hazardous Waste Sites*
- *OSHA Certification, 8-hou Refresher Health and Safety Training at Hazardous Waste Sites*
- *OSHA Certification, 8-hour Management Training*
- *OSHA Certification, 8-hour Radiation Safety Training*

Continuing Education

- *Princeton Groundwater Hydrogeology and Pollution course*
- *Environmental Law and Regulations Course, U.C. Berkeley Extension*
- *NGWA MODFLOW and MODPATH Modeling Course*
- *NGWA Visual MODFLOW Modeling Course*

General Project Experience

Mr. Baldwin has extensive experience in the selection, design, installation and maintenance of a wide range of soil and groundwater remediation systems. Remedial systems have included both active and passive free-product recovery, traditional groundwater pump and treat, soil-vapor extraction, air sparging, bioventing, bioremediation, excavation, impacted-soil management and natural attenuation. MTBE and other petroleum-related volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) were the contaminants of concern in many of these project sites.

Mr. Baldwin has been involved in hundreds of subsurface soil and groundwater investigations ranging from Phase I & II Environmental Site Assessments (ESAs) to Remedial Investigations. Investigation and delineation techniques have included soil borings, groundwater monitoring well networks, Hydropunch / GeoProbe sampling, surface and bore-hole geophysical methods, soil-gas surveys, aquifer testing, surface water and sediment sampling, waste characterization (soils piles, drums, USTs, aboveground storage tanks (ASTs), landfills, etc), test pits, and computer fate and transport modeling. Materials investigated have included petroleum products (heating/fuel oil and gasoline), PCB oils, coal tar, heavy metals, chlorinated solvents, explosives, pesticides, herbicides and buried medical waste.

Mr. Baldwin has evaluated the potential environmental impacts of proposed projects including golf courses, housing developments, senior housing, schools, automobile repair facilities and retail shopping centers. The potential impacts included those to groundwater quality from herbicide/pesticide application, disposal of sanitary waste and school laboratory waste and the impacts to soil quality from handling and disposal of hazardous materials, leaking petroleum underground storage tanks (USTs), historic disposal of hazardous waste and pesticide/herbicide application. These impacts were evaluated through a variety of means including the collection and analysis of soil and groundwater samples, geo- and organic-chemistry modeling, groundwater fate and transport modeling and basic research of materials, their uses and their potential migration pathways. Mr. Baldwin has provided expert witness services for various venues ranging from New York State Department of Environmental Conservation (NYSDEC) spill and hazardous waste sites to potential noise impacts.

Mr. Baldwin works closely with the U.S. Environmental Protection Agency (EPA), NYSDEC Region 1, Region 2, Region 3 and Central Office, New York State Department of Health (NYSDOH), Suffolk County Department of Health Services (SCDHS) and Nassau County Department of Health (NCDOH). Mr. Baldwin also works with local planning and review boards including the Town of East Hampton, Town of Southampton, Town of Babylon, Town of Brookhaven, Village of

Patchogue, Village of Great Neck and New York City on issues ranging from groundwater quality to historic resources to noise impacts.

Mr. Baldwin has been in the forefront of both evaluating and addressing shallow soils on Long Island which have been impacted by pesticides (particularly arsenic) and herbicides. This important issue is particularly of concern due to the re-development of agricultural lands for residential and educational end uses. Mr. Baldwin has work closely with the SCDHS and Town of Brookhaven to develop effective and easily implementable Soil Management Plans.

Mr. Baldwin's projects include supervising and performing Remedial Investigations/Feasibility Studies (RI/FSs), Interim Remedial Actions (IRMs), and implementation of selected remedies at NYSDEC Class 2 and 2a Inactive Hazardous Waste Disposal sites. Other work, conducted with the NYSDEC, includes evaluating and implementing large-scale groundwater and soil in-situ and ex-situ treatment systems to remediate MTBE.

Mr. Baldwin also has extensive experience in conducting other types of environmental work ranging from NYSDEC spill sites to remediating buried medical waste at a Long Island psychiatric center. Mr. Baldwin has extensive experience providing expert testimony/meeting presentation services in various venues. He has provided same in support of work being conducted in the Village of Greenport, Village of Lake Success, New Hyde Park, Dutchess County Supreme Court, South Farmingdale, Bay Shore, Brookhaven, Wassaic, Central Islip, Plainview and Amityville, New York. Before moving to the East Coast in 1993, Mr. Baldwin worked in the environmental industry in California. His work in the environmental industry consisted primarily of conducting large-scale environmental investigations at United States military and Department of Energy facilities

Selected Project Experience

Groundwater Evaluation and Treatment, Taconic Developmental Disabilities Services Office, Wassaic, NY

