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Hazardous Waste Remediation
NYSDEC Region 1

Remedial Investigation/ Feasibility Study Sampling and Analysis Plan

Fashion Cleaners
641 East Park Avenue
Long Beach, New York 11561

NYSDEC Site Code 130170

Date:

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Submitted To:

Mr. Girish Desai, P.E.
NYSDEC – Region One
Division of Environmental Remediation
50 Circle Road
Stony Brook, New York 11790

Prepared By:

EnviroTrac Ltd.
5 Old Dock Road
Yaphank, New York 11980
(631) 924-3001

A Full Service Environmental Consulting and Contracting Firm

The following personnel have prepared, reviewed,
and approved this document:

Remedial Investigation/Feasibility Study Sampling and Analysis Plan

Fashion Cleaners
641 East Park Avenue
Long Beach, New York 11561-2512

Jeffrey A. Bohlen
Senior Project Manager/Hydrogeologist

Peter C. Breen
Senior Project Manager

James Van Horn
Quality Assurance Officer

Thomas Bosshard
Thomas H. Bosshard
Project Manager/Senior Geologist

10/30/08
Date

EnviroTrac
Environmental Services

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1. INTRODUCTION

EnviroTrac Ltd. (EnviroTrac) has prepared this Sampling and Analysis Plan (SAP) for the remedial investigation/feasibility study (RI/FS) at the Fashion Cleaners Site (Site), Long Beach, Nassau County, New York. The RI/FS will be conducted in accordance with procedures presented in three documents that have been prepared for the Fashion Cleaners RI/FS including: 1) the RI Work Plan; 2) this SAP; and 3) the Citizen's Participation Plan (CPP).

The SAP contains a Field Sampling Plan (FSP), a Quality Assurance Project Plan (QAPP) and a Health and Safety Plan (HASP). The FSP describes procedures that will be employed in conducting the RI scope of work, The QAPP outlines data quality objectives and details the specific sampling procedures and the relevant sampling and analytical protocols to ensure that the data collected during the RI are of sufficient quality to support remedial decisions. The HASP, provided in Appendix A, is intended to ensure the health and safety of workers and the immediate community during performance of the RI investigative/assessment activities.

The CPP outlines activities to ensure adequate involvement of the community in the remedial process.

2. FIELD SAMPLING PLAN

2.1 Site Background

EnviroTrac Ltd. (EnviroTrac) has been contracted to prepare a Remedial Investigation/Feasibility Study (RI/FS) Work Plan for the Fashion Cleaners Site (Site) located at 641 East Park Avenue, Long Beach, New York 11561-2512. A Site location map and Site plan are presented in Figures 2-1 and 2-2, respectively. The RI/FS for the Site will be conducted in a phased approach utilizing guidance provided in *Draft DER-10 Technical Guidance for Site Investigation and Remediation* (December, 2002)[1]. The first phase of the RI includes a background review and initial Site investigation activities. The second phase of the RI will focus on off-site groundwater evaluation and other additional investigative work to complete the RI and to support a Feasibility Study (FS). The final scope of the second phase of the RI will be determined following implementation and completion of the Phase I investigation, at which time a Phase II RI Work Plan will be prepared.

Summary of Previous Environmental Investigations

Two (2) environmental investigations were previously conducted at the Site, the results of which were reviewed and are summarized below. As part of an environmental review of the Site, a limited soil and groundwater investigation was conducted at the Site in June 2005 by Environmental Resources Management – Northeast (ERM) of Melville, New York, on behalf of the property owner, Lido Realty. The results of the investigation are summarized in a letter report prepared by ERM dated July 29, 2005. Figure 2-3 provides a summary of findings pertaining to soil and groundwater testing conducted by ERM. Based on the results of the June 2005 ERM investigation, an additional limited investigation was subsequently conducted at the Site in September 2005 by Berninger Environmental, Inc. (BEI) of Bohemia, New York, on behalf of the current Fashion Cleaners tenant. The results of this investigation are summarized in a letter report prepared by BEI dated November 27, 2005. Figure 2-4 provides a summary of findings pertaining to soil and groundwater testing conducted by BEI. As a result of those studies the presence of VOCs associated with dry cleaning processes has been identified in soil and groundwater at the Site. Further detail pertaining to these previously conducted investigations is provided in the Phase I RI/FS Work Plan.

2.2 Sampling Objectives

The purpose of the RI is to confirm the findings of limited prior testing results and to fully evaluate the extent of impacts to the environment, and to develop data and other information needed to formulate remedies.

2.2.1 Work Plan Approach

The Work Plan approach is to define the contamination distribution at the Fashion Cleaners Site. Contaminant distribution at the Site is a function of:

- Historic and current waste handling/processing and disposal practices.
- The physio-chemical properties of the contaminants (e.g., solubility, specific gravity).
- Site topography and drainage patterns.
- The sorptive/retarding capabilities of the aquifer solids (as a function of organic carbon content).
- The movement of groundwater in the vadose and saturated zones.
- Meteorological and tide-related conditions.

The potential sources of contamination identified at this time include:

- Former and present dry cleaning process areas within the building; and
- A boiler blowdown pipe located in the exterior courtyard.

Characterization of the Site and potential off-site areas that may be affected in terms of the vertical and horizontal distribution of contaminants and related mechanisms of transport will be accomplished through a series of activities including:

- Definition of source areas on the Site through soil testing;

- Assessment of lithology in the vicinity of the Site to evaluate potential preferential flow pathways and other stratigraphic influences controlling plume migration;
- Assessing potential impacts due to tidal fluctuations on groundwater flow and on the distribution of contaminants present in the vadose and saturated zones;
- Installation of monitoring wells to define the lateral and vertical extent of impacts in groundwater;
- Assessment of groundwater flow patterns to estimate the direction of groundwater flow and hydraulic gradients;
- Performance of in-situ hydraulic conductivity testing to estimate the water transmitting potential of the sandy deposits at and in the vicinity of the Site; and
- Collection of sub-slab soil gas and indoor and outdoor air samples to assess the potential for soil vapor intrusion to nearby businesses and residences.

The remedial investigation will characterize the Site in regard to the presence and distribution of NYSDEC Target Compound List (TCL) and Target Analyte List (TAL) chemical constituents. However, particular attention will be paid to the volatile organic compounds (VOCs) which have been associated with previous activities and have previously been found in the soil and groundwater beneath the Site.

The field work is designed in two phases; RI Phase I is envisioned to fully define the on-site areas of concern. This phase consists of the following major tasks:

- Evaluating lithology in the immediate vicinity of the Site through the drilling of soil borings;
- Assessing tidal influence on groundwater flow patterns and plume migration;
- The collection and laboratory analysis of soil samples to supplement prior testing, and to complete the delineation of on-site concerns;
- The installation of additional shallow groundwater monitoring wells to further assess horizontal impacts to groundwater;
- The installation of deeper groundwater monitoring wells at the locations of existing shallow wells, and potentially other locations judged to exhibit evidence of site impacts, to evaluate the vertical extent of dissolved contamination at the Site; and

- Conducting an evaluation of soil vapor intrusion potential in the immediate vicinity of the Site.

It is envisioned that Phase II of the RI will concentrate on investigating off-site impacts to media including soil, groundwater, sediment, surface water and soil vapor (as warranted) based on the results of Phase I testing. In addition, any additional on-site testing required for completion of the investigation objectives will be conducted during Phase II. Phase II will include an evaluation of human health risk and fish and wildlife assessments as required. The goal of the Phase II work elements will be to complete data gathering and assessments needed to develop appropriate remedies for impacted media. Table 2-1 provides a summary of the scope of work.

2.2.2 Characterization of Contamination

As outlined in the previous section on the Work Plan approach, various types of media will be sampled and analyzed to characterize the types, levels, and extent of contamination at the Fashion Cleaners Site. The location and frequency of sampling to be conducted during the RI is outlined in Section 2.3. Sampling equipment and procedures are outlined in Section 2.5

To ensure the integrity and accuracy of the field sample results, Quality Control (QC) samples will be collected during field activities. The guidelines for type and frequency of collection of field QC samples are provided in the QAPP - Appendix B, Section 2.4. Table 2-2 provides a summary of sampling frequency and analysis.

2.3 Sampling Location and Frequency

2.3.1 Tidal Influence Study

A one-week duration water level monitoring event will be conducted at proposed monitoring well MW-03(5-15) to evaluate whether groundwater at the Site is subject to tidal effects. The location of this well is shown on Figure 2-5. The results of this study will also be used to identify approximate water table low and high elevations; information that will be used to guide the collection of soil samples and location of monitoring well screen settings and to more fully develop the site conceptual model.

2.3.2 Hand Auger Sampling

Soil sampling using a hand auger or similar portable device is proposed at up to six locations designated SB-06 through SB-11. The locations of these soil borings are provided on Figure 2-6. The purpose of this testing is to further evaluate the extent of environmental impacts to soil beneath the building and to soil in the exterior courtyard. Prior testing conducted in 1995 revealed the presence of elevated concentrations of VOCs including trichloroethylene (TCE) and tetrachloroethylene (PCE), compounds associated with dry cleaning processes.

The decision to use a hand auger device for this testing is based on the limited accessibility for setting drilling/testing equipment, particularly within the building interior. If possible, based on conditions encountered, these borings will penetrate to a depth of approximately 5 feet below the minimum depth of the water table, based on the results of the tidal survey (Section 2.3.1). At each location two samples (12 samples in total) will be collected, logged and sent to the laboratory to more fully delineate these previously identified impacts. At each location the samples will be collected at shallow (surface) and deeper depths to better define the extent of impacts. The soil samples will be analyzed for NYSDEC TCL VOCs. If evidence of contamination is present at the bottom of a boring additional (deeper) investigation will be conducted and samples collected per discussion with the NYSDEC as practicable. Upon completion of the testing, the borings will be properly abandoned.

2.3.3 Soil Boring Sampling

A total of seven soil borings designated SB-12 through SB-18 will be installed using a Geoprobe®, hollow stem auger drilling machine or portable tripod, pending available work space, to further define the extent of impacts to soil and groundwater. Subsequently, upon completion of drilling and sample collection, these borings will be used to install groundwater monitoring wells. The locations of these borings are provided on Figure 2-6.

Soil borings SB-14 through SB-18 will be installed at previously untested locations to investigate the lateral extent of impacts to soil. At a minimum, soil will be screened at 2 to 4-foot intervals for the presence of VOCs using a PID during drilling to an anticipated final depth of approximately 15 feet unless evidence of deeper contamination is found. In that instance the further investigation of this will be discussed with the NYSDEC and further work conducted as appropriate and to the extent practicable. At each location, a soil sample from the interval exhibiting the highest PID response will be submitted to the laboratory for analysis of the NYSDEC TCL VOCs; as a default, the sample from the interval immediately above the water table will be submitted.

Soil borings SB-12 and SB-13 will be installed adjacent to existing wells MW-01(5-15) and MW-02(5-15) to evaluate vertical impacts at these locations where elevated levels of VOCs have been found in shallow soil. Soil will be screened for the presence of VOCs using a PID during drilling to an anticipated final depth of approximately 20 feet unless evidence of deeper contamination is found. In that instance the further investigation of this will be discussed with the NYSDEC and further work conducted as appropriate and to the extent practicable. At each of these two locations two soil samples will be submitted to the laboratory for analysis of the full NYSDEC TCL/TAL list of compounds. These samples will include the 13 to 15 foot and 18 to 20 foot intervals. However, the shallow sample interval may be adjusted based on PID results at the discretion of the field geologist.

2.3.4 Monitoring Well Installation and Groundwater Sampling

A total of seven 2-inch diameter, PVC groundwater monitoring wells will be installed at the soil boring locations SB-12 through SB-18, described in Section 2.3.4, to further define the extent of impacts to soil and groundwater. The locations of these wells are provided on Figure 2-5.

Five proposed shallow groundwater monitoring wells designated MW-03 through MW-07 will be installed at previously untested locations to help define the direction of ground water flow and to further delineate the lateral extent of impacts to groundwater that were identified previously at the MW-01 and MW-02 locations. These wells will be screened from approximately 5 to 15 feet to bridge the water table under all tide conditions (as determined through the tidal study described in Section 2.3.1).

Proposed monitoring wells MW-01(15-20) and MW-02(15-20) will be installed adjacent to existing wells MW-01(5-15) and MW-02(5-15), but screened deeper (from approximately 15 to 20 feet), to help evaluate the vertical extent of contamination at these locations where elevated levels of trichloroethylene (TCE) and tetrachloroethylene (PCE) were previously found.

Groundwater samples will be collected from the two existing wells and from each of the new wells to document current groundwater quality condition and to assess the need for additional delineation that would be conducted during RI Phase II. In order to more fully evaluate groundwater quality concerns the existing monitoring wells, MW-01(5-15) and MW-02(5-15), will be tested for the full NYSDEC TCL/TAL compound list and chlorides. The seven proposed wells will be tested for NYSDEC TCL VOCs and chlorides.

2.3.5 Hydraulic Conductivity Estimation

Slug testing will be conducted to evaluate the permeability of shallow and deeper sandy deposits underlying the Site and immediate vicinity. This will be accomplished through the performance of slug tests at proposed groundwater monitoring wells MW-03(5-15), MW-05(5-15), MW-07(5-15), MW-01(15-20) and MW-02(15-20), the locations of which are provided on Figure 2-5. Due to technical constraints pertaining to data analysis, the testing conducted at monitoring wells MW-03(5-15), MW-05(5-15) and MW-07(5-15) will be limited to rising head (i.e., "slug out") tests only. For the deeper wells, MW-01(15-20) and MW-02(15-20), testing will include falling head and rising head ("slug in" and "slug out") methods.

2.3.6 Soil Vapor Intrusion Assessment

Based on the results of the limited prior investigations that have been conducted at the Site, that identified elevated concentrations of VOCs in soil and groundwater, it has been determined that there is the potential for soil vapor intrusion to the Site's interior and neighboring structures. Accordingly, a soil vapor intrusion assessment will be conducted to evaluate this potential through the collection of indoor and outdoor air samples and sub slab soil vapor samples at the approximate locations shown on Figure 2-7. It should be noted that the final testing locations will be determined in the field based on accessibility; in particular with regard to the proposed sub slab test locations.

The NYSDOH Guidance for Evaluating SVI in the State of New York[2] has been used in the design of the proposed testing. The results of this testing will be used in conjunction with the soil and groundwater assessment results to further develop the site conceptual model and to determine if additional follow up is warranted.

2.4 Sample Designation

2.4.1 Sample Identification

Details on the identification of samples can be found in the QAPP - Appendix B, Section 2.6.

2.4.2 Sample Documentation

Each sample bottle will be labeled with at least the following:

- Complete Sample Identification;
- Date and Time of Sample Collection;
- Required Analytes; and
- Sampler's Initials.

All sample bottles will be accounted for on a Chain-of-Custody form; see the QAPP – Appendix B, Section 2.6 for additional details on completion of the form. Additional details on samples and locations will be recorded in the bound field logbooks maintained by field personnel as outlined in the QAPP – Appendix B, Section 2.5.

2.5 Sampling Equipment and Procedures

This section provides descriptions of the testing that will be conducted to further evaluate environmental impacts to media found at and in the vicinity of the Site.

2.5.1 Tidal Influence Study

A water level evaluation will be conducted to asses the potential for tidal effects to influence water levels on-site and to estimate the magnitude of fluctuation. This information will be subsequently utilized to determine appropriate screen settings for proposed monitoring wells and to select intervals for the collection of soil samples from the vadose and saturated zones. The general steps that will be followed include the following:

- A measurement of water level elevation will be conducted at the test well (i.e., proposed monitoring well MW-03(5-15)) to provide a starting point in the record that will be developed during the study. Detailed procedures for conducting this water level measurement task are provided in Section 2.5.6.1.
- A digital water level data logger (e.g., In-Situ® miniTROLL®) will be installed within monitoring well MW-03(5-15) to develop a detailed record of water levels. The logger will be suspended in the well using a stable/non-elastic cord at a fixed depth sufficient to ensure submergence in groundwater throughout the duration of the test, and at a minimum of 1 to 2 feet above the bottom of the well.
- The data logger will be programmed to record a water level every five minutes over a period of one week, resulting in a total record of approximately 2,000 measurements.

- Prior to leaving the Site on day one of the test, the well will be secured taking care to ensure that the well is protected from elements and precipitation that could directly enter the well and corrupt results.
- The test will be ended after approximately one week of logger deployment by first repeating the water level measurement procedures provided in Section 2.5.6.1 and subsequently removing the logger from the well.
- The data logger will be decontaminated in accordance with procedures provided in Section 2.5.9 prior to leaving the Site. The cord and any other disposable equipment that had been used for the testing will be properly disposed in accordance with procedures provided in Section 2.5.10.
- The logger data will be downloaded to a computer file and results presented in chart and tabular format for subsequent analysis.

2.5.2 Lithologic Assessment

Geoprobe® Macro-Core® samples shall be collected using the direct push method to assess potential stratigraphic variability in the vicinity of the Site. Further detail regarding the use of direct push method is provided in the ASTM guidance document D6282, *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations*[3]. An EnviroTrac Hydrogeologist will examine and identify the sample immediately upon collection. The sample will also be screened for VOCs using a handheld photoionization detector (PID).

Organic Vapor Screening - Soil Sample Headspace

Field screening for organic compounds in soil samples will be performed as one of several field screening criteria, and continuously in the breathing zone of all work areas where intrusive activities are to occur as of the part of the Health and Safety monitoring program. This will serve as an immediate indication as to volatile organic hazards at the work location and will determine if personnel health and safety protection is adequate. Screening with a hand-held PID meter will be performed during all intrusive work activities (i.e. installation of soil borings and/or groundwater monitoring wells, or collection of groundwater samples) field investigation and all sample collection activities.

(1) Calibrate the PID daily in accordance with the particular manufacturer's procedures.

(2) For health and safety monitoring during intrusive activities, the PID will be used to continuously monitor for organic vapors in the breathing zone of all work areas in accordance with the HASP.

(3) For soil samples, a container separate from any jars that may be used for laboratory analysis will be used to check for total organic vapor concentrations using the PID. Generally, the sample aliquot retained for geologic description and archive is used for headspace total organic vapor screening.

(4) Fill the sample container approximately ⅔ full with soil,

(5) Place aluminum foil over the sample jar mouth, tightly sealing the opening.

(6) Allow the jar to stand for 5 minutes in a location where the sample temperature change will be minimal.

(7) After the 5 minutes, shake to jar for 1 minute to aid the desegregation of VOCs from the soil matrix.

(8) Allow the jar to stand for an additional 5 minutes in a location where the sample temperature change will be minimal.

(9) After the 5 minutes, insert the probe of a PID through the foil seal and observe the instrument for the maximum organic vapor reading.

(10) Record the sample number and maximum headspace organic vapor concentration reading.

Borehole Logging

The EnviroTrac Hydrogeologist will examine each Macro-Core® sample and use visual and field test criteria to classify the soils. A standard "Geologic Log" will be maintained for each boring that will include all of the geological information gathered in the field, including the following:

- The structure of the soils sampled, including layering stratification features, and the dominant soil types;
- The color of soils, using Munsell Soil Color Charts;
- The moisture content of soils;

- Soil grain features, including grain sizes, degree of sorting or grading, angularity, and mineralogy. The soils will be classified using the ASTM guidance document D2488-06, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*[4];
- Identification of any rock fragments, organic material or other components; and
- The consistency of clay-dominated soils.

All of the soil information collected will be recorded as a designation under the USCS along with additional observations for each distinctive soil type within each sample. At the discretion of the supervising Hydrogeologist samples will be collected and retained for archival purposes and will placed in glass jars or plastic ziplock bags. The EnviroTrac Hydrogeologist will label the jars or plastic bags with soil boring or well number, sample interval and date.

2.5.3 Hand Auger Sampling

Due to the shallow depth to water and limited access for drilling machinery hand augers may be employed to collect soil samples in the building interior at the Site and within the exterior courtyard area at locations designated SB-06 through SB-11.

Hand auger sampling procedures are summarized below:

- Areas to be sampled will be selected based on historical information and will be marked with the hand auger location identifier (e.g., SB-06).
- In the case of interior locations, access to the subsurface will be accomplished by saw cutting through the existing concrete slab.
- A decontaminated hand auger (i.e., bucket auger) will be used to remove each interval and advance the boring to final depth.
- Soil samples will be screened for the presence of VOCs and will be logged following the procedures previously presented in Section 2.5.2.
- Samples from selected intervals will be placed into laboratory supplied containers and sent to the laboratory for analysis. Samples from selected intervals will be placed into laboratory supplied containers and sent to the laboratory for analysis

of chemical constituents. Depending on the boring location, the sample will be tested either for the full TCL/TAL list or the TCL list compounds.

- Upon completion of the boring and sample collection the borehole will be grouted with a cement/bentonite grout. Subsequently the concrete slab (interior locations) will be repaired to original surface elevation and additional repairs to the floor made (if required) to re-establish the original (or equivalent) condition.
- Excavated soil not provided to the laboratory will be drummed placed into 55-gallon drums and disposed properly off-site.
- Detailed notes will be maintained by supervising Hydrogeologist in the field book including:
    - Location and orientation of the hand auger samples including distance to identifiable structures, north orientation and spatial orientation of locations.
    - Evidence of soil staining
    - PID screening results
    - Depth of samples.
- Photographs will be taken during and at the completion of the sampling. A log of the photographs will be maintained in the field notebook.

2.5.4 Soil Boring Sampling

As an alternative to collecting soil samples using a hand auger at locations SB-06 through SB-11, as described in Section 2.5.3, and for the collection of samples during the installation of monitoring wells MW-01(15-20), MW-02(15-20) and MW-03 through MW-07 (soil borings SB-12 through SB-18, respectively) a small drilling machine (Geoprobe®) or portable tripod will be used. Further detail regarding the use of direct push method is provided in the ASTM guidance document D6282-98, *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations*[3]. Further detail regarding the use of split-spoon samplers is provided in ASTM guidance document D1586-99, *Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils*[5].

- Areas to be sampled will be selected based on historical information and will be marked with the hand auger soil boring location or monitoring well identifier (e.g., SB-06, MW-03).
- In the case of interior locations, access to the subsurface will be accomplished by saw cutting through the existing concrete slab.
- Soil samples will be collected using either Geoprobe® Macro-Core® Sample Barrel or split-barrel sampling tools.
- Soil samples will be screened for the presence of VOCs and will be logged following the procedures previously presented in Section 2.5.2.
- Samples from selected intervals will be placed into laboratory supplied containers and sent to the laboratory for analysis. Samples from selected intervals will be placed into laboratory supplied containers and sent to the laboratory for analysis of chemical constituents. Depending on the boring location, the sample will be tested either for the full NYSDEC TCL/TAL list or the NYSDEC TCL list compounds.
- In the case of borings SB-06 through SB-11, upon completion of the boring and sample collection, the borehole will be grouted with a cement/bentonite grout. Subsequently the concrete slab (interior locations) will be repaired to original surface elevation and additional repairs to the floor made (if required) to re-establish the original (or equivalent) condition.
- For the locations of proposed soil borings SB-12 through SB-18 (monitoring well locations MW-01(15-20), MW-02(15-20) and the locations of MW-03 through MW-07) see Section 2.5.5 for procedures pertaining to well installation.
- Excavated soil not provided to the laboratory will be placed into 55-gallon drums and disposed properly off-site.
- Detailed notes will be maintained by supervising Hydrogeologist in the field book including:
  - Location and orientation of the hand auger samples including distance to identifiable structures, north orientation and spatial orientation of locations.
  - Evidence of soil staining
  - PID screening results
  - Depth of samples.
- Photographs will be taken during and at the completion of the soil sampling. A

log of the photographs will be maintained in the field notebook.

2.5.5 Monitoring Well Installation

As discussed in Section 2.3.4 a minimum of seven new wells will be installed during the Fashion Cleaners Site RI/FS. Shallow and deep wells will be installed in the sandy deposits that underlie the Site. General procedures for installing groundwater monitoring wells are provided in the ASTM guidance document D5092-04, *Standard Practice for Design and Installation of Ground Water Monitoring Wells*[6]. Procedures regarding the installation of groundwater monitoring wells using a Geoprobe® are provided in the ASTM guidance document D6724-04, *Standard Guide for Installation of Direct Push Ground Water Monitoring Wells*[7].

2.5.5.1 Monitoring Well Construction

Following completion of drilling and soil sampling pertaining to locations MW-01(15-20), MW-02(15-20) and locations MW-03 through MW-07 as described in Section 2.5.4 each boring will be completed as a 2-inch diameter PVC monitoring well. All groundwater wells will be installed and constructed according to NYSDEC requirements. All monitoring well installation, drilling, construction, development, testing and sampling will be overseen by a qualified EnviroTrac Hydrogeologist who will maintain detailed records (e.g., soil boring logs, screening data, field observations, odors, pumping rate/yield during development) at each well.

Source of Water

The use of drilling mud and/or foams shall not be allowed. All water used during drilling (if required) and/or steam-cleaning operations shall be from a potable source and so designated in writing. EnviroTrac's drilling subcontractor will obtain all permits from the local water purveyor and any other concerned authorities, and provision of any required back-flow prevention devices.

Monitoring Well Drilling Procedures

Boreholes shall be advanced by the direct push drilling method using a Geoprobe® drilling machine or through the use of a portable tripod rig as described in Section 2.5.4.

Drill Cuttings

Cuttings generated from the construction of the boreholes will be contained in New York State Department of Transportation (NYSDOT)-approved 55-gallon ring-top drums. The drums will be labeled according to the borehole/well number and disposed at an approved off-site disposal facility.

Well Construction Materials

All monitoring wells shall be constructed of 2-inch inside diameter, threaded flush joint, schedule 40 PVC casing and screens 5 to 10 feet in length, PVC construction having slot openings of 0.010-inches. Typical monitoring well construction details are shown on Figure 2-8.

EnviroTrac's Hydrogeologist shall inspect all well materials for dents, cracks, grease, etc. and to ensure that the materials are in accordance with the specifications. Any materials found to be defective shall be rejected and replaced by the drilling subcontractor. If required, well casing and screen shall be steam cleaned, wrapped in clean polyethylene sheeting and stored until the time of well construction.

Well Completions at Grade

For each of the wells, a 2-inch diameter PVC riser will extend from the top of the screen to approximately 4-inches below ground surface. A permanent mark will be made at the top of the well casing to provide a reference point from which to make future water level measurements.

Each well will be fitted with a flush-mounted steel well vault which is a minimum of two (2) inches larger in diameter than the well casings, and secured in a surface seal to adequately protect the casing. A locking cap will be provided for each well with one (1) to two (2) inches clearance between the top of the well cap and the bottom of the locking cap of the protective casing when in the locked position. The EnviroTrac Hydrogeologist will provide keyed-alike padlocks for the wells.

Each well will have a concrete surface seal that will secure the protective casing in place. The surface seal will extend below the frost depth to prevent potential well damage. The top of the seal will be constructed by pouring concrete into a pre-built form with a minimum of 2-foot long sides. The seal will be finished with a sloping surface to prevent surface runoff from ponding and entering the well vault.

2.5.5.2 Monitoring Well Development

All newly installed monitoring wells will be developed by submersible pump or air-lift methods to ensure the removal of any drilling fines and to restore the hydraulic properties of the surrounding formation. All wells will be developed no sooner than twenty-four hours after installation, in order to allow the cement/bentonite grout to set. At no time will water be introduced into the well during well development procedures.

If submersible pumps are used during development, the pump will be decontaminated to the satisfaction of the EnviroTrac Hydrogeologist, and new lengths of dedicated polyethylene hose will be used as a discharge line. If an air-lift assembly is used during well development, the air source will be oil-less type compressor outfitted with appropriate oil trap and/or filters, and new lengths of dedicated polyethylene hose will be used as a discharge line. Additionally, the airlift assembly will be configured in a manner such that the air discharge will remain within the discharge and not come in contact with the well. The adequacy of the airlift assembly to fulfill the aforementioned conditions and effectively develop the monitoring well will be subject to the approval of the EnviroTrac Hydrogeologist or the Field Team Leader (FTL).

Each well will be developed to remove at a minimum, water used during drilling (as applicable), and the point that the turbidity of the recovered well water is less than 50 NTUs. Additionally, well development monitoring will be supplemented by measurement of the development water for pH, conductivity and temperature that will be within 10% for a minimum of three consecutive measurements before development is considered complete. The EnviroTrac Hydrogeologist will be responsible for collection of NTU, pH, conductivity, and temperature measurements after each well volume is removed from the well. At a minimum, the volume of water introduced during drilling will be removed during development of each well.

Well development water will be handled in accordance with the Management of Investigative Derived Waste (IDW) described in Section 2.5.10. Wells will not be sampled for a minimum of one (1) week following development. Analytical results of the samples collected from the groundwater monitoring wells will determine the ultimate disposition of the development water.

2.5.6 Groundwater Sampling

Groundwater sampling will be conducted to assess groundwater quality and to define the extent of impacts to groundwater. These procedures will include measuring water levels, purging monitoring wells and recording field parameters and through the collection of samples for analysis in the laboratory.

2.5.6.1 Groundwater Elevation Measurements

Groundwater elevation measurements are to be obtained using the following general procedures whenever depth to groundwater or groundwater elevation data is required. This may include activities such as soil borings, groundwater monitoring well installation/development, groundwater monitoring well sampling, and/or synoptic groundwater level measurements. The measurements will be collected concurrent with the groundwater sampling event and the water levels will be obtained prior to well evacuation and sample collection. The static water level will be measured to the nearest 0.01 foot.

(1) Clean all water-level measuring equipment using appropriate decontamination procedures.

(2) Remove locking well cap, note weather, time of day, and date, etc. in field notebook, or on an appropriate form.

(3) Remove well casing cap.

(4) Monitor headspace of well with a PID to determine presence of VOCs, and record in field notebook.

(5) Lower water level measuring device into well until the water surface is encountered.

(6) Measure distance from water surface to reference measuring point on well casing, and record in field notebook.

NOTE: if water level measurement is from either the top of protective steel casing, top of PVC riser pipe, from ground surface, or some other position on the wellhead.

(7) Measure total depth of well and record in field notebook or on log form.

(8) Remove all downhole equipment; replace well casing cap and locking steel caps.

(9) Calculate elevation of water:

Egw = E – Dgw

Where:

Egw = Elevation of Groundwater;
E = Elevation at point of measurement; and
Dgw = Depth to Groundwater.

2.5.6.2 Field Measurement Procedures

The characterization of groundwater quality will include the measurement of indicator parameters in the field during groundwater sampling events using portable testing instruments. These parameters will include turbidity, specific conductance, pH, temperature and dissolved oxygen. It is anticipated that a flow-through cell equipped with probes and a meter for measuring these parameters will be used and the specific manufacturer's calibration and operation procedures should be followed. In the event that a flow through cell is not used (i.e., during conventional purge and sample methods) then a hand held meter(s) will be employed. Following are general procedures that describe typical operation of these meters.

Turbidity Measurements:

(1) Ensure that the sample cell (sample vials) is clean, with no dust and lint on the inside or outside surface.

(2) Ensure that instrument has been standardized recently and span control has not been changed.

(3) Range calibration of instrument is performed at the factory, but it should be checked from time to time against fresh formalin turbidity standard dilutions.

(4) Check the mechanical zero setting while instrument is off.

(5) Turn on the power and press the battery check switch and verify the battery check range. The needle should be in the battery check area. If battery was not recharged before use, switch to a charged instrument. The battery pack should be charged on a daily basis.

(6) Select the range that will exceed the expected turbidity of the sample under test and press the appropriate range switch.

(7) Place the focusing template into the cell holder and adjust the zero control for a reading of zero NTU. Remove the focusing template.
Note: If the instrument will be used in the 100 range, place the cell riser into the cell holder before inserting the test sample. When using the 1 and 10 ranges, the cell riser must not be used.

(8) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(9) Fill a clean sample cell to the marked line with the sample to be measured and place it into the cell holder. Use the white dot on the sample cell to orient the cell in the same position each time. Cover the sample cell with the light shield and allow the meter to stabilize. Read the turbidity of the sample. The sample size for all turbidity measurements should be 18 ml. Use the line on the sample cell as a level indicator. Variation in sample volume can affect the accuracy of the determinations. When measuring the lower range (0 - 10 and 0 - 1 NTU), air bubbles in the sample will cause false high readings -before covering the cell with the light shield, observe the sample in its cell. A five-minute wait period can eliminate air bubbles from the sample and thereafter a valid reading can be taken.

(10) Record the results in the Field Notebook.

Specific Conductance Measurements:

(1) Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.
(2) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the well purging activities) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.
(3) Rinse the cell with one or more portions of the sample to be tested.
(4) Immerse the electrode in the sample and measure the temperature. Do not immerse the electrode into a sample, which will be chemically analyzed.
(5) Adjust the temperature setting to the sample temperature.
(6) Immerse the electrode in the sample and measure the conductivity. Do not immerse the electrode into a sample, which will be chemically analyzed.
(7) Record the results in the Field Notebook.

pH and Temperature Measurements:

(1) Immerse the tip of the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode tip in water for at least an hour before use.
(2) Rinse the electrode with demineralized water.
(3) Immerse the electrode in pH 7 buffer solution,
(4) Adjust the temperature compensator to the proper temperature.
(5) Adjust the pH meter to read 7.0.
(6) Remove the electrode from the buffer and rinse with demineralized water.
(7) Collect a groundwater sample using a bailer (or from the pump discharge line in the case of the vertical profile wells) and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.
(8) Immerse the electrode into the extra sample jar. Do not immerse the electrode into a sample that will be chemically analyzed.
(9) Read and record the pH of the solution, after adjusting the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).
(10) Rinse the electrodes with demineralized water.