Worked on a public water supply site in New York conducting a full-scale groundwater investigation in the vicinity of the facility's supply wells which have been impacted by MTBE. Multiple well clusters were installed surrounding the high-capacity wells to evaluate subsurface conditions. One impacted well was converted to a remediation well to provide hydraulic capture of the MTBE plume prior to its impacting the remaining downgradient wells. A large-scale granulated-activated carbon (GAC) system was installed to treat the water extracted from the well. A 40,000-pound GAC unit was also installed in standby mode to address the facility's drinking water should the concentrations of MTBE ever warrant treatment. Several rounds of groundwater investigation were also conducted to confirm the MTBE source area as a nearby gasoline service station. Pilot testing was conducted and an on-site groundwater treatment system was being designed to provide source area remediation. Part of the pilot testing including evaluating specialized GAC manufactured specifically to address MTBE. Drawdown data associated with a long-term pumping well was utilized to accurately characterize aquifer/hydrogeologic conditions in order to evaluate well capture zones.

Potable Water Treatment System, Village of Brewster, NY

Designed and constructed a supplemental water treatment system at a public water supply plant to address MTBE contamination in the system prior to its distribution. The treatment system consisted of a large air stripping tower, installed in line with an existing air stripper to remove the MTBE to non-detectable concentrations. Additionally, a source area investigation was being conducted to determine the potential source(s) of the MTBE contamination.

Potable Water Treatment System, Sullivan Correctional Facility, Fallsburg, NY

Worked with the NYSDEC to evaluate, design and install a supplemental water treatment system to address MTBE present in a New York State Correctional Facility's drinking water. All four of the facility's wells were impacted. Several remedial options including utilizing GAC or air strippers were evaluated. The selected alternative was a 20,000-pound GAC system which was installed inline and in standby mode.

Former Fuel Terminal, Patchogue River, Patchogue, NY

Conducted a site investigation program at this former major fuel oil terminal site to evaluate the efficacy of same for residential re-development, which would have included a residence-use only marina. The site had been the subject of previous site remediation activities, and the NYSDEC had closed its spill file assuming that the site would only be utilized for commercial or industrial purposes. Soil, groundwater, soil vapor and outdoor ambient air samples were collected and analyzed as part of this evaluation. The results of the investigation indicated that, in part due to the presence of MTBE and other gasoline-related VOCs, additional soil remediation would have been required to make the property suitable for residential re-development. Additionally, the NYSDEC would have likely required the installation and operation of sub-slab depressurization systems for all on-site residential buildings prior to their approving the plans for the site.

Active Marina Facility, Hampton Bays, NY

The owner of this active marina facility was served with a Notice of Violation (NOV) by the NYSDEC for various environmental issues, mostly related to on-site petroleum storage/delivery systems, as well as impacts potentially associated with marine-activity uses such as vessel bottom paint removal and application, use of preserved woods, vessel maintenance activities, housing-keeping issues, etc. Apex was responsible, with input from the NYSDEC, for developing and implementing a Site Investigation Program to investigate potential soil and groundwater impacts associated with the aforementioned on-site practices. Based upon the results of the investigation, Apex was able to conclude that the fuel distribution system was not leaking and that groundwater was not deleteriously impacted. Minor concentrations of MTBE in groundwater were thought to represent ambient conditions typical for an active marina. Minor areas of impacted soil, likely from vessel bottom cleaning activities, were identified. Apex is currently assisting with negotiations with the NYSDEC to potentially allow for the implementation of engineering controls to address the impacted soils.

Aerospace Facility Superfund Site, Lake Success, NY

Managed large-scale site activities at a major Long Island aerospace facility. Activities included operations of on-going IRMs (soil vapor extraction and groundwater extraction and treatment systems); citizen participation activities; design and implementation of on-site remedies (drywell removal and soil excavation, installation of fencing and an 1,800 gallon per minute groundwater extraction and treatment system); on- and off-site RIs; regulatory compliance activities; client interactions; multi-task, multi-contractor scheduling and management; and general project management. As part of the RI, prepared a large three-dimensional groundwater flow and particle model utilizing Visual MODFLOW and MODPATH. The model was then utilized to design an optimum groundwater treatment system.

Prepared a scoping plan and RI report for an Inactive Hazardous Waste Disposal site in New York under the NYSDEC Superfund program

The work involved evaluating the nature and extent of halogenated solvents in soil and groundwater both on and off of the site. Was responsible for overseeing all phases of the report preparation, including communications with the NYSDEC and for implementing the citizen participation program. Also involved in the preparation of the FS report and selection of the final remedy which included the use of an innovative groundwater treatment technology, in-well air stripping

Former Manufacturing Facility Superfund Site, Central Islip, NY

Prepared an RI report for a Class 2 Inactive Hazardous Waste Disposal site under the NYSDEC Superfund program. The work involved evaluating the nature and extent of 1,2,3-trichloropropane (1,2,3-TCP) in soil, soil vapor and groundwater. Additionally, was responsible for evaluating the physical characteristics of this uncommon contaminant and determining potential human health effects as part of the Human Health Evaluation. Oversaw all phases of the report generation, including communications with the NYSDEC and for implementing the citizen participation program, including preparing and presenting the results of the RI at a public meeting.

Former Manufacturing Facility Superfund Site, Plainview, NY

Designed and managed targeted on-and off-site groundwater investigations, reporting and remedial design activities for a Class 2a Inactive Hazardous Waste site under the NYSDEC Voluntary Cleanup Program (VCP). By utilizing existing and recently acquired data, that resulted in a significant cost savings to the client. Oversaw the design of an air sparge/soil vapor extraction system to remediate halogenated volatile organic compounds in the site's source area unsaturated soils and underlying groundwater.

Psychiatric Facility, Islip, NY
Conducted all phases of an expedited buried medical waste program at a large New York State psychiatric hospital. Upon discovery of buried medical waste during the installation of a sewer main, a site investigation program was designed and implemented for the purpose of determining the extent of the buried waste. A successful remediation program was then implemented, which included a project-specific Health and Safety Plan dealing with medical "sharps" and potential blood-borne pathogens. The work was conducted under NYSDEC oversight.

Psychiatric Facility, Middletown, NY
Designed and implemented a subsurface investigation and oxygen release compound (ORC)/bio-venting pilot testing program at an upstate New York State psychiatric facility to remediate a No. 6 fuel oil spill. Due to the existence of on-site infrastructure, in-situ bioremediation techniques were required to remediate the petroleum without disrupting facility operations.

Former Marina Facility, Greenport, NY
Managed one of the few active NYSDEC Brownfield sites on Long Island utilizing New York State Environmental Bond Act funding. The work included evaluating the presence of undocumented USTs utilizing surface geophysical techniques, removing the USTs and associated impacted soils and preparing Site Investigation and Remedial Action reports. Responsible for all regulatory interactions, subcontractor management and Citizen Participation Plan implementation. The work was conducted concurrently with the redevelopment of the site for use as a public park.

General Environmental Planning Experience, NY
Responsible for preparing various chapters of Environmental Impact Statements (EISs) including Geology, Soil and Topography; Groundwater; Utilities, Open Space and Recreational Resources; and Project Alternatives. Reviewed other consultants' EISs for local municipalities to determine compliance with the State Environmental Quality Review Act (SEQRA) and to evaluate the potential impacts of proposed projects. Prepared potential environmental impact sections (e.g., groundwater, wetlands, air quality, visual quality, zoning, etc.) of New York Public Service Commission Article X pre-application packages for four proposed power plants.

General Military Base Experience, Nation-wide
Conducting large-scale environmental investigations at United States Military and Department of Energy facilities. Assignments included: evaluating the nature and extent of soil and groundwater contamination associated with landfills, fire training facilities and miscellaneous disposal areas on several military bases for the United States Army Corps of Engineers and the United States Navy; characterizing the nature and extent of unexploded ordnance; obtaining and interpreting surface and borehole geophysical surveys; conducting large-scale aquifer pumping tests; preparing Remedial Investigation and Site Investigation reports

Daniel J. Smith, P.E.
Apex Companies, LLC, New York Division Manager
National Remediation Group Coordinator

Mr. Smith is a licensed Professional Engineer (chemical engineering) with over 20 years of consulting, engineering, construction, and litigation support experience in the environmental industry. He serves as New York Division Director and National Remediation Group coordinator for Apex and is responsible for day-to-day operations in the metropolitan New York City market as well as coordination of remediation and litigation support projects nationwide. He has extensive experience in environmental compliance, investigation, remediation, and site construction at residential, commercial and industrial properties. Mr. Smith has managed several large national accounts and understands the business concepts that drive remediation and litigation support projects.

Selected Project Experience

Education

- *Case Western Reserve University, Biomedical Engineering*
- *Polytechnic University, Brooklyn, NY, B.S. Chemical Engineering, 1987*

Professional Registration

- *Professional Engineer, NYS*

Continuing Education

- *"Advanced Technologies for Cost-Effective Clean-up of Contaminated Properties," Regenesis, November 2008*
- *"Phase I and Phase II Environmental Site Assessment Process," ASTM, Oct/Nov. 2007*
- *"Property Condition Assessments," ASTM, October 2007*
- *"Erosion Control and Stormwater Management, Institute for Design Professionals," March 2006*
- *"Oxidation and Reduction Technologies for In-Situ Treatment of Soil and Groundwater", ORTs-4, Chicago, Illinois, October 2005*
- *"In-situ Thermal Treatment for Remediation of DNAPLS," United States Environmental Protection Agency, December 1999*
- *"Airport Fueling System Management," University of Wisconsin, October 1997*
- *"Airport Fuel Storage and Distribution Systems," Air Transport Association, March 1997*

Dry Cleaner Legal Support, Groundwater Monitoring Impacts and Soil Vapor Intrusion, Confidential Client, Suffolk County, NY

Completed a detailed evaluation of historic assessment and remediation activities at a former dry cleaner site in Suffolk County. Work included review of soil and groundwater data and implementation of a Soil Vapor Intrusion Evaluation at a NYSDE Inactive Hazardous Waste Disposal Site (i.e., State Superfund Site). Contaminants of concern focused on PCE and its degradation products. In addition, to technical evaluations, work also included coordination with counsel regarding reporting obligations to commercial tenants and impact of environmental conditions on real estate valuation.