(11) Keep the electrode immersed in demineralized water when not in use.

(12) All results are to be recorded in the Field Notebook.

DO Measurements:

The dissolved oxygen (DO) meter will be properly calibrated prior to each sampling event.

Calibration Procedure

(1) Prepare the DO meter with a thin Teflon® membrane stretched over the sensor.

(2) Perform a battery check.

(3) Set mode switch to operate and the operation switch to zero, and zero the instrument.

(4) Take a temperature measurement and determine the calibration value from the manufacturers table for the appropriate atmospheric pressure.

(5) Select the desired range and adjust the instrument to an appropriate calibration value (determined in the preceding step).

(6) Place the probe in a water sample with a known dissolved oxygen level and read mg/L-dissolved oxygen.

(7) Record temperature and dissolved oxygen calibration information on the equipment calibration and maintenance log for that instrument.

Operating Procedure

(1) Calibrate the dissolved oxygen meter.

(2) Perform the battery check.

(3) Immerse the electrode in water overnight. If this is not possible due to field conditions, immerse the electrode for at least an hour before use.

(4) Collect a groundwater sample using a bailer and pour a small amount of this sample into an extra sample jar, which will not be used to store chemically analyzed samples.

(5) Rinse the cell with one or more portions of the sample to be tested.

(6) Set mode switch to operate and the operation switch to the desired range.

(7) Immerse the probe in the water sample.

(8) Take a temperature and adjust the temperature compensator to the sample temperature (obtained during measurement of specific conductance or from a standard scientific thermometer).

(9) Switch the dissolved oxygen content measurement and allow reading to stabilize.

(10) Record the results in the Field Notebook.

(11) Repeat procedure and record a second reading. Average the results and record the average.

(12) Rinse the probe with distilled water and replace protective cover on probe with a small amount of distilled water to keep the probe membrane wet.

2.5.6.3 Groundwater Sample Collection

It is envisioned that groundwater samples will be collected with a bladder pump during the RI using low flow methods. General procedures for sampling groundwater monitoring wells using low-flow procedures are provided in the ASTM guidance document D6771-02, *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations*[8]. General procedures for sampling groundwater monitoring wells using conventional procedures (if utilized) are provided in the ASTM guidance document D4448-01, *Standard Guide for Sampling Ground-Water Monitoring Wells*[9].The following Sections present general well sampling procedures common to both techniques followed by low-flow sampling procedures, and conventional procedures are also presented for reference.

The low-flow groundwater purging/sampling technique employs the use of a flow-through cell equipped with probes and a meter for measuring groundwater quality parameters such as pH, temperature, specific conductivity, and dissolved oxygen. One example of this equipment is the Horiba U-22 Flow-Through Cell and the specific manufacturer's calibration and operation instructions should be followed. In the event that low-flow purging/sampling cannot be performed and conventional procedures must be employed, the measurement of pH, temperature, specific conductivity and dissolved oxygen using standard hand-held meters will be conducted.

General Procedures

The following procedure will be used for all monitoring well groundwater sampling:

- Clean all water-level measuring equipment using appropriate decontamination procedures.
- Wear appropriate health and safety equipment as outlined in the HASP. In addition, samplers will don new sampling gloves at each individual well prior to sampling.
- Visually examine the exterior of the monitoring well for signs of damage or tampering and record in the field logbook.
- Unlock well cap.
- Take and record in field logbook PID readings.
- Measure the static water level in the well with a decontaminated steel tape or electronic water level indicator. The tape or water level indicator will be rinsed with deionized water in between individual wells to prevent cross-contamination. Synoptic round of water level measurements will all be completed on the same day.
- All wells will also be checked for the presence and thickness of Light or Dense Non Aqueous Phase Liquids (LNAPL/DNAPL).
- If LNAPL or DNAPL is encountered on the top of the water table at the time of sampling, a sample of the LNAPL or DNAPL will be collected for analysis if accumulations are sufficient. Measurement of the thickness of this layer will be taken using an interface probe. A sample of the LNAPL or DNAPL may be obtained using a dedicated bottom-loading bailer. The sample will be sent to the laboratory for analysis of its chemical composition and physical properties (specific gravity, and gas chromatograph (GC) fingerprint). Initially, no groundwater sample will be collected from wells that contain LNAPL or DNAPL.
- If LNAPL or DNAPL is not detected in the well, continue with the low-flow sampling procedures described below.

Low-Flow Sampling

The low-flow sampling procedure is intended to facilitate the collection of minimum-turbidity groundwater monitoring well samples.

Sample Equipment

- Bladder pumps will be used for collecting groundwater samples.
- Tubing: Tubing used in purging and sampling each well must be dedicated to that well. Once properly located, moving the pump in the well should be avoided. Consequently, the same tubing should be used for purging and sampling. Teflon®, Teflon®-lined polyethylene or polyethylene tubing must be used to collect samples for organic analysis. For samples collected for inorganic analysis, Teflon® or Teflon®-lined polyethylene, or polyethylene tubing may be used.
- Electronic water level measuring device, 0.01-foot accuracy.
- Flow measurement supplies (e.g., graduated cylinder and stop watch).
- Interface probe.
- Power or air source (generator, compressed air tank, etc.).
- In-line purge criteria parameter monitoring instruments - pH, turbidity, specific conductance, temperature, and dissolved oxygen.
- Decontamination supplies.
- Field book.
- Sample bottles.
- Sample preservation supplies (as specified by the analytical methods).
- Sample tags or labels, chain of custody forms.
- Well construction data, location map, field data from last sampling event.

Sample Procedure

I) Lower the pump, safety cable and tubing very slowly into the well to a depth corresponding to the center of the saturated screen section of the well. If possible, the pump intake should be kept at least two feet above the bottom of the well to prevent mobilization of any sediment. Lowering the pump quickly, or even at a moderate rate, will result in disturbing sediment in the well. This is one of the most important steps in low flow sampling at the Site.

2) Measure the water level again with the pump in well before starting the pump. Start pumping the well at a low rate. Ideally, the pump rate should cause little or no water level drawdown in the well (less than 0.3 foot and the water level should stabilize).

- Measure and record the depth to water and pumping rate every 3 to 5 minutes (or as appropriate) during pumping. If purging continues for more than 30 minutes, readings will be recorded at approximately 10-minute intervals.
- Care should be taken not to cause pump suction to be broken or entrainment of air in the sample. Do not allow the groundwater level to go below the pump intake.
- Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to minimize drawdown and/or to ensure stabilization of indicator parameters.

3) Continue purging and remove 4 to 10 standing volumes of casing water.

4) Before sampling, either disconnect the in-line cell or use a by pass assembly to collect groundwater samples before the in-line cell. All sample containers should be filled by allowing the pump discharge to flow gently down the inside of the container with minimal turbulence.

5) Samples requiring pH adjustments will have their pH checked to ensure that the proper pH has been obtained. For VOC samples, this will necessitate the collection of a test sample to determine the amount of preservative that needs to be added to the sample container prior to sampling.

6) Label the samples using waterproof labels, or apply clear tape over the paper labels. Place all samples in a cooler as described in the QAPP with bagged ice or frozen cold packs and maintain at 4°C for delivery to the laboratory.

7) Do not use ice for packing material; melting will cause bottle contact and possible breakage.

8) Measure and record well depth. Take final water quality reading using low flow cell.

9) Secure the well.

Conventional Purging and Sampling

1) Calculate the standing volume of water in the well as follows:

$$\text{Volume (in gallons)} = 3.14r^2(h) \times 7.48 \text{ gal/ft}^3$$

Where:

h = well depth (feet) - static water level (feet)
r = well radius (feet)

For a 2-inch diameter monitoring well this reduces to the following:

$$\text{Volume (in gallons)} = 0.1632 \text{ gallons/ft} \times h$$

2) Lower the decontaminated submersible pump with new, dedicated lengths of polyethylene tubing into the well so the pump is set at the screen interval. Purge 3 to 5 volumes of water from the well, using the submersible pump.

3) Measure and record time, temperature, pH, turbidity, and specific conductance as each volume of well water is purged. Once the temperature, pH, and specific conductance have stabilized to within 10% for two successive well volumes and the turbidity is less than 50 NTUs, a groundwater sample may be collected. Measure DO and remove the submersible pump from the well.

4) After purging, allow static water level to recover to approximate original level.

5) Place polyethylene sheeting around well casing to prevent contamination of sampling equipment in the event equipment is dropped.

6) Obtain sample from well with a dedicated, factory pre-cleaned polyethylene Voss™ bailer (or equivalent). The bailer will be suspended on a new, dedicated length of polypropylene string. The maximum time between purging and sampling will be three (3) hours. All the bailers for one day of sampling will be pre-cleaned and dedicated to each individual wells.

Sample for VOCs first by lowering the bailer slowly to avoid degassing, then collect any other organic and inorganic samples by pouring directly into sample bottles from bailers.

The sample preservation procedure will be to immediately place analytical samples in the cooler and chill to 4°C. Samples will be delivered to the appropriate laboratory within 24 hours. Samples will be maintained at 4°C until time of analysis.

7) Decontaminate the submersible pump and discard the pump discharge line.

8) Re-lock the well cap.

9) Fill out field book, labels, custody seals and Chain-of-Custody forms.

2.5.7 Hydraulic Conductivity Estimation

A falling head or rising head slug test is the instantaneous displacement of water in a well and the subsequent recording of the change in displacement over time as the water level recovers to static conditions. This method can be used to provide order-of-magnitude estimates of the hydraulic conductivity (K) of aquifer material immediately surrounding the test well screen.

General Procedure

1. The decision to perform a slug test must be made with the understanding of how the

resulting data will be applied to the site conceptual model. Slug tests provide an order of magnitude estimate of aquifer K immediately surrounding the screened portion of the well. This degree of accuracy may or may not be adequate for incorporation into a site's conceptual model. Additional methods to obtain estimates of aquifer K are available including:

- literature references based on soil/rock type
- soil sample permeameter analysis
- soil sample grain size analysis
- pumping tests

2. Before any fieldwork or slug testing can be performed, the method for data analysis, which will determine the procedure of the field-testing, must be defined to ensure that all the appropriate dimensions and measurements are recorded.

3. The well to be used during the slug test must be selected after the data analytical method is determined to ensure the appropriate aquifer conditions (i.e. confined/unconfined aquifer, penetration of the aquifer by the well screen, and the water column) exist within the test well. Review all site well constructions logs to determine the most suitable test wells. Some sites may not contain an existing well that is suitable for testing due to well diameter, depth of penetration, screened intervals open to different water bearing layers, etc. A new well may need to be designed and installed to obtain valid data for the portion of the aquifer to be tested.

4. The test well must be adequately developed at least two weeks before testing. A slug test is only representative of conditions near the test well and may therefore be significantly influenced by near-well conditions such as gravel pack, poor well development, and skin effects.

5. Slug generation may be achieved with a large variety of equipment including solid pipe, a bailer and pneumatic pressure. Slug equipment should be selected based on the desired testing results but must take into consideration known or assumed aquifer hydraulic properties and well construction.

6. Select appropriate water level response measurement equipment (manual or automatic) based on the desired testing results, assumed aquifer hydraulic properties, and well construction. Standard data loggers commonly used include In-Situ Mini-Troll and Solinst LT Levelogger.

7. Begin the aquifer test by measuring the water level within the testing well to determine a reference static water level and any observable pre-test water level fluctuations. If a down well logger is being utilized, allow enough time for the water level in the well to reach equilibrium/static conditions after installing the logger into the well. Ensure that the logger is installed deep enough to remain submerged during the slug test.

8. Cause a water level displacement within the test well using a slug. The displacement should be nearly instantaneous, yet should not cause excessive turbulence or result in a "heaving" effected on the water column.

9. Measure water level recovery. The frequency of measurement during the test will be dependent on the hydraulic conductivity of the aquifer material being tested. Measure water levels at closely spaced intervals until the water level has recovered to 70% of its static water level, then the length of time between measurements may be increased until the test is complete. Continue to measure the water level response until the testing well has recovered to approximately 95% of its static water level. The observed displacement in the well should be equal to the expected displacement based on the dimensions of the slug. Large discrepancies may be due to a slug geometry that is incompatible with the test well, or water column "heaving".

10. If feasible, multiple tests should be conducted on a single well using different slug dimension that result in different values of displacement. Data from these tests can be used to evaluate the validity of testing.

11. Before leaving the test well, field-verify the water level response data for apparent anomalous recordings. Discuss data anomalies with project hydrogeologist/project manager.

12. At the end of each aquifer test the date, time, well identification, slug generation method and volume, inside diameter of the testing well, depth of testing well, testing well water column thickness, length and depth of testing well screen, and depth of water level response measuring point within the testing well, must be included within the field notes.

12. Deactivate and remove all testing equipment from the well. Decontaminate all testing equipment.

14. Using the predetermined data analysis method, analyze the data to estimate the hydraulic conductivity of the aquifer. Commercially available software including Aqtesolv® is available to streamline data analysis. A few test analyses should be performed by "hand" calculations and compared to the results determined from using automated software.

2.5.8 Soil Vapor Intrusion Assessment

There is a potential for soil vapor contamination to exist on-site that may impact adjacent businesses and residences. To evaluate this potential a soil vapor intrusion assessment will be conducted. The testing associated with this assessment will include collection of indoor, outdoor and sub slab air samples.

2.5.8.1 Indoor and Outdoor Air Sampling

Indoor and outdoor air samples will be collected to assess air quality at the Site and at businesses adjacent to the Site using SUMMA® canisters equipped with timed sample acquisition regulators. The canisters and regulators will be certified clean by the laboratory prior to onsite re-use. A NYSDOH ELAP-certified laboratory will analyze each sample for the specified VOCs using United States Environmental Protection Agency (USEPA) Method TO-15 and will be consistent with the NYSDEC Modifications to EPA Region 9 TO-15 QA/QC Criteria February 2008. General details are presented below.

1. Prior to sampling, EnviroTrac will select an appropriate location for collection of the indoor and outdoor air samples. EnviroTrac will attempt to obtain the sample from a central location at the sampling point, away from foundation walls. If possible, sources of VOCs will be removed from the sampling area. A PID will be used to help identify such sources.

2. The location of the sample will be marked, documented, and photographed. A Sample identification label will be visible in each photograph. In addition, a measuring device will be visible in each photograph to show that indoor ambient air sample intake valves are located between three and five-feet from the floor.

3. An initial PID reading will be made at the location of each air sample.

4. The SUMMA® canister will be attached to a sampling regulator set to collect a sample over a previously established period (sample collection time may be changed at the discretion of the NYSDEC Project Manager). At the end of each day and after approximately 80% of the specified sample collection time has elapsed, the canister will be checked to ensure substantial vacuum pressure remains in the canister for sample collection and shipment.

5. For each indoor sample location, all the pertinent data will be recorded in the field book. This information should include the following:

- Sampler's name;
- Date, time and PID reading;
- Date and time of sample start and stop;
- SUMMA® canister serial number;
- Survey location number, and descriptive location of the sampling area;
- Sample identification for corresponding outdoor air samples
- Weather conditions;
- Barometric pressure;
- Initial SUMMA® canister pressure; and
- Final SUMMA® canister pressure.

Preparation of SUMMA® Canister and Collection of Sample:

- Place SUMMA® canister at height equivalent to approximately the breathing zone of the ground story level of a building (e.g., approximately 3 to 5 feet above the ground surface). Position canister on stable surface, or suspend from stable structure with nylon rope. The canister inlet should be protected from precipitation (rain, ice, or snow) either by pointing the inlet downward or by shielding the top of the canister.
- Record SUMMA® canister serial number in the field book and COC.
- Assign sample identification on canister ID tag, and record in the field book and COC.
- Remove brass plug from canister fitting.
- Install pressure gage / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.
- Open and close canister valve.
- Record gage pressure in the field book and COC. Gage pressure must read >28 inches Hg. Replace SUMMA® canister if gage pressure reads <28 inches Hg.
- Remove brass plug from gage fitting and store for later use.
- Install particulate filter onto metering valve input fitting and tighten.
- Open canister valve to initiate sample collection.
- Record local time in the field book and COC.
- Take digital photograph of SUMMA® canister and surrounding area.

Termination of Sample Collection:

- Revisit SUMMA® canister at the end of each sampling day and approximately after 80% of sample collection time has elapsed to verify sufficient amount of vacuum pressure remains for sample collection and shipment. If vacuum pressure no longer exists, or if vacuum pressure is <5 inches Hg, close the canister valve and document conditions. At end of sample collection period record gage pressure in the field book and COC.
- Record local time in the field book and COC.

- Close canister valve.
- Remove particulate filter and pressure gage / metering valve from canister.
- Reinstall brass plug on canister fitting and tighten.
- Remove SUMMA® canister from sample collection area.
- Preparation and shipment of sample to analytical laboratory will follow the procedure below.
- Pack SUMMA® canister in shipping container, note presence of brass plug installed in tank fitting.
- Complete COC and place requisite copies in shipping container.
- Close shipping container and affix custody seal to container closure.

Quality Assurance/Quality Control (QA/QC) Samples:

The collection of QA/QC samples will include the submittal of blind sample duplicates to the analytical laboratory for analyses of target compounds. Co-located "duplicate" samples will be collected "side-by-side" over the same time interval. The following procedure should be followed when collecting a duplicate sample.

- Record SUMMA® canister serial number in the field book and COC.
- Assign sample identification on canister ID tag, record in the field book and COC.
- Remove brass plug from canister fitting.
- Install pressure gage / metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.
- Open and close canister valve.
- Record gage pressure in the field book and COC.

Remove pressure gage and replace brass plug on canister fitting and tighten.

2.5.8.2 Sub Slab Soil Gas Sampling

The sub slab samples will be collected at the general locations specified in the Work Plan using SUMMA® canisters equipped with timed sample acquisition regulators. Actual locations will be established based on accessibility with concurrence of the NYSDEC. The canisters and regulators will be certified clean by the laboratory prior to on-site use. A NYSDOH ELAP-certified laboratory will analyze each sample for VOCs using USEPA Method TO-15.

Selection and Preparation of Sub-Slab Soil Vapor Sample Collection Point

Observe the condition of the building floor slab for apparent penetrations such as concrete floor cracks, floor drains, or sump holes. Note the floor conditions in the field book and select a potential location or locations for a temporary subsurface probe. The location or locations should be away from foundation walls and apparent penetrations.

Review the proposed location or locations with the occupant/owner describing how the sampling port or ports will be installed. After receiving permission from the occupant or owner, mark the proposed location(s) and describe the location(s) in the field book.

Using the PID, screen indoor air in the area of floor penetrations such as concrete floor cracks, floor drains, or sump holes (note that the detection limits for the laboratory analyses to be performed on the samples collected are considerably lower than the detection limits of the PID). Record the indoor air PID readings in the field book.

Permanent soil vapor monitoring point will be installed to facilitate resampling, construction details are provided on Figure 2-9.

Preparation of SUMMA® Canister and Collection of Sample

1. Place SUMMA® canister adjacent to the subsurface probe.
2. Record SUMMA® canister serial number in the field book and COC.
3. Assign sample identification on canister ID tag, and record in the field book and COC.
4. Remove brass plug from canister fitting.
5. Install pressure gauge I metering valve on canister valve fitting and tighten. If pressure gage has additional (2nd) fitting, install brass plug from canister fitting into gage fitting and tighten.
6. Open and close canister valve.

7. Record gage pressure in the field book and COC. Gage pressure must read >28 psi. Replace SUMMA® canister if gage pressure reads <28 psi.
8. Remove brass plug from gauge fitting and store for later use.
9. Install particulate filter onto metering valve input fitting and tighten.
10. Connect subsurface probe to end of in-line particular filter via ¼-inch O.D. Teflon® tubing and Swagelok® fittings.
11. Open canister valve and in-line stainless steel valve to initiate sample collection.
12. Take photograph of SUMMA® canister set up and surrounding area.
13. Record date and local time of valve opening in the field book and COC.

Termination of Sample Collection

1. Revisit SUMMA® canister after 80% of sample collection time has elapsed to verify sufficient amount of vacuum pressure remains for sample collection and shipment. At the end of sample collection period record gauge pressure in the field book and COC.
2. Record date and local time of valve closing in the field book and COC.
3. Close canister valve.
4. Disconnect Teflon® tubing and remove particulate filter and pressure gage / metering valve from canister.
5. Reinstall brass plug on canister fitting and tighten.
6. Remove SUMMA® canister from sample collection area.
7. Remove temporary subsurface probe and plug the slab probe hole with solid laboratory grade rubber plug. Set plug slightly below the finished floor level cover flush with the floor surface using quick drying hydraulic cement.

Preparation and Shipment of Sample to Analytical Laboratory

1. Pack SUMMA® canister in shipping container, note presence of brass plug installed in tank fitting.
2. Complete COC and place requisite copies in shipping container.
3. Close shipping container and affix custody seal to container closure.

2.5.9 Decontamination Procedures

Non-dedicated sampling equipment will be decontaminated before use according to the following steps:

1. Wash in tap water with non-phosphate detergent;
2. Rinse with tap water (optional);
3. Rinse with distilled/deionized water;
4. * Rinse with 10% nitric acid solution (1.0% nitric acid for stainless steel split-spoons);
5. Rinse with distilled/deionized water;
6. Rinse with pesticide-grade acetone;
7. Rinse with distilled/deionized water; and
8. Totally air dry.

*Only if sample is to be analyzed for metals.

Sampling equipment that has been subjected to these procedures will be wrapped in aluminum foil. Custody seals will be affixed to the foil for identification.

Laboratory supplied well bailers (if utilized) will be dedicated equipment subjected to laboratory cleaning procedures as described previously, before use in the field. Well bailers will be decontaminated in the field before they are returned to the laboratory.

Field measurement equipment, such as water level indicators, should be cleaned in the following manner:

- Wipe with paper towel to remove visual contamination;
- Wash with tap water and non-phosphate detergent;
- Rinse with tap water; and
- Rinse with distilled/deionized water.

Drilling rig and materials will arrive on-site in a clean condition. Prior to the start of the drilling, all drill rods, bits, tool spaces, and tools will be steam-cleaned at an area onsite that will have been prepared for this purpose. The equipment, including well casings, will be inspected to ensure that all residues such as machine oils have been removed. Similar decontamination procedures will be implemented between each borehole to prevent cross-contamination.

2.5.10 Management of Investigative Derived Waste

The following section describes the general protocols for handling and disposal of solid and liquid investigative derived waste (IDW) generated during the implementation of the RI. Waste generated during the investigation is expected to consist of trash (boxes, paper, etc.), soil cuttings, decontamination wash water, groundwater monitoring well purge water, and used protective clothing.

The following guidance documents and regulations may be relied upon to guide the management, staging, storage and disposal of RI-generated IDW:

- NYSDEC's TAGM #4032 on "Disposal of Drill Cuttings" (November 21,1989)[10];
- NYSDEC's RCRA TAGM #3028 on "Contained-In Criteria for Environmental Media" (November 30,1992)[11];
- 40 C. F. R. Part 262 (Standards Applicable to Generators of Hazardous Waste)[12];
- 40 C. F. R. Part 263 (Standards Applicable to Transporters of Hazardous Waste)[13];
- 40 C. F. R. Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities)[14]; and
- 40 C. F. R. Part 268 (Land Disposal Restrictions)[15].

Accordingly, handling and disposal will be as follows:

- Cuttings from soil borings and the tailings from the unused portion of the samples collected from on-Site and/or source areas and from monitoring well installations will be collected on plastic sheeting and stored in reconditioned 55-gallon, New

York State Department of Transportation (DOT) open-top drums to be provided by the EnviroTrac's drilling subcontractor.

- Liquids generated from equipment decontamination, temporary and permanent groundwater monitoring well development/purging will be collected in 55-gallon drums at the point of generation. The water will be sampled for characterization parameters required by the disposal facility and then disposed of appropriately.
- Used protective clothing and equipment that is suspected to be contaminated with hazardous waste will be placed in plastic bags, packed in 55-gallon drums.
- All drums will be labeled according to the borehole/well number. The drilling subcontractor shall move the drums on a daily basis at the direction of EnviroTrac's representative to the staging area.
- EnviroTrac will procure waste transport and disposal subcontractor services to properly dispose of all IDW in accordance with all local, State and Federal regulations.
- Non-contaminated trash, debris and protective clothing will be placed in a trash dumpster and disposed of by a local garbage hauler.

2.5.11 Surveying

The location and elevation of the top of the innermost casing of all monitoring wells will be surveyed by a New York licensed surveyor. The horizontal coordinates will be measured to within ±1 foot using State Planer coordinates. The elevation will be surveyed to within ±0.01 foot and reported in feet above mean sea level (MSL). The locations and elevations - will be determined with respect to onsite benchmarks.

In addition to surveying the monitoring well locations and elevations; sub-slab soil vapor intrusion assessment locations, soil boring, hand auger and surface water/sediment locations will be surveyed with respect to onsite benchmarks and plotted on the base map.

2.6 Sample Handling and Analysis

2.6.1 Chain-of-Custody Procedures

Each sample collected for analysis will be recorded on a Chain-of-Custody form. If an error is made while completing the multi-part form, a single line is drawn through the error and initially by field personnel. A copy of the completed form is maintained by field personnel once transfer of custody of the samples is documented by signing of release by field personnel. The Chain-of-Custody form accompanies the samples during shipment to the laboratory and each transfer of custody is documented. Further detail pertaining to acceptable COC procedures is provided in the ASTM guidance document D4840-99, *Standard Guide for Sample Chain-of-Custody Procedures*[16].

2.6.2 Sample Packaging and Shipment

Samples will be packaged and shipped according to requirements provided in the QAPP – Appendix B, Section 2.6.

2.6.3 Sample Containers, Holding Times and Preservation

Requirements pertaining to sample containers, sample holding times and sample preservation are provided in the QAPP – Appendix B, Section 2.6 and summarized in the QAPP – Appendix B, Table B-1.

2.6.4 Sampling QA/QC Protocols

Field QA/QC samples will be collected and analyzed as part of all field sampling activities. The protocols to be followed for collection of field QA/QC samples are provided in the QAPP – Appendix B, Section 2.4. The sample identifier numbers for QA/QC samples are outline in the QAPP – Appendix B, Section 2.6.

3. QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP), provided in Appendix B of this Sampling and Analysis Plan (SAP), is being prepared in conjunction with the Field Sampling Plan (FSP) detailing activities to be undertaken as part of the remedial investigation/feasibility study (RI/FS) at the Fashion Cleaners Site (Site).

The purpose of the QAPP is to describe the following items:

- Quality Assurance (QA) objectives;
- Sampling and laboratory procedures;
- Sample custody procedures;
- Calibration procedures, references, and frequencies;
- Protocols for field activities;
- Internal quality control (QC) checks;
- QA performance and system audits;
- Preventive maintenance procedures and schedules;
- Data assessment procedures;
- Corrective actions; and
- QA reports to management.

4. REFERENCES

1) New York State Department of Environmental Conservation, Draft DER-10 Technical Guidance for Site Investigation and Remediation, December, 2002.

2) New York State Department of Health, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October, 2006.

3) ASTM Designation: D6282-98, Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.

4) ASTM Designation: D2488-06, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

5) ASTM Designation: D1586-99, Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils.

6) ASTM Designation: D5092-04, Standard Guide for Design and Installation of Ground Water Monitoring Wells.

7) ASTM Designation: D6724-04, Standard Guide for Installation of Direct Push Ground Water Monitoring Wells.

8) ASTM Designation: D6771-02, Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations.

9) ASTM Designation: D4448-01, Standard Guide for Sampling Ground-Water Monitoring Wells.

10) New York State Department of Environmental Conservation, TAGM #4032 on "Disposal of Drill Cuttings" (November 21,1989).

11) New York State Department of Environmental Conservation, RCRA TAGM #3028 on "Contained-In Criteria for Environmental Media" (November 30,1992).

12) 40 C. F. R. Part 262 (Standards Applicable to Generators of Hazardous Waste).

13) 40 C. F. R. Part 263 (Standards Applicable to Transporters of Hazardous Waste).

14) 40 C. F. R. Part 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities).

15) 40 C. F. R. Part 268 (Land Disposal Restrictions).

16) ASTM Designation: D4840-99, Standard Guide for Sample Chain-of-Custody Procedures.

USGS TOPOGRAPHIC MAP

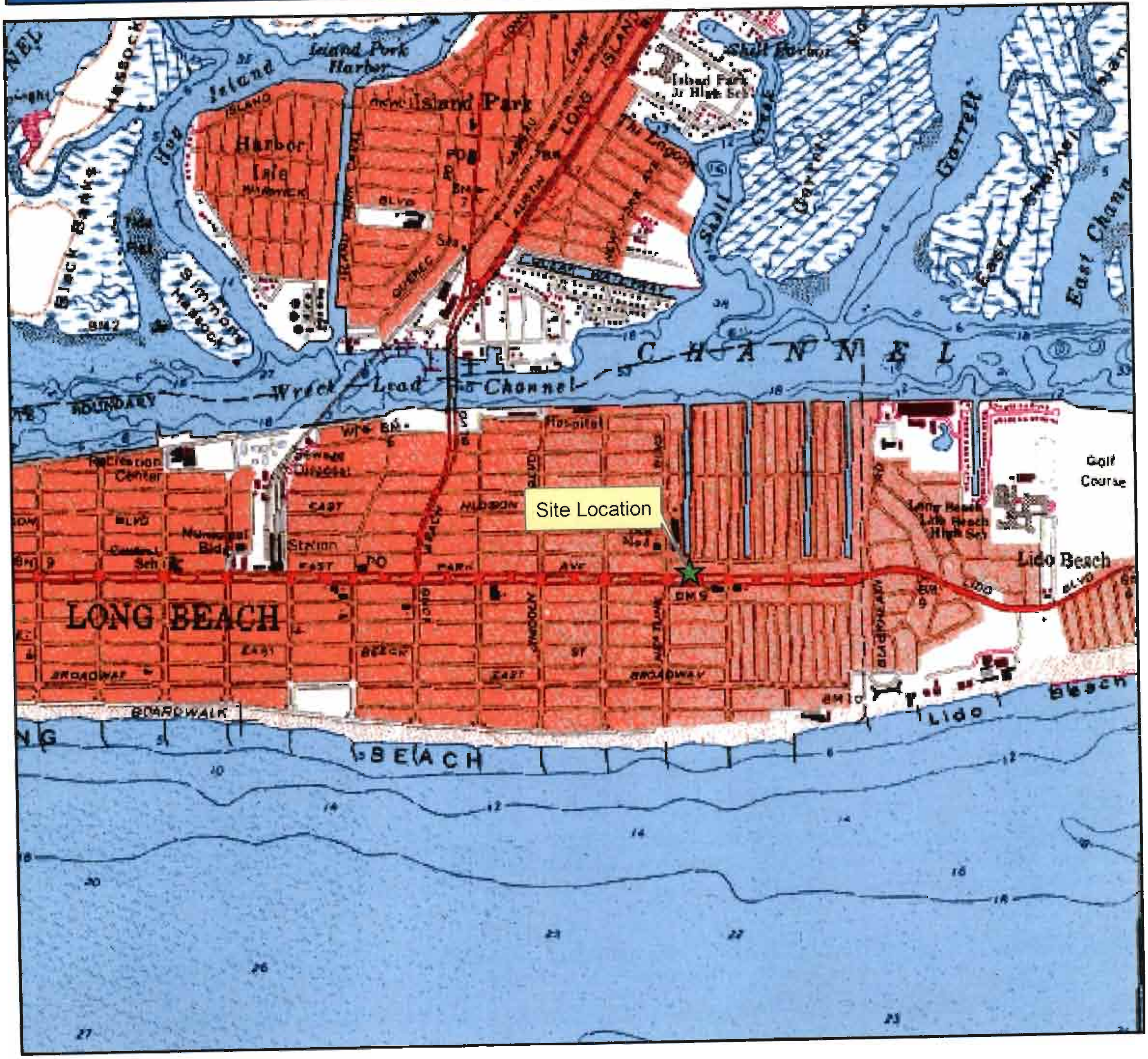


Figure 2-1
Site Location

Fashion Cleaners
641 East Park Avenue
Long Beach, NY 11561-2512

USGS Quadrangle:
Lawrence

Approximate Elevation:
3 feet amsl

0 455 910 1,820 2,730 3,640
Feet

N
W E
S

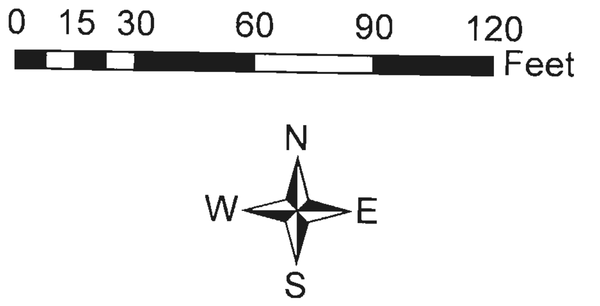
EnviroTrac
Environmental Services
5 Old Dock Road
Yaphank, NY 11980
P: 631-924-3001 F:631-924-5001

AERIAL PHOTOGRAPH

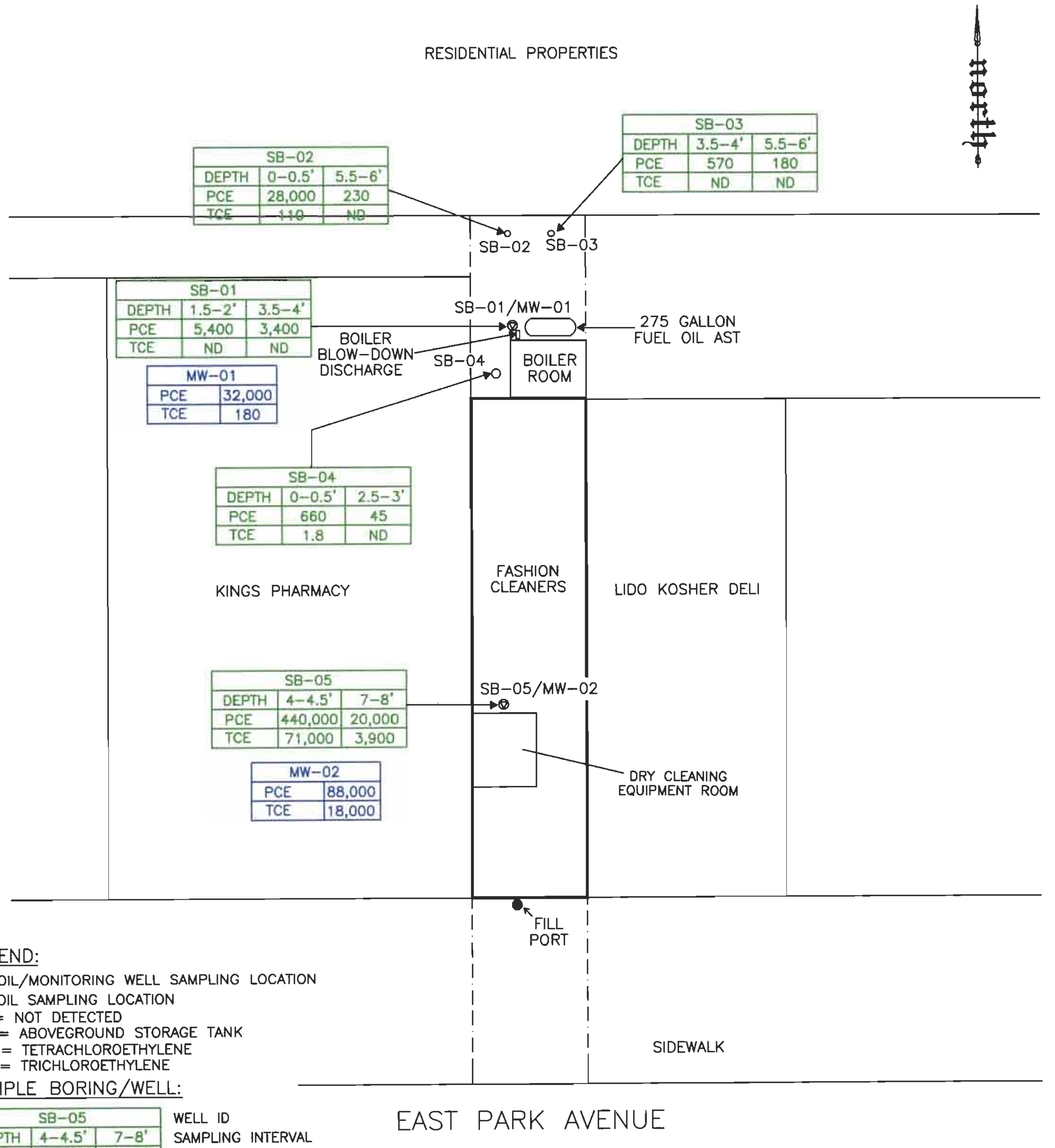
Figure 2-2
Site Plan

Fashion Cleaners
641 East Park Avenue
Long Beach, NY 11561-2512

Digital imagery taken in 2004



EnviroTrac
Environmental Services
5 Old Dock Road
Yaphank, NY 11980
P: 631-924-3001 F:631-924-5001



SB-02		
DEPTH	0-0.5'	5.5-6'
PCE	28,000	230
TCE	110	ND

SB-03		
DEPTH	3.5-4'	5.5-6'
PCE	570	180
TCE	ND	ND

SB-01		
DEPTH	1.5-2'	3.5-4'
PCE	5,400	3,400
TCE	ND	ND

MW-01	
PCE	32,000
TCE	180

SB-04		
DEPTH	0-0.5'	2.5-3'
PCE	660	45
TCE	1.8	ND

SB-05		
DEPTH	4-4.5'	7-8'
PCE	440,000	20,000
TCE	71,000	3,900

MW-02	
PCE	88,000
TCE	18,000

LEGEND:

⊗ SOIL/MONITORING WELL SAMPLING LOCATION
○ SOIL SAMPLING LOCATION
ND = NOT DETECTED
AST = ABOVEGROUND STORAGE TANK
PCE = TETRACHLOROETHYLENE
TCE = TRICHLOROETHYLENE

SAMPLE BORING/WELL:

SB-05			
			WELL ID
DEPTH	4-4.5'	7-8'	SAMPLING INTERVAL
PCE	440,000	20,000	PCE RESULTS IN ug/Kg
TCE	71,000	3,900	TCE RESULTS IN ug/Kg

MW-02		
		WELL ID
PCE	88,000	PCE RESULTS IN ug/L
TCE	18,000	TCE RESULTS IN ug/L

GREEN = SOIL RESULTS
BLUE = GROUND-WATER RESULTS

NOTE: ANALYTICAL DATA SUMMARIZED FROM JULY 29, 2005
LETTER REPORT PREPARED BY ENVIRONMENTAL RESOURSES

EnviroTrac
MANAGEMENT - NORTHEAST
ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

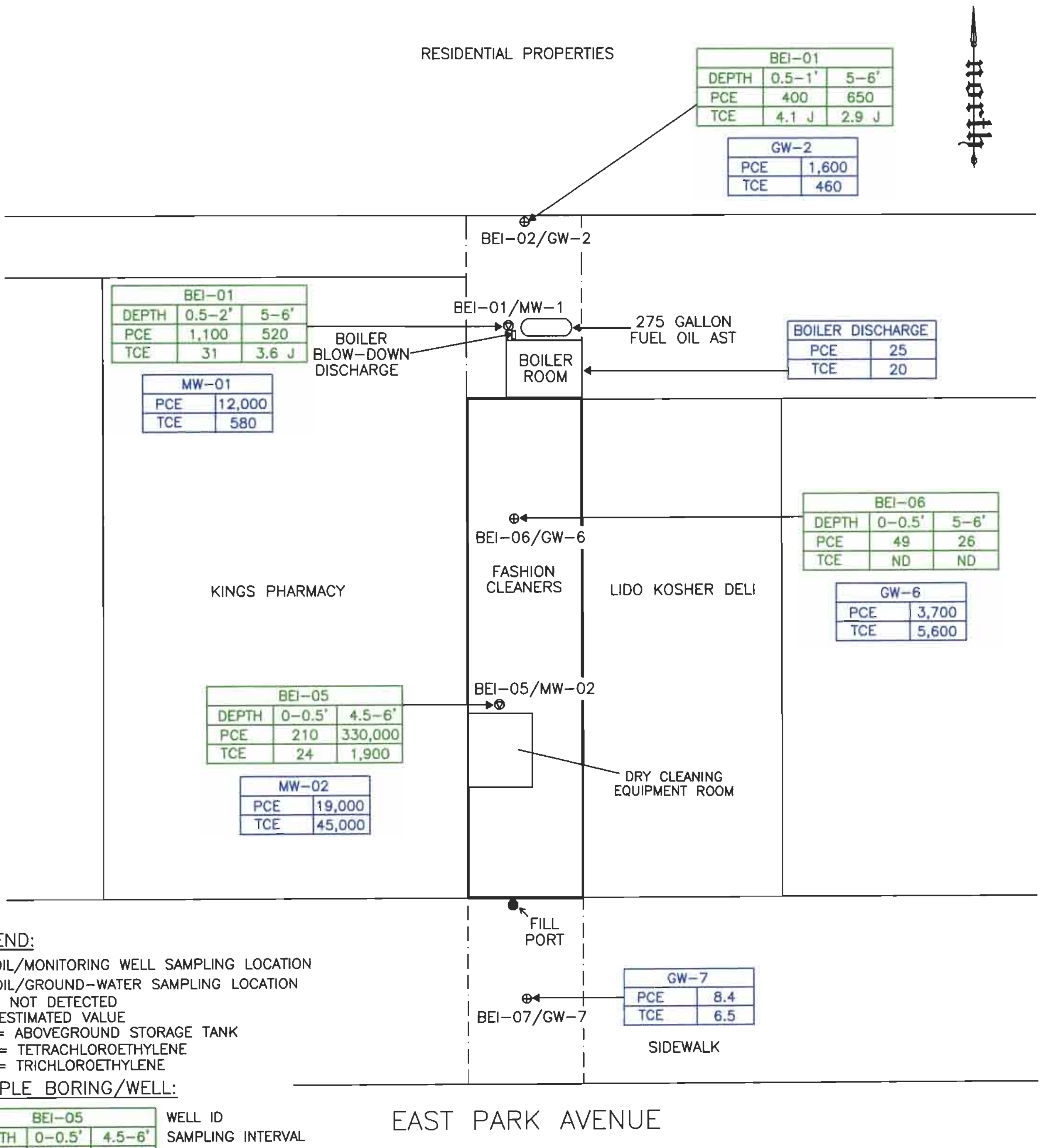
0 10 FT. 20
1" = 20 FEET

REVISION DATE: AUGUST 18, 2008
REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

JUNE 2005
PCE AND TCE
ANALYTICAL RESULTS

FIGURE #
2-3



BEI-01		
DEPTH	0.5-1'	5-6'
PCE	400	650
TCE	4.1 J	2.9 J

GW-2	
PCE	1,600
TCE	460

BEI-01		
DEPTH	0.5-2'	5-6'
PCE	1,100	520
TCE	31	3.6 J

MW-01	
PCE	12,000
TCE	580

BOILER DISCHARGE	
PCE	25
TCE	20

BEI-06		
DEPTH	0-0.5'	5-6'
PCE	49	26
TCE	ND	ND

GW-6	
PCE	3,700
TCE	5,600

BEI-05		
DEPTH	0-0.5'	4.5-6'
PCE	210	330,000
TCE	24	1,900

MW-02	
PCE	19,000
TCE	45,000

GW-7	
PCE	8.4
TCE	6.5

LEGEND:

⊽ SOIL/MONITORING WELL SAMPLING LOCATION
⊕ SOIL/GROUND-WATER SAMPLING LOCATION
ND = NOT DETECTED
J = ESTIMATED VALUE
AST = ABOVEGROUND STORAGE TANK
PCE = TETRACHLOROETHYLENE
TCE = TRICHLOROETHYLENE

SAMPLE BORING/WELL:

BEI-05			WELL ID
DEPTH	0-0.5'	4.5-6'	SAMPLING INTERVAL
PCE	210	330,000	PCE RESULTS IN ug/Kg
TCE	24	1,900	TCE RESULTS IN ug/Kg

MW-02		WELL ID
PCE	19,000	PCE RESULTS IN ug/L
TCE	45,000	TCE RESULTS IN ug/L

GREEN = SOIL RESULTS
BLUE = GROUND-WATER RESULTS

NOTE: ANALYTICAL DATA SUMMARIZED FROM NOVEMBER 27 2005
LETTER REPORT PREPARED BY ENVIRONMENTAL RESOURSES

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ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

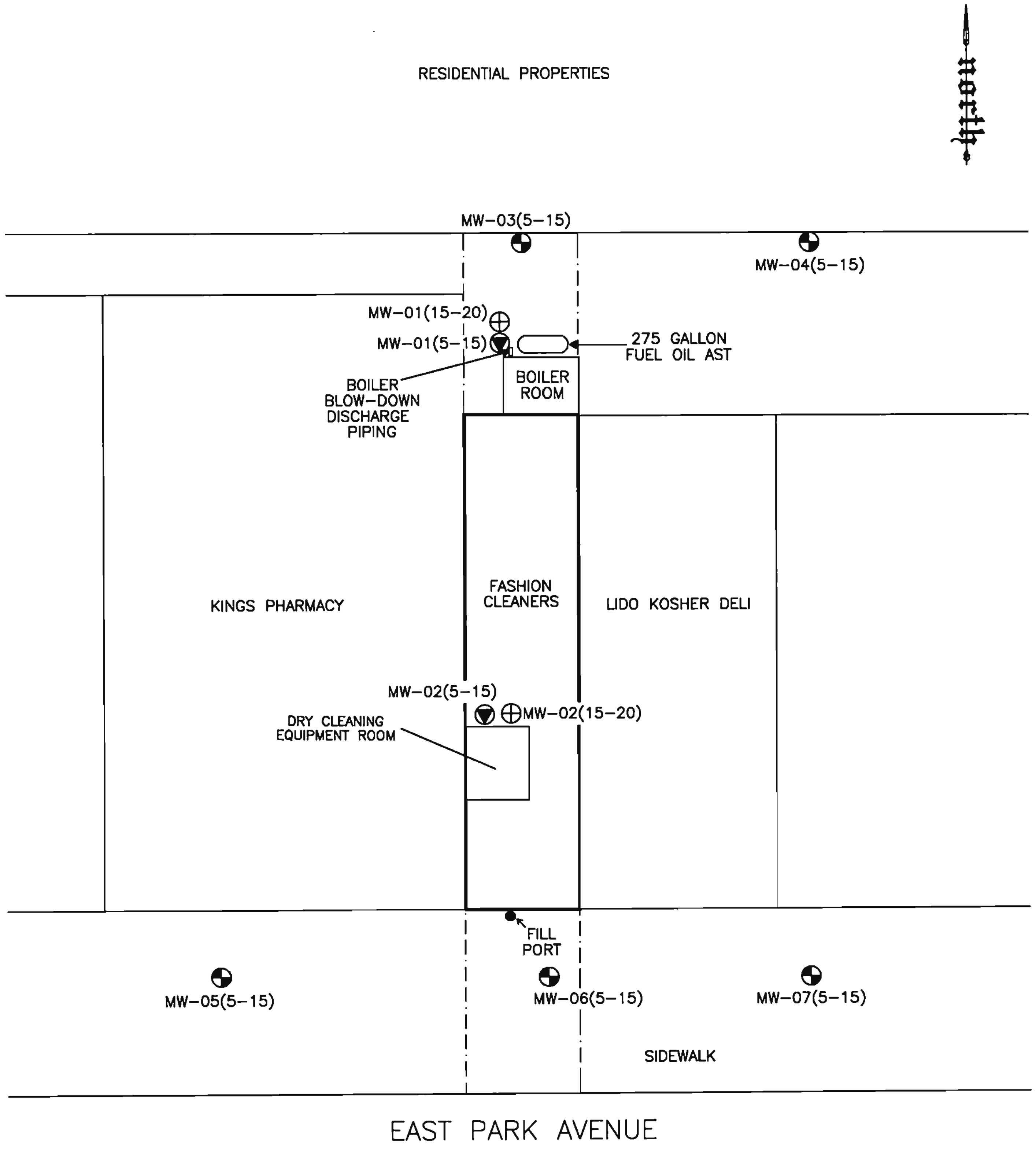
0 10 FT. 20
1" = 20 FEET

REVISION DATE: AUGUST 18, 2008
REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

SEPTEMBER 2005
PCE AND TCE
ANALYTICAL RESULTS

FIGURE #
2-4



LEGEND:

- ▼ EXISTING SHALLOW MONITORING WELL
- ⊕ PROPOSED DEEP MONITORING WELL
- ◐ PROPOSED SHALLOW MONITORING WELL

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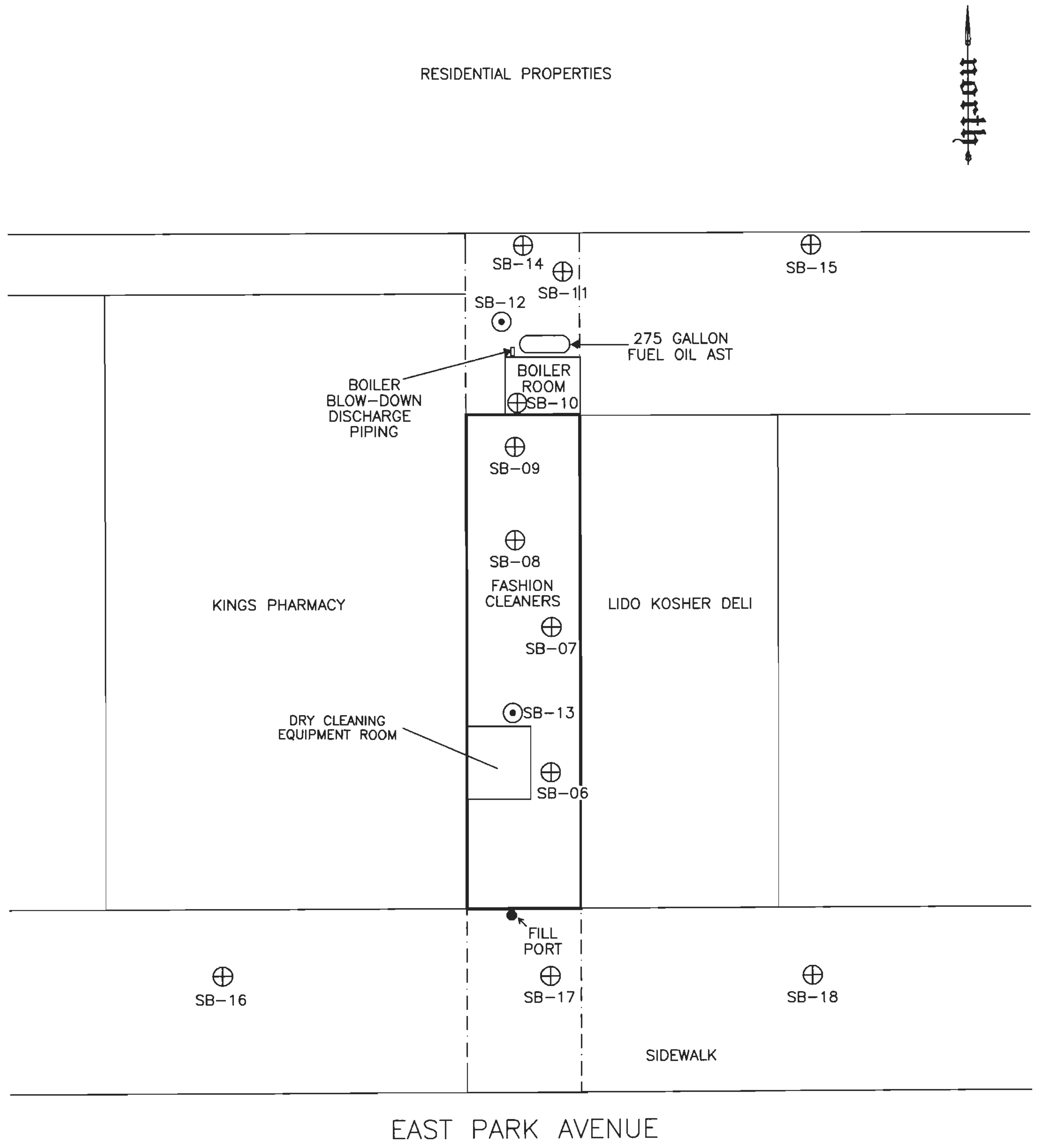
0 10 FT. 20
1" = 20 FEET

REVISION DATE: AUGUST 18, 2008
REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

PROPOSED GROUNDWATER TESTING LOCATIONS

FIGURE #
2-5



LEGEND:

⊕ PROPOSED SOIL BORING

⊙ PROPOSED SOIL BORING AT DEEP MONITORING WELL LOCATION

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ENVIRONMENTAL SERVICES
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0 10 FT. 20
1" = 20 FEET

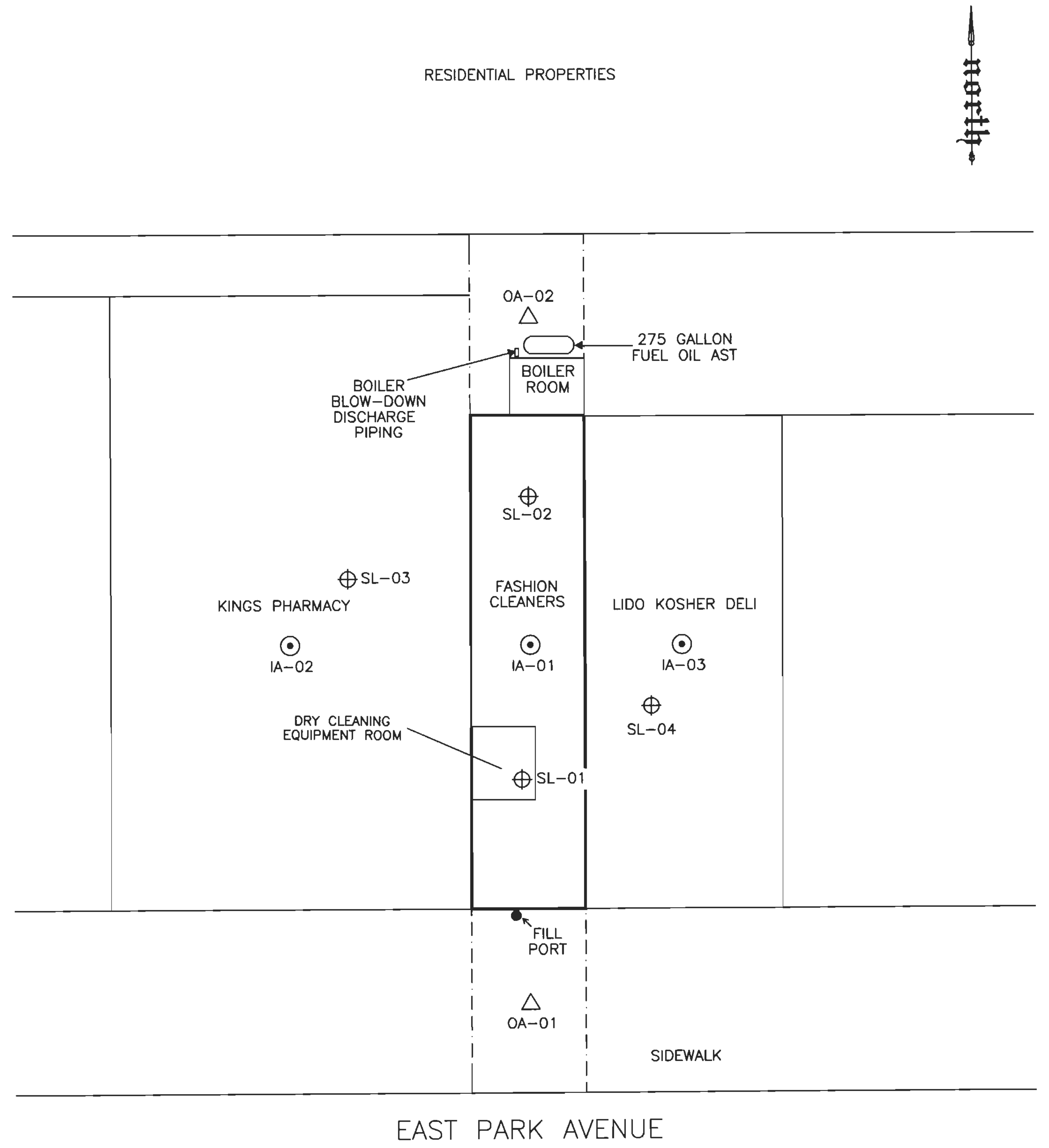
REVISION DATE: AUGUST 18, 2008

REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

PROPOSED
SOIL TESTING
LOCATIONS

FIGURE #
2-6



LEGEND:

- ⊕ PROPOSED SUBSLAB SAMPLING LOCATION
- ⊙ PROPOSED INDOOR AIR SAMPLING LOCATION
- △ PROPOSED OUTDOOR AIR SAMPLING LOCATION

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0 10 FT. 20
1" = 20 FEET

REVISION DATE:
AUGUST 18, 2008

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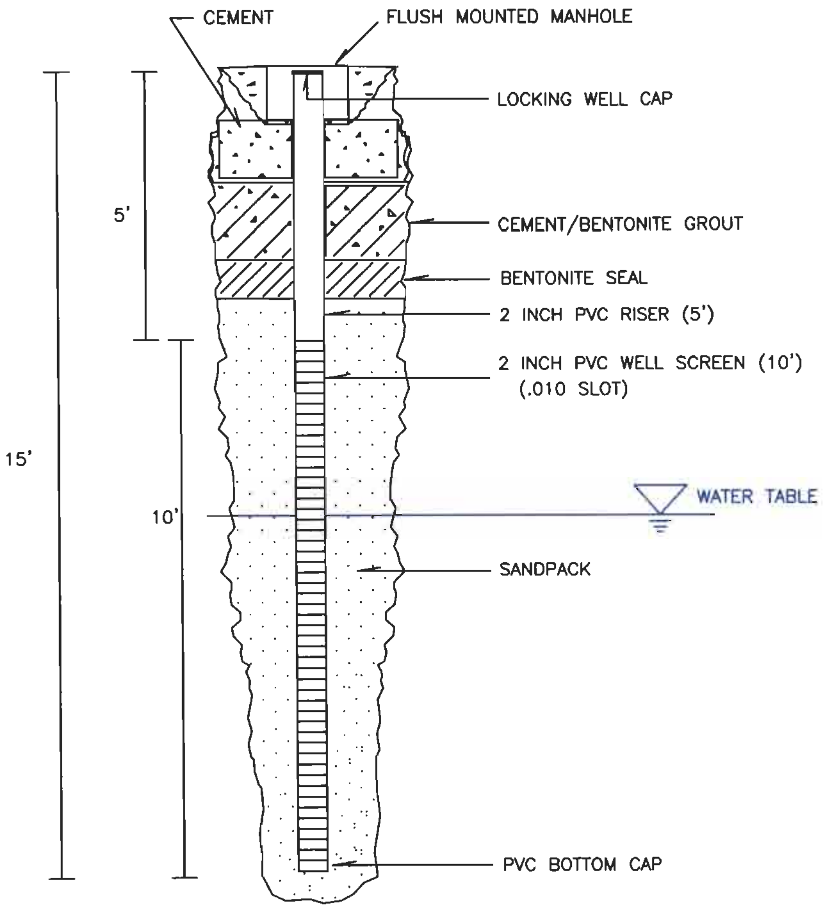
FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

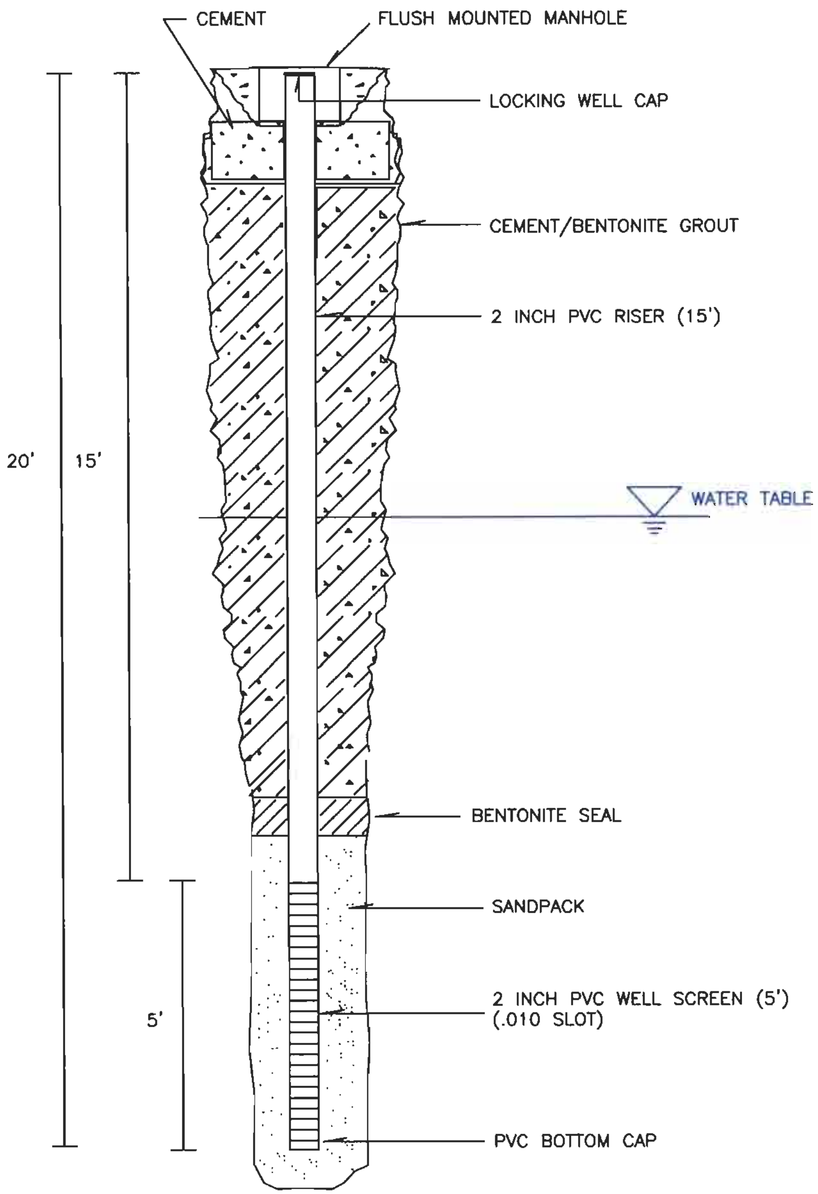
PROPOSED SOIL VAPOR
INTRUSION ASSESSMENT
SAMPLE LOCATIONS

FIGURE #
2-7

SHALLOW MONITORING WELL



DEEP MONITORING WELL



EnviroTrac
ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

SCALE:
NOT TO SCALE

REVISION DATE:
OCTOBER 20, 2008

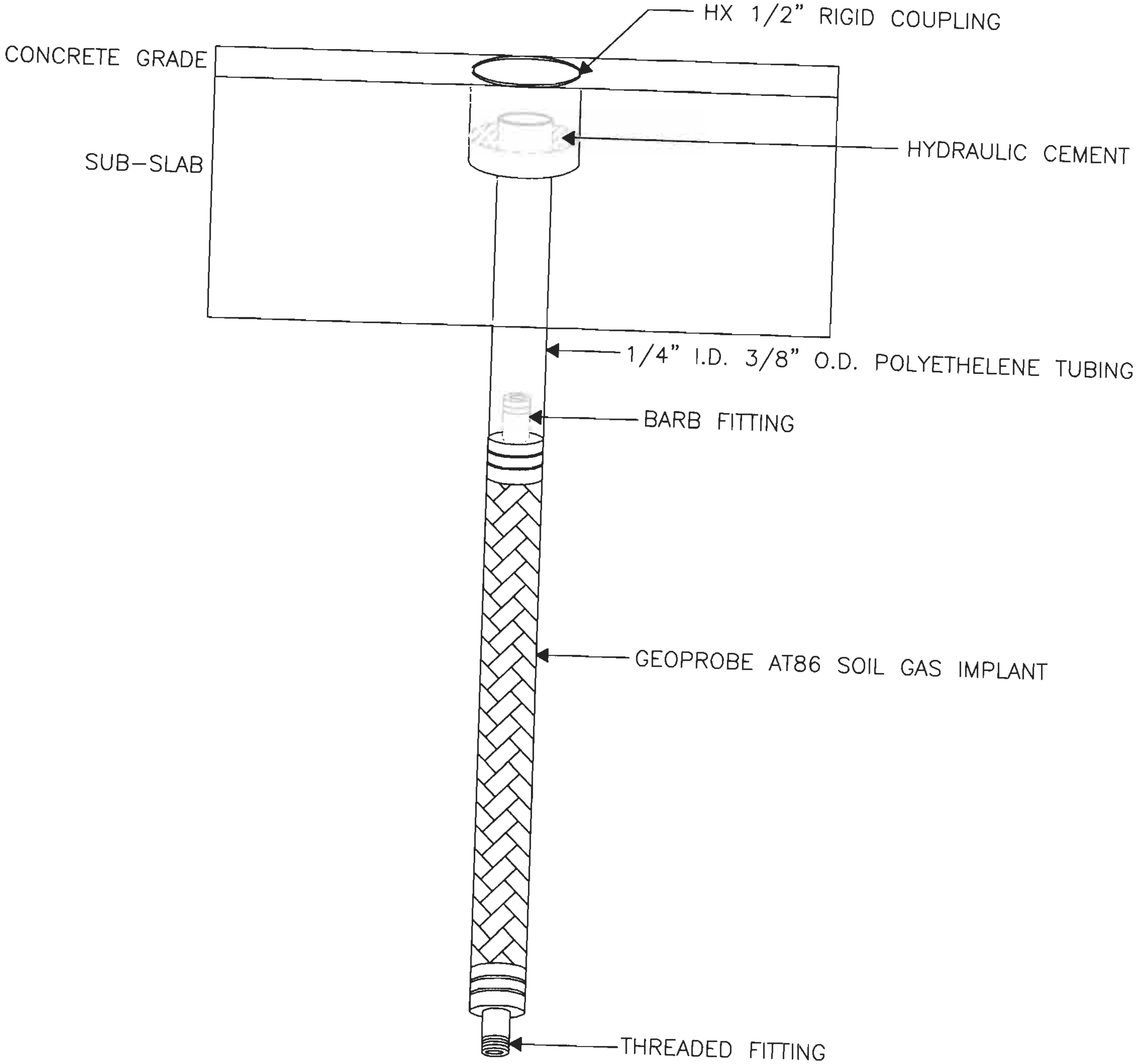
REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