Soil and Groundwater Pilot Test and Remediation, Confidential Environmental Risk Management Firm, Largo, Florida

Designed and implemented a comprehensive pilot test program to evaluate the use of *in-situ* enhanced reductive dechlorination at a former RCRA facility to remediate soil and groundwater impacted with chlorinated Volatile Organic Compounds (VOCs). Work was coordinated with FDEP, the local site owner, the risk management firm, and a major insurance company to expedite remediation under a "lump sum to closure" liability acquisition contract. Initial injections of Edible Oil Substrate (EOS®) and Hydrogen Reducing Compound (HRC®) indicated transformation of the subsurface to a reducing environment and significant reduction of contaminant levels in most wells within 6 months of injection. Work was coordinated with a hydraulic control system to address inorganic contaminants as the VOC remedy was implemented.

Groundwater Contaminant Fate & Transport Modeling, Public Water Supplier and NYSDEC Inactive Hazardous Waste Disposal Site (State Superfund), Nassau County, NY

Completed a QA/QC evaluation of a complex, three-dimensional groundwater flow and contaminant fate and transport model for a public water supplier in order to identify upgradient sources of chlorinated VOC contamination and to predict future impacts to public supply wells. QA/QC review included assessment of boundary conditions, research of geologic conditions, estimation of hydraulic properties, and evaluation of model calibration and sensitivity. Data generated from the review was used to determine possible long-term water treatment requirements and the need for a monitoring well network downgradient of the source area and upgradient of the public supply wells.

Remediation Cost Evaluation & Sensitivity Analysis, Confidential Manufacturing Facility, British Columbia, Canada

Completed a detailed cost evaluation that included evaluating potential environmental liabilities under multiple site expansion, reduction, and development scenarios. Cost estimates included excavation, *in-situ* remediation, dredging, and landfill alternatives. Sensitivity analyses were performed on all major unit costs driving total remediation costs. Socio-economic factors impacting site redevelopment were considered as part of the evaluation process.

UST System Evaluation, Ground Service Equipment Facility, SeaTac, Washington

Coordinated the evaluation of an existing UST and hydraulics system at an active Ground Service Equipment (GSE) maintenance facility where petroleum products had been detected in soils underlying the facility. Work included identification of source areas, development and implementation

Continuing Education (cont'd)

- *"Lead Symposium '94" Con-Test Educational Resource Center, February 1994*
- *"Soil Remediation Techniques - In-Situ and Ex-Situ Technologies," National Groundwater Association, December 1994*
- *Risk Assessment for Soil Contamination," University of Wisconsin, December 1992*
- *""Site Remediation - Source Control," University of Connecticut, April 1992*
- *"Bioremediation, State of Practice in Hazardous Remediation Operations," USEPA, January 1992*
- *Soil Vapor Extraction Short Course, University of Connecticut, Oct 1991*

Publications / Presentations

- *"Expedited Environmental Closure," AIG Environmental Department Meeting, August 2007*
- *"In-Situ Chemical Oxidation, A Case Study," Apex Companies Annual Project Managers Meeting, 2005*
- *"Horizontal Well Applications in Environmental Remediation," Suffolk County Bar Association, Environmental Committee Meeting, October 1999*
- *"Aggressive Remediation Approaches at JFK International Airport," IT Technical Exchange, Orlando, Florida, February 1999*
- *"Emulsified Oils with Dual Phase, High Vacuum Extraction," Fluor Daniel GTI Tech Notes, Volume I, No. 1, October 1997*
- *"Waste Minimization Cuts Compliance Costs," LI Environmental Expo, 1995*
- *"Solid Waste Minimization, Recycling & Reuse," Hauppauge Industrial Association, October 1995*

of soil delineation program and comparison of soil data to regulations and risk-based cleanup levels under Department of Ecology (DOE) Model Toxics Control Act and UST regulations.

Air Sparge/Soil Vapor Extraction System Design, Brookhaven National Laboratory, DOE CERCLA (Federal "Superfund") Facility

Completed the design of a large-scale air sparge/soil vapor extraction system to remediate a combination of fuel oils and chlorinated organics. The project included review of existing data to identify the extent of contamination followed by the design of over 40 air sparge wells, 20 soil vapor extraction wells, and a monitoring well network. The design package included 30%, 90%, and 100% design drawings and full CSI specifications for well construction, mechanical equipment, air emissions control, and system start-up and operation. Modeling of the air emissions was completed to predict control system loading rates and permitting requirements.