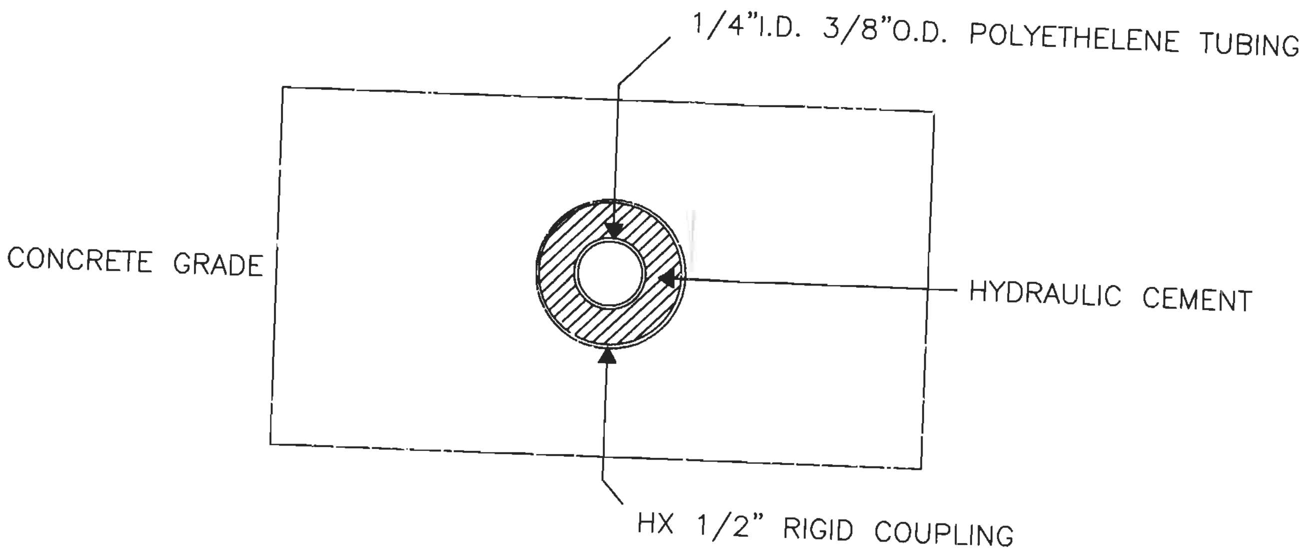
SHALLOW AND DEEP WELL
CONSTRUCTION DIAGRAM

FIGURE #
2-8

PLAN VIEW



TOP VIEW



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ENVIRONMENTAL SERVICES
5 OLD DOCK ROAD, YAPHANK, NEW YORK 11980
PHONE: (631)924-3001 FAX: (631)924-5001

SCALE:
NOT TO SCALE

REVISION DATE:
OCTOBER 20, 2008

REVISED BY: TB

FASHION CLEANERS
641 EAST PARK AVENUE
LONG BEACH, NEW YORK
11561-2512

SUB-SLAB VAPOR MONITORING POINT CONSTRUCTION DIAGRAM

FIGURE #
2-9

Table 2-1
Remedial Investigation - Phase I Scope of Work
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Activity	Rationale	Number	Location	Parameters	Total No. of Samples[1]
Underground Utility Evaluation	Identify utilities that might interfere with invasive testing or provide conduits for preferential migration of contamination	NA	On-Site and vicinity of Site in areas of proposed testing	NA	NA
Tidal Influence Study	Determine if groundwater at the Site is tidally influenced	1	Proposed Monitoring Well MW-03(5-15)	NA	~2,000[2]
Lithologic Assessment	Assess stratigraphy	NA	Proposed Soil Borings	NA	NA
Hand Augering	Further delineate shallow soil contamination at identified source areas	6	On Property (building and exterior courtyard)	NYSDEC TCL and TAL compounds[3]	12
Soil Borings	Define extent of soil contamination	7	On Property (building and exterior courtyard), and immediate vicinity of the Site	NYSDEC TCL VOC compounds[4,5]	9
Monitoring Well Installation and Groundwater Sampling	Determine the extent of groundwater contamination	9	On Property (building and exterior courtyard), and immediate vicinity of the Site	NYSDEC TCL and TAL compounds, chloride[6,7]	9
Hydraulic Conductivity Estimation	Determine hydraulic conductivity of the shallow sandy deposits underlying the Site	5	Proposed Monitoring Wells MW-03(5-15), MW-05(5-15), MW-07(5-15), MW-01(15-20), MW-02(15-20)	Hydraulic Conductivity	5[8,9]
Soil Vapor Intrusion Assessment	Establish baseline conditions and evaluate potential for vapor intrusion at the Site and immediate vicinity	9	Indoor, outdoor and sub slab testing locations on property and at immediatley adjacent businesses	TO-15 VOCs	9

Notes:
NA - Not Applicable.
1) Does not include QA/QC analysis.
2) Data will be collected by digital logger every five minutes over a period of one week.
3) Samples from soil boring SB-06, SB-07, SB-08, SB-09, SB-10, SB-11: NYSDEC TCL VOCs.
4) Samples from soil boring SB-12 and SB-13: full NYSDEC TCL/TAL list of compounds.
5) Samples from soil borings SB-14 through SB-18: NYSDEC TCL VOCs.
6) Samples from MW-01(5-15) and MW-02(5-15): full NYSDEC TCL/TAL list of compounds, chloride.
7) Samples from MW-03 through MW-07 locations, MW-01(15-20) and MW-02(15-20): NYSDEC TCL VOCs, chloride.
8) Wells MW-03(5-15), MW-05(5-15), MW-07(5-15): two rising head tests will be conducted for each well.
9) Wells MW-01(15-20) and MW-02(15-20): two rising head tests and two falling head tests will be conducted for each well.

Table 2-2
Summary of Sample Frequency and Analysis
Remedial Investigation - Phase I
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Location/Matrix	Number of Locations	Analytes[1]	Number of Samples	Total No.[2]
Hand Auger - Soil	6	TCL VOCs	12	15
Soil Borings - Soil	2	full TCL/TAL	4	7
	5	TCL VOCs	5	5
Groundwater	2	full TCL/TAL	2	5
	7	TCL VOCs	7	7
	9	Chloride	9	11
Soil Vapor Intrusion Assessment	9	TO-15 VOCs	9	10

Notes:

1) TCL - Target Compount List (VOA, BNA, Pest/PCB).
   TCL - Target Compount List (VOA, BNA, Pest/PCB).
   TAL - Target Analyte List (Metals and Cyanide).
   TCL VOCs - Target Compound List Volatile Organics.
2) Estimated total number of samples including QA/QC samples.

Health and Safety Plan

TABLE OF CONTENTS

TABLE OF CONTENTS (continued

ATTACHMENTS

Attachment 1	Affidavits
Attachment 2	OSHA HAZWOPER Training Certificates
Attachment 3	Safety Regulations
Attachment 4	Material Safety Data Sheet
Attachment 5	First-Aid and Safety Equipment Lists
Attachment 6	Accident Report Form
Attachment 7	Site Personnel Protection and Safety Evaluation Form
Attachment 8	Hospital Location and Directions Map

1. INTRODUCTION

This Health and Safety Plan (HASP) has been prepared to identify the health and safety precautions, methods, and requirements for investigations, construction, installation and sampling activities at Fashion Cleaners located at 641 East Park Avenue, Long Beach, New York 11561-2512 (the Site) to ensure the protection of site workers, surrounding community, and the environment. This HASP applies to the activities set forth in the Remedial Investigation (RI) Work Plan for the Site prepared by EnviroTrac Ltd. (EnviroTrac) dated May 16, 2008. It addresses specific health and safety issues related to the presence of tetrachloroethlyene (PCE) and other hazardous constituents during field activities. The procedures were developed in accordance with Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard 29 CFR 1910.120.

2. SITE BACKGROUND

The Site is located in the western portion of a retail shopping center building located in a mixed residential and commercial area of Long Beach, New York. According to available information, the shopping center building appears to have been constructed in 1951 and a dry cleaner appears to have operated at the Site since at least 1966. The Site is currently owned by Lido Realty Co. (Lido Realty) and has reportedly been operated as Fashion Cleaners for over ten (10) years by the current tenant, Oceanside Sands Cleanery. The tenant space consists of a reception area, a dry cleaning equipment room, a steam press and work area, a boiler room, and a small exterior area.

Two (2) environmental investigations conducted at the Site in 2005 revealed that soil and ground-water beneath the Site are impacted with PCE and its breakdown products. EnviroTrac, on behalf of Cougar Management & Realty Services, Inc. (Cougar Management), as agent for Lido Realty, has prepared a Remedial Investigation (RI) Work Plan for the Site dated May 16, 2008 to gain an updated and further understanding of environmental concerns previously identified at the Site. Detailed Site information is provided in the RI Work Plan.

3. OBJECTIVES

The objective of this HASP is to protect on-Site worker and surrounding community health and safety during field activities at the Site. General Site guidelines in the HASP are provided to assure that safe working conditions exist at the Site. The health and safety procedures set forth in this plan have been established based on analysis of potential hazards and protection measures have been selected in response to these potential risks.

This plan includes health and safety procedures required for field activities performed at the site. It has been designed to meet the following objectives:

1. Evaluate the risk associated with each operation;
2. Provide for identification, recognition, evaluation, and control of health, safety, and environmental hazards (if any);
3. Provide the requirements for an optimum, safe, and healthful work environment, in which personnel are not exposed to avoidable risks, accidents, or injuries in the performance of their duties;
4. Identify the roles and responsibilities of on-Site personnel; and
5. Establish protection standards and mandatory safety practices and procedures for all on-site personnel.
6. This document will be periodically reviewed to ensure that it is current and technically correct.

4. PERSONNEL RESPONSIBILITIES

The Health and Safety Coordinator (HSC) is responsible for the development and implementation of the HASP. The Health and Safety Officer (HSO) will be responsible for the day to day implementation of the HASP during Site work. In addition, the HSO is responsible for the distribution of this HASP to all field personnel and discussion of the plan prior to the start of field activities. The field personnel will sign Attachment 1 of this HASP certifying that they have read, are familiar with, and understand the contents of this HASP. The HSO will also have the following authority and responsibilities:

- Responsibility for the field implementation;
- Authority to make necessary field modifications to this HASP with approval of the HSC and New York State Department of Environmental Conservations (NYSDEC) representatives;
- Responsibility to ensure that the following safety equipment is available at the Site: fire extinguisher, eye wash equipment, and first aid supplies.
- Authority to suspend field operations due to potential health and safety concerns;
- Responsibility to supervise emergency response activities;
- Implementation and documentation of pre-task field briefings.

HSO alternates will be designated to act accordingly when the primary HSO is not present at the Site. All Site personnel and contract workers working within the exclusion zone will have received the appropriate level of training necessary to perform applicable duties and comply with 29 CFR 1910.120.

Christine M. Pirotin, Corporate Director Health and Safety, of EnviroTrac is designated as the HSC. Thomas H. Bosshard, Project Manager/Senior Geologist, of EnviroTrac is designated as the site HSO. Jeffrey A. Bohlen, Senior Project Manager/Hydrogeologist and Peter C. Breen, Senior Project Manager, of EnviroTrac are designated as the HSO alternates. Other site personnel may be called upon to perform HSO duties. Certificates of OSHA 1910.120 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training are included in Attachment 2.

All EnviroTrac personnel who will be working at the Site will be provided with a copy of this HASP for review. All subcontractors will follow EnviroTrac's HASP. Personnel responsible for HASP monitoring during on-Site activities will be responsible for informing the field workers and subcontractors of any changes in conditions and/or levels of protection required in the affected work area.

All personnel working on-Site will supply documentation of compliance with 29 CFR 1910.120 in advance of undertaking any physical activities at the Site.

5. SITE CHARACTERIZATION

5.1 Environmental Hazard Evaluation

The environmental hazards associated with remedial investigation at the Site principally concern the potential presence of PCE and other hazardous constituents in soil materials and ground water. Although it is not anticipated that activities will involve direct worker contact with the soil and/or ground water containing these constituents, potential routes by which workers could be exposed to PCE or other hazardous constituents include:

1. Inhalation
2. Ingestion
3. Dermal Contact

All the active Site personnel will be protected against potential exposure to the constituents of concern using suitable personal protection as discussed below and as detailed in Section 8.0.

1. Inhalation

Continuous environmental air monitoring for organic vapors will be conducted through the use of a photo-ionization detector (PID) within and at the perimeter of the exclusion zone and work areas during all ground-intrusive Site activities (e.g., drilling). Periodic monitoring will be conducted during non-intrusive work (e.g., sampling). Level D personal protective equipment (PPE) will be required at all times, as detailed in Section 8.0.

<u>ORGANIC VAPORS</u>

If PID monitoring readings are greater than 5 ppm above background levels within the breathing zone, all work will cease. Prior to recommencement of work, work practices will be implemented to lower volatile emissions only after approval by the HSC and

NYSDEC. If work practices do not lower emissions to less than 5 ppm above background, then recommencement of work will be postponed until proper engineering controls can be put in place.

AIRBORNE PARTICULATES (DUST)

Airborne particulates (dust) will be continuously monitored upwind, downwind, and within and at the perimeter of the exclusion zone during ground-intrusive activities. If the particulate reading is 150 micrograms per cubic meter (ug/m^3) or the downwind particulate reading is 100 (ug/m^3) above upwind readings, then dust masks will be required, as stated in Section 8.0, and NYSDEC-approved dust suppression will be implemented. Dust suppression by a hand held garden hose and nozzle to "mist" the work area with water would be adequate. If this method of dust suppression is inadequate to maintain the environment within acceptable levels, then all work activities will stop and additional measures will be proposed to the HSC and NYSDEC. In no case will intrusive work activities commence until particulate readings at the downwind perimeter of the exclusion zone are less than 150 ug/m; greater than the upwind particulate level.

2. Ingestion

There is also a possibility of ingestion of airborne soil materials during field activities. Since a respirator or dust mask is required whenever inhalation exposure levels are triggered, it would eliminate the ingestion exposure when a respirator or dust mask is worn. At other times, safe work practices should be followed to avoid potential ingestion of soil materials.

3. Dermal Contact

Due to the potential for dermal contact with soils containing PCE or other hazardous constituents, all active Site personnel performing drilling and sampling activities will be required to wear appropriate Level D personal protective clothing, as detailed in Section 8.0, including work boots, hard hats, and appropriate work gloves. In addition, as further noted in Section 8.0, if and when free-phase liquids are encountered, Tyvek disposable coveralls, eye/face protection, protective gloves, and chemically resistant over-boots that are provided will be worn. As a precautionary measure, extra skin protective gear will be available on-Site in the field vehicle. Safety regulations are included as Attachment 3 and 4.

5.2 Chemical Exposure Data

Toxicological information is provided below on some of the chemicals that were or are presently found at the Fashion Cleaners Site. In addition, material safety (MSDS) sheets for instrument calibration gases and chemical of concern are included as Attachment 4.

GENERAL DESCRIPTION

TETRACHLOROETHYLENE

Tetrachloroethylene, also called perchloroethylene and known as PCE or PERC, is a clear colorless volatile liquid having an ether-like odor. It is used as a dry cleaning solvent, a vapor degreasing solvent, drying agent for metals, and for the manufacture of other chemicals. It is non-combustible, insoluble in water and its vapors are heavier than air. Symptoms of exposure by ingestion include nausea, flushed face and neck. Target organs are skin, liver, kidneys, eyes, upper respiratory system and central nervous system. The current OSHA permissible exposure limit (PEL) is 100 ppm with a short-term exposure limit (STEL) of 300 ppm/5 minutes and an immediately dangerous to life and health (IDLH) recommendation to treat PCE as a potential human carcinogen.

TRICHLOROETHYLENE

Trichloroethylene (TCE) is a clear colorless volatile liquid having a chloroform-like odor. It is used as a solvent, fumigant, in the manufacture of other chemicals, and for many other uses. It is heavier than water and is slightly soluble in water. It is non-combustible ((C)AAR, 1986). The current OSHA permissible exposure limit (PEL) is 100 ppm with a short-term exposure limit (STEL) of 300 ppm/5 minutes and an immediately dangerous to life and health (IDLH) recommendation to treat TCE as a potential human carcinogen.

HEALTH HAZARDS:

TETRACHLOROETHYLENE

VAPOR: Irritating to eyes, nose and throat. If inhaled, will cause difficult breathing, or loss of consciousness. LIQUID: Irritating to skin and eyes. Harmful if swallowed (USCG, 1985).

TRICHLOROETHYLENE

VAPOR: Irritating to eyes, nose and throat. If inhaled, will cause nausea, vomiting, difficult breathing, or loss of consciousness.

LIQUID: Irritating to skin and eyes. If swallowed, will cause nausea, vomiting, difficult breathing, or loss of consciousness (USCG, 1985).

FIRE/EXPLOSION HAZARDS:

TETRACHLOROETHYLENE

Not flammable. Poisonous gases are produced when heated. Toxic, irritating gases may be generated in fires (USCG, 1985).

TRICHLOROETHYLENE

Combustible. POISONOUS GASES ARE PRODUCED IN FIRE. Toxic and irritating gases are produced in fire situations (USCG, 1985).

FIRE FIGHTING:

TETRACHLOROETHYLENE

Extinguish fire using agent suitable for type of surrounding fire (material itself does not burn or burns with difficulty) ((C)AAR, 1986).

TRICHLOROETHYLENE

Extinguish fire using agent suitable for type of surrounding fire (material itself does not burn or burns with difficulty) ((C)AAR, 1986).

NON-FIRE SPILL RESPONSE:

TETRACHLOROETHYLENE

Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Attempt to stop leak if without hazard. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash or cement powder. Water spill: If dissolved, apply activated carbon at ten times the spilled amount in region of 10 ppm or greater concentration. Remove trapped material with suction hoses. Air spill: Apply water spray or mist to knock down vapors. Vapor knockdown water is corrosive or toxic and should be diked for containment ((C)AAR, 1986).

TRICHLOROETHYLENE

Keep material out of water sources and sewers. Build dikes to contain flow as necessary. Land spill: Dig a pit, pond, lagoon, holding area to contain liquid or solid material. Dike surface flow using soil, sand bags, foamed polyurethane, or foamed concrete. Absorb bulk liquid with fly ash or cement powder. Water spill: If dissolved, apply activated carbon at ten times the spilled amount in region of 10 ppm or greater concentration. Remove trapped material with suction hoses. Use mechanical dredges or lifts to remove immobilized masses of pollutants and precipitates. Air spill: Apply water spray or mist to knock down vapors. Combustion products include corrosive or toxic vapors ((C)AAR, 1986).

FIRST AID:

TETRACHLOROETHYLENE

If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately (NIOSH, 1987).

TRICHLOROETHYLENE

If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical. If this chemical comes in contact with the skin, promptly wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and wash the skin with soap and water. Get medical attention promptly. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get medical attention immediately (NIOSH, 1987).

5.3 Task/Operation Safety and Health Risk Analysis

The following subsections describe each task/operation in terms of the specific hazards associated with it. In addition, the protective measures to be implemented during completion of those operations are also identified.

5.3.1 Task by Task Risk Analysis

The evaluation of hazards is based upon the knowledge of Site background presented in the RI Work Plan, and anticipated risks posed by the specific operation.

The following subsections describe each task/operation in terms of the specific hazards associated with it. In addition, the protective measures to be implemented during completion of those operations are also identified. Tables 5.3.1 and 5.3.2 provide a summary of task analysis and chemical hazards for each task at the Site. The PEL, Threshold Limit Value (TLV) and IDLH levels are listed on Tables 5.3.1 and 5.3.2 for each contaminant. In general, OSHA PELs are regulatory requirements that must be met and TLVs are guidance values. The PEL represents the maximum exposure concentration an individual can be exposed to as a time weighted average of 8 hours. TLVs represent the exposure concentration which an individual can be exposed to eight hours a day, five days a week (40 hours), without harmful effects. The IDLH represents the maximum concentration of a contaminant for which an individual can be exposed to for thirty minutes without any "escape impairing" symptoms or irreversible health effects.

TABLE 5.3.1
TASK ANALYSIS - AIR MONITORING CHEMICAL HAZARDS OF CONCERN
(PEL=Permissible Exposure Limit, TLV=Threshold Limit Value, IDLH=Immediately Dangerous to Life and Health)

CONTAMINANT	PEL/TLV/IDLH	ROUTES OF CONCENTRATION	EXPOSURE
TETRACHLORO-ETHYLENE	PEL:100 ppm TLV: 25 ppm IDLH:Not Applicable, Potential Human Carcinogen (NIOSH, 1987)	AIR SUBSURFACE SOIL	INHALATION INGESTION CONTACT
TRICHLORO-ETHYLENE	PEL: 100 ppm TLV: 50 ppm IDLH: Not Applicable, Potential Human Carcinogen (NIOSH, 1987)	AIR SUBSURFACE SOIL	INHALATION INGESTION CONTACT

TABLE 5.3.2
TASK ANALYSIS - WELL INSTALLATION AND EXCAVATION CHEMICAL HAZARDS OF CONCERN
(PEL=Permissible Exposure Limit, TLV= Threshold Limit Value, IDLH= Immediately Dangerous to Life and Health)

CONTAMINANT	PEL/TLV/IDLH	ROUTES OF CONCENTRATION	EXPOSURE
TETRACHLORO-ETHYLENE	PEL:100 ppm TLV: 25 ppm IDLH:Not Applicable, Potential Human Carcinogen (NIOSH, 1987)	AIR GROUND WATER SUBSURFACE SOIL	INHALATION INGESTION CONTACT
TRICHLORO-ETHYLENE	PEL: 100 ppm TLV: 50 ppm IDLH: Not Applicable, Potential Human Carcinogen (NIOSH, 1987)	AIR GROUNDWATER SUBSURFACE SOIL	INHALATION INGESTION CONTACT

5.3.2 Task Hazard Description and Hazard Prevention

The following section identifies the hazards associated with Site tasks, and provides suggestions for hazard prevention on-Site.

PERIMETER MONITORING:
The site boundaries clearly mark off the "clean" off-Site areas, from the "contaminated" on-Site areas, and so chemical contamination from the Site should not be a hazard

associated with perimeter and off-Site monitoring.

Perimeter monitoring and off-Site monitoring will be performed once the Site boundaries have been established (refer to Section 9). Hazards specific to perimeter and off-Site monitoring include encounters with residents and non-project personnel. This is a unique hazard, in that untrained personnel prove to be a risk when performing any type of Site work. Inquisitive and/or hostile persons may interfere with the monitoring/sampling effort, jeopardizing their safety as well as the safety of the field team.

HAZARD PREVENTION DURING PERIMETER MONITORING:
To minimize public involvement in perimeter monitoring/off-Site monitoring, the most effective preventative measure is to inform all interested parties. A Community Air Monitoring Plan (CAMP) is included in Section 13.0 of this HASP for that purpose.

AIR MONITORING:
General hazards frequently encountered during air monitoring include:

- Electrical hazards as a result of power sources to run equipment.
- Placing monitoring equipment in elevated areas or areas where slip, trip, and fall hazards exist.
- Hazards associated with ambient environment being sampled.
- Readings indicating non-explosive atmospheres, low concentrations of toxic substances, or other conditions may increase or decrease suddenly, changing the associated risks.
- Air sampling matrix solutions may be acidic or basic, causing a corrosive hazard, and broken glass collection tubes can cut hands if mishandled.

HAZARD PREVENTION DURING AIR MONITORING:
Grounded plugs should be used when a power source is needed to reduce the hazard of electric shock.

- Generators or air pumps should be used in dry areas, away from possible ignition sources. Do not stand in water or other liquids when handling equipment. Electrical equipment shall conform with OSHA 1910.303(a), 1910.305(a),(f),(f)(3).

- Ground fault interrupters are used in the absence of properly grounded circuitry or when portable tools must be used in wet areas.
- Extension cords should be protected from damage and maintained in good condition.
- Air pumps should be placed within easy reach.
- Personnel should be thoroughly familiar with the use, limitations, and operating characteristics of the monitoring instruments.
- Perform continuous monitoring in variable atmospheres.
- Use intrinsically safe instruments until the absence of combustible gases or vapors is anticipated.

WELL INSTALLATION:

Hazards generally associated with drilling operations include the following:

- Noise levels exceeding the OSHA PEL of 90 dBA are both a hazard and a hindrance to communication.
- Fumes (carbon monoxide) from the drilling machine.
- Overhead utility wires (e.g., electrical) can be hazardous when the drill boom is in the upright position.
- Underground pipelines and utility lines can be ruptured or damaged during active drilling operations
- Moving parts on the drill may catch clothing. Free or falling parts from the drill head may cause head injury.
- Moving the drilling equipment over uneven terrain may cause the machine to roll over or get stuck. Be aware of hazards associated with moving heavy machinery and other associated injury.
- High pressure hydraulic lines and air lines are hazardous when they are in ill repair or incorrectly assembled.

HAZARD PREVENTION DURING WELL INSTALLATION:

- Review the contaminants suspected to be on-Site and perform air monitoring as required. Shut down drill rig and/or divert exhaust fumes.
- All chains, lines, and cables should be inspected daily for weak spots, frays, etc.
- Ear muffs and ear plugs effectively reduce noise levels and must be worn during drilling operations. A sound meter will be available on-Site to monitor levels.

- Hard hats should be worn at all times when working around a drill rig. Secure loose clothing. Check boom prior to approaching the machine.
- To avoid contact with any overhead lines, the drill rig boom should be lowered prior to moving the rig. Overhead utilities should be considered "live" until determined otherwise.
- The rig mast should not be erected within 10 feet of an overhead electrical line until the line is de-energized, grounded, or shielded and an electrician has certified that arcing cannot occur.
- Minimum working distances around "live" overhead power lines are:

Minimum working voltage range ((phase to phase) kilovolt) and clear hot stick distance:

2.1 to 15	2 ft. 0 in.
15.1 to 35	2 ft. 4 in.
35.1 to 46	2 ft. 6 in.
46.1 to 72.5	3 ft. 0 in.
72.6 to 121	3 ft. 0 in.
138 to 145	3 ft. 6 in.
161 to 169	3 ft. 8 in.
230 to 242	5 ft. 0 in.
345 to 362	7 ft. 0 in.1
500 to 552	11 ft. 0 in.1
700 to 765	15 ft. 0 in.1

- A thorough underground utilities search should be conducted before the commencement of a drilling project.
- All high pressure lines should be checked prior to and during use.

REMEDIAL ACTIVITIES:

Activities during remedial activities may include trenching for underground system lines, construction of a shed intended to house remediation equipment, and connection of the equipment. Hazards may include:

- Contact with or inhalation of contaminants, potentially in high concentrations in sampling media.

- Noise levels exceeding the OSHA PEL of 90 dBA are both a hazard and a hindrance to communication.
- Fumes (carbon monoxide) from heavy machinery.
- Underground pipelines and utility lines can be ruptured or damaged during trenching operations
- Moving parts on excavation equipment may catch clothing.
- Moving the machinery over uneven terrain may cause the vehicle to roll over or get stuck. Be aware of hazards associated with moving heavy machinery and other associated injury.
- High pressure hydraulic lines and air lines are hazardous when they are in ill repair or incorrectly assembled.
- Back strain and muscle fatigue due to lifting and shoveling techniques.

HAZARD PREVENTION DURING REMEDIAL ACTIVITIES:

- Review the contaminants suspected to be on-Site and perform air monitoring as required. Shut down heavy machinery and/or divert exhaust fumes.
- All chains, lines, cables should be inspected daily for weak spots, frays, etc.
- Ear muffs and ear plugs effectively reduce noise levels and will be worn during installation activities that have elevated noise levels.
- Hard hats should be worn at all times when working around heavy equipment. Secure loose clothing.
- Proper lifting (pre-lift weight assessment, use of legs, multiple personnel) techniques will prevent back strain. Use slow easy motions when shoveling and digging to decrease muscle strain.
- A thorough underground utilities search should be conducted before the commencement of a trenching project.
- All high pressure lines should be checked prior to and during use.
- To minimize exposure to chemical contaminants, a thorough review of suspected contaminants should be completed and implementation of an adequate protection program.

5.4 General Hazard Evaluation

In addition, there are several Site activities which do not involve the potential contact with PCE or other hazardous constituents and therefore have low associated hazard for exposure. While these activities do not involve significant exposure risks, various physical hazards do exist. General hazards associated with these activities include the following:

1. Personnel slipping, tripping, and falling as a result of improperly stored equipment and materials;
2. Puncture wounds and lacerations from sharp edges of hand tools;
3. Personnel being struck by equipment, tools, and vehicles; injuries to feet from falling objects, or sharp objects; and,
4. Back or other muscle injuries or strains from improper or excessive lifting.

To protect against accidental mechanical hazards, safe work practices will be followed and a hard hat, gloves, appropriate eye/face protection, and durable work boots are required to be worn when working around heavy equipment, as detailed in Section 8.0.

Adverse weather conditions are also important considerations in planning and conducting site operations. Cold or hot weather can cause physical discomfort, loss of efficiency, and personnel injury. To protect against injury due to cold or hot weather, appropriate control measures will be taken, as detailed in Section 6.0.

5.5 Risk Characterization

Based on the following factors, it is believed that the conditions of exposure during field activities at the Site pose low risk of adverse health effects or injury:

1. Environmental monitoring will be performed, during intrusive activity, for organic vapors and airborne particulates.
2. Personnel involved with intrusive activity within the exclusion zone will follow OSHA guidelines and wear the appropriate level of protection.

3. All Site work will be accomplished at Level D personal protection.
4. Discontinuation of site activities will occur when personnel exposure to organic vapors exceeds 5 ppm above background levels or when airborne particulate levels exceed 150 ug/m^3 above background levels.
5. Mandatory safe occupational work practices will be followed at all times.

6. SITE CONTROL

6.1 Site Work Locations

Activities involving the installation of wells, air monitoring, and excavation will be performed at several locations throughout the Site. The work areas are the locations in which the actual activities will occur (see Figure 1). Workers entering these areas are required to be protected as defined in Section 8.0. Only authorized personnel, including personnel conducting the work activities involved, and specialized personnel such as subcontractors engaged in well installation and operation of heavy equipment, will be allowed in the work areas. Within the work areas, the levels of protection will be determined based on the degree of hazard present, as detected by the measurements obtained with the PID, and/or other activity-specific monitoring equipment. As an engineering control, a regenerative air blower may be used to reduce the potential for dangerous concentrations of VOCs in the breathing zone near the borings, if warranted.

6.1.1 Work Zones

Work zones will be defined prior to the commencement of work activities. These work zones will limit equipment, operations and personnel in the areas as defined below:

1. Exclusion Zone - This shall include all areas where potential environmental monitoring has shown or is suspected that a potential chemical hazard may exist to workers. The level of PPE required in these areas shall be determined by the Site HSO after air monitoring and on-Site inspection has been conducted. The area shall be clearly delineated from the decontamination area. As work proceeds, the delineation boundary shall be relocated as necessary to prevent the accidental contamination of nearby people and equipment.

2. Contamination Reduction Zone - This zone will occur at the interface between the Exclusion Zone ("Hot Zone") and Support Zone ("Clean Zone") and shall provide a transfer of personnel and equipment to and from the Support Zone to the Exclusion Zone, the decontamination of personnel and equipment prior to entering the Support

Zone, and for the physical segregation of the Support Zone and Exclusion Zone.

3. Support Zone - This area is the remainder of the work Site and project Site. The function of the Support Zone includes:
    A. An entry area for personnel, material and equipment to the Exclusion Zone of site operations through the Contamination Reduction Zone;
    B. An Exit for decontamination personnel, materials and equipment from the "Decon" area of Site operations;
    C. The Housing of Site special services;
    D. A storage area for clean safety and work equipment.

Small decontamination areas may be set up adjacent to the work area to facilitate decontamination of equipment that is reused throughout the field activity.

6.2 Security

Periodic security patrols will be conducted to ensure that adequate security is being maintained. Only workers authorized by the field manager may be allowed to enter the Site. Warning signs will be posted to discourage entry by unauthorized personnel. The HSO will brief all visitors of all security and safety plans.

6.3 Site Communications

Communications on-Site will be conducted through verbal communications. When out of audible range, verbal communications may be assisted using portable telephones and two-way radios.

6.4 General Work Rules

To protect against the occurrence of accidents and dangerous situations, as well as to minimize the potential for emergency events, all on-Site personnel shall:

1. Attend a daily safety meeting, read this HASP and sign a Site Personnel Protection

and Safety Evaluation form (Attachment 1) attesting to this, prior to beginning any work activities. The HASP will be reviewed periodically by all on-Site personnel conducting field activities.

2. Field work will only be conducted during daylight hours unless adequate artificial lighting is provided.
3. No eating, drinking, or smoking will be permitted within the exclusion or contamination reduction zone.
4. All personnel shall be knowledgeable in the use of the first-aid equipment outlined in Attachment 5. Personnel will be advised of the precautions to be taken against sunburn, heat stroke, frostbite, and hypothermia.
5. Only authorized personnel will be allowed on Site.
6. Fire extinguishers shall be available at the work site for immediate availability in an emergency.

To minimize the possibility of injuries, the following general precautions will be taken:

1. All hand and power tools will be maintained in a safe condition.
2. Safety guards will be kept in place during use.
3. Power tools will be double-insulated and/or properly grounded.
4. Walkways will be kept clear of equipment, vegetation, excavated material, or other obstructions.
5. Proper work gloves will be provided and used when the possibility of burns, lacerations, or other injury exists.
6. Hard hats and work boots will be worn.
7. Employees exposed to vehicular traffic on public roads will wear warning vests.
8. Employees will observe proper lifting techniques and obey sensible lifting limits.
9. Heavy equipment will be used in accordance with the manufacturer's specifications and guidelines.

To guard against injury caused by exposure to cold temperatures, the following measures will be taken in cold weather:

1. Workers will be outfitted with adequate winter clothing.
2. Clothing will be changed if it becomes wet.

3. Warm shelters and regular rest periods will be available for workers.
4. Training sessions will be held as appropriate to emphasize warning symptoms of hypothermia or frostbite such as reduced coordination, drowsiness, impaired judgment, fatigue, and numbing of toes and fingers.
5. Warm beverages will be provided.

To guard against injury by heat stress, the following control measures will be employed in hot weather:

1. Provision for adequate liquids to replace lost body fluids. Employees must replace water and salt lost through perspiration. Employees will be encouraged to drink more than the amount required to satisfy thirst, since thirst satisfaction is not an accurate indicator of adequate salt and fluid replacement. Replacement fluids can be a 0.1 percent salt solution, commercial mixes such as Gatorade or Powerade, or a combination of these with fresh water.
2. Establishment of a work regimen that will provide adequate rest periods for cooling down. Rest breaks are to be taken in a cool, shaded area during hot weather.
3. Employees shall not be assigned other tasks during rest periods.
4. All employees shall be informed of the importance of adequate rest, acclimation, and proper diet in the prevention of heat stress.

6.5 Health and Safety Responsibilities

All project personnel are responsible for the following:

1. Taking all reasonable precautions to prevent injury to themselves and to their fellow employees.
2. Implementing the requirements of this HASP and reporting any deviations from the anticipated conditions described herein.
3. Performing only those tasks that they believe they can do safely, and immediately reporting any accidents and/or unsafe conditions to the work supervisor.
4. Filling out an accident report form (Attachment 6) for all injuries, regardless of severity. The form will be submitted to the work supervisor.

7. PERSONNEL TRAINING

Field team personnel associated with those activities in which the potential for exposure to hazardous substances exists are required to participate in a health and safety training program that complies with the OSHA standard 29 CFR 1910.120 and 1910.126. This program instructs employees on general health and safety principles and procedures, proper operation of monitoring instruments, and use of personnel protective equipment.

In addition, field team personnel must undergo Site-specific training prior to the start-up of any given project or task. As activities change at a particular work Site, related training must be provided as necessary. The Site-specific training will address potential hazards and associated risks, site operating procedures, emergency response and Site control methods to be employed. All work Site personnel will document their review of the HASP with their signature on the Site Personnel Protection Evaluation Form (Attachment 7).

8. PERSONAL PROTECTIVE AND SAFETY EQUIPMENT

8.1 Personal Protective Equipment Selection

Based on available data, it is anticipated that all field activities will be performed at Level D protection.

Level D

The following Personal Protective Equipment (PPE) for Level D will be necessary for all field personnel on Site:

a. boots
b. hard hat
c. safety glasses
d. work gloves (nitrile gloves for sampling); and
e. dust mask (if required by the activity)

If contaminated soil is exposed by drilling or trenching, tyvek suits, safety glasses, and overboots will be used.

Additionally, if and when free phase liquids are encountered, the following equipment will be necessary for all field personnel in the affected work area or dealing with the affected soil material:

a. laminated - type Tyvek (e.g., Saranex) disposable coveralls;
b. safety glasses/goggles/faceshield;
c. chemically resistant overboots; and
d. protective gloves.

Work Stoppage

Work stoppage will be required for all personnel in the work area when a PID reading is greater than 5 ppm above background at the exclusion zone perimeter. Sampling activities may be resumed when levels below 5 ppm are reached at the perimeter. In addition, work stoppage will be required if a particulate reading is greater than 150 ug/m^3 or 100 ug/m^3 above upwind readings. Activities may resume when levels below 100 ug/m^3; are reached in the work area.

8.2 Personal Protective Equipment Use

Just prior to entering into the work area, the required PPE will be donned. In the event of damage to the PPE, a worker will return to the decontamination area set up for the specific work activity to repair or replace the damaged gear. All used PPE will be wrapped in plastic bags and disposed of as regular garbage.

8.3 First-Aid Supplies and Safety Equipment

First aid supplies will be located within the contamination reduction zone. The first aid equipment list is included in Attachment 5. An emergency contact telephone list has been included in Section 12.0.

Safety equipment, in addition to the PPE, may be required depending upon the specific Site activity. A list of safety equipment that may be required is included in Attachment 6.

9. COMMUNITY AIR MONITORING PLAN

9.1 Intrusive Air Monitoring Plan

Real-time air monitoring, for volatile organic compounds and particulate levels in the work area and at the perimeter of the exclusion zone will performed during on-Site ground intrusive as follows:

- Volatile organic compounds will be monitored at the downwind perimeter of the work area on a continuous basis. If the total organic vapor level exceeds 5 ppm above background, work activities will be halted and monitoring continued under the provisions of the Vapor Emission Response Plan. All readings will be recorded and be available for NYSDEC personnel review.

- Particulates will be monitored continuously upwind, downwind and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m^3 greater than the upwind particulate level, then dust suppression techniques will be employed. All readings will be recorded and be available for NYSDEC review.

9.1.1 Intrusive Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities will resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided that the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down. When work shutdown occurs, downwind air monitoring as directed by the HSO will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

9.1.2 Intrusive Major Vapor Emission

If any organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone).

If efforts to abate the emission source are unsuccessful and if organic vapor levels approach 5 ppm above background for more than 30 minutes in the 20 foot zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect. However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

9.1.3 Intrusive Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in Section 12.1 of this Health and Safety Plan will go into effect.
2. The local police authorities will immediately be contacted by the HSO and advised of the situation.
3. Frequent air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

9.2 Non-Intrusive Air Monitoring Plan

Real-time air monitoring for volatile organic and particulate levels in the work area and at the perimeter of the exclusion zone during non-intrusive on-Site activities will performed as follows:

- VOCs will be monitored at the downwind perimeter of the work area at 2 hour intervals. If the total organic vapor level exceeds 5 ppm above background, work activities must be halted and monitoring continued under the provisions of the Vapor Emission Response Plan. All readings will be recorded and be available for NYSDEC personnel review.
- Particulates will be monitored continuously upwind, downwind, and within the work area at temporary particulate monitoring stations. If the downwind particulate level is 150 ug/m^3 or 100 ug/m^3 greater than the upwind particulate level, then dust suppression techniques will be employed. All readings will be recorded and be available for NYSDEC personnel review.

9.2.1 Non-Intrusive Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities will resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities will resume provided that the organic vapor level 200 feet downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities will be shut down. When work shutdown occurs, downwind air monitoring as directed by the HSO will be implemented to ensure that vapor emission does not impact the nearest residential of commercial structure at levels exceeding those specified in the Major Vapor Emission section.

9.2.2 Non-Intrusive Major Vapor Emission

If any organic vapor levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities will be halted.

If, following the cessation of work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance the nearest residential or commercial property from the work area, then the air quality will be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 foot zone).

If efforts to abate the emission source are unsuccessful and if organic vapor levels approach 5 ppm above background for more than 30 minutes in the 20 foot zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect. However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

9.2.3 Non-Intrusive Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

4. All Emergency Response Contacts as listed in Section 12.1 of this Health and Safety Plan will go into effect.
5. The local police authorities will immediately be contacted by the HSO and advised of the situation.
6. Frequent air monitoring will be conducted at 30 minute intervals within the 20 foot zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the HSO.

9.3 Physical Condition Monitoring

Heat Stress

One of the most frequently encountered problems associated with operations conducted under PPE Safety Level D is heat stress. Heat stress manifests itself in two (2) forms: heat stroke and heat exhaustion. Depending on ambient conditions, the worker and the work being performed, heat stress can adversely affect a worker in as little as 15 minutes. This is especially important as ambient temperatures exceed approximately 69 degrees Fahrenheit at high humidity.

Heat stroke is a much more dangerous form of heat stress. Symptoms of heat stroke include high body temperatures and red or flushed hot, dry skin. There may be dizziness, nausea, headache, rapid pulse, and unconsciousness. First-aid for all forms of heat stress includes cooling the body by removing PPE, moving to a safe area, and allowing the worker to rest in a cooler environment.

Frostbite

Frostbite may be categorized into three (3) types:

1. Frostbite or incipient frostbite characterized by sudden blanching or whitening of the skin.
2. Superficial frostbite - skin has a waxy or white appearance, is firm to the touch but tissue beneath is resilient.
3. Deep frostbite - tissues are cold and hard indicating an extremely serious injury.

Sign and symptoms of frostbite include:

- The skin changes to white or grayish-yellow in appearance.
- Pain is sometimes felt early but subsides later (often there is no pain).
- Blisters may appear later.
- The affected part feels intensely cold and numb.
- The person frequently is not aware of frostbite until someone tells him or

he observes the pale, glossy skin.

As time passes, the affected worker may become confused, stagger, experience eyesight impairment, become unconscious, and breathing may stop.

First aid for frostbite will include protecting the frozen area from further injury, bringing the victim indoors, warming the affected areas quickly with warm water, and maintaining respiration according to the first-aid procedures. Medical assistance should be obtained immediately.

Frostbite may be prevented by the use of insulated gloves, socks and other protective clothing capable of keeping moisture away from the skin. All protective clothing should be chosen so that it is compatible with any chemical-resistant clothing required for the site activities involved.

10. DECONTAMINATION PROCEDURES

10.1 General

An equipment and worker decontamination area will be set up adjacent to the work area. The equipment decontamination procedures described herein include in-the-field and post-field decontamination of sampling equipment. The non-disposable equipment will be cleaned after completing each sampling event. Rinse water from equipment that comes in contact with contaminated soil will be contained on-Site for later disposal.

10.2 Safety Procedures During Equipment Decontamination

1. Personnel will wear the following safety equipment when decontaminating smaller equipment:
   - Safety glasses, goggles, and/or a splash shield; and
   - Nitrile or PVC gloves.

2. Personnel will wear the following additional safety equipment when decontamination large equipment requiring a high-pressure water/steam decontamination unit:
   - Laminated-type Tyvek (e.g., Saranex) disposable coveralls; and
   - Chemically resistant overboots.

10.3 Decontamination Procedures

Drilling Equipment - Drilling equipment that comes in direct contact with subsurface soil will be cleaned with potable water before each well location and before leaving the Site. All equipment that comes into direct contact with subsurface soil will be scrubbed manually to remove heavy material. Rinse water and sediment generated from equipment will be contained on-Site for later disposal.

1) Potable water scrub to remove excess soil;
2) Potable water rinse; and
3) Air dry

Excavation Equipment (shovels, etc.) - All excavation equipment that has had direct contact with contaminated soil will be decontaminated before leaving the Site. Rinse water from equipment that comes in contact with contaminated soil will be contained on-Site for later disposal.

1) Potable water scrub to remove excess soil;
2) Potable water rinse; and
3) Air dry

Meters and Probes - All meters and probes that are used in the field (other than those used solely for air monitoring purposes will be decontaminated between use as follows:

1) Non-phosphate detergent and water scrub to remove visual contamination;
2) Potable water rinse followed by a distilled water rinse; and
3) Air dry

10.4 Disposal Method

PPE solids (e.g., disposable gloves, disposable clothing, and other disposable equipment) will be decontaminated as necessary or as directed by the NYSDEC prior to disposal as normal solid waste. Rinse water generated during decontamination of equipment or PPE that comes in contact with contaminated soil or water will be contained in properly labeled drums, on-Site, for later disposal.

10.5 Decontamination Areas

The equipment decontamination areas will be located within the work area. A decontamination pad will be constructed of plastic sheeting to allow for contaminated rinse water to be collected for transfer to on-Site storage containers for later disposal. Decontamination procedures will be conducted on equipment, instruments, etc. if such equipment, etc. comes in contact with contaminated soil during intrusive work within the exclusion zone. All equipment (i.e., drilling rods) that contacts ground water will be considered contaminated and properly decontaminated. All decontamination activities for contaminated equipment, etc. will be conducted within the designated decontamination area. This area will be a minimum of 5 feet by 5 feet and lined with plastic sheeting. To further contain rinse water, this area will be bermed. All rinse water will be transferred into and contained in 55-gallon steel drums and properly labeled. Sediments remaining in the contained area will also be drummed.

11. CONTINGENCY PLAN

11.1 Emergency Notification

If downwind readings of airborne particulates or organic vapors exceed the conditions described in Section 10.0, and remedial measures fail to control their release, the NYSDEC, local Police and Fire Departments, State and Federal authorities will be notified immediately at the following numbers:

NYSDEC: Girish Desai (Case Manager)		(631) 444-0243
Local Fire Department		911
Local Police Department		911
Local Rescue Service (EMS)		911
Hospital (Long Beach Medical Center)		(516) 897-1000
New York Poison Control		(800) 336-6997
Chemical Emergency Advice (CHEMTREC)		(800) 424-3900
Federal:	National Response Center	(800) 424-8802
	National Poison Control	(800) 926-1253

11.2 On-Site Fire Prevention

To protect and prevent against accidental fire hazards, safe work practices will be followed and:

1. Fire extinguishers (ABC 20 pound) shall be available in each vehicle and work area and should only be used in accordance with the manufacturer's specifications and guidelines.
2. The HSO shall notify the fire and police departments in the event that a fire cannot be controlled by the available on-Site equipment.
3. System electric shall satisfy all explosion proof code criteria.
4. Smoking is prohibited in the exclusion and contamination reduction zone.

11.3 Evacuation Procedures

The exclusion zone will be delineated and air monitoring activities started prior to invasive work. Results of air monitoring at the exclusion zone perimeter will be monitored by the HSO and recorded in the on-Site air monitoring log. All work activities shall be halted if any of the following levels of particulates or organic vapors are exceeded at the exclusion zone perimeter:

- particulate readings greater than 150 ug/m^3 above upwind readings;
- organic vapor levels greater than 25 ppm above background.

If any of the above conditions persists after cessation of work activities, and cannot be alleviated by the implementation of engineering controls, then the following contingency plan shall be placed into effect:

- the perimeter of the nearest downwind residence or commercial property shall be monitored. If particulate or organic vapor levels are consistently elevated above background levels, the evacuation of the residence/commercial property is advisable;
- the HSO will contact the appropriate local agencies, and request assistance in completing the evacuation; and
- designated on-Site personnel will assist the local authorities in the evacuation of the immediate off-Site area without delay.

11.4 Medical Emergency

In the event of a medical emergency in which hospital/emergency care is necessary, personnel will be a taken to the Long Beach Medical Center. A hospital direction map is included as Attachment 8.

ATTACHMENTS

Attachment 1

AFFIDAVITS

I, ______________________________, of ______________________________ have read the Health and Safety Plan (HASP) for Fashion Cleaners I agree to conduct all on-Site work in accordance with the requirements set forth in this HASP and understand that failure to comply with this HASP could lead to my removal from this Site.

Signed: ______________________________ Date: ____________________

Attachment 2

OSHA HAZWOPER TRAINING CERTIFICATES

Attachment 3

SAFETY REGULATIONS

The main safety emphasis in on preventing personal contact with gases, soils, sludge, and water. Towards that end, the following rules have been established:

Regulations

A. Eating on the Site is PROHIBITED except in specifically designated areas.

B. All project personnel on the Site must wear clean or new gloves daily.

C. If you get wet to the skin, you must wash the affected area with soap and water immediately. If clothes in touch with the skin are wet, these must be changed.

D. You must wash your hands and face before eating, drinking or smoking.

Recommendations

A. Do not smoke with dirty hands; better yet, do not smoke.

B. Check personal habit which could get soil or water into your body. Examples: food off your fingers, wiping your face or nose with a dirty hand or running a dirty hand through your hair.

C. Check that any regularly worn clothing is clean. Examples: dirty watchbands, neck chains and a dirty liner on your safety helmet. Safety practices with poisonous chemicals can be summed up with a few words.
    - Don't breathe in chemical odors and don't touch the water, soil, and sludge.
    - If you do get dirty or wet, clean up as soon as possible.

Attachment 4

MATERIAL SAFETY DATA SHEET

Attachment 5

FIRST-AID EQUIPMENT LIST

- First-Aid Handbook
- A Standard First-Aid Kit, containing:
- Compresses
- Gauze and gauze roller bandage
- Triangular bandages
- Eye dressing packet
- Ammonia inhalant
- Salt or other emetic
- Band aids
- Tape
- Scissors
- Tweezers
- First-aid cream
- Antiseptic wipes
- Instant cold packs
- Eye irrigation solution
- Burn cream
- Sterile gloves
- Tourniquet
- Rescue blanket
- Non-aspirin pain reliever

SAFETY EQUIPMENT LIST

- Electrolyte replacement drink, stored in a clean area and used to prevent heat stress
- Type ABC multipurpose fire extinguisher
- Portable emergency eyewash station

Attachment 6

ACCIDENT REPORT FORM

Name of Reporter: ______________________ Date: ______________________

Name(s) of Victim(s): ______________________ Date of Accident: ______________________

Witnesses: ______________________ Time of Accident: ______________________

Location on Accident: ______________________

Description of Accident: ______________________

____

____

____

____

Cause of Accident: ______________________

____

____

____

____

Persons/Agencies Notified	Time	Time of Arrival (if Applicable)

Corrective Actions: ______________________

____

____

____

Duration of Accident: ______________________

Comments: ______________________

____

____

____

____

Attachment 7

SITE PERSONNEL PROTECTION AND SAFETY EVALUATION FORM

1.0 GENERAL INFORMATION

1.1 Site: Fashion Cleaners
1.2 Address: 641 East Park Avenue, Long Beach, New York 11561-2512
1.3 Site Work Objective: Remedial Investigation
1.4 Site Work Date: Spring 2008
1.5 Site Team:
a. Jeffrey A. Bohlen, Senior Project Manager/Hydrogeologist, EnviroTrac Ltd.
b. Peter C. Breen, Senior Project Manager, EnviroTrac Ltd.
c. Christine M. Pirotin, Corporate Director Health and Safety, HSC, EnviroTrac Ltd.
d. Thomas H. Bosshard, Project Manager/Senior Geologist, HSO, EnviroTrac Ltd.
e. Other EnviroTrac Personnel (see Attachment 2 of HASP)
1.6 Other Personnel:
a. Drilling Subcontractor Personnel
b. ______________________________
c. ______________________________
d. ______________________________

2.0 BACKGROUND

2.1 Site Location: East Park Avenue, Long Beach, New York
2.2 Site Status: Active ____X____ Inactive __________
2.3 Site Physical Description: Active dry cleaner
2.4 Site Chemical History: Tetrachloroethylene contamination of soil and ground water
2.5 Site Waste Analysis:

Priority Pollutants: Volatile __X__ Base/Neutral ______
Acid ______ Metals ______
Cyanide ______ Pesticides ______
PCBs ______

Other Chemicals: Trichloroethylene

2.6 Site Hazard Type: Hazardous __X__
Non-hazardous ______
Unknown ______

2.7 Site Waste Type (s): Solid __X__ Liquid __X__ Gas/Vapor ______

2.8 Site Waste Characteristics:

Corrosive		Toxic	X	Ignitable	
Reactive		Volatile	X	Flammable	
Explosive		Radioactive		Unknown	

2.9 Site Hazard Evaluation:

a. Chemical Exposure

Potential: Low exposure potential

b. Monitoring: Volatile organic compounds and airborne particulates will be monitored continuously. An action level of 25 ppm for VOCs and 150 ug/m3 has been set (see HASP).

c. Personal Protection Level: Level D.

d. Site Overall Risk Assessment:

Low ___X___ Moderate ______ High ______ Unknown _________

NA = not applicable

ND = no data available

NT = not tested

WAL = within acceptable limits

BDL = below detection unit

X = present, but concentrations unknown

3.0 PROPOSED SITE WORK: See Section 1.3.

4.0 SITE MONITORING:

1. Equipment Used: PID ___X____ Particulate Monitor ___X____
2. Monitoring: Start-Up ______________ Continuous ____X_______
   Periodic ______X________ Chart Recording______________
3. Communications: Verbal _____X_____
   Telephone _____X_____
   Radio _____X_____

5.0 MINIMUM LEVEL OF PROTECTION:

1 Site Personnel: Level D as Stated in the HASP

2 Visitors: Level D as Stated in the HASP

6.0 SITE FIRST AID SUPPLIES:

First-Aid Handbook ____________

First-Aid Kit _____X______

Other____

The site firs -aid supplies are located in Site Vehicles

7.0 DECONTAMINATION AND/OR DISPOSAL:

Steam______________ Detergent/Potable Water_____X_____

Other: Rinse water and sediment resulting from decontamination activities within the decontamination area will not be allowed to drain on-Site. Equipment will be cleaned on plastic sheeting so that it will not come into contact with any surface or sub-surface soil. All decontamination-derived wastes will be stored on-Site in 55-gallon steel drums for later disposal.

8.0 EMERGENCY RESPONSE (Medical & Environmental):

8.1 Contingency and Community Air Monitoring Plan

As stated in the HASP.

8.2 Hospital Directions

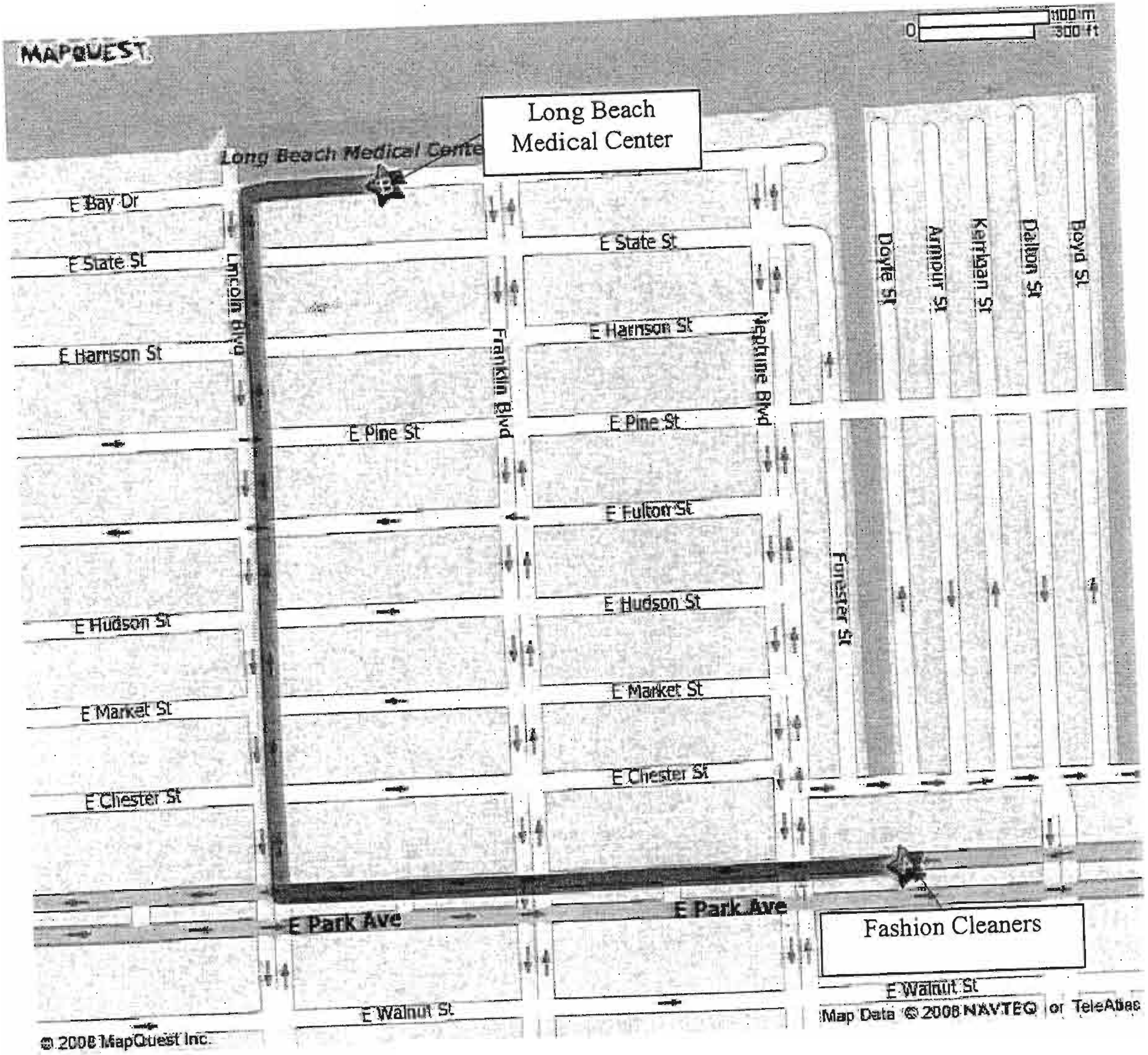
Refer to HASP.

9.0 SITE SAFETY RULES

Please refer to HASP.

Attachment 8

HOSPITAL LOCATION AND DIRECTIONS MAP



Hospital Contact Information

Long Beach Medical Center
455 East Bay Drive
Long Beach, New York 11561
Telephone: (516) 897-1000
Total Distance: 0.82 Miles
Approximate Driving Time: 2 Minutes

Start: Start out going WEST on EAST PARK AVENUE toward NEPTUNE BOULEVARD

1. Turn RIGHT onto LINCOLN BOULEVARD
2. Turn RIGHT onto EAST BAY DRIVE

End: End at 455 East Bay Drive, Long Beach, New York 11561

EnviroTrac
Environmental Services

Quality Assurance Project Plan

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TABLES

1. PURPOSE AND OBJECTIVES

1.1 Purpose

This Quality Assurance Project Plan (QAPP) has been prepared for investigation and sampling activities at Fashion Cleaners located at 641 East Park Avenue, Long Beach, New York 11561-2512, herein referred to as the Site. This QAPP applies to the activities set forth in the Remedial Investigation (RI) Work Plan for the Site prepared by EnviroTrac Ltd. (EnviroTrac) dated May 16, 2008, which includes a summary of background information of the Site. The QAPP is intended to set Chemical Quality Assurance (CQA) guidelines of reliable data obtained by measurement activities, such that data generated are scientifically valid, defensible, comparable, and of known precision and accuracy.

This QAPP contains a detailed discussion of the chemical quality assurance protocols to be used by field and laboratory personnel, as well as project organization and responsibilities. The proposed laboratory to be used for sample analysis will be referred to herein as the "Selected Laboratory". The Selected Laboratory will abide by the procedures outlined in the 2005 New York State Department of Environmental Conservation (NYSDEC) Analytical Services Protocol (ASP) and be capable of producing New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) Category B deliverables and Quality Assurance/Quality Control (QA/QC) documentation.

This QAPP contains a detailed discussion of the quality assurance and quality control (QA/QC) protocols to be utilized by EnviroTrac and laboratory personnel. The RI sampling program and relevant field/laboratory QA/QC requirements are summarized in Tables B-1 through B-12.

1.2 Definitions

The parameters that will be used to specify data quality objectives, and to evaluate the analytical system performance for all analytical samples are precision, accuracy, representativeness, completeness, and comparability (PARCC). Definitions of these and other key terms used in this QAPP are provided below

- *Accuracy* - the degree of agreement of a measurement with an accepted reference value. Accuracy is generally reported as a percent recovery, and calculated as:

  Accuracy = Measured Value/Accepted Value x 100

- *Analyte* - the chemical or property for which a sample is analyzed.

- *Comparability* - the expression of information in units and terms consistent with reporting conventions; the collection of data by equivalent means; or the generation of data by the same analytical method. Aqueous samples will be reported as ug/l, solid samples will be reported in units of mg/kg, dry weight.

- *Completeness* - the percentage of valid data obtained relative to that which would be expected under normal conditions. Data are judged valid if they meet the stated precision and accuracy goals.

- *Duplicate* - two separate samples taken from the same source by the same person at essentially the same time and under the same conditions that are placed into separate containers for independent analysis. Duplicate samples are intended to assess the effectiveness of equipment decontamination, the precision of sampling efforts, the impacts of ambient environmental conditions on sensitive analyses (e.g., volatile organics analysis (VOA), and the potential for contaminants attributable to reagents or decontamination fluids. Identifying such potential sources of error is essential to the success of the sampling program and the validity of the environmental data. Each QC sample is described below. As a minimum, each set of ten or fewer field samples will include a trip blank, a duplicate, and one sample collected in a sufficient volume to allow the laboratory to perform a matrix spike.

- *Field Blanks* - field blanks (sometimes referred to as "equipment blanks" or "sampler blanks") are the final analyte-free water rinse from equipment decontamination in the field and are collected at least one during a sampling episode. If analytes pertinent to the project are found in the field blank, the results from the blanks will be used to qualify the levels of analytes in the samples. This qualification is made during data validation. The field blank is analyzed for the same analytes as the sample that has been collected with that equipment.

- *Precision* - a measure of the agreement among individual measurements of the sample property under prescribed similar conditions. Precision is generally reported as Relative Standard Deviation (RSD) or Relative Percent Difference (RPD). Relative standard deviation is used when three or more measurements are available and is calculated as:

  RSD = Standard Deviation/Arithmetic Mean x 100.

  Relative percent difference is used for duplicate measurements and is calculated as:

  RPD = ((Value 1-Value 2)/Arithmetic Mean) x 100.

- *Quality Assurance (QA)* - all means taken in the field and inside the laboratory to make certain that all procedures and protocols use the same calibration and standardization procedures for reporting results; also, a program which integrates the quality planning, quality assessment, and quality improvements activities within an organization.

- *Quality Control (QC)* - all the means taken by an analyst to ensure that the total measurement system is calibrated correctly. It is achieved by using reference standards, duplicates, replicates, and sample spikes. In addition, the routine application of procedures designed to ensure that the data produced achieve known limits of precision and accuracy.

- *Replicate* - two aliquots taken from the same sample container and analyzed separately. Where replicates are impossible, as with volatile organics, duplicates must be taken.

- *Representativeness* - degree to which data represent a characteristic of a set of samples. The representativeness of the data is a function of the procedures and caution utilized in collecting and analyzing the samples. The representativeness can be documented by the relative percent difference between separately collected, but otherwise identical sample volumes.

- *Trip Blanks* - trip blanks are samples that originate from analyte-free water taken from the laboratory to the Site and returned to the laboratory with the volatile organic samples. One trip blank should accompany each cooler containing volatile organics; it will be stored at the laboratory with the samples, and analyzed with the sample set. Trip blanks are only analyzed for VOCs.

1.3 Data Quality Objectives

1.3.1 Overall Data Quality Objectives

Data Quality Objectives (DQO) are quantitative and qualitative statements specifying the quality of the environmental data necessary to support the decision-making process to guide the RI and any subsequent corrective actions. DQO define the total uncertainty in the data that is acceptable for each specific activity during the RI. This uncertainty includes both sampling error and analytical error. Ideally, the prospect of zero uncertainty is the objective; however, the very processes by which data are collected in the field and analyzed in the laboratory contribute to the uncertainty of the data. It is the overall objective to keep the total uncertainty to a minimal level such that it will not hinder the intended use of the data.

To achieve the project DQO, specific data quality parameters such as detection limits, criteria for accuracy and precision, sample representativeness, data comparability and data completeness must be specified. The overall objectives are established such that there is a high degree of confidence in the measurements.

The parameters that will be used to specify data quality objectives and to evaluate the analytical system performance for soil and groundwater samples are PARCC: precision, accuracy, representativeness, completeness, and comparability.

1.3.2 Field Investigation Data Quality Objectives

To permit calculation of precision and accuracy for the samples, blind field duplicate, field blanks, trip blanks, and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected, analyzed, and evaluated.

Through the submission of field QC samples, the distinction can be made between laboratory problems, sampling technique considerations, sample matrix effects, and laboratory artifacts. To assure sample representativeness, all sample collection will be performed in strict accordance with the procedures set forth in this QAPP.

Precision will be calculated as RPD if there are only two analytical points and percent relative standard deviation (% RSD) if there are more than two analytical points. Blind field duplicate and MS/MSD sample analyses will provide the means to assess precision. The submission of field and trip blanks will provide a check with respect to accuracy and will monitor chemicals that may be introduced during sampling, preservation, handling, shipping, and/or the analytical process. In the event that the blanks are contaminated and/or poor precision is obtained, the associated data will be appropriately qualified.

Representativeness will be assured through the implementation of the structured and coherent RI of which this QAPP is a part. This RI has been designed so that the appropriate numbers of samples of each matrix and of each location of interest are obtained for analysis.

Ideally, 100% completeness is the goal. However, it must be recognized that unforeseen issues may result in the generation of some data that may not be acceptable for use. Therefore, a completeness target of 90%, as determined by the total number of usable data points versus the total number of data points measured, will be the realistic goal of this program.

Comparability is defined as the extent to which data from one data set can be compared to similar data sets. Comparability between data sets is often questionable due to issues such as different analytical methods used or inter-laboratory differences. In order that the data generated as part of this project remain comparable to any previously generated data or data to be generated in the future, currently published analytical methods have been identified for the analysis of the collected samples. These methods will be performed by an analytical laboratory with a demonstrated proficiency in the analysis of similar samples by the referenced methods. In addition, samples will be collected using documented procedures to ensure consistency of effort and reproducibility if necessary.