NYCTA and NYCOGS, Various City Property Remediation Systems, Multiple Boroughs, New York City, NY

Managed the remediation of several bus terminal and police station sites impacted by Underground Storage Tank (UST) systems within NYC. Remediation technologies included product recovery, total fluids recovery, bioventing, and soil vapor extraction. Work was completed following New York City Site-Specific Investigative Summary and Remedial Plan (ISRP) recommendations and guidelines under the NYSDEC Spills program.

Aviation Fueling System Investigation and Contaminant Delineation, Hydrant Fueling Line Study, SeaTac, Washington

Coordinated an investigation of a large-scale, high pressure fuel delivery system serving Seattle-Tacoma International Airport (SEATAC) in advance of a proposed terminal re-development project. The linear assessment included development of a cost-effective program to delineate several miles of underground fuel hydrant lines to identify areas of possible soil contamination and to develop a soil management plan to be implemented during future demolition activities. As part of the scope of work, contaminant data was compared to DOE evaluation criteria under the Model Toxics Control Act regulations and recommendations to prioritize remedial activities were made.

Horizontal Well, Dual Phase High Vacuum Extraction System, Major Airline Terminal, JFK Airport, NY

Work under the project included three major phases: negotiations with potentially responsible parties to structure a technical partnering agreement; remedial design of a DPHVE system with optional conversion to an air sparging / soil vapor extraction system; and operation and maintenance of the remediation system. Since the major impacted areas were located near gate operations, a horizontal well system was designed to minimize disruptions to gate operations. The horizontal well system design consisted of over 20 horizontal wells and an associated water treatment system including solids removal and VOC treatment. Bench-scale treatability and field pilot testing was performed as part of the technology evaluation phase of the project.

Bulk Fuel Farm UST and AST Evaluation, Soil and Groundwater Impacts, Confidential Airline, Portland, Oregon

Performed an evaluation of soil and groundwater remediation requirements and environmental liability assessments for a former bulk fuel farm at a major international airport. Work was performed to settle environmental claims as part of the bankruptcy proof of claim process. Work included evaluation of local UST area impacts as well as contaminant migration via stormwater systems and associated impacts to local surface waterways. As part of the project, cost estimates for environmental liability were prepared for settlement of claims.

Airline Hangar Investigation & Remediation, JFK Airport, Jamaica, NY

Completed a baseline environmental assessment at an active hangar facility. The assessment identified potential environmental liabilities and served as a basis for remedial design. The project was completed under a negotiated Stipulation Agreement with the NYSDEC's Region 2 Spills group. A feasibility study which included evaluation of real estate related factors (i.e., cost of maintaining a leasehold during long -term remediation v. expedited remediation to eliminated leasehold costs) identified several approaches that saved the customer at least $500,000. A

Publications / Presentations (cont'd)

- *"RCRA - Hazardous Waste Management Overview," International Facilities Managers Association (IFMA), LI Chapter Meeting, 1994*
- *"Site Remediation - A Cost Effective Approach," LI Environmental Expo, 1994*
- *"The NYSDEC Voluntary Cleanup Policy: How will it impact remediation projects in New York State?" NYWEA Spring 1995 technical meeting, Saratoga Springs, NY*
- *"Phase I Environmental Site Assessments," In-house seminar program, H2M Group, 1993*
- *"Proper Field Sampling Techniques for Soil and Groundwater," In-house seminar program, H2M Group, 1993*

Business Affiliations

- *Long Island Business Aviation Association*
- *Hauppauge Industrial Association - Inactive*

technology consisting of dual phase high vacuum extraction and steam injection was implemented to expedite remediation. The majority of closure goals were met within only 6 months from the onset of the design effort, ahead of schedule and under budget.

Soil Vapor Extraction Pilot Test Program, Retail Gasoline Station, Suffolk County, NY

Completed a pilot test program for a soil vapor extraction system at a former gasoline station where USTs had reportedly leaked. The pilot test program determined the radius of influence of extraction wells, likely contaminant emission concentrations and flow rates, vacuum profiles in subsurface soils, and possible adsorption system removal efficiencies. Contaminants of concern included benzene, toluene, ethylbenzene, xylenes (BTEX), naphthalene and MTBE.

Soil / Groundwater Investigation, Municipal Wastewater Treatment Facility, Wards Island, NY

Directed a comprehensive soil gas, soil, and groundwater investigation including the installation of over 50 soil borings and 10 monitoring wells. A soil gas survey was performed using a Geoprobe and soil and groundwater samples were collected to characterize the site prior to a planned expansion of the facility. On-site debris piles were screened for contaminants including volatile organic compounds and radioactive materials, and the piles sorted for cost-effective disposal. The investigation report identified several areas of concern to be addressed prior to the planned expansion. Work completed under this project also included development and implementation of Work Plans and QA/QC Plans.

Industrial Wastewater Treatment System Design, GAC Treatment and Filtration, Photographic Equipment Manufacturer, Suffolk County, NY

Designed a granular activated carbon (GAC) system for removal of acetone and other organics prior to on-site discharge in accordance with state pollutant discharge elimination system requirements. The upgrade included evaluation of adsorption isotherms, carbon regeneration requirements, and estimated time for breakthrough of contaminants. A complete cost evaluation was also included as part of the design effort.