1.3.3 Laboratory Data Quality Objectives

The analytical laboratory will demonstrate analytical precision and accuracy by the analysis of various QC samples (i.e., laboratory duplicates, spike samples, matrix spike duplicates and laboratory control samples). Tables B-9 through B-12 present the relevant precision and accuracy criteria for the analytical parameters related to this RI. Precision, as well as instrument stability, will also be demonstrated by comparison of calibration response factors from the initial calibration to that of the continuing calibrations. Laboratory accuracy will be evaluated by the addition of surrogate and matrix spike compounds, and will be presented as percent recovery (%R). Precision will be presented as RPD, % RSD, or percent difference (%D), whichever is appropriate for the number and type of QC samples analyzed. Laboratory blanks can also be used to demonstrate the accuracy of the analyses and possible effects from laboratory artifact contamination.

2. FIELD QUALITY ASSURANCE/QUALITY CONTROL

2.1 Equipment Maintenance

In addition to the laboratory analyses conducted during the course of this RI, field measurements will be collected for total volatile organics (air monitoring and soil sample screening), pH, conductivity, temperature, dissolved oxygen (DO) and turbidity in groundwater. A maintenance, calibration, and operation program will be implemented to ensure that routine calibration and maintenance is performed on all field instruments. EnviroTrac's equipment manager, the Quality Assurance Officer (QAO), and the field team members will administer the program. EnviroTrac's equipment manager will perform the scheduled monthly and annual calibration and maintenance. Monthly and annual maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments.

2.2 Equipment Calibration

Trained field team members will be familiar with the field calibration, operation, and maintenance of the equipment. They will perform field calibrations, checks, and instrument maintenance daily. The photoionization detector (PID) will be calibrated on a periodic basis with isobutylene. A trained team member will perform daily field checks and instrument maintenance prior to use. A trained team member using standard calibration solutions will calibrate the pH, conductivity, DO, and turbidity meters. Field maintenance, calibration, and equipment operation will follow the procedures outlined in the manufacturer's Operation and Field Manuals accompanying the respective instruments. All maintenance and calibration will be documented on an instrument-specific master calibration/ maintenance form.

The Field Task Manager will be responsible for keeping a master instrument calibration/maintenance form for each measuring device. Each form will include at least the following relevant information:

- Name of device and/or instrument calibrated;
- Device/instrument serial and/or identification (I.D.) number;
- Frequency of calibration;
- Date of calibration;
- Results of calibration;
- Name of person performing the calibration;
- Identification of the calibration standards; and
- Buffer solutions (pH meter only).

2.3 Equipment Decontamination

To minimize the potential for cross-contamination, all drilling and sampling equipment will be properly decontaminated prior to and after each use.

2.3.1 General Procedures

All heavy equipment will be decontaminated in a designated clean area. Sampling equipment and probes will be decontaminated in an area covered by plastic near the sampling location. All solvents and wash water used in the decontamination process will be collected and drummed for off-site disposal. All disposable sampling equipment will be properly disposed of in dry containers.

All well casing and screen will be steam cleaned, wrapped in clean polyethylene sheeting, and stored until the time of well construction.

Extraneous contamination and cross-contamination will be controlled by wrapping the sampling equipment with aluminum foil when not in use and changing and disposing of the sampler's gloves between samples. Decontamination of sampling equipment will be kept to a minimum in the field, and wherever possible, dedicated sampling equipment will be used.

Personnel directly involved in equipment decontamination will wear appropriate protective equipment.

2.3.2 Heavy Equipment (drill rigs, etc.)

Drilling equipment that comes in direct contact with soil and/or ground water will be cleaned and rinsed with detergent and potable water between sampling points and before leaving the Site. Decontamination of drilling equipment will include scrubbing manually (if necessary) to remove heavy soils prior to cleaning. Rinse water and sediment generated from contaminated equipment decontamination will be contained on-Site for later disposal.

- Potable water and detergent scrub to remove excess soil;
- Potable water rinse; and
- Air dry

All excavation equipment that has had direct contact with soil and/or ground water will be decontaminated between sampling points and before leaving the Site. Rinse water and sediment generated from contaminated equipment will be stored on site for later disposal.

- Potable water and detergent scrub to remove excess soil;
- Potable water rinse; and
- Air dry

2.3.3 Aqueous Sampling Equipment

Factory pre-cleaned disposable bailers will be used during the RI. In the event that field decontamination of reusable sampling equipment is necessary, decontamination procedures will be as follows:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination;
- Generous tap water rinse; and
- Distilled and deionized (ASTM Type 11) water rinse;
- 10% nitric acid rinse, followed by a distilled and deionized water rinse (metals only), or
- Methanol (pesticide grade) rinse (volatiles only);
- Total air dry; and
- Distilled and deionized water rinse.

The submersible sampling pumps that are placed in the borehole will be decontaminated with an Alconox detergent rinse and by pumping approximately 5 gallons of potable water through the pump. Since dedicated new lengths of polyethylene tubing will be used for sampling each well, the tubing will not be decontaminated. Unless otherwise specified, the submersible pumps will be decontaminated prior to the sampling the first well and between each subsequent well as follows:

- Potable water rinse;
- Alconox detergent and potable water scrub;
- Potable water rinse;
- Distilled/deionized water rinse; and
- Wrap in aluminum foil, shiny side facing out.

2.3.4 Meters and Probes

All meters and probes that are used in the field (other than those used solely for air monitoring purposes, will be decontaminated between use as follows:

- Non-phosphate, laboratory-grade detergent and water scrub to remove visual contamination;
- Potable water rinse, followed by distilled water rinse; and
- Air dry.

2.3.5 Disposal Methods

All soil and water generated during cleaning of equipment in contact with soil and/or ground water will be stored on-Site for later disposal following the NYSDEC's approval. Personal protective equipment (PPE), such as gloves, disposable clothing, and other disposable equipment, resulting from personnel cleaning procedures, will be collected and disposed of as normal trash following decontamination (if necessary).

2.4 Quality Assurance/Quality Control Sampling

The field sampling quality assurance-sampling program is summarized in Table B-1. Specific guidance regarding the collection of field and laboratory QA/QC samples is presented separately below.

2.4.1 Field QA/QC Samples

<u>Trip Blanks</u>

The trip blank will be used to determine if any cross-contamination occurs between aqueous samples during shipment. The analytical laboratory will supply trip blanks as aliquots of distilled, deionized water that will be sealed in a sample bottle prior to initiation of each day of fieldwork. Glass vials (40 ml) with Teflon lined lids will be used for trip blanks. The sealed trip blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the Site by the laboratory personnel. If multiple coolers are necessary to store and transport aqueous VOC samples, then each cooler must contain an individual trip blank. Trip blanks are analyzed for VOCs only.

Field Blanks

Field blanks will be collected to evaluate the cleanliness of soil and aqueous sampling equipment, sample bottles and the potential for cross-contamination of samples due to handling of equipment, sample bottles and contaminants present in the air. Field blanks will collected at a frequency of one per decontamination event for each type of sampling equipment, and each media being sampled (e.g., a groundwater bailer for groundwater, and a hand auger for soil sampling), at a minimum of one per equipment type and/ or media per day.

Field blanks will be collected prior to the occurrence of any analytical field-sampling event by pouring deionized or potable water over a particular piece of sampling equipment and into a sample container. The analytical laboratory will provide field blank water and sample jars with preservatives for the collection of all field blanks. Glass jars will be used for organic blanks. The field blanks as well as the trip blanks will accompany field personnel to the sampling location. The field blanks will be analyzed for the same analytes as the environmental samples being collected that day and will be shipped with the samples taken.

Field blanks will be taken in accordance with the procedure described below:

- Decontaminate sampler using the procedures specified in the QAPP;
- Pour distilled/deionized water over the sampling equipment and collect the rinsate water in the appropriate sample bottles;
- The sample will be immediately placed in a sample cooler and maintained at a temperature of 4°C until receipt by the laboratory; and
- Fill out sample log, labels, and COC forms, and record in field notebook.

Temperature Blanks

The temperature blank will be used to determine the temperature of the samples within the cooler upon arrival at the analytical laboratory. A laboratory-supplied temperature blank will be an aliquot of distilled, deionized water that will be sealed in a sample bottle. The sealed temperature blank bottles will be placed in a cooler with the empty sample bottles and will be shipped to the Site by the laboratory personnel. If multiple coolers are necessary to store and transport samples, then each cooler must contain an individual temperature blank.

2.4.2 Laboratory QA/QC

Blind Field Duplicate Samples

Blind field duplicate samples will be collected analyzed to check laboratory reproducibility of analytical data. One blind field duplicate sample will be collected with the air samples. Blind field duplicate samples will be collected at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected to evaluate the precision and reproducibility of the analytical methods. All blind field duplicate samples will be submitted to the analytical laboratory as a normal sample, however will have a fictitious sample identification and fictitious time of sample collection. Each blind field duplicate will be cross-referenced to document which actual sample it is a blind field duplicate of in the field notes and on the master sample log.

Split Samples

One of the aspects for generating sound quality analytical data is to collect quality assurance (QA) split samples that will be submitted to a third party analytical laboratory selected by the NYSDEC for analysis. The results from the QA split samples will then be compared to the analytical results from the primary analytical laboratory (CHEMTECH).

Matrix Spike/Matrix Spike Duplicate

Additional environmental sample volume will be collected for use as MS/MSD samples at a frequency of at least 5% (one out of every 20 samples) of the total number of samples collected per matrix to evaluate the precision and reproducibility of the analytical methods.

2.5 Field Records

Proper management and documentation of field activities is essential to ensure that all necessary work is conducted in accordance with the RI, and QAPP in an efficient and high quality manner. Field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Field management forms and field logbook will be used to document all field activities, as this documentation will support that the samples were collected and handled properly, making the resultant data complete, comparable and defensible. Field logbook procedures and field management forms are identified in the following sections.

2.5.1 Field Logbook

Data reporting practices will be followed carefully and data entries will be validated regularly to insure that raw data are accurate and that an audit trail is developed for those data that require reduction. All the field data, generated during field measurements, observations and field instrument calibrations, will be entered directly into the Fashion Cleaners RI Logbook. Each project team member will be responsible for proofing all data transfers made, and the FM will initial and date at least 10 percent of all data transfers.

One bound book (Fashion Cleaners Site RI Logbook) will be maintained for the Site. The book will remain with the project files. Copies will be made for the PM and for the person who made the entries, if requested. In addition, site data will compiled into an on-site computer data base.

All entries in the logbook will be made in ink. When a mistake is made in the log, it will be crossed out with a single ink line and will be initialed and dated.

Special care will be taken in the description and documentation of sampling procedures. Sampling information to be documented in the field notebook and/or associated forms are as follows:

- Sample identification;
- Date and time of sample collection;
- Location of sample - document with a site sketch and/or written description of the sampling location so that accurate re-sampling can be conducted if necessary;
- Analysis and QA/QC required;
- Chemical preservation used (nitric acid, sulfuric acid, sodium hydroxide, none, etc.);
- Field data;
- Field observations - all significant observations will be documented;
- Sample condition (color, odor, etc.);
- Site condition;
- Sample shipping procedure, date, time, destination and if legal seals were attached to transport container(s); and
- Comments - Any observation or event that occurred that would be relevant to the Site; for example; weather changes and effect on sampling.

2.5.2 Field Management Forms

In addition to maintenance of a field logbook, which will constitute the primary means to document field activities, field management forms may be used to supplement the logbook entries. Field management forms provide a regular format to record the relevant information for a particular field activity. Use of these forms helps to ensure that the field team consistently and completely records all pertinent data relative to a particular field activity on a regular basis. All forms, sample labels, custody seals and other sample documents will be filled out completely.

2.6 Sample Preparation and Custody

2.6.1 Sample Identification

To provide for proper identification in the field, and proper tracking in the laboratory, all samples must be labeled in a clear and consistent fashion using the procedures and protocols described below and within the following subsections.

- Sample labels will be waterproof and have a pre-assigned, unique number that is indelible.
- Field personnel must maintain a field notebook. This notebook must be water resistant with sequentially numbered pages. Field activities will be sequentially recorded in the notebook.
- The notebook, along with the COC form, must contain sufficient information to allow reconstruction of the sample collection and handling procedure at a later time.
- Each sample will have a corresponding notebook entry which includes:

  - Sample ID number;
  - Well or other sample location and number;
  - Date and time;
  - Analysis for which sample was collected;
  - Additional comments as necessary; and
  - Samplers' name.

- Each sample must have a corresponding entry on a COC manifest.
- The manifest entry for sampling at any one well is to be completed before sampling is initiated at any other well by the same sampling team.

- In cases where the samples leave the immediate control of the sampling team (i.e., shipment via common carrier) the shipping container must be sealed.

The soil and groundwater monitoring well sample coding system developed previously during the investigation conducted by ERM in 2005 will be used, and sampling location designators will be added sequentially to the previous testing. ERM installed soil borings at five locations (SB-01 through SB-05). Soil borings installed during the RI will begin with SB-06. ERM installed two groundwater monitoring wells (that were designated MW-01 and MW-02). Additional wells installed at different locations will start with MW-03. Also, to anticipate the possibility of installing wells at different depths at specific locations a depth indicator will be added to the Well name (e.g., existing monitoring well MW-01 is screened from 5 to 15 feet and will be renamed to reflect this as follows: MW-01(5-15)).

Each sample collected will be designated by an alphanumeric code that will identify the type of sampling location and a specific sample designation (identifier). Location types will be identified by a two-letter code. Groundwater samples collected from the monitoring wells will begin with "MW" and will have the screen zone interval depths indicated. Soil samples will begin with "SB". The depth will also be added to soil samples. Lithologic characterization samples will begin with "DB" and will show the sample depth interval. Sub-slab air samples will begin with "SL", indoor air samples will begin with "IA", outdoor ambient air samples will begin with "OA". The specific sampling designation (identifier) will be identified using a one or two-digit number. Samples collected for waste characterization will begin with "WC".

For example, a soil sample collected from the interval of 5-5.5' at soil boring location SB-10 will be identified as SB-10 (5-5.5); a deeper groundwater monitoring well set at the existing MW-01 location and screened at 15-20' will be identified as MW-01 (15-20)

A more detailed description of each sample to be collected can be found in Table B-2.

In the case of QC samples such as field blanks, trip blanks and blind field duplicate samples, six digits will follow FB, TB and DUP respectively to represent the date (e.g., FB110108 would represent a field blank collected on 01 November 2008). For matrix spike/matrix spike duplicate samples, MS/MSD will be added following the applicable sample identification.

2.6.2 Sample Containers

- The analytical laboratory will provide all sample containers.

  - If glass bottles are used, extra glass bottles will be obtained from the laboratory to allow for accidental breakage that may occur.

  - If sample preservation is specified, the necessary preservatives will be placed in the sample bottles by the laboratory.

- The sample bottles will be handled carefully so that any preservatives are not inadvertently spilled.

A more detailed description of the sample containers to be utilized for this RI can be found in Table B-1.

2.6.3 Sample Preservation

Sample Preservation

Soil samples collected during the RI will be preserved by cooling to 4°C and maintained at this temperature until time of analysis. Groundwater samples for VOC analysis during the RI will be preserved by acidification to a pH of <2 using hydrochloric acid (HCl), cooled to 4'C, and maintained at this temperature until time of analysis. A more detailed description of the sample preservation to be utilized for the RI can be found in Table B-1.

- Immediately following collection of the samples, they will be placed in a cooler with "freezer-pacs" to maintain sample integrity. All volatile sample bottles to be filled to capacity with no headspace for volatilization. If necessary to meet a maximum recommended holding time, the samples are to be shipped by overnight courier to the laboratory.

- The shipping container used will be designed to prevent breakage, spills, and contamination of the samples. Tight packing material is to be provided around each sample container and any void around the "freezer-pacs". The container is to be securely sealed, clearly labeled, and accompanied by a COC record. Separate shipping containers should be used for "clean" samples and samples suspected of being heavily contaminated. During winter months, care should be taken to prevent samples from freezing. Sample bottles will not be placed directly on "freezer-pacs".

Sample Holding Time

- All samples will be shipped the same day they are obtained to the analytical laboratory.
- The samples must be stored at or near 4°C and analyzed within specified holding times.
- The analytical laboratory will be a NYSDOH ELAP-certified laboratory, and conform to meeting specifications for documentation, data reduction, and reporting. The laboratory will follow all method specifications pertaining to sample holding times contained in the NYSDEC ASP (revised 2005) and/or as prescribed by the specific analytical method.

A more detailed description of the sample holding times to be utilized for this RI can be found in Table B-1. These holding times are consistent with NYSDEC ASP Exhibit I although technical holding times vary. The holding times for the air samples will be consistent with the method requirements and not the EPA Region 2 validation criteria.

Sample Custody

Chain of Custody - The primary objective of the sample custody procedures is to create an accurate written record that can be used to trace the possession and handling of all samples from the moment of their collection, through analysis, until their final disposition. All field sampling personnel will adhere to proper sample custody procedures because samples collected during an investigation could be used as evidence in litigation. Therefore, possession of the samples must be traceable from the time each sample is collected until it is analyzed at the laboratory.

Custody Transfer to Field Personnel - The on-site hydrogeologist or the field personnel will maintain custody of samples collected during this investigation. All field personnel are responsible for documenting each sample-transfer and maintaining custody of all samples until they are shipped to the laboratory. COC records will be completed at the time of sample collection and will accompany the samples inside the cooler for shipment to the selected laboratory.

Each individual who has the samples in their possession will sign the COC record. Preparation of the COC record is as follows:

- For every sample, the person collecting the sample will initiate the COC record in the field. Every sample will be assigned a unique identification number that is entered on the COC Record.
- The record will be completed in the field to indicate project, sampling team, etc.
- If the person collecting the sample does not transport the samples to the laboratory or deliver the sample containers for shipment, the fist block for Relinquished By ________, Received By_______ will be completed in the field.
- The person transporting the samples to the laboratory or delivering them for shipment will sign the record form as Relinquished By________.
- If commercial carrier ships the samples to the laboratory, the original COC record will be sealed in a watertight container and placed in the shipping container, which will be sealed prior to being given to the carrier. The carbonless copy of the COC record will be maintained in the field file.
- If the samples are directly transported to the laboratory, the COC will be kept in possession of the person delivering the samples.
- For samples shipped by commercial carrier, the waybill will serve as an extension of the COC record between the final field custodian and the laboratory.

- Upon receipt in the laboratory, the Sample Custodian or designated representative, will open the shipping containers, compare the contents with the COC record, and sign and date the record. Any discrepancies will be noted on the COC record.
- If discrepancies occur; the samples in question will be segregated from normal sample storage and the field personnel immediately notified.
- COC records will be maintained with the records for a specific project, becoming part of the data package.

Custody Transfer to Laboratory - All samples collected during the RI will be submitted to a NYSDOH ELAP-certified laboratory meeting specifications for documentation, sample login, internal chain of custody procedures, sample/analysis tracking, data reduction, and reporting. The laboratory will follow all specifications pertaining to laboratory sample custody procedures contained in the NYSDEC ASP (revised 2005).

In general, the following procedures will be followed upon sample receipt. The laboratory will not accept samples collected by project personnel for analysis without a correctly prepared COC record.

The fist steps in the laboratory receipt of samples are completing the COC records and project sample login form. The laboratory Sample Custodian, or designee, will note that the shipment is accepted and notify the Laboratory Manager or the designated representative of the incoming samples.

Upon sample receipt, the laboratory Sample Custodian, or designee, will:

- Examine all samples and determine if proper temperature has been maintained during shipment. If samples have been damaged during shipment, the remaining samples will be carefully examined to determine whether they were affected. Any samples affected will also be considered damaged. It will be noted on the COC record that specific samples were damaged and that the samples were removed from the sampling program. Field personnel will be notified as soon as possible that samples were damaged and that they must be resampled, or the testing program changed, and provide an explanation of the cause of damage.

- Compare samples received against those listed on the COC record.
- Verify that sample holiday times have not been exceeded.
- Sign and date the COC record and attach the waybill to the COC record.
- Denote the samples in the laboratory sample log-in book which contains the following information:
  - Project identification number
  - Sample numbers
  - Type of samples
  - Date received in laboratory
  - Record of the verified time of sample receipt (VTSR)
  - Date put into storage after analysis is completed
  - Date of disposal.

The last two items will be added to the log when the action is taken.

- Notify the Laboratory Manager of sample arrival.
- Place the completed COC records in the project file.

The VTSR is the time of sample receipt at the laboratory. The date and time the samples are logged in by the Sample Custodian or designee, will agree with the date and time recorded by the person relinquishing the samples.

2.6.4 Sampling Packaging and Shipping

Sample bottles and samples will either be delivered/picked up at the Site daily by the analytical laboratory, or delivered/shipped via overnight courier. Once the samples have been collected, proper procedures for packaging and shipping will be followed as described below.

Packaging

Prior to shipment, samples must be packaged in accordance with current United States Department of Transportation (USDOT) regulations. All necessary government and commercial carrier shipping papers must be filled out. The procedure below should be followed regardless of transport method:

- Samples will be transported in metal ice chests or sturdy plastic coolers (cardboard or Styrofoam containers are unacceptable).
- Remove previously used labels, tape, and postage from cooler.
- Ship filled sample bottles in same cooler in which empty bottles were received.
- Affix a return address label to the cooler.
- Check that all sample bottles are tightly capped.
- Check that all bottle labels are complete.
- Be sure COC forms are complete.
- Wrap sample bottles in bubble pack and place in cooler.
- Pack bottles with extra bubble pack, vermiculite, or Styrofoam "peanuts". Be sure to pack the trip blank, if one is being submitted with the samples.
- Keep samples refrigerated in cooler with bagged ice or frozen cold packs. Do not use ice for packing material; melting will cause bottle contact and possible breakage.
- Separate and retain the sampler's copy of COC and keep with field notes.
- Tape paperwork (COC, manifest, return address) in zipper bag to inside cooler lid.
- Close cooler and apply signed and dated custody seal in such a way that the seal must be broken to open cooler.
- Securely close cooler lid with packing or duct tape. Be sure to tape latches and drain plugs in closed position.

Shipping

Samples should arrive at the laboratory as soon as possible following sample collection to ensure that holding times are not exceeded. All samples must be hand delivered on the same day as sampling or sent via overnight courier. When using a commercial carrier, follow the steps below.

- Securely package samples and complete paperwork;

- Weigh coolers for air transport;
- Complete air bill for commercial carrier (air bills can be partially completed in office prior to sampling to avoid omissions in field). If necessary, insure packages;
- Keep customer copy of air bill with field notes and COC form;
- When coolers have been released to transporter, call receiving laboratory and give information regarding samplers' names, method of arrival; and
- Call the lab on day following shipment to be sure all samples arrived intact. If bottles are broken, locations can be determined from COC and resampled.

2.7 Analytical Laboratory

The data collected during the course of the RI activities will be used to determine the presence and concentration of certain analytes in soil, groundwater and air.

All samples collected for laboratory analysis during the RI will be submitted to CHEMTECH located at 284 Sheffield Street, Mountainside, New Jersey. CHEMTECH is a NYSDOH ELAP CLP-certified laboratory (Lab ID #11376) meeting specifications for documentation, data reduction, and reporting.

2.8 Analytical Test Parameters

The RI will require the analysis of groundwater, soil and air samples that will be collected to characterize the Site.

Groundwater samples will be analyzed for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, Pesticides by USEPA SW-846 Method 8081A, PCBs by USEPA Method 8082 and Metals by USEPA SW-846 Methods 6010B/7471A as well as chloride by USEPA Method 300.

Soil samples will be analyzed for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, Pesticides by USEPA SW-846 Method 8081A, PCBs by USEPA Method 8082 and Metals by USEPA SW-846 Methods 6010B/7471A.

Aqueous and solid samples will also be collected for waste characterization. 'Those samples are to be analyzed for Toxicity Characteristic Leaching Procedure (TCLP) in accordance with SW-846 Method 1311 for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, and Metals by USEPA SW-846 Methods 6010B/7471A, as well as Reactivity to Sulfide and Cyanide, Corrosivity and Flammability.

Air samples will be collected and analyzed for volatile compounds following "Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition 1997, EPA/625/X-96/010B", Compendium Method TO-15, "Determination Of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters And Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)".

2.9 Instrument Calibration

The frequency of laboratory instrument calibration and associated procedures for the specific analytical methods to be followed by the selected laboratory are specified in the individual USEPA analytical method procedures. The selected laboratory's calibration schedule will adhere to all analytical method specifications.

2.10 Data Management and Reporting Plan

2.10.1 Data Use and Management Objectives

Data Use Objectives

The typical data use objectives for this RI are:

- Ascertaining if there is a threat to public health or the environment;
- Locating and identifying potential sources of impacts to soil or groundwater;
- Delineation of horizontal and vertical constituent concentrations, identifying clean areas, estimating the extent and/or volume of impacted soil and groundwater;
- Determining treatment and disposal options;
- Characterizing soil for on-site or off-site treatment; and
- Formulating remediation strategies, and estimating remediation costs.

Data Management Objectives

The primary objective of proper data management is to ensure and document that all necessary work is conducted in accordance with the RI and QAPP in an efficient and high quality manner thereby maximizing the confidence in the data in terms of PARCC. Data management procedures not only include field and laboratory documentation, but also include how the information is handled after the conclusion of field investigation and laboratory analyses area completed. - Data handling procedures include project fie management, reporting, usability analysis (review and validation) and use of consistent formats for the fid presentation of the data.

Project File Specifications

The EnviroTrac Project Manager in EnviroTrac's Yaphank, New York office location will keep all project information in a central Project File maintained. The Project File will be assigned a unique project number that will be clearly displayed on all project file folders (including electronic files). Electronic files will be maintained in a similarly organized Project File located on the EnviroTrac central network system that is backed regularly to both on-site and off-site locations. Both hard copy and electronic Project Files will contain, at a minimum copies or originals of the following key project information:

- All correspondence including letters, transmittals, telephone logs, memoranda, and emails;
- Meeting notes;
- Technical information such as analytical data; field survey results, field notes, field logbooks and field management forms;
- Project calculations;
- Subcontractor agreements/contracts, and insurance certificates;
- Project-specific health and safety information/records;
- Access agreements;
- Project document output review/approval documentation; and
- Reports: Monthly Progress, Interim Technical, and Draft/Final Technical.

2.10.2 Reporting

Field Data

Field data will be recorded and reported by field personnel using appropriate field data documentation materials such as the field logbook, field management forms, and COC forms.

Good field management procedures include following proper chain of custody procedures to track a sample from collection through analysis, noting when and how samples are split (if necessary), making regular and complete entries in the field logbook, and the consistent use and completion of field management forms. Proper completion of these forms and the field logbook are necessary to support the consequent actions that may result from the sample analysis. This documentation will support that the samples were collected and handled properly making the resultant data complete, comparable, and defensible.

Laboratory Data

The analytical results of all samples collected, as part of the RI will be reported following NYSDEC ASP 2005 specifications. All laboratory analytical data will be reported as NYSDEC Category B deliverables. The Category B data deliverables include all backup QA/QC documentation necessary to facilitate a complete validation of the data.

In addition, NYSDEC "Sample Identification and Analytical Requirement Summary" and "Sample Preparation and Analysis Summary" forms will be completed and included with each data package. The sample tracking forms are specified and supplied by the 2005 NYSDEC ASP.

The laboratory will also transmit the analytical data in an electronic data format to minimize the chances of transposition errors in summarizing the data. The data will be transmitted in an electronic data deliverable (EDD) in GISKEY (most recent version) format and a PDF copy of each ASP deliverable. The data will be sent to NYSDEC in USEPA Region II Multimedia Electronic Data Deliverable (MEDD) format.

2.10.3 Data Validation

All field and laboratory data will be reviewed, validated and qualified as necessary to assess data usability by direct comparison to the specified data quality objectives and/or procedures set forth in this QAPP. The EnviroTrac QAO will determine this. Information that can be obtained includes comparison of results obtained from samples taken at the same location, and the identification of missing data points. Examination of the data at the end of the process allows for the assessment of data quality with respect to PARCC.

Field Data Validation Protocol

Field data generated in accordance with the project-specific RI will primarily consist of field temperature, pH, dissolved oxygen, turbidity and specific conductance data, and data associated with soil boring advancement, monitoring well installation and development, and soil classification. This data will be validated by review of the project documentation to check that all forms specified in the Work Plan and this QAPP have been completely and correctly filled out and that documentation exists for the specified instrument calibrations. This documentation will be considered sufficient to provide that proper procedures have been followed during the field investigation.

Laboratory Data Validation Protocol

Data validation is the assessment of data quality with respect to method specifications and technical performance of the analytical laboratory. Analytical data packages will be examined to ensure that all specified lab components are included, all QA/QC specifications were performed or met, and the data use restrictions are well defined.

Summary documentation regarding QA/QC results will be completed by the laboratory using NYSDEC ASP forms and will be submitted with the raw analytical data packages (NYSDEC ASP Category B deliverables). Data validation will be performed to assess and document analytical data quality in accordance with the project data quality objectives. The data review will evaluate data for its quality and usability. This process will qualify results so that the end user of the analytical results can make decisions with consideration of the potential accuracy and precision of the data. For example, the results are acceptable as presented, considered estimated and qualified with a "J", or rejected and not useable and therefore qualified with an "R".

The validation of the analytical data will be performed according to the protocols and QC requirements of the analytical methods, the reviewer's professional judgment, the NYSDEC ASP and the USEPA Region 2 Data Review Standard Operating Procedures (SOPs):

- HW-24, Revision 2, October 2006: Validating Volatile Organic Compounds by SW-846 Method 8260;
- HW-22, Revision 3, October 2006: Validating Semivolatile Organic Compounds by SW-846 Method 8270;
- HW-44, Revision 1, October 2006: Data Validation SOP of Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081;

- HW-45, Revision 1, October 2006: Data Validation SOP of Organic Analysis of PCBs by Gas Chromatography SW-846 Method 8082;
- HW-2, Revision 13, ILM05.3, September 2006: Evaluation of Metals Data for the CLP Program; and
- HW-31, Revision 4, October 2006: Validating Canisters of Volatile Organics in Ambient Air.

The order in which the aforementioned guidance documents and/or criteria are listed does not imply a hierarchy of reliance on a particular document for validation. EnviroTrac will utilize all guidance documents and/or criteria relying on the most comprehensive reference sources to perform the most complete validation possible.

The data validation process will provide an informed assessment of the laboratory's performance based upon contractual requirements and applicable analytical criteria. The report generated as a result of the data validation process will provide a base upon which the usefulness of the data can be evaluated by the end user of the analytical results.

During the validation process, it will be determined whether sufficient back-up data and QA/QC results are available so the reviewer may conclusively determine the quality of data support laboratory submittals for sample results. Each data package will be checked for completeness and technical adequacy of the data. Upon completion of the review, the reviewers will develop a QA/QC data validation report for each SDG.

For the organic parameter analyses, the following items or criteria will be reviewed:

- Case narrative and deliverable compliance;
- Holding times both technical and procedural and sample preservation (including pH and temperature);
- Surrogate Compound recoveries, summary and data;
- Matrix Spike/Matrix Spike Duplicate (MS/MSD) results, recoveries, summary and data;
- Blank Spike Sample (BSS) recoveries;
- Method blank summary and data;

- Gas Chromatography (GC)/Mass Spectroscopy (MS) tuning and performance;
- Initial and continuing calibration summaries and data;
- Internal standard areas, retention times, summary and data;
- Blind Field Duplicate sample results;
- Field Blank results;
- Trip Blank results;
- Organic analysis data sheets (Form I);
- GC/MS chromatograms, mass spectra and quantitation reports;
- Quantitation and detection limits; and
- Qualitative and quantitative compound identification.

After the Summary Reports are prepared for each SDG, the validator will prepare a Data Usability Report (DUSR). The DUSR will be prepared according to the guidelines established by Division of Environmental Remediation Quality Assurance Group and will review the following:

- Is the data package complete as defied under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?
- Have all holding times been met?
- Do all the QC data: 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?.
- Have all of the data been generated using established and agreed upon analytical protocols?
- Does an evaluation of the raw data confirm the results provided in the data summary sheets and qualify control verification forms?
- Have the correct data qualifiers been used?

Evaluation of NYSDEC ASP Matrix Spike Blank (MSB) data - If the MSB recovery is less that the ASP criteria, the positive results should be qualified as J, estimated biased low. If the MSB recovery is less than the ASP criteria, but greater than 10%, the non-detects should be qualified J, biased low. If the MSB recovery is less than 10%, the non-detect data must be rejected.

Any Quality Control exceedances must be numerically specified in the DUSR and the corresponding QC summary sheet from the data package should be attached to the DUSR. All data that would be rejected by the EPA Region 2 Data Validation Guidelines must also be rejected in the DUSR.

Once the data package has been reviewed and the above questions asked and answered the DUSR proceeds to describe the samples and the analytical parameters. Data deficiencies, analytical protocol deviations, and quality control problems are identified and their effect-on the data is discussed. The DUSR shall also include recommendations on resampling/reanalysis. All data qualifications must be documented following the NYSDEC ASP 2005 Rev. Guidelines.

2.10.4 Data Presentation Formats

Project data will be presented in consistent formats for all letters, Progress Reports, Interim Technical Reports, and Draft/Final Technical Reports. Specific formats will be tailored to best fit the needs of the data being presented but general specifications are described below.

<u>Data Records</u>

The data record will generally include one or more of the following:

- Unique sample or field measurement code;
- Sampling or field measurement location and sample or measurement type;
- Sampling or field measurement raw data;
- Laboratory analysis ID number;
- Property or component measured; and
- Result of analysis (e.g., concentration).

Tabular Displays

The following data will generally be presented in tabular displays:

- Unsorted (raw) data;
- Results for each medium or for each constituent monitored;
- Data reduction for statistical analysis;
- Sorting of data by potential stratification factors (e.g., location, soil Layer/depth, topography, etc.); and
- Summary data.

Graphical Displays

The following data will be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

- Sample locations and sampling grid;
- Boundaries of sampling area;
- Areas where additional data are necessary;
- Constituent concentrations at each sample location;
- Geographical extent of impacts;
- Constituent concentration levels, averages, minima and maxima;
- Changes in concentration in relation to distance from the source, time,
- depth or other parameters;
- Features affecting intramedia transport; and
- Potential receptors.

2.11 Performance Audits

2.11.1 Field Audits

During field activities, the EnviroTrac QAO may accompany sampling personnel into the field to verify that the sampling program is being properly implemented and to detect and define problems so that corrective action can be taken. All findings will be documented and provided to the EnviroTrac Project Manager and Field Task Manager.

2.11.2 Laboratory Audits

The NYSDOH ELAP CLP certified laboratory that has satisfactorily completed performance audits and performance evaluation samples will be used for all sample analysis. The results of the most recent performance audits and performance evaluations will be made available upon request. EnviroTrac may perform a laboratory audit if warranted.

2.11.3 Corrective Actions

The laboratory utilized for this project will meet the specifications for corrective action protocols typical for performing contract laboratory services. Laboratory corrective action may include instrumentation maintenance, methods modification, cross contamination/carry over issues, sample tracking practices, laboratory information management (LIMs), etc.

Prior to mobilization for the field investigation, a meeting may be scheduled among representatives of EnviroTrac and the laboratory to discuss general corrective action approach and establish procedures to ensure good and timely communications among all parties during the investigation. New procedures will be put into effect as appropriate.

3. REMEDIAL INVESTIGATION PROJECT ORGANIZATION

The EnviroTrac personnel involved in the project have extensive experience in conducting environmental investigations and remedial actions. The project organization is provided below and resumes for key personnel are presented in Appendix B of the Phase I RI/FS Work Plan

Mr. Jeffrey Bohlen will be the RI/FS project manger for EnviroTrac. Mr. Bohlen will be responsible for overall coordination and implementation of the project. Mr. Bohlen or his designee will keep the NYSDEC and the New York State Department of Health (NYSDOH) updated on the status of the RI/FS.

Mr. James Van Horn will serve as the Quality Assurance Officer (QAO) for EnviroTrac. As necessary, Mr. Van Horn will perform a field and sampling audit and interface with both laboratory and field personnel. Field personnel and the laboratory will bring any quality assurance/quality control concerns to the attention of the EnviroTrac project manager. Mr. Van Horn will work with the data validator to develop a project specific data usability report.

Mr. Thomas Bosshard will serve as the project hydrogeologist. Mr. Bosshard will be responsible oversight of the soil boring and monitoring well installations and the hydraulic conductivity testing. Mr. Bosshard will also be responsible for interpretation of sub-surface geology and hydrogeology and will report to the EnviroTrac project manager and QAO on an as needed basis. Mr. Bosshard will work with the EnviroTrac project manager to ensure that the required data are obtained.

Table B-1
Analytical Methods/Quality Assurance Summary Table
Remedial Investigation - Phase I
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Matrix Type	Soil						Air
Number of Samples	21	4	4	4	4	4	9
Number of Field Blanks (1)	2	1	1	1	1	1	NA
Number of Trip Blanks (2)	NA	NA	NA	NA	NA	NA	NA
Analytical Parameter	TCL VOA	TCL BNA SemiVOA	TCL Pest	TCL PCB	TAL Metals	Mercury	TO-15 VOA
Analytical Method	SW-846 8260B	SW-846 8270C	SW-846 8081A	SW-846 8082	SW-846 6010B	SW-846 7471A	TO-15
MS/MSD (3)	2	1	1	1	1	1	NA
Duplicate Samples (4)	2	1	1	1	1	1	1
Split Samples (5)	2	1	1	1	1	1	1
Sample Preservation (6)	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C	NA
Sample Container (6)	4 oz., glass wide mouth, Teflon liner	8 oz., amber glass jar	8 oz., plastic or glass jar	8 oz., plastic or glass jar	8 oz., plastic or glass jar	8 oz., plastic or glass jar	6L, Summa Canister
Sample Holding Time (6)	14 days	14 days	14 days	14 days	180 days	28 days	30 days

Table B-1 (Continued)

Matrix Type	Aqueous						
Number of Samples	9	2	2	2	2	2	9
Number of Field Blanks	1	1	1	1	1	1	1
Number of Trip Blanks	1	NA	NA	NA	NA	NA	NA
Analytical Parameter	TCL VOA	TCL BNA Semi-VOA	TCL Pesticides	TCL PCB	TAL Metals	Mercury	Chloride
Analytical Method	SW-846 8260B	SW-846 8270C	SW-846 8081A	SW-846 8082	SW-846 6010B	SW-846 7470A	4500-CL C
MS/MSD	1	1	1	1	1	1	NA
Duplicate Samples	1	1	1	1	1	1	1
Split Samples (5)	1	1	1	1	1	1	1
Sample Preservation (6)	Cool, 4°C, 0.008% NA2SO3 if residual cl2 present, 1:1 HCl to ph<2	Cool, 4°C, 0.008% NA2SO3 if residual cl2 present	Cool, 4°C, 0.008% NA2SO3 if residual cl2 present	Cool, 4°C, 0.008% NA2SO3 if residual cl2 present	HNO3 to pH<2	Cool, 4°C	none
Sample Container (6)	40 ml, glass vial screw cap with center hole Teflon-faced silicone septum	1000 ml, glass amber Teflon-lined screw cap	1000 ml, glass amber Teflon-lined screw cap	1000 ml, glass amber Teflon-lined screw cap	100 ml, plastic bottle	8 oz., plastic or glass bottle	100 ml, plastic or glass bottle
Sample Holding Time (6)	7 days without HCl, 14 days with HCl	Extraction 7 days, extract analysis 40 days	Extraction 7 days, extract analysis 40 days	Extraction 7 days, extract analysis 40 days	180 days	28 days	28 days

Table B-1 (Continued)

Matrix Type	Waste Charactierization					
Number of Samples	2	2	2	2	2	2
Number of Field Blanks	NA	NA	NA	NA	NA	NA
Number of Trip Blanks	NA	NA	NA	NA	NA	NA
Analytical Parameter	Toxicity Characteristic Leaching Procedure (TCLP) VOCs	TCLP Metals, Semi-volatiles	Reactivity to Sulfide	Reactivity to Cyanide	Corrosivity	Flammability (Ignitability)
Analytical Method	1311	1311	SW-846 7.3.4.2	SW-846 7.3.3.2	1110	1010
MS/MSD	NA	NA	NA	NA	NA	NA
Duplicate Samples	NA	NA	NA	NA	NA	NA
Split Samples (5)	NA	NA	NA	NA	NA	NA
Sample Preservation (6)	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C	Cool, 4°C
Sample Container (6)	4 oz. glass	16 oz. glass	8 oz. plastic	8 oz. plastic	8 oz. plastic	8 oz. plastic or glass
Sample Holding Time (6)	14 days	14 days	14 days	14 days	14 days	Not Regulated

Table B-1 (Continued)

Notes:
MS/MSD - Matrix Spike, Matrix Spike Duplicate.
(1) Field Blanks will be collected at a minimum frequency of one per day where applicable. More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
(2) Trip Blanks will be collected at the rate of one per aqueous sample shipment when VOCs are collected where applicable.
(3) MS/MSD Pairs (two samples) will be collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
(4) Duplicates are generally collected at a minimum frequency of five percent (1 per 20 field samples). More frequent collection may be warranted based on field conditions/observations and/or at the discretion of the Field Team Leader.
(5) Samples to be split with the NYSDEC - estimated, to be determined in the field during sample collection.
(6) As specified by CHEMTECH, Mountainside, New Jersey.

Table B-2
Sampling Locations
Remedial Investigation - Phase I
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Task	Locations to be Sampled	Matrix	Analysis
Soil Sampling	SB-06 (first depth)	Soil	TLC VOCs
	SB-06 (subsequent depths)	Soil	TLC VOCs
	SB-07 (first depth)	Soil	TLC VOCs
	SB-07 (subsequent depths)	Soil	TLC VOCs
	SB-08 (first depth)	Soil	TLC VOCs
	SB-08 (subsequent depths)	Soil	TLC VOCs
	SB-09 (first depth)	Soil	TLC VOCs
	SB-09 (subsequent depths)	Soil	TLC VOCs
	SB-10 (first depth)	Soil	TLC VOCs
	SB-10 (subsequent depths)	Soil	TLC VOCs
	SB-11 (first depth)	Soil	TLC VOCs
	SB-11 (subsequent depths)	Soil	TLC VOCs
	SB-12 (first depth)	Soil	full TCL/TAL, Hg
	SB-12 (subsequent depths)	Soil	full TCL/TAL, Hg
	SB-13 (first depth)	Soil	full TCL/TAL, Hg
	SB-13 (subsequent depths)	Soil	full TCL/TAL, Hg
	SB-14 (depth)	Soil	TLC VOCs
	SB-15 (depth)	Soil	TLC VOCs
	SB-16 (depth)	Soil	TLC VOCs
	SB-17 (depth)	Soil	TLC VOCs
	SB-18 (depth)	Soil	TLC VOCs
Groundwater Sampling	MW-01 (5-15)	Aqueous	full TCL/TAL, Hg, chlorides
	MW-01 (15-20)	Aqueous	TLC VOCs, chlorides
	MW-02 (5-15)	Aqueous	full TCL/TAL, Hg, chlorides
	MW-02 (15-20)	Aqueous	TLC VOCs, chlorides
	MW-03 (5-15)	Aqueous	TLC VOCs, chlorides
	MW-04 (5-15)	Aqueous	TLC VOCs, chlorides
	MW-05 (5-15)	Aqueous	TLC VOCs, chlorides
	MW-06 (5-15)	Aqueous	TLC VOCs, chlorides
	MW-07 (5-15)	Aqueous	TLC VOCs, chlorides
Soil Vapor Intrusion Assessment	IA-01	Air	TO-15 TCL
	IA-02	Air	TO-15 TCL
	IA-03	Air	TO-15 TCL
	OA-01	Air	TO-15 TCL
	OA-02	Air	TO-15 TCL
	SL-01	Air	TO-15 TCL
	SL-02	Air	TO-15 TCL
	SL-03	Air	TO-15 TCL
	SL-04	Air	TO-15 TCL
Management of IDW	WC-01	Soil	Waste Characterization (1)
	WC-02	Aqueous	Waste Characterization (1)

Notes:
(1) Waste Characterization sampling to include PCBs in accordance with SW-846 Method 8082, TCLP in Accordance with SW-846 Method 1311 for VOCs by USEPA SW-846 Method 8260B, SVOCs by USEPA SW-846 Method 8270C, and Metals by USEPA SW-846 Methods 6010B / 7470A, Ignitability, Corrosivity and Reactivity to Sulfide and Cyanide.

Table B-3
Comparison of Compound Lists
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Comparison of Volatile Lists

CAS #	Compound Name	TCLP Volatiles	Priority Pollutant Volatiles	Target Compound Volatiles (1)	CLP Volatiles OLM 4.2
67-64-1	Acetone			X	X
107-02-8	Acrolein		X		
107-13-1	Acrylonitrile		X		
71-43-2	Benzene	X	X	X	X
75-27-4	Bromodichloromethane		X	X	X
75-25-2	Bromoform		X	X	X
74-83-9	Bromomethane		X	X	X
78-93-3	2-Butanone	X		X	X
75-15-0	Carbon Disulfide			X	X
56-23-5	Carbon Tetrachloride	X	X	X	X
108-90-7	Chlorobenzene	X	X	X	X
75-00-3	Chloroethane		X	X	X
110-75-8	2-Chloroethyl vinyl ether		X		
67-66-3	Chloroform	X	X	X	X
74-87-3	Chloromethane		X	X	X
156-59-2	cis-1,2-Dichloroethene			X	X
10061-01-5	cis-1,3-Dichloropropene		X	X	X
110-82-7	Cyclohexane				X
124-48-1	Dibromochloromethane		X	X	X
96-12-8	1,2-Dibromo-3-Chloropropane				X
106-93-4	1,2-Dibromoethane	X			X
75-71-8	Dichlorodifluoromethane				X
75-34-3	1,1-Dichloroethane		X	X	X
107-06-2	1,2-Dichloroethane		X	X	X
75-35-4	1,1-Dichloroethene	X	X	X	X
95-50-1	1,2-Dichlorobenzene*		X		X
541-73-1	1,3-Dichlorobenzene*		X		X
106-46-7	1,4-Dichlorobenzene*		X		X
78-87-5	1,2-Dichloropropane		X	X	X
100-41-4	Ethyl Benzene		X	X	X
591-78-6	2-Hexanone			X	X
98-82-8	Isopropylbenzene				X
136777-61-2	m/p-Xylenes		X	X	X
79-20-9	Methyl Acetate				X
1634-04-4	Methyl tert-butyl Ether				X
108-87-2	Methylcyclohexane				X
75-09-2	Methylene Chloride		X	X	X
108-10-1	4-Methyl-2-Pentanone			X	X
95-47-6	o-Xylene		X	X	X
100-42-5	Styrene			X	X

Notes:
(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

Table B-3 (Continued)

Comparison of Volatile Lists (Continued)

CAS #	Compound Name	TCLP Volatiles	Priority Pollutant Volatiles	Target Compound Volatiles (1)	CLP Volatiles OLM 4.2
10061-02-6	t-1,3-Dichloropropene		X	X	X
79-34-5	1,1,2,2-Tetrachloroethane		X	X	X
127-18-4	Tetrachloroethene	X	X	X	X
108-88-3	Toluene		X	X	X
71-55-6	1,1,1-Trichloroethane		X	X	X
79-00-5	1,1,2-Trichloroethane		X	X	X
156-60-5	trans-1,2-Dichloroethene		X	X	X
120-82-1	1,2,4-Trichlorobenzene				X
79-01-6	Trichloroethene	X	X	X	X
75-69-4	Trichlorofluoromethane		X		X
76-13-1	1,1,2-Trichlorotrifluoroethane				X
75-01-4	Vinyl Chloride	X	X	X	X

* Indicates a compound that is reported from the BNA fraction when both parameters are requested

Notes:

(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

Table B-3 (Continued)

Comparison of Semi-Volatile Lists

CAS #	Compound	TCLP Semi-Volatiles	Priority Pollutant Semi-Volatiles	Target Compound Semi-Volatiles (1)	CLP Semi-Volatiles OLM4.2
100-52-7	Benzaldehyde				X
108-95-2	Phenol		X	X	X
111-44-4	bis(2-Chloroethyl)ether		X	X	X
95-57-8	2-Chlorophenol		X	X	X
95-48-7	2-Methylphenol	X		X	X
108-60-1	2,2'-oxybis(1-Chloropropane)		X	X	X
98-86-2	Acetophenone				X
65794-96-9	3+4-Methylphenols	X		X	X
621-64-7	N-Nitroso-di-n-propylamine		X	X	X
67-72-1	Hexachloroethane	X	X	X	X
98-95-3	Nitrobenzene	X	X	X	X
78-59-1	Isophorone		X	X	X
88-75-5	2-Nitrophenol		X	X	X
105-67-9	2,4-Dimethylphenol		X	X	X
111-91-1	bis(2-Chloroethoxy)methane		X	X	X
120-83-2	2,4-Dichlorophenol		X	X	X
91-20-3	Naphthalene		X	X	X
106-47-8	4-Chloroaniline			X	X
87-68-3	Hexachlorobutadiene	X	X	X	X
105-60-2	Caprolactam				X
59-50-7	4-Chloro-3-methylphenol		X	X	X
91-57-6	2-Methylnaphthalene			X	X
77-47-4	Hexachlorocyclopentadiene		X	X	X
88-06-2	2,4,6-Trichlorophenol	X	X	X	X
95-95-4	2,4,5-Trichlorophenol	X		X	X
92-52-4	1,1'-Biphenyl				X
91-58-7	2-Chloronaphthalene		X	X	X
88-74-4	2-Nitroaniline			X	X
131-11-3	Dimethylphthalate		X	X	X
208-96-8	Acenaphthylene		X	X	X
606-20-2	2,6-Dinitrotoluene		X	X	X
99-09-2	3-Nitroaniline			X	X
83-32-9	Acenaphthene		X	X	X
51-28-5	2,4-Dinitrophenol		X	X	X
100-02-7	4-Nitrophenol		X	X	X
132-64-9	Dibenzofuran			X	X
121-14-2	2,4-Dinitrotoluene	X	X	X	X
84-66-2	Diethylphthalate		X	X	X
7005-72-3	4-Chlorophenyl-phenylether		X	X	X
86-73-7	Fluorene		X	X	X
100-01-6	4-Nitroaniline			X	X

Notes:

(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

Table B-3 (Continued)

Comparison of Semi-Volatile Lists (Continued)

CAS #	Compound	TCLP Semi-Volatiles	Priority Pollutant Semi-Volatiles	Target Compound Semi-Volatiles (1)	CLP Semi-Volatiles OLM4.2
534-52-1	4,6-Dinitro-2-methylphenol		X	X	X
86-30-6	N-Nitrosodiphenylamine		X	X	X
101-55-3	4-Bromophenyl-phenylether		X	X	X
118-74-1	Hexachlorobenzene	X	X	X	X
1912-24-9	Atrazine				X
87-86-5	Pentachlorophenol	X	X	X	X
85-01-8	Phenanthrene		X	X	X
120-12-7	Anthracene		X	X	X
86-74-8	Carbazole			X	X
84-74-2	Di-n-butylphthalate		X	X	X
206-44-0	Fluoranthene		X	X	X
129-00-0	Pyrene		X	X	X
85-68-7	Butylbenzylphthalate		X	X	X
91-94-1	3,3'-Dichlorobenzidine		X	X	X
56-55-3	Benzo(a)anthracene		X	X	X
218-01-9	Chrysene		X	X	X
117-81-7	bis(2-Ethylhexyl)phthalate		X	X	X
117-84-0	Di-n-octyl phthalate		X	X	X
205-99-2	Benzo(b)fluoranthene		X	X	X
207-08-9	Benzo(k)fluoranthene		X	X	X
50-32-8	Benzo(a)pyrene		X	X	X
193-39-5	Indeno(1,2,3-cd)pyrene		X	X	X
53-70-3	Dibenzo(a,h)anthracene		X	X	X
191-24-2	Benzo(g,h,i)perylene		X	X	X
95-50-1	1,2-Dichlorobenzene		X	X	
541-73-1	1,3-Dichlorobenzene		X	X	
106-46-7	1,4-Dichlorobenzene	X	X	X	
120-82-1	1,2,4-Trichlorobenzene		X	X	
62-75-9	n-Nitrosodimethylamine		X		
122-66-7	Azobenzene		X		
110-86-1	Pyridine	X			
92-87-5	Benzidine		X		

Notes:

(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

Table B-3 (Continued)

Comparison of Inorganic Lists

CAS #	Compound	TCLP Metals	Priority Pollutant Metals	Target Compound Metals	CLP Metals OLM4.2
7429-90-5	Aluminum			X	X
7440-36-0	Antimony		X	X	X
7440-38-2	Arsenic	X	X	X	X
7440-39-3	Barium	X		X	X
7440-41-7	Beryllium		X	X	X
7440-43-9	Cadmium	X	X	X	X
7440-70-2	Calcium			X	X
7440-47-3	Chromium	X	X	X	X
7440-48-4	Cobalt			X	X
7440-50-8	Copper		X	X	X
7439-89-6	Iron			X	X
7439-92-1	Lead	X	X	X	X
7439-95-4	Magnesium			X	X
7439-96-5	Manganese			X	X
7439-97-6	Mercury	X	X	X	X
7440-02-0	Nickel		X	X	X
7440-09-7	Potassium			X	X
7782-49-2	Selenium	X	X	X	X
7440-22-4	Silver	X	X	X	X
7440-23-5	Sodium			X	X
7440-28-0	Thallium		X	X	X
7440-62-2	Vanadium			X	X
7440-66-6	Zinc		X	X	X
57-12-5	Cyanide			X	X

Table B-3 (Continued)

Comparison of Pesticide Lists

CAS #	Compound	TCLP Pesticides (2)	Priority Pollutant Pesticides	Target Compound Pesticides (1)	CLP Pesticides OLM 4.2
319-84-6	alpha-BHC		X	X	X
58-89-9	gamma-BHC (Lindane)	X	X	X	X
76-44-8	Heptachlor	X	X	X	X
309-00-2	Aldrin		X	X	X
319-85-7	beta-BHC		X	X	X
319-86-8	delta-BHC		X	X	X
1024-57-3	Heptachlor epoxide	X	X	X	X
959-98-8	Endosulfan I		X	X	X
5103-71-9	gamma-Chlordane		X	X	X
5103-74-2	alpha-Chlordane		X	X	X
72-55-9	4,4'-DDE		X	X	X
60-57-1	Dieldrin		X	X	X
72-20-8	Endrin	X	X	X	X
33213-65-9	Endosulfan II		X	X	X
72-54-8	4,4'-DDD		X	X	X
50-29-3	4,4'-DDT		X	X	X
7421-93-4	Endrin aldehyde		X	X	X
1031-07-8	Endosulfan Sulfate		X	X	X
72-43-5	Methoxychlor	X	X	X	X
53494-70-5	Endrin ketone		X	X	X
57-74-9	Chlordane	X	X		
8001-35-2	Toxaphene	X	X	X	X

Notes:

(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

(2) TCLP Herbicides include the following compounds: 2,4-D and 2,4,5-TP (silvex).

Comparison of PCB Lists

CAS #	Compound	Priority Pollutant PCBs	Target Compound PCBs (1)	CLP PCBs OLM 4.2
12674-11-2	Aroclor-1016	X	X	X
11104-28-2	Aroclor-1221	X	X	X
11141-16-5	Aroclor-1232	X	X	X
53469-21-9	Aroclor-1242	X	X	X
12672-29-6	Aroclor-1248	X	X	X
11097-69-1	Aroclor-1254	X	X	X
11096-82-5	Aroclor-1260	X	X	X

Notes:

(1) Please note that the TCL List refers to the compounds listed in OLM 3.2 (SOW).

Table B-4
Volatile Target Compound List and Reporting Limits
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
1,1,1,2-Tetrachloroethane	5.0	0.39	ug/L	5.0	0.85	ug/kg
1,1,1-Trichloroethane	5.0	0.39	ug/L	5.0	0.95	ug/kg
1,1,2,2-Tetrachloroethane	5.0	0.37	ug/L	5.0	0.89	ug/kg
1,1,2-Trichloroethane	5.0	0.32	ug/L	5.0	0.61	ug/kg
1,1,2-Trichlorotrifluoroethane	5.0	0.61	ug/L	5.0	1.68	ug/kg
1,1-Dichloroethane	5.0	0.48	ug/L	5.0	1.12	ug/kg
1,1-Dichloroethene	5.0	0.67	ug/L	5.0	1.00	ug/kg
1,1-Dichloropropene	5.0	0.20	ug/L	5.0	1.03	ug/kg
1,2,3-Trichlorobenzene	5.0	0.36	ug/L	5.0	0.85	ug/kg
1,2,3-Trichloropropane	5.0	0.37	ug/L	5.0	0.79	ug/kg
1,2,4-Trichlorobenzene	5.0	0.39	ug/L	5.0	0.66	ug/kg
1,2,4-Trimethylbenzene	5.0	0.32	ug/L	5.0	0.78	ug/kg
1,2-Dibromo-3-Chloropropane	5.0	0.58	ug/L	5.0	1.02	ug/kg
1,2-Dibromoethane	5.0	0.26	ug/L	5.0	0.82	ug/kg
1,2-Dichlorobenzene	5.0	0.40	ug/L	5.0	0.86	ug/kg
1,2-Dichloroethane	5.0	0.41	ug/L	5.0	0.63	ug/kg
1,2-Dichloropropane	5.0	0.46	ug/L	5.0	0.94	ug/kg
1,3,5-Trimethylbenzene	5.0	0.18	ug/L	5.0	1.04	ug/kg
1,3-Dichlorobenzene	5.0	0.28	ug/L	5.0	0.67	ug/kg
1,3-Dichloropropane	5.0	0.23	ug/L	5.0	0.79	ug/kg
1,4-Dichlorobenzene	5.0	0.22	ug/L	5.0	0.77	ug/kg
2,2-Dichloropropane	5.0	0.62	ug/L	5.0	0.90	ug/kg
2-Butanone	25.0	1.94	ug/L	25.0	5.02	ug/kg
2-Chloroethyl vinyl ether	25.0	1.35	ug/L	25.0	4.87	ug/kg
2-Chlorotoluene	5.0	0.25	ug/L	5.0	0.91	ug/kg
2-Hexanone	25.0	1.76	ug/L	25.0	4.37	ug/kg
4-Chlorotoluene	5.0	0.30	ug/L	5.0	0.92	ug/kg
4-Methyl-2-Pentanone	25.0	1.76	ug/L	25.0	3.82	ug/kg
Acetone	25.0	2.15	ug/L	25.0	17.01	ug/kg
Acrolein	25.0	2.24	ug/L	25.0	9.07	ug/kg
Acrylonitrile	25.0	1.48	ug/L	25.0	7.16	ug/kg
Benzene	5.0	0.35	ug/L	5.0	0.72	ug/kg
Bromobenzene	5.0	0.24	ug/L	5.0	0.92	ug/kg
Bromochloromethane	5.0	0.35	ug/L	5.0	1.02	ug/kg
Bromodichloromethane	5.0	0.23	ug/L	5.0	0.70	ug/kg
Bromoform	5.0	0.44	ug/L	5.0	0.81	ug/kg
Bromomethane	5.0	1.37	ug/L	5.0	2.03	ug/kg
Carbon disulfide	5.0	0.20	ug/L	5.0	1.08	ug/kg
Carbon Tetrachloride	5.0	0.27	ug/L	5.0	0.59	ug/kg
Chlorobenzene	5.0	0.28	ug/L	5.0	0.76	ug/kg
Chloroethane	5.0	0.80	ug/L	5.0	1.85	ug/kg

Table B-4 (Continued)

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
Chloroform	5.0	0.45	ug/L	5.0	0.89	ug/kg
Chloromethane	5.0	0.37	ug/L	5.0	1.33	ug/kg
cis-1,2-Dichloroethene	5.0	0.72	ug/L	5.0	1.29	ug/kg
cis-1,3-Dichloropropene	5.0	0.29	ug/L	5.0	0.67	ug/kg
cyclohexane	5.0	0.57	ug/L	5.0	1.02	ug/kg
Dibromochloromethane	5.0	0.23	ug/L	5.0	0.66	ug/kg
Dibromomethane	5.0	0.30	ug/L	5.0	0.80	ug/kg
Dichlorodifluoromethane	5.0	0.88	ug/L	5.0	1.92	ug/kg
Ethyl Acetate	-	-	-	5.0	0.87	ug/kg
Ethyl Benzene	5.0	0.05	ug/L	5.0	0.80	ug/kg
Hexachlorobutadiene	5.0	0.57	ug/L	5.0	1.07	ug/kg
Isopropylacetate	-	-	-	5.0	1.19	ug/kg
Isopropylbenzene	5.0	0.37	ug/L	5.0	0.82	ug/kg
m/p-Xylenes	10.0	0.47	ug/L	10.0	1.86	ug/kg
Methyl Acetate	5.0	0.45	ug/L	5.0	1.69	ug/kg
Methyl tert-butyl Ether	5.0	0.23	ug/L	5.0	0.89	ug/kg
Methylcyclohexane	5.0	0.47	ug/L	5.0	0.83	ug/kg
Methylene Chloride	5.0	0.38	ug/L	5.0	2.43	ug/kg
Naphthalene	5.0	0.29	ug/L	5.0	0.57	ug/kg
n-amyl acetate	-	-	-	5.0	0.94	ug/kg
n-Butylbenzene	5.0	0.29	ug/L	5.0	0.94	ug/kg
N-propylbenzene	5.0	0.28	ug/L	5.0	0.79	ug/kg
o-Xylene	5.0	0.16	ug/L	5.0	0.76	ug/kg
p-Isopropyltoluene	5.0	0.26	ug/L	5.0	0.87	ug/kg
Sec-butylbenzene	5.0	0.26	ug/L	5.0	0.84	ug/kg
Styrene	5.0	0.19	ug/L	5.0	0.62	ug/kg
t-1,3-Dichloropropene	5.0	0.31	ug/L	5.0	0.84	ug/kg
Tert butyl alcohol	25.0	1.98	ug/L	25.0	5.02	ug/kg
tert-Butylbenzene	5.0	0.27	ug/L	5.0	0.72	ug/kg
Tetrachloroethene	5.0	0.97	ug/L	5.0	1.24	ug/kg
Toluene	5.0	0.16	ug/L	5.0	0.88	ug/kg
trans-1,2-Dichloroethene	5.0	0.44	ug/L	5.0	1.23	ug/kg
Trichloroethene	5.0	0.34	ug/L	5.0	0.73	ug/kg
Trichlorofluoromethane	5.0	0.53	ug/L	5.0	1.19	ug/kg
Vinyl Acetate	25.0	3.30	ug/L	25.0	4.08	ug/kg
Vinyl chloride	5.0	0.30	ug/L	5.0	1.38	ug/kg

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
RDL - Reporting Detection Limit.
MDL - Method Detection Limit.

Table B-5
Semi-Volatile Target Compound List and Reporting Limits
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
1,1-Biphenyl	10	0.32	ug/L	330	9.78	ug/Kg
1,2,4-Trichlorobenzene	10	0.31	ug/L	330	11.97	ug/Kg
1,2-Dichlorobenzene	10	0.31	ug/L	330	9.95	ug/Kg
1,3-Dichlorobenzene	10	0.30	ug/L	330	7.04	ug/Kg
1,4-Dichlorobenzene	10	0.30	ug/L	330	8.57	ug/Kg
2,2-oxybis(1-Chloropropane)	10	0.27	ug/L	330	13.62	ug/Kg
2,4,5-Trichlorophenol	10	0.38	ug/L	330	9.80	ug/Kg
2,4,6-Trichlorophenol	10	0.35	ug/L	330	7.69	ug/Kg
2,4-Dichlorophenol	10	0.34	ug/L	330	7.85	ug/Kg
2,4-Dimethylphenol	10	0.76	ug/L	330	9.88	ug/Kg
2,4-Dinitrophenol	10	0.64	ug/L	330	17.61	ug/Kg
2,4-Dinitrotoluene	10	0.34	ug/L	330	10.95	ug/Kg
2,6-Dinitrotoluene	10	0.35	ug/L	330	11.81	ug/Kg
2-Chloronaphthalene	10	0.23	ug/L	330	8.02	ug/Kg
2-Chlorophenol	10	0.33	ug/L	330	8.97	ug/Kg
2-Methylnaphthalene	10	0.37	ug/L	330	9.33	ug/Kg
2-Methylphenol	10	0.36	ug/L	330	8.79	ug/Kg
2-Nitroaniline	10	0.25	ug/L	330	15.52	ug/Kg
2-Nitrophenol	10	0.28	ug/L	330	12.12	ug/Kg
3,3-Dichlorobenzidine	10	1.08	ug/L	330	24.93	ug/Kg
3+4-Methylphenols	10	0.39	ug/L	330	10.04	ug/Kg
3-Nitroaniline	10	0.35	ug/L	330	21.96	ug/Kg
4,6-Dinitro-2-methylphenol	10	0.29	ug/L	330	44.69	ug/Kg
4-Bromophenyl-phenylether	10	1.40	ug/L	330	15.07	ug/Kg
4-Chloro-3-methylphenol	10	0.22	ug/L	330	9.71	ug/Kg
4-Chloroaniline	10	0.92	ug/L	330	21.76	ug/Kg
4-Chlorophenyl-phenylether	10	0.29	ug/L	330	12.61	ug/Kg
4-Nitroaniline	10	0.36	ug/L	330	26.03	ug/Kg
4-Nitrophenol	10	1.73	ug/L	330	19.41	ug/Kg
Acenaphthene	10	0.32	ug/L	330	7.15	ug/Kg
Acenaphthylene	10	0.35	ug/L	330	4.84	ug/Kg
Acetophenone	10	0.37	ug/L	330	9.85	ug/Kg
Aniline	10	0.68	ug/L	330	39.23	ug/Kg
Anthracene	10	1.42	ug/L	330	11.12	ug/Kg
Atrazine	10	0.37	ug/L	330	23.34	ug/Kg
Azobenzene	10	0.22	ug/L	330	11.49	ug/Kg
Benzidine	10	1.27	ug/L	330	42.63	ug/Kg
Benzo(a)anthracene	10	1.30	ug/L	330	7.96	ug/Kg
Benzo(a)pyrene	10	0.22	ug/L	330	9.75	ug/Kg
Benzo(b)fluoranthene	10	0.43	ug/L	330	23.82	ug/Kg
Benzo(g,h,i)perylene	10	0.39	ug/L	330	23.94	ug/Kg
Benzo(k)fluoranthene	10	0.30	ug/L	330	15.17	ug/Kg

Table B-5 (Continued)

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
Benzoic Acid	10	1.50	ug/L	330	40.58	ug/Kg
Benzyl Alcohol	10	0.30	ug/L	330	23.32	ug/Kg
Benzylaldehyde	10	0.27	ug/L	330	11.07	ug/Kg
bis(2-Chloroethoxy)methane	10	0.33	ug/L	330	7.60	ug/Kg
bis(2-Chloroethyl)ether	10	0.28	ug/L	330	4.32	ug/Kg
bis(2-Ethylhexyl)phthalate	10	1.30	ug/L	330	12.65	ug/Kg
Butylbenzylphthalate	10	0.42	ug/L	330	20.93	ug/Kg
Caprolactam	10	1.48	ug/L	330	39.66	ug/Kg
Carbazole	10	0.24	ug/L	330	25.28	ug/Kg
Chrysene	10	0.26	ug/L	330	6.15	ug/Kg
Dibenz(a,h)anthracene	10	0.54	ug/L	330	24.29	ug/Kg
Dibenzofuran	10	0.31	ug/L	330	10.24	ug/Kg
Diethylphthalate	10	0.32	ug/L	330	11.27	ug/Kg
Dimethylphthalate	10	0.27	ug/L	330	9.65	ug/Kg
Di-n-butylphthalate	10	5.86	ug/L	330	15.53	ug/Kg
Di-n-octyl phthalate	10	0.26	ug/L	330	11.60	ug/Kg
Fluoranthene	10	0.20	ug/L	330	8.02	ug/Kg
Fluorene	10	0.28	ug/L	330	8.90	ug/Kg
Hexachlorobenzene	10	0.27	ug/L	330	9.99	ug/Kg
Hexachlorobutadiene	10	0.39	ug/L	330	13.40	ug/Kg
Hexachlorocyclopentadiene	10	0.56	ug/L	330	16.97	ug/Kg
Hexachloroethane	10	0.23	ug/L	330	10.82	ug/Kg
Indeno(1,2,3-cd)pyrene	10	0.66	ug/L	330	8.37	ug/Kg
Isophorone	10	0.26	ug/L	330	10.83	ug/Kg
Naphthalene	10	0.28	ug/L	330	7.98	ug/Kg
Nitrobenzene	10	0.33	ug/L	330	7.76	ug/Kg
N-nitrosodimethylamine	10	2.04	ug/L	330	39.46	ug/Kg
N-Nitroso-di-n-propylamine	10	0.34	ug/L	330	11.98	ug/Kg
N-Nitrosodiphenylamine	10	0.35	ug/L	330	24.86	ug/Kg
Pentachlorophenol	10	0.52	ug/L	330	37.49	ug/Kg
Phenanthrene	10	1.36	ug/L	330	10.30	ug/Kg
Phenol	10	0.55	ug/L	330	9.19	ug/Kg
Pyrene	10	1.41	ug/L	330	7.21	ug/Kg
Pyridine	10	1.46	ug/L	330	26.02	ug/Kg

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
RDL - Reporting Detection Limit.
MDL - Method Detection Limit.