Industrial Wastewater Treatment System Upgrade, Metal-Finishing Facility, Suffolk, NY

Designed a system upgrade for a 70,000-gallon per day wastewater treatment system. The upgrade included designing floc settling and sludge dewatering systems. Bench-scale treatability tests were performed as part of the design effort. As a result of the dewatering system, hazardous waste sludge generation has been decreased by more that 50 percent at the site. Regulatory negotiations regarding the applicability of RCRA TSDF requirements were included as part of the upgrade program.

Remedial Investigation, Risk Assessment, and Preliminary Feasibility Study, New York State Inactive Hazardous Waste Disposal Site (State Superfund), Queens, NY

Managed and oversaw QA/QC on a site impacted by VOC and TPH contamination in soil and groundwater. Remedies evaluated for possible implementation included soil vapor extraction (SVE), bioremediation, excavation, and thermal treatment. In addition, a baseline risk assessment was performed. The baseline risk assessment indicated that site controls would be a cost-effective mechanism for protection of human health.

Underground Storage Tank (UST) Removal and Remediation Program, Staten Island, New York

Designed and implemented a program consisting of work plan preparation, delineating the extent of contamination, groundwater modeling, evaluating remedial alternatives, pilot testing of a pump and treat groundwater remediation system, and evaluating possible dewatering schemes. The project was performed as part of the demolition and reconstruction of the maintenance area at a major New York City transportation hub.

Groundwater Modeling, New York City Marine Terminal, Staten Island, NY
Developed a groundwater model to predict contaminant migration pathways in a tidally influenced shallow aquifer with fill material. The model included estimating hydraulic parameters, reviewing tidal influence study data, evaluating the impacts of manmade structures, and a particle tracking analysis.

Multi-Media Pollution Prevention Audit - Electronics Manufacturing Facility
Completed a multi-media, pollution prevention (M2P2) audit for a Fortune 500 electronics manufacturing facility. The audit included review of hazardous waste management procedures; air emissions compliance; process wastewater collection, treatment, and disposal; secondary containment permit compliance; UST and AST management; SARA Title III compliance; employee training; corporate and departmental record keeping and tracking; and stormwater management. The audit was performed prior to a multi-agency audit. The findings of the audit allowed the company to remedy deficiencies prior to the State agency audits, thereby preventing fines of several hundred thousand dollars.

Environmental Compliance Audit - Metals Machining Facility
Completed an environmental compliance audit for an international machining company with headquarters in New Jersey. The audit focused on waste oil handling and compliance, but also considered wastewater discharges, air emissions, and Community Right-To Know compliance. New Jersey ISRA requirements as well as importer and exporter regulations were included in the auditing program. The audit report was submitted as a working database to improve facility environmental tracking procedures and to ensure that recommended actions were incorporated into the overall facility operations schedule and budget.

Compliance Documents, Various Customers and Locations
Prepared various environmental compliance documents including hazardous waste analysis plans, closure plans and certification reports, contingency plans, Best Management Practices (BMP) plans, Spill Prevention Control and Countermeasures (SPCC) Plans, discharge monitoring reports, Tier I and Tier II Community Right-to-Know forms, and Form R submittals.

Industrial Compliance Audit and Wastewater Study, Aircraft Parts Manufacturer
The environmental compliance audit focused on waste storage, treatment and disposal and wastewater handling. As a result of the audit a new process wastewater collection system was designed to ensure compliance with local and state discharge requirements. As part of the program, internal inspection and environmental compliance programs were developed to educate workers on proper record keeping techniques.

Litigation and Legal Support Experience

Legal Support, New York State Inactive Hazardous Waste Disposal Site (State Superfund), Filtration System Manufacturer, Nassau County, NY
Managed a groundwater investigation consisting of review of existing on-site and off-site data, installation of monitoring wells, determination of groundwater flow direction, and identification of possible upgradient sources of contamination through review of groundwater quality data and the nature of contaminants in the subsurface. The primary contaminants of concern included PCE, TCE, 111-TCA, DCE, Vinyl Chloride and Freon®. Assisted counsel in negotiations with third parties and regulatory agencies that focused on the differentiation of chlorinated organic plumes from multiple sources. As part of the legal support project, contaminant fate and transport models and a conceptual site model was developed to identify source areas and potential impacts to a downgradient municipal well field. Mr. Smith also worked with the client and potential purchasers of the facility to help facilitate a real estate transaction of the contaminated property.

Litigation Support for MTBE Class Action Suit Defense, Consolidated in NY
Recently retained as an expert witness in a national class action suit involving MTBE contamination of public supply wells. Work is just initiating (January 2009).