Table B-6
Inorganic Compound List and Reporting Limits
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
Mercury	0.200	0.06	ug/L	0.01	0.007	mg/Kg
Aluminum	50.00	19.3	ug/L	5.00	2.04	mg/Kg
Antimony	25.00	11.5	ug/L	2.50	1.24	mg/Kg
Arsenic	10.00	5.4	ug/L	1.00	0.57	mg/Kg
Barium	50.00	11.2	ug/L	5.00	1.46	mg/Kg
Beryllium	3.00	0.3	ug/L	0.30	0.03	mg/Kg
Cadmium	3.00	0.9	ug/L	0.30	0.10	mg/Kg
Calcium	1000.00	281.8	ug/L	100.00	35.70	mg/Kg
Chromium	5.00	1.4	ug/L	0.50	0.16	mg/Kg
Cobalt	15.00	2.5	ug/L	1.50	0.43	mg/Kg
Copper	10.00	3.7	ug/L	1.00	0.35	mg/Kg
Iron	50.00	27.0	ug/L	5.00	2.80	mg/Kg
Lead	6.00	3.1	ug/L	0.60	0.44	mg/Kg
Magnesium	1000.00	290.7	ug/L	100.00	33.85	mg/Kg
Manganese	10.00	0.9	ug/L	1.00	0.10	mg/Kg
Nickel	20.00	4.9	ug/L	2.00	0.51	mg/Kg
Potassium	1000.00	52.5	ug/L	100.00	58.61	mg/Kg
Selenium	10.00	4.5	ug/L	1.00	0.82	mg/Kg
Silver	5.00	1.7	ug/L	0.50	0.21	mg/Kg
Sodium	1000.00	492.8	ug/L	100.00	78.24	mg/Kg
Thallium	20.00	6.1	ug/L	2.00	0.99	mg/Kg
Vanadium	20.00	4.1	ug/L	2.00	0.47	mg/Kg
Zinc	20.00	4.2	ug/L	2.00	0.55	mg/Kg
Titanium	10.00	4.9	ug/L	1.00	0.530	mg/Kg
Molybdenum	100.00	5.7	ug/L	10.00	0.460	mg/Kg
Silicon	100.00	3.9	ug/L	10.00	3.760	mg/kg
Tin	10.00	7.1	ug/L	1.00	0.660	mg/kg
Sulfur	50.00	8.8	ug/L	50.00	0.100	mg/kg
Boron	50.00	4.7	ug/L	5.00	0.550	mg/kg

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
RDL - Reporting Detection Limit.
MDL - Method Detection Limit.

Table B-7
Pesticide/PCB Compound List and Reporting Limits
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Pesticides

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
4,4'-DDD	0.050	0.01813	ug/L	1.7	0.27	ug/kg
4,4'-DDE	0.050	0.01585	ug/L	1.7	0.19	ug/kg
4,4'-DDT	0.2	0.01354	ug/L	1.7	0.16	ug/kg
Aldrin	0.050	0.01381	ug/L	1.7	0.16	ug/kg
alpha-BHC	0.050	0.0133	ug/L	1.7	0.14	ug/kg
alpha-Chlordane	0.050	0.01439	ug/L	1.7	0.19	ug/kg
beta-BHC	0.2	0.01536	ug/L	1.7	0.18	ug/kg
Chlordane	0.50	0.1914	ug/L	17	4.10	ug/kg
delta-BHC	0.050	0.01684	ug/L	1.7	0.18	ug/kg
Dieldrin	0.050	0.01455	ug/L	1.7	0.19	ug/kg
Endosulfan I	0.050	0.01642	ug/L	1.7	0.19	ug/kg
Endosulfan II	0.050	0.02078	ug/L	1.7	0.20	ug/kg
Endosulfan sulfate	0.050	0.01487	ug/L	1.7	0.23	ug/kg
Endrin	0.050	0.01374	ug/L	1.7	0.57	ug/kg
Endrin aldehyde	0.050	0.0145	ug/L	1.7	0.20	ug/kg
Endrin ketone	0.050	0.01469	ug/L	1.7	0.47	ug/kg
gamma-BHC (Lindane)	0.050	0.01302	ug/L	1.7	0.16	ug/kg
gamma-Chlordane	0.050	0.0153	ug/L	1.7	0.18	ug/kg
Heptachlor	0.050	0.0154	ug/L	1.7	0.15	ug/kg
Heptachlor epoxide	0.050	0.0133	ug/L	1.7	0.19	ug/kg
Methoxychlor	0.050	0.01351	ug/L	1.7	0.21	ug/kg
Toxaphene	0.50	0.242	ug/L	17	5.00	ug/kg

PCBs

	Aqueous			Solid		
Compound Name	**RDL (1)**	**MDL (1)**	**Units**	**RDL (1)**	**MDL (1)**	**Units**
AROCLOR 1016	0.5	0.142	ug/L	17	3.74	ug/Kg
AROCLOR 1221	0.5	0.113	ug/L	17	4.57	ug/Kg
AROCLOR 1232	0.5	0.115	ug/L	17	4.79	ug/Kg
AROCLOR 1242	0.5	0.073	ug/L	17	2.10	ug/Kg
AROCLOR 1248	0.5	0.101	ug/L	17	4.61	ug/Kg
AROCLOR 1254	0.5	0.139	ug/L	17	4.68	ug/Kg
AROCLOR 1260	0.5	0.089	ug/L	17	3.73	ug/Kg

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
RDL - Reporting Detection Limit.
MDL - Method Detection Limit.

Table B-8
Volatiles in Air Compound List and Reporting Limits
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	RDL (1)	MDL (1)	RDL (1)	MDL (1)
Compound Name	**ppbv**		**ug/m3**	
1,1,1-Trichloroethane	0.5	0.022	0.12	0.54
1,1,2,2-Tetrachloroethane	0.5	0.024	0.16	0.69
1,1,2-Trichloroethane	0.5	0.044	0.24	0.54
1,1,2-Trichlorotrifluoroethane	0.5	0.026	0.20	0.76
1,1-Dichloroethane	0.5	0.024	0.10	0.40
1,1-Dichloroethene	0.5	0.025	0.10	0.40
1,2,4-Trichlorobenzene	0.5	0.035	0.26	0.74
1,2,4-Trimethylbenzene	0.5	0.024	0.12	0.49
1,2-Dibromoethane	0.5	0.130	1.00	1.54
1,2-Dichlorobenzene	0.5	0.022	0.13	0.60
1,2-Dichloroethane	0.5	0.050	0.20	0.40
1,2-Dichloropropane	0.5	0.048	0.22	0.46
1,3,5-Trimethylbenzene	0.5	0.035	0.17	0.49
1,3-Butadiene	0.5	0.036	0.08	0.22
1,3-Dichlorobenzene	0.5	0.017	0.10	0.60
1,4-Dichlorobenzene	0.5	0.025	0.15	0.60
1,4-Dioxane	0.5	0.046	0.17	0.36
2,2,4-Trimethylpentane	0.5	0.025	0.12	0.47
2-Butanone	0.5	0.100	0.29	0.58
2-Chlorotoluene	0.5	0.038	0.20	0.52
2-Hexanone	0.5	0.097	0.40	0.82
4-Ethyltoluene	0.5	0.026	0.07	0.49
4-Methyl-2-Pentanone	0.5	0.050	0.20	0.41
Acetone	0.5	0.081	0.19	0.24
Allyl Chloride	0.5	0.061	0.19	0.31
Benzene	0.5	0.044	0.14	0.32
Benzyl Chloride	0.5	0.024	0.14	0.58
Bromodichloromethane	0.5	0.050	0.34	0.67
Bromoethene	0.5	0.024	0.11	0.44
Bromoform	0.5	0.015	0.16	1.03
Bromomethane	0.5	0.024	0.09	0.39
Carbon Disulfide	0.5	0.015	0.05	0.31
Carbon Tetrachloride	0.04	0.017	0.11	0.25
Chlorobenzene	0.5	0.026	0.12	0.46
Chloroethane	0.5	0.017	0.05	0.27
Chloroform	0.5	0.031	0.15	0.49
Chloromethane	0.5	0.025	0.05	0.20
cis-1,2-Dichloroethene	0.5	0.035	0.14	0.40
cis-1,3-Dichloropropene	0.5	0.050	0.23	0.45
Cyclohexane	0.5	0.012	0.04	0.34
Dibromochloromethane	0.5	0.026	0.22	0.85
Dichlorodifluoromethane	0.5	0.017	0.08	0.49

Table B-8 (Continued)

	RDL (1)	MDL (1)	RDL (1)	MDL (1)
Compound Name	ppbv		ug/m3	
Dichlorotetrafluoroethane	0.5	0.022	0.15	0.70
Ethanol	0.5	0.088	0.17	0.19
Ethyl Acetate	0.5	0.048	0.17	0.36
Ethyl Benzene	0.5	0.018	0.08	0.43
Heptane	0.5	0.024	0.10	0.41
Hexachloro-1,3-Butadiene	0.5	0.022	0.23	1.07
Hexane	0.5	0.026	0.09	0.35
Isopropyl Alcohol	0.5	0.054	0.13	0.25
m/p-Xylene	0.5	0.043	0.19	0.43
Methyl methacrylate	0.5	0.063	0.26	0.41
Methyl tert-Butyl Ether	0.5	0.017	0.06	0.36
Methylene Chloride	0.5	0.015	0.05	0.35
o-Xylene	0.5	0.024	0.10	0.43
Propene	0.5	0.022	0.04	0.17
Styrene	0.5	0.062	0.26	0.43
t-1,3-Dichloropropene	0.5	0.057	0.26	0.45
tert-Butyl alcohol	0.5	0.079	0.24	0.30
Tetrachloroethene	0.5	0.048	0.33	0.68
Tetrahydrofuran	0.5	0.084	0.25	0.29
Toluene	0.5	0.048	0.18	0.38
trans-1,2-Dichloroethene	0.5	0.031	0.12	0.40
Trichloroethene	0.046	0.041	0.22	0.25
Trichlorofluoromethane	0.5	0.028	0.16	0.56
Vinyl Acetate	0.5	0.097	0.34	0.70
Vinyl Chloride	0.5	0.024	0.06	0.26

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
RDL - Reporting Detection Limit.
MDL - Method Detection Limit.

Table B-9
Analytical Laboratory Data Quality Objectives (DQOs) for Precision and Accuracy - Volatile Analyses
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)
1,1,1,2-Tetrachloroethane	94.0	121.0	81.0	116.0	83.4	132.3	82.0	110.0
1,1,1-Trichloroethane	64.0	146.0	64.0	124.0	75.9	129.6	80.0	125.0
1,1,2,2-Tetrachloroethane	52.0	162.0	54.0	124.0	72.4	141.7	83.0	133.0
1,1,2-Trichloroethane	86.0	119.0	69.0	120.0	80.3	131.3	83.0	123.0
1,1,2-Trichlorotrifluoroethane	31.0	131.0	44.0	135.0	84.7	150.0	74.0	131.0
1,1-Dichloroethane	55.0	139.0	55.0	139.0	76.6	138.7	50.0	150.0
1,1-Dichloroethene	45.0	167.0	50.0	150.0	82.3	154.2	69.0	143.0
1,1-Dichloropropene	78.0	135.0	80.0	111.0	76.9	146.5	76.0	109.0
1,2,3-Trichlorobenzene	60.0	127.0	73.0	134.0	66.0	156.9	75.0	115.0
1,2,3-Trichloropropane	57.0	145.0	79.0	162.0	75.0	153.8	75.0	133.0
1,2,4-Trichlorobenzene	58.0	143.0	72.0	130.0	67.1	154.9	69.0	118.0
1,2,4-Trimethylbenzene	64.0	154.0	81.0	118.0	78.1	148.2	82.0	114.0
1,2-Dibromo-3-Chloropropane	67.0	116.0	64.0	114.0	65.9	131.7	78.0	129.0
1,2-Dibromoethane	86.0	117.0	79.0	114.0	77.3	132.0	79.0	120.0
1,2-Dichlorobenzene	87.0	121.0	74.0	123.0	76.8	138.6	86.0	115.0
1,2-Dichloroethane	68.0	138.0	66.0	125.0	81.5	136.2	82.0	122.0
1,2-Dichloropropane	81.0	131.0	68.0	125.0	82.6	138.9	80.0	127.0
1,3,5-Trimethylbenzene	85.0	125.0	82.0	117.0	78.2	150.6	81.0	116.0
1,3-Dichlorobenzene	86.0	124.0	74.0	125.0	73.1	146.8	83.0	113.0
1,3-Dichloropropane	50.0	150.0	84.0	120.0	78.9	140.8	77.0	121.0
1,4-Dichlorobenzene	83.0	126.0	75.0	122.0	78.6	136.7	83.0	113.0
1,4-Dioxane	50.0	150.0	50.0	150.0	-	-	-	-
2,2-Dichloropropane	74.0	114.0	45.0	127.0	70.2	145.8	81.0	119.0
2-Butanone	26.0	160.0	53.0	134.0	52.7	155.8	70.0	155.0
2-Chloroethyl vinyl ether	10.0	150.0	59.0	132.0	71.0	135.9	80.0	118.0
2-Chlorotoluene	93.0	127.0	85.0	121.0	76.3	145.0	86.0	115.0
2-Hexanone	57.0	141.0	60.0	143.0	71.7	150.0	68.0	129.0

Table B-9 (Continued)

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
4-Bromofluorobenzene	50.0	150.0	50.0	150.0	-	-	-	-
4-Chlorotoluene	93.0	125.0	87.0	117.0	79.0	142.8	86.0	113.0
4-Isopropyltoluene	50.0	150.0	50.0	150.0	-	-	-	-
4-Methyl-2-Pentanone	66.0	141.0	68.0	132.0	74.4	150.0	82.0	128.0
Acetone	10.0	204.0	10.0	194.0	55.5	175.7	34.0	189.0
Acrolein	99.0	145.0	10.0	154.0	55.8	196.9	44.0	162.0
Acrylonitrile	64.0	131.0	48.0	136.0	60.9	144.0	35.0	197.0
Allyl Chloride	50.0	150.0	50.0	150.0	-	-	-	-
Benzene	85.0	121.0	66.0	125.0	83.3	135.1	81.0	118.0
Bromobenzene	89.0	115.0	87.0	116.0	75.1	135.0	87.0	109.0
Bromochloromethane	92.0	126.0	81.0	120.0	41.1	159.2	82.0	131.0
Bromodichloromethane	75.0	121.0	66.0	117.0	77.9	130.0	77.0	122.0
Bromoform	70.0	119.0	59.0	119.0	68.8	125.1	76.0	119.0
Bromomethane	57.0	148.0	50.0	147.0	59.2	135.7	72.0	135.0
Carbon disulfide	30.0	188.0	33.0	150.0	51.3	147.6	62.0	133.0
Carbon Tetrachloride	62.0	130.0	61.0	122.0	78.8	137.6	71.0	115.0
Chlorobenzene	85.0	119.0	70.0	122.0	80.3	141.1	83.0	114.0
Chloroethane	35.0	194.0	34.0	198.0	66.0	122.5	69.0	140.0
Chloroform	60.0	145.0	66.0	125.0	72.9	138.0	82.0	130.0
Chloromethane	57.0	150.0	50.0	135.0	51.6	127.7	70.0	130.0
cis-1,2-Dichloroethene	47.0	149.0	69.0	125.0	74.7	124.9	76.0	140.0
cis-1,3-Dichloropropene	65.0	139.0	66.0	119.0	79.7	136.9	79.0	116.0
cyclohexane	35.0	142.0	48.0	130.0	72.3	136.8	68.0	135.0
Dibromochloromethane	78.0	117.0	66.0	117.0	76.0	128.9	76.0	119.0
Dibromofluoromethane	50.0	150.0	32.0	135.0	-	-	-	-
Dibromomethane	85.0	122.0	86.0	114.0	82.6	128.8	87.0	114.0
Dichlorodifluoromethane	58.0	144.0	50.0	150.0	54.8	131.5	56.0	135.0
Diethyl Ether	50.0	150.0	50.0	150.0	45.6	139.8	50.0	150.0
Ethyl Benzene	63.0	134.0	65.0	124.0	81.5	138.7	80.0	113.0
Ethyl Methacrylate	50.0	150.0	50.0	150.0	74.7	146.7	50.0	150.0
Hexachloroethane	50.0	150.0	50.0	150.0	-	-	-	-
Hexachlorobutadiene	62.0	130.0	53.0	154.0	64.7	162.1	70.0	120.0

Table B-9 (Continued)

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)
Iodomethane	50.0	150.0	50.0	150.0	72.2	165.4	50.0	150.0
Isopropylbenzene	56.0	139.0	78.0	118.0	79.6	144.7	81.0	118.0
Isopropyl Alcohol	50.0	150.0	50.0	150.0	-	-	-	-
Isopropyl Ether	50.0	150.0	50.0	150.0	-	-	-	-
m/p-Xylenes	58.0	136.0	66.0	128.0	80.8	143.1	80.0	115.0
Methacrylonitrile	50.0	150.0	50.0	150.0	-	-	-	-
Methyl Acrylate	50.0	150.0	50.0	150.0	-	-	-	-
Methyl Acetate	36.0	96.0	42.0	154.0	36.7	150.0	50.0	153.0
Methyl Methacrylate	50.0	150.0	50.0	150.0	72.7	141.8	50.0	150.0
Methyl tert-butyl Ether	45.0	141.0	66.0	127.0	74.2	148.6	74.0	145.0
Methylcyclohexane	46.0	134.0	63.0	123.0	71.1	138.6	74.0	115.0
Methylene Chloride	36.0	180.0	18.0	206.0	37.4	150.0	48.0	190.0
Naphthalene	72.0	130.0	68.0	126.0	63.8	160.9	78.0	122.0
n-Butylbenzene	80.0	126.0	79.0	119.0	81.3	153.8	75.0	116.0
N-propylbenzene	78.0	127.0	79.0	118.0	74.4	159.6	81.0	116.0
o-Xylene	74.0	129.0	71.0	123.0	79.0	143.5	83.0	115.0
pentachloroethane	50.0	150.0	50.0	150.0	-	-	-	-
p-Isopropyltoluene	77.0	142.0	77.0	118.0	75.4	150.9	78.0	112.0
propionitrile	50.0	150.0	50.0	150.0	-	-	-	-
Sec-butylbenzene	88.0	123.0	79.0	120.0	80.6	147.4	80.0	115.0
Styrene	82.0	124.0	80.0	120.0	79.7	146.3	83.0	115.0
t-1,3-Dichloropropene	54.0	141.0	60.0	119.0	81.8	139.4	78.0	118.0
t-1,4-Dichloro-2-butene	50.0	150.0	50.0	150.0	44.2	152.5	50.0	150.0
Tert butyl alcohol	10.0	171.0	20.0	142.0	60.4	194.5	18.0	215.0
tert-Butylbenzene	102.0	131.0	75.0	121.0	74.5	148.4	73.0	117.0
Tetrachloroethene	33.0	107.0	54.0	168.0	67.8	144.8	72.0	130.0
Tetrahydrofuran	50.0	150.0	50.0	150.0				
Toluene	83.0	123.0	68.0	121.0	78.5	140.3	81.0	115.0
trans-1,2-Dichloroethene	69.0	151.0	56.0	132.0	71.4	150.0	70.0	145.0
Trichloroethene	55.0	138.0	61.0	138.0	81.0	128.9	82.0	113.0
Trichlorofluoromethane	24.0	137.0	13.0	158.0	77.4	140.0	65.0	140.0
Vinyl Acetate	50.0	150.0	10.0	178.0	63.2	154.9	47.0	151.0

Table B-9 (Continued)

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
Vinyl chloride	62.0	151.0	57.0	131.0	60.2	129.2	69.0	137.0
1,2-Dichloethane-d4	75.0	124.0	-	-	54.0	142.0	-	-
Toluene-d8	83.0	117.0	-	-	50.0	133.0	-	-
4-Bromofluorobenzene	74.0	123.0	-	-	54.0	141.0	-	-
Dibromofluoromethane	84.0	122.0	-	-	63.0	124.0	-	-

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
BS - Blank Spike.
LCL - Lower Confidence Limit (%).
UCL - Upper Confidence Limit (%).

Table B-10
Analytical Laboratory Data Quality Objectives (DQOs) for Precision and Accuracy - Semi-Volatile Analyses
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)	LCL (1)	UCL (1)
1,1-Biphenyl	66	84	58	112	-	-	55	105
1,2,4-Trichlorobenzene	62	105	59	104	42	98	57	93
1,2-Dichlorobenzene	57	89	56	95	51	93	56	89
1,3-Dichlorobenzene	66	77	56	92	44	99	57	86
1,4-Dichlorobenzene	49	88	53	91	40	101	57	86
1,4-Dioxane	-	-	21	95	-	-	-	-
2,2-oxybis(1-Chloropropane)	71	81	53	102	44	102	47	97
2,4,5-Trichlorophenol	45	98	52	97	55	105	56	98
2,4,6-Trichlorophenol	37	106	52	102	50	112	60	99
2,4-Dichlorophenol	50	150	51	97	55	109	50	150
2,4-Dimethylphenol	49	89	47	88	47	109	58	88
2,4-Dinitrophenol	36	90	23	91	26	131	37	93
2,4-Dinitrotoluene	61	99	67	106	56	104	61	101
2,6-Dinitrotoluene	50	150	64	105	49	116	58	97
2-Chloronaphthalene	63	101	65	104	50	113	59	97
2-Chlorophenol	35	99	41	91	52	107	54	92
2-Methylnaphthalene	10	79	62	99	49	115	59	91
2-Methylphenol	37	97	30	94	50	100	55	91
2-Nitroaniline	10	91	53	108	52	110	53	96
2-Nitrophenol	51	95	53	96	52	116	58	89
3,3-Dichlorobenzidine	10	100	42	105	31	111	28	101
3+4-Methylphenols	50	150	50	150	30	106	57	92
3-Nitroaniline	10	85	32	86	27	88	10	91
3Methylphenols	32	95	25	88	-	-	-	-
4,6-Dinitro-2-methylphenol	47	120	48	117	40	105	58	107
4-Bromophenyl-phenylether	75	104	67	108	53	113	62	101
4-Chloro-3-methylphenol	12	125	46	97	60	100	57	92

Table B-10 (Continued)

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
4-Chloroaniline	21	43	23	74	15	92	7	68
4-Chlorophenyl-phenylether	67	103	64	110	37	127	60	99
4-Nitroaniline	50	150	49	112	41	115	47	102
4-Nitrophenol	10	89	10	78	45	95	24	120
Acenaphthene	68	99	63	101	65	100	52	97
Acenaphthylene	61	100	60	103	52	107	51	98
Acetophenone	63	92	56	105	-	-	49	98
Aniline	-	-	-	-	-	-	33	61
Anthracene	81	100	65	109	54	108	55	103
Atrazine	72	92	68	114	37	122	62	102
Azobenzene	71	92	50	108	51	114	54	98
Benzaldehyde	10	46	10	89	-	-	10	78
Benzidine	50	150	10	76	20	130	14	67
Benzo(a)anthracene	68	107	67	106	60	100	58	100
Benzo(a)pyrene	60	118	61	107	58	102	53	103
Benzo(b)fluoranthene	52	131	56	108	42	126	49	104
Benzo(g,h,i)perylene	34	125	50	117	39	130	40	106
Benzo(k)fluoranthene	45	137	47	124	43	125	47	119
Benzoic acid	-	-	10	100	16	112	27	106
Benzyl Alcohol	50	150	28	76	43	97	53	90
bis(2-Chloroethoxy)methane	71	80	57	100	51	111	57	88
bis(2-Chloroethyl)ether	67	85	57	102	37	114	49	96
bis(2-Ethylhexyl)phthalate	54	130	63	121	54	124	51	115
Butylbenzylphthalate	74	90	66	104	55	120	56	103
Carbazole	77	108	67	138	54	117	50	139
Caprolactam	10	8	10	100	-	-	31	94
Chrysene	71	108	64	109	51	115	53	103
Dibenz(a,h)anthracene	46	125	55	115	41	130	44	108
Dibenzofuran	74	85	66	102	52	113	56	91
Diethylphthalate	74	90	64	106	49	115	55	101
Dimethylphthalate	52	99	55	106	45	122	54	102
Di-n-butylphthalate	67	114	69	112	52	112	60	106

Table B-10 (Continued)

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
Di-n-octyl phthalate	74	94	64	110	53	122	54	106
Fluoranthene	67	107	61	113	55	105	54	104
Fluorene	65	105	60	105	47	117	52	97
Hexachlorobenzene	32	87	41	112	48	118	59	101
Hexachlorobutadiene	26	132	51	102	20	107	17	73
Hexachlorocyclopentadiene	24	77	25	82	43	101	50	91
Hexachloroethane	39	91	51	89	42	124	35	112
Hexachlorobutadiene	-	-	-	-	-	-	53	98
Indeno(1,2,3-cd)pyrene	50	150	35	139	48	111	55	89
Isophorone	69	85	55	100	34	120	50	94
Naphthalene	61	88	55	100	50	109	53	92
Nitrobenzene	45	94	52	98	31	101	39	108
N-nitrosodimethyamine	50	150	10	100	63	97	49	99
N-Nitroso-di-n-propylamine	55	127	54	116	55	120	60	101
N-Nitrosodiphenylamine	83	105	67	109	31	101	50	150
Pentachlorophenol	39	107	33	100	33	111	32	102
Phenanthrene	79	105	65	114	50	119	55	106
Phenol	11	48	10	100	42	105	48	96
Pyrene	72	112	64	108	49	120	53	103
Pyridine	35	83	36	81	-	-	-	-
2-Fluorophenol	30	78	-	-	23	104	-	-
Phenol-d5	30	77	-	-	-	-	-	-
Nitrobenzene-d5	30	120	-	-	28	110	-	-
2-Fluorobiphenyl	35	111	-	-	-	-	-	-
2,4,6-Tribromophenol	27	118	-	-	-	-	-	-
Terphenyl-d14	26	135	-	-	30	150	-	-
2,4,6-Tribromophenol	-	-	-	-	24	112	-	-
2-Fluoro-1,1'-biphenyl	-	-	-	-	32	109	-	-
Phenol-d6	-	-	-	-	29	104	-	-

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
BS - Blank Spike.
LCL - Lower Confidence Limit (%).
UCL - Upper Confidence Limit (%).

Table B-11
Analytical Laboratory Data Quality Objectives (DQOs) for Precision and Accuracy - Inorganic Analyses
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

	Aqueous (ug/L)					Solid (ug/kg)				
	MS/MSD		BS		Dup RPD	MS/MSD		BS		Dup RPD
Compound Name	LCL (1)	UCL (1)	LCL (1)	UCL (1)		LCL (1)	UCL (1)	LCL (1)	UCL (1)	
Aluminum	75	125	80	120	20	75	125	80	120	20
Antimony	75	125	80	120	20	75	125	80	120	20
Arsenic	75	125	80	120	20	75	125	80	120	20
Barium	75	125	80	120	20	75	125	80	120	20
Beryllium	75	125	80	120	20	75	125	80	120	20
Cadmium	75	125	80	120	20	75	125	80	120	20
Calcium	75	125	80	120	20	75	125	80	120	20
Chromium	75	125	80	120	20	75	125	80	120	20
Cobalt	75	125	80	120	20	75	125	80	120	20
Copper	75	125	80	120	20	75	125	80	120	20
Iron	75	125	80	120	20	75	125	80	120	20
Lead	75	125	80	120	20	75	125	80	120	20
Magnesium	75	125	80	120	20	75	125	80	120	20
Manganese	75	125	80	120	20	75	125	80	120	20
Mercury	75	125	80	120	20	75	125	80	120	20
Nickel	75	125	80	120	20	75	125	80	120	20
Potassium	75	125	80	120	20	75	125	80	120	20
Selenium	75	125	80	120	20	75	125	80	120	20
Silver	75	125	80	120	20	75	125	80	120	20
Sodium	75	125	80	120	20	75	125	80	120	20
Thallium	75	125	80	120	20	75	125	80	120	20
Vanadium	75	125	80	120	20	75	125	80	120	20
Zinc	75	125	80	120	20	75	125	80	120	20
Cyanide	75	125	80	120	20	75	125	80	120	20
Chloride	75	125	80	120	20	75	125	80	120	20

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
BS - Blank Spike.
LCL - Lower Confidence Limit (%).
UCL - Upper Confidence Limit (%).
Dup RPD - Duplicate Relative Percent Difference (%).

Table B-12
Analytical Laboratory Data Quality Objectives (DQOs) for Precision and Accuracy - Pesticide/PCB Analyses
Remedial Investigation
Fashion Cleaners - 641 East Park Avenue
Long Beach, New York

Pesticides

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
4,4'-DDD	55	177	86	134	35.0	165.0	86.0	133.0
4,4'-DDE	54	126	89	126	50.0	144.0	80.0	130.0
4,4'-DDT	55	160	74	138	23.0	170.0	72.0	141.0
Aldrin	57	167	83	131	57.0	145.0	84.0	133.0
alpha-BHC	63	178	87	136	37.0	154.0	81.0	136.0
alpha-Chlordane	69	144	88	131	44.0	156.0	88.0	132.0
beta-BHC	50	150	88	131	51.0	161.0	83.0	132.0
delta-BHC	98	131	78	128	43.0	159.0	77.0	131.0
Dieldrin	72	136	81	132	41.0	154.0	81.0	129.0
Endosulfan I	84	127	91	132	41.0	169.0	86.0	133.0
Endosulfan II	79	138	90	129	52.0	151.0	85.0	132.0
Endosulfan sulfate	84	134	99	130	32.0	162.0	76.0	135.0
Endrin	75	143	87	130	31.0	165.0	82.0	134.0
Endrin aldehyde	62	160	95	133	48.0	152.0	85.0	134.0
Endrin ketone	87	135	90	130	70.0	141.0	87.0	132.0
gamma-BHC (Lindane)	89	138	86	133	48.0	159.0	83.0	135.0
gamma-Chlordane	76	126	92	133	61.0	147.0	87.0	135.0
Heptachlor	63	131	85	131	41.0	155.0	85.0	132.0
Heptachlor epoxide	82	125	89	132	44.0	160.0	86.0	132.0
Methoxychlor	76	161	88	139	44.0	163.0	82.0	137.0
TCMX	30	151	-	-	30	158	-	-
DCB	45	131	-	-	30	161	-	-

PCBs

	Aqueous (ug/L)				Solid (ug/kg)			
	MS/MSD		BS		MS/MSD		BS	
Compound Name	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**	**LCL (1)**	**UCL (1)**
AROCLOR 1016	30	150	65	126	55	128	67	121
AROCLOR 1260	36	147	76	131	58	140	78	128
TCMX	42	133	-	-	44	141	-	-
DCB	30	141	-	-	34	145	-	-

Notes:
(1) As specified by CHEMTECH, Mountainside, New Jersey.
MS/MSD - Matrix Spike/Matrix Spike Duplicate.
BS - Blank Spike.
LCL - Lower Confidence Limit (%).
UCL - Upper Confidence Limit (%).