Litigation Support for Former Manufacturing Company, Cost Recovery Defense, Westchester County, NY
Served as a technical expert in the evaluation of historic and proposed remediation costs to address a chlorinated VOC plume underlying a former manufacturing building. Work has included preparation of expert reports, attendance and presentation at settlement meetings, and general coordination with counsel and the client. Work is currently underway to try to reach settlement between the two parties.

Litigation Support for Printing Company, Underground Injection Control and RCRA Closure, Nassau County, NY
Served as an expert witness in a dispute between a tenant and landlord related to alleged disposal of wastes (primarily inorganics including chromium and lead, and solvents) into drains and site underground structures. Work included evaluation of Underground Injection Control (UIC) program applicability and review of work completed by third parties to remedy historic contamination. The project focused on the costs and technical effectiveness of remediation and coordination of site remediation with RCRA closure requirements. Work included deposition preparation and reviews, affidavit reviews, and other litigation support tasks.

Litigation Support for Major Airline, Bankruptcy Proof of Claim Evaluations, Nationwide
Served as technical expert in the analysis of environmental Proof of Claims ranging from tank farm spill issues to multi-million dollar airport-wide cleanups. Work focused on detailed cost estimation for remediation scenarios for both *in-situ* and *ex-situ* remediation and development of presentations for airport authorities. Cost estimates included evaluation of union issues and complicating airport security factors. Work was performed for both environmental counsel and bankruptcy counsel.

Litigation Support for Major Airline, Miami International Airport Remediation, Miami Florida
Represented a major international air carrier in a litigation matter involving the remediation of soil and groundwater contaminated with petroleum products and chlorinated VOCs throughout the airport. Work included evaluation of remedial approaches taken, claimed environmental costs, cost-effectiveness, and schedule impacts on cost claims. Technical settlement scenarios were developed and presented, each with detailed cost backup. Work involved review of hundreds of file boxes spanning data from the 1950 to the present time. All work was also completed on an expedited schedule.

Litigation Support for Pesticide Manufacturer, Suffolk County, NY
Prepared investigation, damage assessment, and remediation feasibility reports to support litigation related to the impacts of pesticides on several public water supply wells. Records for over a decade of operations were reviewed and an engineering evaluation of a granular activated carbon treatment system was performed. In addition, a thorough QA/QC review of analytical data packages was completed for trial. Cost estimates for all remedial options considered were evaluated and a ranking system was used to recommend an alternative remedial / treatment approach.

Litigation Support for Regional Environmental Agency, Nassau County, NY
Evaluated site investigation procedures employed by a local environmental agency regarding a felony complaint that alleged illegal disposal of hazardous substances. Mr. Smith's role included preparation of an expert report rendering opinions on the applicability of RCRA and CERCLA and on the reliability of environmental quality data.

Litigation Support for National Petroleum Company, Suffolk County, NY
Represented a major petroleum company in litigation with the owner of a retail petroleum station property and an adjacent vacant parcel. Developed a technical report and corresponding professional opinion regarding the extent of contamination at the site, the source of contamination, and potential remedies that could be implemented in coordination with proposed site development plans. Remedial cost estimates were developed for multiple development scenarios.

Litigation Support, Major International Airline, Queens, NY
Reviewed and prepared documents for a Fortune 500 airline to support counsel. Work included identification of contaminated areas, evaluation of the extent of separate phase hydrocarbons, potential contaminant migration pathways, remedial technologies applicable at the site, and development of detailed cost estimates for remediation. Work also included differentiation of sources of contamination and a determination of potentially responsible parties for the Airline. Multiple experts were coordinated under the litigation support contract to provide comprehensive litigation support services with a focus on investigation, remediation, airport terminal construction, product and plume aging, and construction planning and scheduling.

Litigation Support, Printed Circuit Board Manufacturer Former NYS Superfund Site), Suffolk County, NY
Following the completion of a comprehensive RCRA Closure program, Mr. Smith represented the tenant of a site in Melville, NY in the defense of a Complaint made by the property owner pertaining to environmental conditions at the site of the Closure program. Litigation support work included preparation of a closure report documenting investigative and remedial activities at the site, and the extent of residual contamination remaining upon completion of closure.

Remediation Cost Evaluation & Technical Mediation, Confidential Airline Client, Philadelphia, Pennsylvania
Coordinated a technical mediation focusing on development of an independent cost estimate for remediation performed by a major airline. Work included review of actual cost documents submitted by the airline and the local aviation authority. Based upon review of the documents, a recommended cost allocation mechanism was presented to the parties.

Appendix B

Supporting information for VOC Analyses

Rpt	T	Analyte	MDL	PQL	MCL	RO
☑	A	1,1,1-Trichloroethane	0.03	0.15	0	0
☑	A	1,1,2,2-Tetrachloroethane	0.022	0.15	0	0
☑	A	1,1,2-Trichloroethane	0.031	0.15	0	0
☑	A	1,1-Dichloroethane	0.024	0.15	0	0
☑	A	1,1-Dichloroethene	0.017	0.15	0	0
☑	A	1,2,4-Trichlorobenzene	0.038	0.15	0	0
☑	A	1,2,4-Trimethylbenzene	0.025	0.15	0	0
☑	A	1,2-Dibromoethane	0.05	0.15	0	0
☑	A	1,2-Dichlorobenzene	0.034	0.15	0	0
☑	A	1,2-Dichloroethane	0.022	0.15	0	0
☑	A	1,2-Dichloropropane	0.038	0.15	0	0
☑	A	1,3,5-Trimethylbenzene	0.025	0.15	0	0
☑	A	1,3-butadiene	0.048	0.15	0	0
☑	A	1,3-Dichlorobenzene	0.034	0.15	0	0
☑	A	1,4-Dichlorobenzene	0.024	0.15	0	0
☑	A	1,4-Dioxane	0.05	0.3	0	0
☑	A	2,2,4-trimethylpentane	0.038	0.15	0	0
☑	A	4-ethyltoluene	0.03	0.15	0	0
☑	A	Acetone	0.047	0.3	0	0
☑	A	Allyl chloride	0.075	0.15	0	0
☑	A	Benzene	0.025	0.15	0	0
☑	A	Benzyl chloride	0.035	0.15	0	0
☑	A	Bromodichloromethane	0.031	0.15	0	0
☑	A	Bromoform	0.034	0.15	0	0
☑	A	Bromomethane	0.035	0.15	0	0
☑	A	Carbon disulfide	0.025	0.15	0	0
☑	A	Carbon tetrachloride	0.022	0.04	0	0
☑	A	Chlorobenzene	0.031	0.15	0	0
☑	A	Chloroethane	0.034	0.15	0	0
☑	A	Chloroform	0.022	0.15	0	0
☑	A	Chloromethane	0.034	0.15	0	0
☑	A	cis-1,2-Dichloroethene	0.03	0.15	0	0
☑	A	cis-1,3-Dichloropropene	0.035	0.15	0	0
☑	A	Cyclohexane	0.09	0.15	0	0
☑	A	Dibromochloromethane	0.044	0.15	0	0
☑	A	Ethyl acetate	0.066	0.25	0	0
☑	A	Ethylbenzene	0.031	0.15	0	0
☑	A	Freon 11	0.026	0.15	0	0
☑	A	Freon 113	0.034	0.15	0	0
☑	A	Freon 114	0.034	0.15	0	0
☑	A	Freon 12	0.025	0.15	0	0
☑	A	Heptane	0.092	0.15	0	0
☑	A	Hexachloro-1,3-butadiene	0.025	0.15	0	0
☑	A	Hexane	0.054	0.15	0	0
☑	A	Isopropyl alcohol	0.035	0.15	0	0
☑	A	m&p-Xylene	0.059	0.3	0	0
☑	A	Methyl Butyl Ketone	0.054	0.3	0	0
☑	A	Methyl Ethyl Ketone	0.048	0.3	0	0
☑	A	Methyl Isobutyl Ketone	0.102	0.3	0	0
☑	A	Methyl tert-butyl ether	0.031	0.15	0	0
☑	A	Methylene chloride	0.026	0.15	0	0
☑	A	o-Xylene	0.079	0.15	0	0
☑	A	Propylene	0.06	0.15	0	0
☑	A	Styrene	0.022	0.15	0	0
☑	A	Tetrachloroethylene	0.024	0.15	0	0
☑	A	Tetrahydrofuran	0.095	0.15	0	0

Rpt	T	Analyte	MDL	PQL	MCL	RO
☑	A	Toluene	0.034	0.15	0	0
☑	A	trans-1,2-Dichloroethene	0.038	0.15	0	0
☑	A	trans-1,3-Dichloropropene	0.042	0.15	0	0
☑	A	Trichloroethene	0.017	0.04	0	0
☑	A	Vinyl acetate	0.104	0.15	0	0
☑	A	Vinyl Bromide	0.031	0.15	0	0
☑	A	Vinyl chloride	0.017	0.04	0	0
☑	I	1,4-Difluorobenzene	0	0	0	0
☑	I	Bromochloromethane	0	0	0	0
☑	I	Chlorobenzene-d5	0	0	0	0
☑	S	Bromofluorobenzene	0.047	0	0	0

TCL VOCs by EPA Method 8260
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloro-1,2,2-trifluoroethane*
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethene
1,2,4-Trichlorobenzene
1,2-Dibromo-3-chloropropane*
1,2-Dibromoethane*
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Butanone
2-Hexanone
4-Methyl-2-pentanone
Acetone
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Dibromochloromethane
Dichlorodifluoromethane
Ethylbenzene
Isopropylbenzene
m&p-Xylene
Methyl acetate*
Methyl tert-butyl ether
Methylcyclohexane
Methylene chloride
o-Xylene
Styrene*
Tetrachloroethene
Toluene
trans-1,2-Dichloroethene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride